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REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 10 (OU 10) SITE 21 GOLF COURSE MAINTENANCE AREA NAS CECIL FIELD FL

10/2/2001

TETRA TECH NUS INC

Rev. 1
10/02/01

Remedial Investigation Report
for
Operable Unit 10, Site 21 – Golf Course Maintenance Area

Naval Air Station Cecil Field
Jacksonville, Florida

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

Contract Task Order 0078

October 2001

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REMEDIAL INVESTIGATION REPORT
FOR
OPERABLE UNIT 10, SITE 21 – GOLF COURSE MAINTENANCE AREA

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 21 – Golf Course Maintenance Area, 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

ABB-ES	ABB Environmental Services, Inc.
AOI	Area of Interest
ATSDR	Agency for Toxic Substances and Disease Registry
BCT	BRAC Closure Team
bgs	below ground surface
BRAC	Base Realignment and Closure
BSAF	biota sediment accumulation factor
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
CTO	Contract Task Order
DON	Department of the Navy
DQO	Data Quality Objective
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
ESV	ecological screening value
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FOC	fraction organic carbon
FFS	Focused Feasibility Study
FS	Feasibility Study
GCTL	Groundwater Cleanup Target Level
HSA	hollow-stem auger
HASP	Health and Safety Plan
HLA	Harding Lawson Associates
HQ	Hazard Quotient
IAS	Initial Assessment Study
IBDS	inorganic background data set
ID	inside diameter
IR	Installation Restoration
JEDC	Jacksonville Economic Development Commission
K_h	horizontal hydraulic conductivity
K_h	horizontal hydraulic conductivity

K_{oc}	organic carbon partition coefficient
K_{ow}	octanol/water partition coefficient
LOAEL	lowest observed adverse effects level
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
NOAEL	no observed adverse effects level
NSF	National Sanitation Foundation
NTU	nephelometric turbidity unit
ORNL	Oak Ridge National Laboratory
OU	Operable Unit
PAH	polynuclear or polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEL	Probable Effects Level
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
QAM	Quality Assurance Manual
QC	Quality Control
RBC	risked-based concentration
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
SCTL	Soil Cleanup Target Level
SMCL	secondary maximum contaminant level
SOP	standard operating procedure

SOUTHDIV	Southern Division
SPECAP	specific capacity
SPLP	Synthetic Precipitation Leaching Procedure
SVOC	semivolitile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TRPH	Total Recoverable Petroleum Hydrocarbons
TRV	toxicity reference value
TtNUS	Tetra Tech NUS, Inc.
UCL	upper confidence level
USCS	United Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
µg/kg	microgram per kilogram
µg/L	microgram per liter

EXECUTIVE SUMMARY

This Remedial Investigation (RI) Report for Operable Unit (OU) 10, Site 21, 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 21 – Golf Course Maintenance Area.

The results of investigations at Site 21 showed the presence on pesticides in the soil. The soil contamination was previously delineated to industrial levels and removed. Chlordane was also detected at a concentration greater than Florida Department of Environmental Protection (FDEP) groundwater criteria in one monitoring well. Because of the presence of contaminants in the groundwater, a remedial investigation that was focused on the groundwater was performed.

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 21 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.

The upper portion of the surficial aquifer is about 40 feet thick and consists of brownish, silty, very fine sand. This 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.

The direction of groundwater flow is toward the south.

The hydraulic conductivity of the shallow sand deposits was estimated to be 3.3 feet per day based on specific capacity tests. No specific capacity tests were performed on deeper zones within the surficial aquifer.

E.2 NATURE AND EXTENT OF CONTAMINATION

At Site 21, the RI investigation was focused primarily on the groundwater. Soil samples were collected from the unsaturated zone as part of a previous investigation. During previous investigations, the contaminated soil was delineated to Florida Department of Environmental Protection (FDEP) industrial criteria and removed as part of a time critical removal action per the NCP, 40 CFR 300.415. Approximately 2,998 tons of soil were removed. Surface water and sediment in drainage ditches were also evaluated during previous investigations. No contaminants were detected in to the surface water and sediment that warranted further investigation.

Prior to the RI, chlordane was detected in one well at the site at concentrations greater than the FDEP Groundwater Cleanup Target Levels (GCTL) Florida Administrative Code (FAC) 62-777 criteria. No other organic compounds were detected in wells greater than the FDEP criteria. Manganese was detected in two wells at concentrations slightly higher than twice the site average background concentration. However, manganese is not believed to be site-related because it is not used in pesticides. No other inorganics were detected at concentrations greater than FDEP criteria or site-specific background levels.

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 chlordane exceed the FDEP GCTL and manganese concentrations exceed twice the background concentration. The average chlordane concentration represents a risk level of 2.4×10^{-6} which exceeds the FDEP target risk level, but is within the U.S. Environmental Protection Agency (USEPA) target risk range. The average manganese concentration corresponds to an HQ of 0.1 which does not pose a risk to human health. However, manganese concentrations do not exceed USEPA Region 9 tap water Preliminary Remedial Goal (PRG).

The removal action for the soil eliminates any significant risks to human health 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 6.2×10^{-7} for an industrial receptor and a cumulative hazard index significantly less than 1.0. Under a residential scenario, post-removal concentrations result in a cancer risk of approximately 5.7×10^{-6} and a cumulative hazard index less than 1.0. The cancer risk falls within USEPA's target risk range, but exceeds FDEP's target risk.

E.4 ECOLOGICAL RISK ASSESSMENT

Exposure to site-related contaminants poses minimal risks to ecological receptors. Much of the contaminated soil is scheduled for excavation. Remaining soil contaminants are either present at relatively low concentrations, are in areas of poor habitat quality, or represent isolated and extremely small areas of contamination. There are no surface water bodies at the site, and there are none near the site in the direction of groundwater flow (toward the south). Therefore, an ecological evaluation of groundwater contaminants was not conducted because an exposure pathway from groundwater to surface water was not identified.

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, chlordane, toxaphene, and dieldrin, 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.

- Chlordane is present in the groundwater at concentrations greater than the FDEP GCTL. The plume, as defined by the GCTL of 2 µg/L, is about 20 feet across and appears to be limited to the shallow zone (about 6 to 25 feet below ground surface) of the surficial aquifer.

- The site average manganese groundwater concentration is less than the background value. Further, the occurrence of manganese is not believed to be site-related because it is not used in pesticides.

- The risk to ecological receptors is negligible.

E.6 RECOMMENDATIONS

Based on the findings of the RI, the following additional activities at Site 21 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 groundwater.

1.0 INTRODUCTION

This Remedial Investigation (RI) Report for Operable Unit (OU) 10, Site 21, 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 21 – Golf Course Maintenance Area.

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 a recreational 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 earlier in a separate investigation and removal action.

Soil contamination was addressed during the Potential Source of Contamination (PSC) investigation in 1999-2000. Soil contaminated with arsenic, chlordane, toxaphene, and dieldrin was delineated for excavation according to the Action Memorandum (TtNUS, 2001). The soil was excavated from May 29 through June 26, 2001 (CH2M Hill, 2001). This RI recommends Land Use Controls for soil based on the completed removal action.

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

1.1 PURPOSE OF REPORT

The report presents the results of the groundwater RI for Site 21. This includes a description of the field investigations, the presentation of the data, and presentation of the PRE.

The results and conclusions of the report will be used to develop a Focused Feasibility Study (FFS) 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 21, the Golf Course Maintenance Area, is located at the northern end of the former I Avenue in the center of the golf course at NAS Cecil Field. The site includes Buildings 238, 370, 371, 397, 398, and 874 and the surrounding land area (HLA, 1999a).

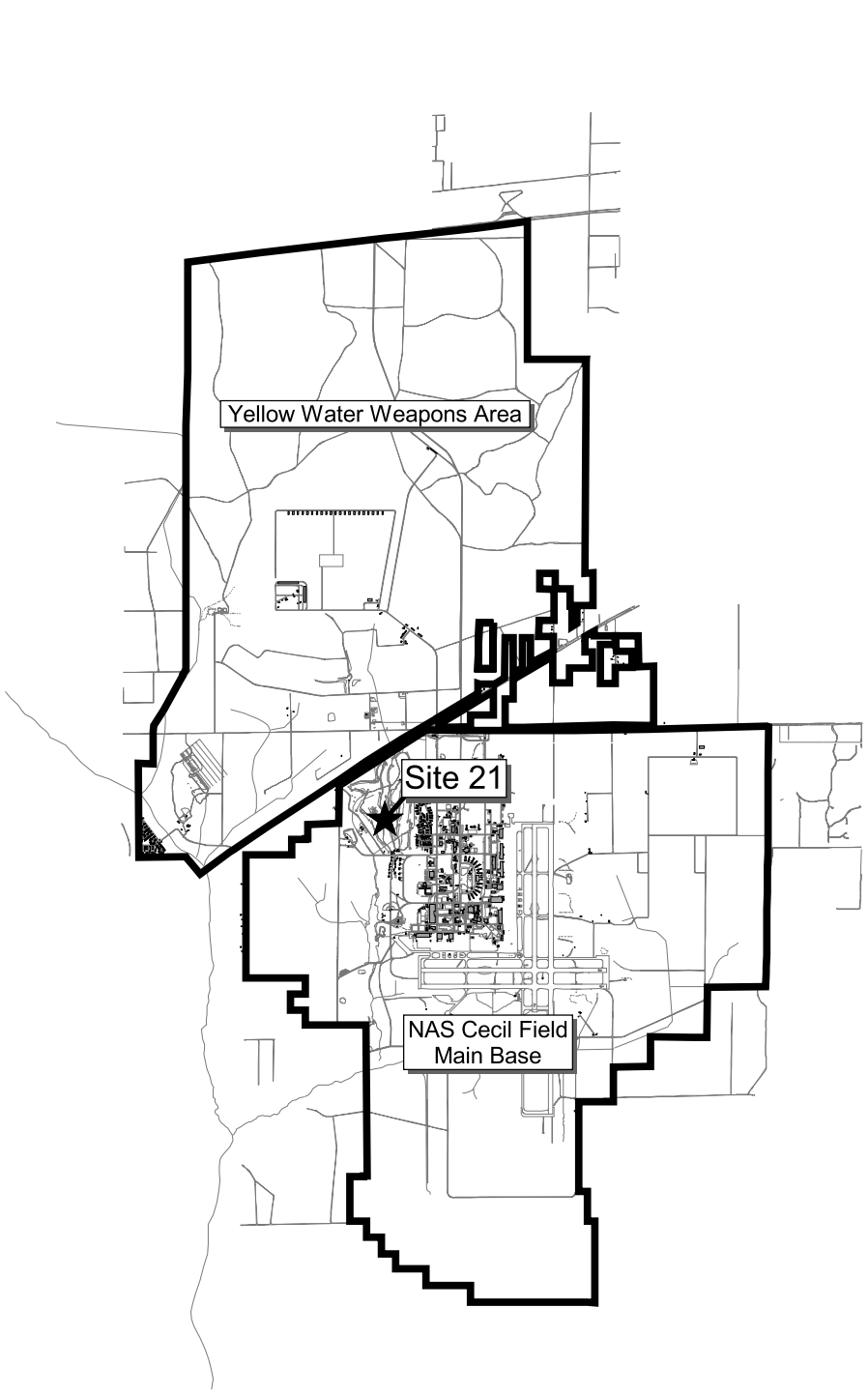
The site is primarily unpaved and covers an area of about 1.5 acres. A drainage ditch forms part of the eastern border of the site. A fence and trees isolate the site from the golf course on the eastern, northeastern, and southern sides. A large wooded area isolates the site from the golf course on the northwestern and western sides.

Building 238 is the Golf Course Maintenance Building and includes office space, a repair shop, and a fenced, sheltered storage area. Buildings 370 and 371 are metal storage sheds. Building 397 is the Pesticide Storage Building, and is secured by a fence and includes a paved mixing area and secondary containment. A septic system south of Building 397 serves Building 397. A valving system is in place to prevent discharge of contaminated water into the septic field. Building 398 is the Golf Course Storage Building and is a quonset hut with an earthen floor. The building is used to store maintenance equipment and vehicles. Building 874 is an abandoned public toilet that was served by an adjacent small septic field. The buildings date to the 1950s, except Building 397, which was built in 1981 (HLA, 1999a).

To the north of Building 238 and adjacent to the ditch is a small concrete washdown pad. Prior to the construction of this pad, equipment was washed down on the eastern side of Building 238, and the rinse water followed a swale to the ditch (HLA, 1999b).

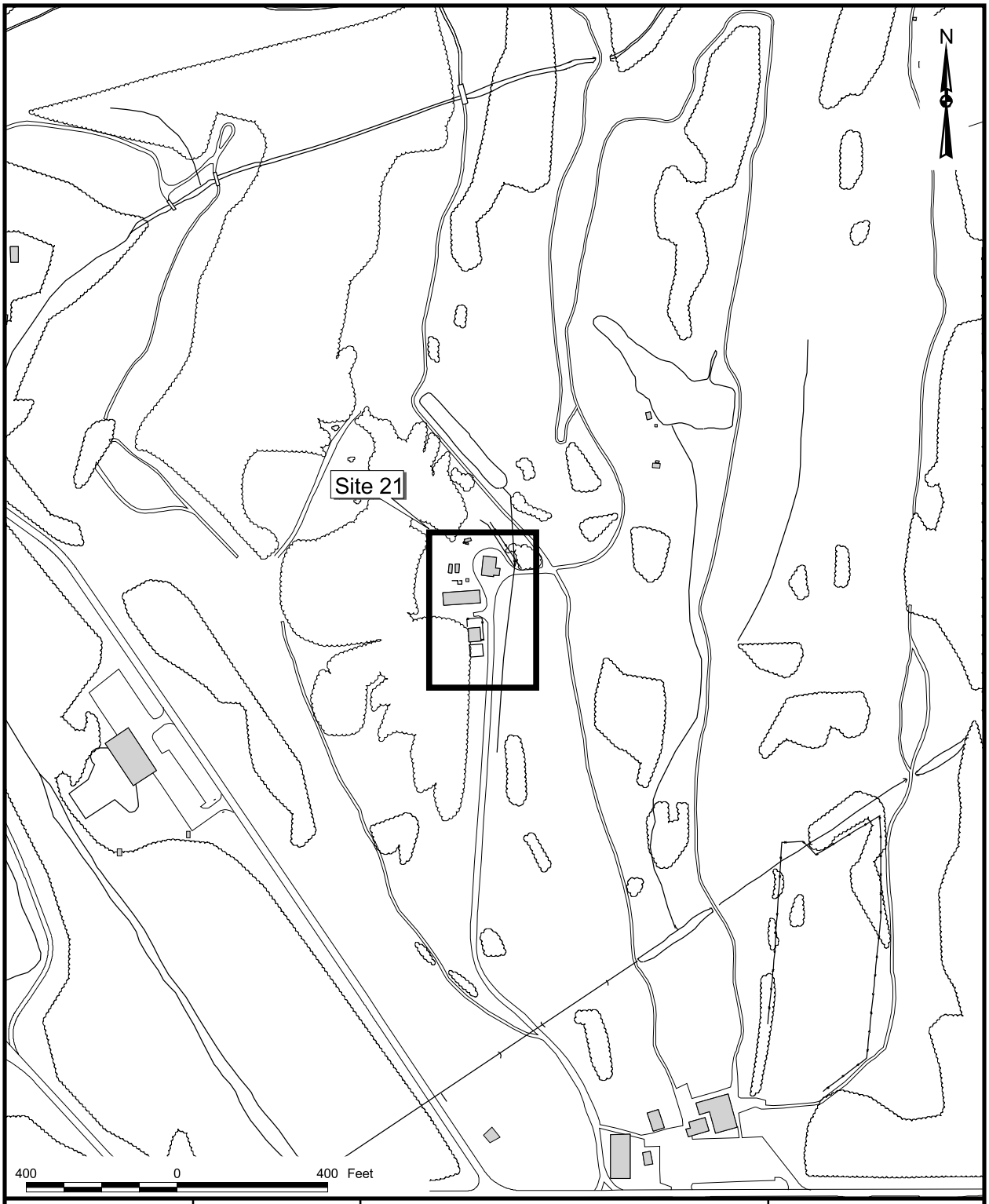
An empty drum and can disposal pile was once located to the northwest of Building 371. Most of these drums and cans were removed prior to 1992 (HLA, 1999b).

Soil contaminated with arsenic and pesticides was delineated during earlier investigations. The contaminated soil was excavated and disposed of off site (CH2M Hill, 2001). Groundwater contaminated by chlordane was also identified in earlier studies, and this contamination is the subject of this RI. These investigations are further described below. Manganese was also detected in two wells at concentrations greater than the Florida Department of Environmental Protection (FDEP) background level, but manganese was not considered a chemical of concern because it was not used at the site.



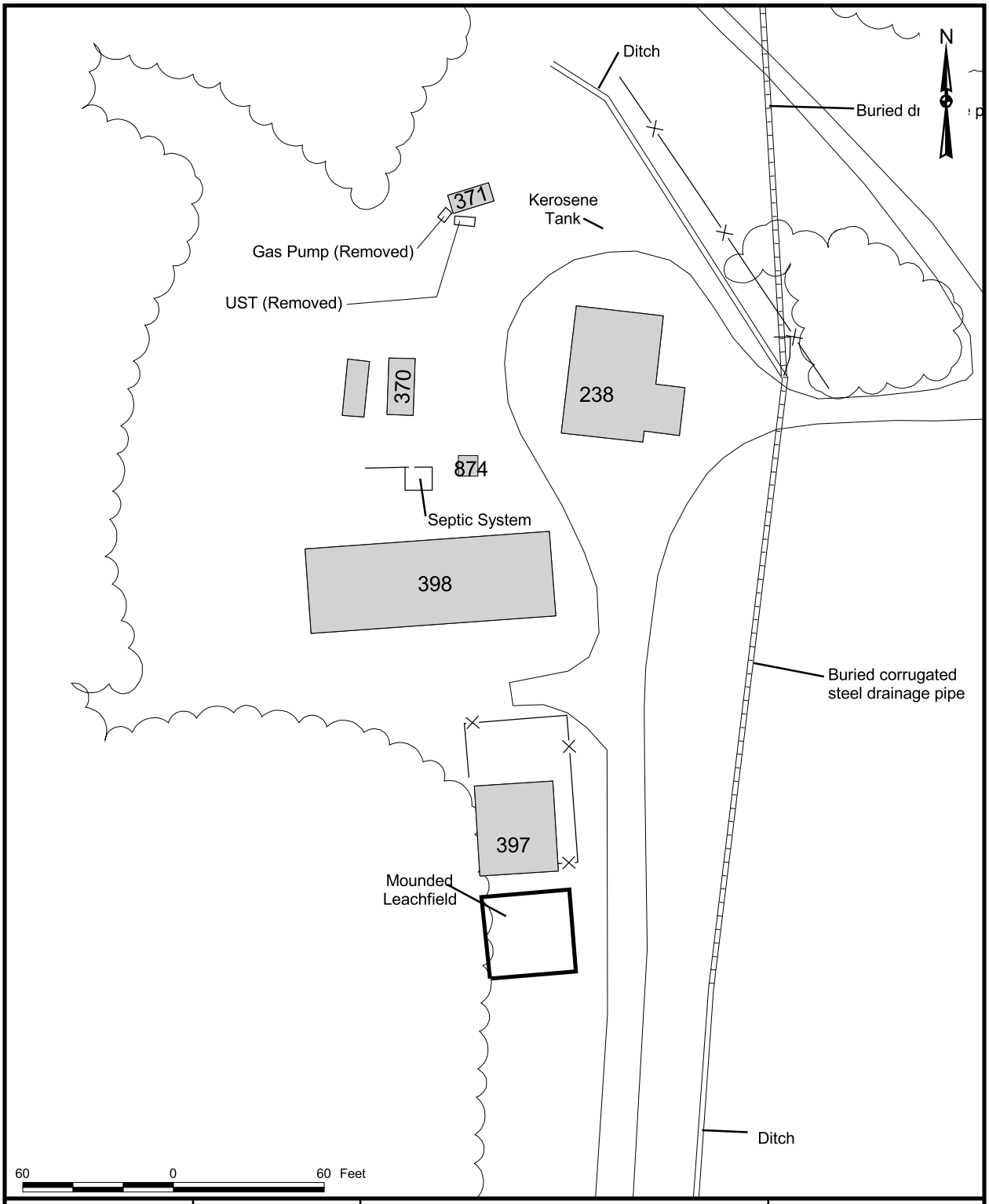
DRAWN BY MJJ	DATE 08May00	GENERAL LOCATION MAP SITE 21 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-1 / REV 1

P:\GIS\NAS_CecilField\psc21_RI.apr 26Jun00 MJJ Site Location Map Layout



DRAWN BY MJJ	DATE 02Oct00	SITE VICINITY MAP SITE 21 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 1-2 / REV 1

P:\GIS\NAS_CecilField\psc21_RI.apr 26Jun00 MJJ 1-2_Site Vicinity Layout



DRAWN BY MJJ	DATE 08May00	GENERAL ARRANGEMENT SITE 21 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 1-3 / REV 1

P:\GIS\NAS_CecilField\psc21_RI.apr 26Jun00 MJJ 2_General Arrangement Layout

The name of the site has been changed over the course of the investigations. In a 1992 screening study, it was referred to as Site A in the Golf Course Maintenance Area. For the BRAC base investigation, the site was designated as Area of Interest (AOI) 21. When it was determined that soil contamination was over a large area, the area was redesignated Potential Source of Contamination (PSC) 21 in March 1999. When the presence of groundwater contamination was confirmed, the area was designated as Installation Restoration (IR) Site 21 and was made part of OU 10 in February 2000. At the time, contamination was detected in only one well, and the concentration of chlordane was 3.4 µg/L.

1.2.2 Site History

Since its construction, the site has always been used as the Golf Course Maintenance Area. Prior to construction, the area was undeveloped. The buildings were constructed in the 1950s, with the exception of Building 397, which was built in 1981. Site activities included the storage and maintenance of golf course maintenance equipment. This included the cleaning and rinsing of chemical-dispensing equipment and the preparation of chemical solutions. Chemicals included fungicides, nematocides, insecticides, and herbicides. Empty containers were at one time disposed of in a pile on the northwestern side of the site (HLA 1999a, 1999b).

Rinsing took place at one of two places, on the eastern side of Building 238, and on a concrete pad on the northern side of the site. At both sites, rinse water discharged into the ditch along the eastern side of the site (HLA, 1999b).

1.2.3 Previous Investigations and Actions

1.2.3.1 Preliminary Investigation

Previous investigations, studies, and actions in and around Site 21 are summarized below:

- November 1991 – Site Screening Study was performed by ABB-Environmental Services (ABB-ES). Six surface soil samples and three sediment samples were collected and 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, 1999a).

- December 1998 – Phase II Investigation of AOI 21 was performed by ABB-ES. Twenty-nine surface soil samples and eight subsurface soil samples were collected and analyzed for TCL VOCs, SVOCs, pesticides and PCBs, organophosphate pesticides and herbicides, and TAL inorganics. One shallow

monitoring well was installed in each septic field. The groundwater samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganics (HLA, 1999a).

- June 1999 through March 2000 – PSC Investigation of PSC 21 was conducted by TtNUS. Samples were collected to delineate soil and groundwater contamination. This investigation is described in detail below.

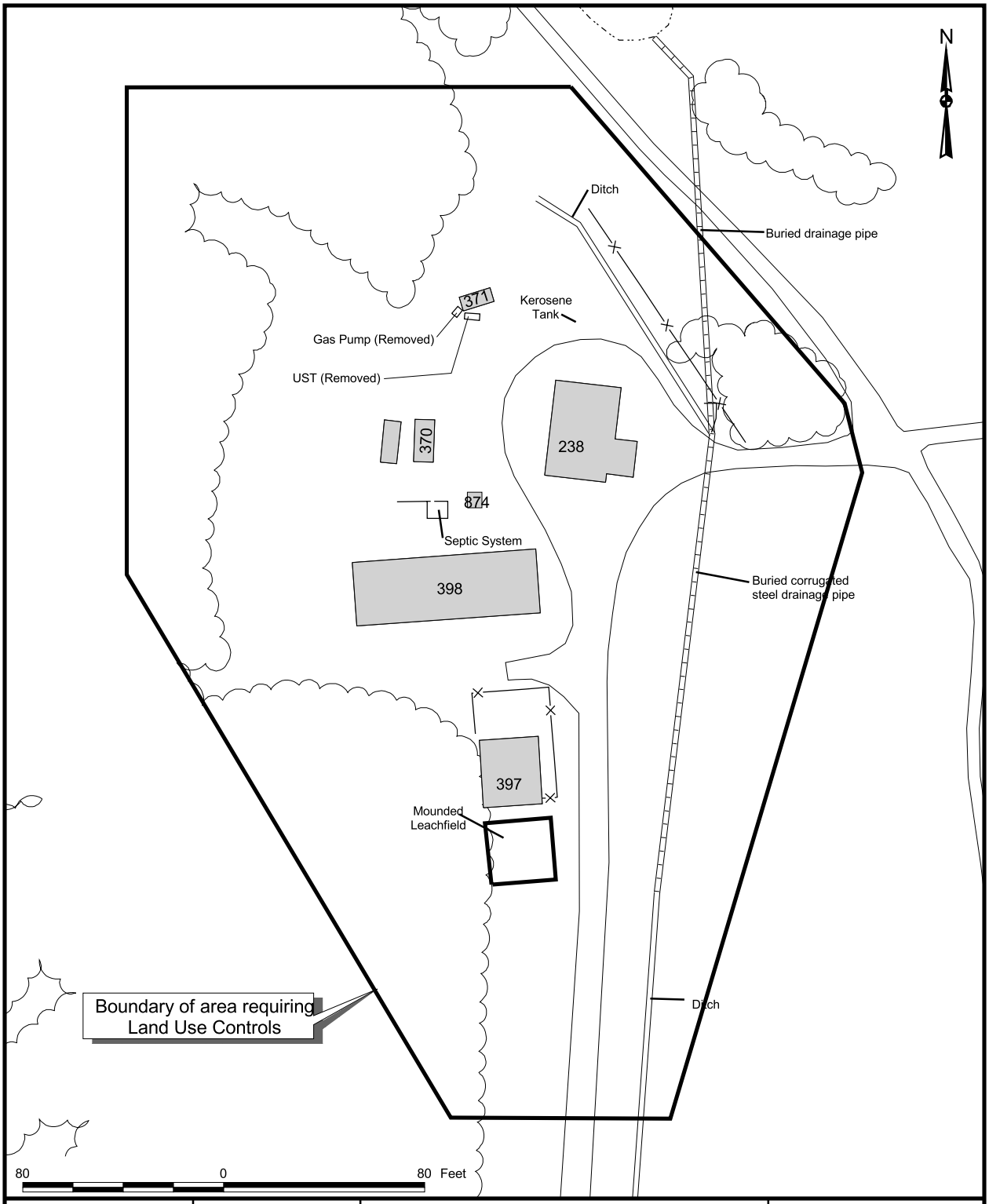
- Because the extent of site contamination was not completely delineated in the vicinity of Site 21 when the Main Base property was transferred to the City of Jacksonville in 2000, a parcel of land requiring land use controls was identified. Only part of the area within the parcel will be subject to 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.

1.2.3.2 PSC Investigation

Twelve soil sampling and analysis events were conducted at PSC 21 between April 1999 and August 2000 to delineate the extent of soil contaminated by pesticides, herbicides, total recoverable petroleum hydrocarbons (TRPH), arsenic and vanadium that had been identified on the preliminary investigations. A total of 135 soil samples were collected.

- During Phase I, 21 surface soil samples were collected at a depth interval of 0 to 1 foot bgs to delineate the horizontal extent of contamination identified in the previous investigations and to provide additional site contaminant characterization. Seventeen samples (CEF-P21-SS-001 through CEF-P21-017) were collected in a grid pattern in the area north of Building 238 to determine the horizontal extent of herbicides, pesticides, arsenic and vanadium. In addition, four samples (CEF-P21-SS-006, CEF-P21-SS-011, CEF-P21-SS-013, and CEF-P21-SS-016) were analyzed for TCL VOCs, TCL SVOCs, TCL PCBs, and TAL inorganics. Four samples (CEF-P21-SS-018 through CEF-P21-SS-021) were collected in the drainage ditch to the south of the site to determine the extent of arsenic contamination.

- During Phase II, 21 soil samples were collected over various depth intervals to delineate the horizontal and vertical extent of pesticide and arsenic contamination. Samples CEF-P21-SS-101 and CEF-P21-SS-102 were collected from the 0 to 1 foot depth interval at the north end of the drainage ditch to delineate arsenic. Samples CEF-P21-SS-103 through CEF-P21-SS-106 were collected from the 0 to 1 foot interval to the north and east of the tee area to delineate pesticides and arsenic. Samples CEF-P21-SS-107 through CEF-P21-SS-109 were collected from the 0 to 1 foot interval to the west of the Building 238 area to delineate arsenic. Samples CEF-P21-SS-110-01 through



DRAWN BY MJJ	DATE 26Jun00	AREA REQUIRING LAND USE CONTROLS SITE 21 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 1-4 / REV 1

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CEF-P21-SS-111-02 were collected from intervals of 0 to 1 foot and 1 to 2 feet bgs at the northeastern edge of the site to delineate pesticides and arsenic. Samples CEF-P21-SS-112 and CEF-P21-SS-113 were collected from the 0 to 1 foot depth interval near the southern ditch to delineate arsenic. Samples CEF-P21-SS-114-02 through CEF-P21-SS-119-03 were collected from depth intervals of 1 to 2 feet bgs and 2 to 3 feet bgs along the south side of the northern ditch to delineate arsenic.

- During Phase III, 11 soil samples were collected over several depth intervals to delineate the horizontal and vertical extent of arsenic contamination. Samples CEF-P21-SS-208 through CEF-P21-SS-211 were collected from a depth interval of 0 to 1 foot bgs along the western edge of the site to delineate arsenic. Samples CEF-P21-SS-212 through CEF-P21-SS-214 were collected from just above the water table along the southern side of the northern ditch to delineate arsenic. Samples CEF-P21-SS-215-01 through CEF-P21-SS-218-02 were collected from depth intervals of 0 to 1 foot bgs and 1 to 2 feet bgs near the southern ditch to delineate arsenic contamination.

- During Phase IV, 16 soil samples were collected over several depths to delineate the horizontal and vertical extent arsenic and pesticide contamination. Samples CEF-P21-SS-301-01, CEF-P21-SS-317-02, and CEF-P21-SS-318-02 were collected from depth intervals of 0 to 1 foot bgs and 1 to 2 feet bgs to delineate pesticide and arsenic in the are to the northwest of Building 238. Samples CEF-P21-SS-302-01 through CEF-P21-SS-305-01 and CEF-P21-SS-316-02 were collected from depth intervals of 0 to 1 foot bgs and 1 to 2 feet bgs to delineate pesticide and arsenic on the western side of the site. Sample CEF-P21-SS-306-01 was collected from a depth interval of 0 to 1 foot bgs to delineate arsenic on the northern side of Building 398. Samples CEF-P21-SS-308-01 and CEF-P21-SS-308-01 were collected from a depth interval of 0 to 1 foot bgs to delineate arsenic near the southern ditch. Samples CEF-P21-SS-311 through CEF-P21-SS-315 were collected from just above the water table along the southern side and to the south of the northern ditch to delineate arsenic.

- During Phase VI, four soil samples were collected over several depths to delineate horizontal and vertical extent of arsenic and pesticides. (No soil samples were collected during phase V.) Sample CEF-P21-SS-401-01 was collected from a depth interval of 0 to 1 feet bgs to delineate arsenic near the southwestern edge of the site. Sample CEF-P21-SS-402-03 was collected from a depth interval of 2 to 3 feet bgs to delineate pesticides in the northwestern part of the site. Sample CEF-P21-SS-403-03 was collected from a depth interval of 2 to 3 feet bgs to delineate arsenic to the northwest of Building 238. Sample CEF-P21-SS-404-03 was collected from a depth interval of 2 to 3 feet bgs to delineate arsenic to the southwest of Building 238.

- During Phase VII, four soil samples were collected over the depth interval of 0 to 1 foot bgs to delineate horizontal extent of arsenic, vanadium, and pesticides. Sample CEF-P21-SS-501-01 was collected to delineate pesticides near the northern end of the northern ditch. Sample CEF-P21-SS-502-01 was collected to delineate pesticides on the northwestern side of the site. Sample CEF-P21-SS-503-01 was collected to delineate arsenic and pesticides on the western side of the site. Sample CEF-P21-SS-504-01 was collected to delineate arsenic on the southwestern side of the site. Sample CEF-P21-SS-505-01 was collected to delineate arsenic to the north of Building 398. Samples CEF-P21-SS-506-01 and CEF-P21-SS-509-01 were collected to delineate pesticides to the southwest of Building 238. Samples CEF-P21-SS-507-01 and CEF-P21-SS-508-01 were collected to delineate vanadium near the southern end of the northern ditch.

- During Phase VIII, three samples were collected to evaluate site-specific leachability characteristics of contaminants at the site. Samples were collected and analyzed and subjected to the SPLP test. Sample CEF-P21-SS-601-01 was collected from a depth interval of 1 to 2 feet bgs from a location near sample CEF-P21-SS-103 to evaluate the leachability of dieldrin. Sample CEF-P21-SS-602-01 was collected from a depth interval of 1 to 2 feet bgs from a location near sample CEF-P21-SS-004 to evaluate the leachability of several pesticides. Sample CEF-P21-SS-603-03 was collected from a depth interval of 2 to 3 feet bgs from a location near sample CEF-P21-SS-116 to evaluate the leachability of arsenic.

- During Phase IX, two soil samples were collected to delineate the horizontal extent of contaminants. Sample CEF-P21-SS-701-01 was collected from a depth interval of 0 to 1 foot bgs to delineate arsenic on the western side of the site. Sample CEF-P21-SS-702-01 was collected from a depth interval of 0 to 1 foot bgs to delineate pesticides near the northeast corner of Building 398.

- During Phase X, 24 soil samples were collected from various depths to delineate the horizontal and vertical extent of contaminants. Most of the deeper samples were collected at previously sampled locations to delineate vertical contamination. Samples CEF-P21-SS-801-02 and CEF-P21-SS-802-03 were collected from depth intervals of 1 to 2 feet bgs and 2 to 3 feet bgs at sample location 90S02401 to delineate arsenic, TRPH, and pesticides. Sample CEF-P21-SS-803-02 was collected from a depth interval of 1 to 2 feet bgs at sample location BOR-A-1-1 to delineate pesticides and herbicides. Sample CEF-P21-SS-804-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S02301 to delineate mercury, TRPH, pesticides, and organophosphorus pesticides. Sample CEF-P21-SS-805-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S02001 to delineate mercury, TRPH, pesticides, and organophosphorus pesticides. Sample CEF-P21-SS-806-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S02101 to delineate mercury, TRPH, pesticides, and organophosphorus pesticides. Sample

CEF-P21-SS-807-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S02201 to delineate mercury, TRPH, pesticides, and organophosphorus pesticides. Sample CEF-P21-SS-809-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S03101 to delineate pesticides. Samples CEF-P21-SS-811-01 through CEF-P21-SS-813-01 were collected from a depth interval of 0 to 1 foot bgs to the southwest of Building 238 to delineate pesticides. Samples CEF-P21-SS-814-01, CEF-P21-SS-815-02, and CEF-P21-SS-816-01 were collected from depth intervals of 0 to 1 foot bgs and 1 to 2 feet bgs in the northwestern portion of the site to delineate pesticides. Samples CEF-P21-SS-817-02 and CEF-P21-SS-818-03 were collected from depth intervals of 1 to 2 feet bgs and 2 to 3 feet bgs at sample location CEF-P21-SS-301-01 to delineate arsenic, TRPH, pesticides, and herbicides. Sample CEF-P21-SS-819-02 was collected from a depth interval of 1 to 2 feet bgs at sample location CEF-P21-SS-012-01 to delineate arsenic, TRPH, pesticides, and herbicides. Sample CEF-P21-SS-820-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S03201 to delineate arsenic, TRPH, pesticides, and herbicides. Sample CEF-P21-SS-822-02 was collected from a depth interval of 1 to 2 feet bgs at sample location CEF-P21-SS-007-01 to delineate arsenic, TRPH, pesticides, and herbicides. Sample CEF-P21-SS-823-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S01201 to delineate arsenic. Sample CEF-P21-SS-825-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S03301 to delineate arsenic. Sample CEF-P21-SS-827-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S00501 to delineate arsenic. Sample CEF-P21-SS-829-02 was collected from a depth interval of 1 to 2 feet bgs at sample location 90S01701 to delineate arsenic. Sample CEF-P21-SS-831-02 was collected from a depth interval of 1 to 2 feet bgs to the west of Building 238 to delineate arsenic.

- During Phase XI, 16 samples were collected at various depth intervals to delineate the horizontal and vertical extent of pesticide contamination. Samples CEF-P21-SS-901-02, CEF-P21-SU-902-03, and CEF-P21-SU-903-04 were collected at depths of 1 to 2 feet bgs, 2 to 3 feet bgs, and 3 to 4 feet bgs at sample location CEF-P21-SS-813-01 to delineate pesticides. Samples CEF-P21-SS-904-01 through CEF-P21-SS-907-01 were collected at a depth interval of 0 to 1 foot bgs to the south of Building 238 to delineate pesticides. Samples CEF-P21-SS-908-02, CEF-P21-SU-909-03, and CEF-P21-SU-910-04 were collected at depths of 1 to 2 feet bgs, 2 to 3 feet bgs, and 3 to 4 feet bgs at sample location CEF-P21-SS-904-01 to delineate pesticides. Samples CEF-P21-SS-911-03 and CEF-P21-SU-912-04 were collected at depths of 2 to 3 feet bgs and 3 to 4 feet bgs at sample location CEF-P21-SS-804-02 to delineate pesticides. Samples CEF-P21-SS-913-03 and CEF-P21-SU-914-04 were collected at depths of 2 to 3 feet bgs and 3 to 4 feet bgs at sample location CEF-P21-SS-805-02 to delineate pesticides. Samples CEF-P21-SS-915-03 and CEF-P21-SU-916-04 were collected at depths of 2 to 3 feet bgs and 3 to 4 feet bgs at sample location CEF-P21-SS-806-02 to delineate pesticides.

- During Phase XII, two soil samples were collected to delineate the vertical extent of arsenic and pesticide contamination. Samples CEF-P21-SS-917-04 and CEF-P21-SU-918-05 were collected at depths of 3 to 4 feet bgs and 4-5 feet bgs at sample location CEF-P21-SS-301-01 to delineate arsenic and pesticides.

- During Phase XIII, six soil samples were collected to delineate the vertical extent of arsenic contamination. Samples CEF-P21-SS-919-02, CEF-P21-SU-920-03, and CEF-P21-SU-921-04 were collected at depths of 1 to 2 feet bgs, 2 to 3 feet bgs, and 3 to 4 feet bgs at sample location CEF-P21-SS-305-01 to delineate arsenic. Samples CEF-P21-SS-922-02, CEF-P21-SU-923-03, and CEF-P21-SU-924-04 were collected at depths of 1 to 2 feet bgs, 2 to 3 feet bgs, and 3 to 4 feet bgs to the northeast of sample location CEF-P21-SS-305-01 to delineate arsenic.

Over the 12 phases of sampling, 17 duplicate groundwater samples were collected for quality assurance/ quality control (QA/QC) purposes.

Soil samples were collected as grab samples using plastic, disposable trowels. Hand augers were used to collect deep subsurface samples. 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.

The soil samples were analyzed for TCL VOCs by USEPA Method SW-846 5035/8260B, TCL SVOCs by USEPA Method SW-846 5035/8270B, TAL inorganics (including arsenic, mercury, and vanadium) by USEPA Method SW-846 6010B, pesticides, organophosphorus pesticides, and herbicides by USEPA Method SW-846 8081A, 8141A, and 8151A, PCBs by USEPA Method SW-846 8082 and for TRPH by the Florida Petroleum Residual Organics (FL-PRO) method. The SPLP analysis was by Method USEPA Method SW-846 1312.

Four groundwater sampling and analysis events were conducted between May 1999 and September 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 May 1999 during Phase I, three shallow monitoring wells, CEF-P21-1S, CEF-P21-2S, and CEF-P21-3S, were installed downgradient of 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 were sampled and analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and herbicides, and TAL inorganics.

- In July 1999 during Phase III, one shallow monitoring well, CEF-P21-4S, was installed in the area with the highest arsenic contamination. The well was about 15 feet deep and had a screen that was 10 feet long. The well was sampled and analyzed for arsenic.

- In August 1999 during Phase IV, two shallow monitoring wells, CEF-P21-4S, and CEF-P21-5S, were installed upgradient and downgradient of an existing well near Building 398 that had chlordane contamination. Each well was about 15 feet deep and had a screen that was 10 feet long. The three new wells were sampled and analyzed for pesticides.

- In September 1999 during Phase V, monitoring well CEF-P21-1S, was resampled because of high detection limits in the first sampling event. The well was sampled and analyzed for pesticides.

Over the four sampling events, four duplicate soil samples were collected for 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 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 TCL VOCs by USEPA Method SW-846 5035/8260B, TCL SVOCs by USEPA Method SW-846 5035/8270B, TAL inorganics (including arsenic) by USEPA Method SW-846 6010B, and pesticides and herbicides by USEPA Method SW-846 8081A and 8151A.

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 was described in the Remedial Action Design Package that was included with the Action Memorandum (TtNUS, 2001). 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. Arsenic, TRPH, total chlordane, 4,4'-DDT, toxaphene, and dieldrin were detected in soil at concentrations in excess of the FDEP industrial

soil cleanup target levels (SCTLs) and/or FDEP leachability criteria for protection of groundwater. 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 percent upper confidence limit of the mean (UCL). The concentration of the excavated sample points were assumed to be replaced with clean fill having contaminant concentrations equal to one half the contaminant's detection limit. If the UCL is less than the industrial SCTL for each contaminant, protection of human health is ensured.

For Site 21, the UCLs are less than industrial SCTLs when samples with concentrations greater than three times their respective SCTLs are removed. In addition, samples with concentrations greater than leachability criteria are to be excavated. Therefore, the pickup levels for the contaminants of concern are the lesser of the leachability criteria and three times the industrial SCTLs.

Contaminant	Leachability Criteria	Industrial Criteria	Pickup Level
Arsenic	29 mg/kg	3.7 mg/kg	12 mg/kg
TRPH	340 mg/kg	2,500 mg/kg	340 mg/kg
Total Chlordane	9,600 µg/kg	12,000 µg/kg	9,600 µg/kg
4, 4'-DDT	11,000 µg/kg	13,000 µg/kg	11,000 µg/kg
Toxaphene	31,000 µg/kg	3,700 µg/kg	12,000 µg/kg
Dieldrin	4 µg/kg	300 µg/kg	4 µg/kg

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. Thus, the depth of the excavation was varies from 1 foot bgs to the depth of the water table.

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 May 29 through June 26, 2001. The removal is described in the Source removal Report (CH2M Hill, 2001) for PSC 21. The RAC characterized, transported, and disposed of 2,998 tons of excavated contaminated soil and restored the site to pre-excavation conditions. The excavated soil was transported and disposed off site on May 31 through June 26, 2001.

The soil was excavated using a track excavator and stockpiled prior to loading onto trucks. Trucks were provided by Beaver Bulk, Inc. and Robbie D. Wood, Inc. Soils were excavated to the horizontal excavation limits and to the vertical excavation limits, as specified in the Remedial Action Design Package that was included with the Action Memorandum (TtNUS, 2001). The non-hazardous soil was transported to the Broadhurst Landfill in Jessup, Georgia. The hazardous soil was transported to Onyx Environmental Services in Sauget, Illinois.

By defining the limits of excavation prior to the remediation activities in the Action Memorandum, it was not necessary to collect confirmation samples from the originally proposed excavation 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 Coxwell's Crystal Springs Pit. The site was then graded and hydroseeded with a mixture of rye and bahia grass, and covered with a layer of straw. 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, 2001). Table 1-1 provides a summary of the detected contaminants in the soil from the previous investigation. A summary of that data, showing the range and average concentrations of contaminants in the soil samples, is provided on Table 1-2. Figures 1-5 and 1-6 show the soil sample locations. The figures also shows the locations of the existing monitoring wells.

Figure 1-7 is a tag map that shows the concentration of contaminants greater than FDEP SCTLs prior to excavation. As described in the Action Memorandum for PSC 21 (TtNUS, 2001), the data was 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 1-8 is a tag map that shows the soil samples with contaminant concentrations greater than industrial SCTLs that have not been excavated. Figure 1-9 is a tag map that shows the soil samples with concentrations greater than residential SCTLs that have not been excavated.

Since the focus of this investigation is 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 the data, showing the range and average concentrations of contaminants in the groundwater samples. The groundwater sampling locations and analytical results are depicted on Figure 1-10. The groundwater data are provided in Appendix D.

The existing groundwater data consist of results from several studies. Groundwater samples collected in December 1998 are identified with the prefix “90G.” Samples collected during the PSC investigation have a prefix “P21-.”

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 RI Work Plan (TtNUS, 2000).

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.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1)	90B00101	90B00201	90S00101	90S00201	90S00301	90S00401	90S00501	90S00601	90S00701	90S01001	90S01101
Sample Date	12/12/98	12/12/98	08/28/98	08/28/98	08/28/98	08/28/98	08/28/98	08/28/98	08/28/98	08/28/98	08/28/98
Depth Interval, feet bgs	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD											
4,4'-DDE											
4,4'-DDT											
ALPHA-BHC											
ALPHA-CHLORDANE											
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC											
CHLORDANE											
DELTA-BHC											
DIAZINON											
DIELDRIN											
DISULFOTON											
ENDOSULFAN II											
GAMMA-BHC (LINDANE)											
GAMMA-CHLORDANE											
HEPTACHLOR EPOXIDE											
TOXAPHENE											
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	11	1.8 J	1.2 J	47	16	21	2.2	1.6 J	0.9 J	7.4	3.5
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1)	90S01201	90S01301	90S01401	90S01402	90S01501	90S01502	90S01601	90S01602	90S01701	90S01702	90S01801
Sample Date	08/28/98	08/28/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98
Depth Interval, feet bgs	0 - 1	0 - 1	0 - 1	1 - 2	0 - 1	1 - 2	0 - 1	1 - 2	0 - 1	1 - 2	0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD											
4,4'-DDE											
4,4'-DDT											
ALPHA-BHC											
ALPHA-CHLORDANE											
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC											
CHLORDANE											
DELTA-BHC											
DIAZINON											
DIELDRIN											
DISULFOTON											
ENDOSULFAN II											
GAMMA-BHC (LINDANE)											
GAMMA-CHLORDANE											
HEPTACHLOR EPOXIDE											
TOXAPHENE											
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	5.4	0.9 J	15	62	1 J	7.3	0.9 J	0.6 U	0.5 U	0.6 U	0.9 J
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1)	90S01802	90S01901	90S01902	90S02001	90S02101	90S02201	90S02301	90S02401	90S02501	90S02601	90S02701
Sample Date	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98
Depth Interval, feet bgs	1 - 2	0 - 1	1 - 2	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE				1 U	1 U	1 U	1 U	1 U	1 U		
1,2-DICHLOROBENZENE				1 U	1 U	1 U	1 U	1 U	1 U		
1,3-DICHLOROBENZENE				1 U	1 U	1 U	1 U	1 U	1 U		
1,4-DICHLOROBENZENE				1 U	450 U	1 U	400 U	1 U	1 U		
4-METHYL-2-PENTANONE											
BENZENE				1 U	1 U	1 U	1 U	1 U	1 U		
CHLOROFORM				1 U	1 U	1 U	1 U	1 U	1 U		
METHYLENE CHLORIDE				18	22	24	22	20	17		
TOLUENE				1 U	1 U	1 U	1 U	1 U	1 U		
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE				1 U	1 U	1 U	1 U	1 U	1 U		
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE				1 U	450 U	1 U	400 U	1 U	1 U		
2-METHYLPHENOL				410 U	450 U	3700 U	400 U	4100 U	360 U		
4-NITROPHENOL				25 U	27 U	22 U	400 U	4100 U	22 U		
BENZO(A)PYRENE				410 U	450 U	3700 U	400 U	4100 U	360 U		
BENZO(B)FLUORANTHENE				420	450 U	3700 U	400 U	4100 U	360 U		
BENZO(K)FLUORANTHENE				410	450 U	3700 U	400 U	4100 U	360 U		
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE				410 U	450 U	3700 U	400 U	4100 U	360 U		
CHRYSENE				410 U	450 U	3700 U	400 U	4100 U	360 U		
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE				410 U	450 U	3700 U	400 U	4100 U	360 U		
NAPHTHALENE				410 U	450 U	3700 U	400 U	3.2	1 U		
PENTACHLOROPHENOL				25 U	27 U	22 U	24 U	4100 U	22 U		
PYRENE				410 U	450 U	3700 U	400 U	4100 U	360 U		
Pesticides/PCBs (ug/kg)											
4,4'-DDD				61	4.4 U	37 U	10	4.1 U	3.6 U		
4,4'-DDE				62	4.4 U	37 U	23	4.1 U	3.6 U		
4,4'-DDT				16	4.4 U	37 U	9.5	4.1 U	3.6 U		
ALPHA-BHC				4.1 U	4.4 U	37 U	4 U	4.1 U	3.6 U		
ALPHA-CHLORDANE				400	200	4400	110	60	4		
AROCLOR-1254				41 U	44 U	370 U	40 U	41 U	36 U		
AROCLOR-1260				41 U	44 U	370 U	40 U	41 U	36 U		
BETA-BHC				4.1 U	4.4 U	37 U	4 U	4.1 U	3.6 U		
CHLORDANE				3000	1600	36000	840	510	46		
DELTA-BHC				4.1 U	4.4 U	37 U	4 U	4.1 U	3.6 U		
DIAZINON				42 U	45 U	37 U	44	42 U	36 U		
DIELDRIN				8	15	200	11	8.5	3.6 U		
DISULFOTON				42 U	45 U	37 U	87	42 U	36 U		
ENDOSULFAN II				4.1	4.4 U	37 U	4 U	4.1 U	3.6 U		
GAMMA-BHC (LINDANE)				4.1 U	4.4 U	37 U	4 U	4.1 U	3.6 U		
GAMMA-CHLORDANE				390	190	5300	100	51	3.6 U		
HEPTACHLOR EPOXIDE				4.1 U	4.4 U	37 U	4 U	4.1 U	3.6 U		
TOXAPHENE				82 U	89 U	740 U	100	82 U	72 U		
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)				25 U	27 U	22 U	24 U	12 U	22 U		
2,4-D				25 U	27 U	22 U	24 U	12 U	22 U		
3,5-DCBA				25 U	27 U	22 U	24 U	12 U	22 U		
4-NITROPHENOL				25 U	27 U	22 U	400 U	4100 U	22 U		
DACTHAL				25 U	27 U	22 U	24 U	12 U	22 U		
MCPA				1200 U	1400 U	1100 U	1200 U	620 U	1100 U		
MCPP				1200 U	1400 U	1100 U	1200 U	620 U	1100 U		
PENTACHLOROPHENOL				25 U	27 U	22 U	24 U	4100 U	22 U		
Inorganics (mg/kg)											
ALUMINUM				3500	2200	1100	1200	2400	890		
ARSENIC	0.8 J	0.5 U	0.7 J	5.6	3.2	4.3	1.1 J	69	1.3 J	9.3	1.8 J
BARIUM				25 U	27 U	22 U	24 U	25 U	22 U		
CADMIUM				1 U	1 U	1.6	1 U	2.8	1 U		
CHROMIUM				8.6	20	9.9	5.5	30	3.6		
COBALT				6 U	7 U	6 U	6 U	6 U	5 U		
COPPER				9.6	19	15	8	14	5 U		
CYANIDE											
IRON				960	1300	930	520	5100	400		
LEAD				12	20	12	6.1	66	7		
MANGANESE				24	55	58	16	40	12		
MERCURY				0.09	0.088	3.5	0.14	0.14	0.074		
NICKEL				6 U	7 U	6 U	6 U	6.9	5 U		
SELENIUM				2 U	3 U	2 U	2 U	2 U	2 U		
SILVER				2 U	3 U	2 U	2 U	2 U	2 U		
VANADIUM				2.2	3	3.7	1	3.1	1 U		
ZINC				36	78	27	24	910	52		
Petroleum Hydrocarbons (mg/kg)											
TRPH				62	76	680	100	1900	37		

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1)	90S03101	90S03401	90S3201	90S3301	BOR-A-1-1	BOR-A-2-1	BOR-A-3-1	BOR-A-4-1	BOR-A-5-1	BOR-A-6-1	BOR-A-7-1
Sample Date	12/12/98	12/12/98	12/12/98	12/12/98	11/05/91	11/05/91	11/05/91	11/05/91	11/05/91	11/05/91	11/05/91
Depth Interval, feet bgs	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE	1 U	1 U	1.4 J	1 U	6 UJ	21 U	6 U	14 UJ	7 U	6 U	38 UJ
1,2-DICHLOROBENZENE	360 U	360 U	7 U	1 U							
1,3-DICHLOROBENZENE	1 U	1 U	5.8	1 U							
1,4-DICHLOROBENZENE	1 U	1 U	4.3	380 U							
4-METHYL-2-PENTANONE					13 UJ	42 U	11 U	27 UJ	14 U	74	77 UJ
BENZENE	1 U	1 U	2.9	1 U	6 UJ	21 U	6 U	14 UJ	7 U	6 U	38 UJ
CHLOROFORM	1 U	1 U	1 J	1 U	6 UJ	21 U	6 U	14 UJ	7 U	6 U	38 UJ
METHYLENE CHLORIDE	20	26	43	30	170 UJ	740	18 U	320 J	170	40 U	1100 J
TOLUENE	1.4 J	2.1 J	1 U	1 U	6 UJ	21 U	6 U	14 UJ	7 U	6 U	38 UJ
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE	360 U	360 U	4.3	1 U	460 U	470 U	400 U	430 U	460 U	400 U	460 U
1,3-DICHLOROBENZENE					460 U	470 U	400 U	430 U	460 U	400 U	460 U
1,4-DICHLOROBENZENE	1 U	1 U	5.8	380 U	460 U	470 U	400 U	430 U	460 U	400 U	460 U
2-METHYLPHENOL	360 U	360 U	370000 U	380 U	460 U	470 U	110 J	430 U	460 U	400 U	460 U
4-NITROPHENOL	22 U	360 U	390	380 U	2300 U	2300 U	2000 U	2100 U	2300 U	2000 U	2200 U
BENZO(A)PYRENE	360 U	360 U	37000 U	380 U	460 U	67 J	400 U	430 U	460 U	82 J	86 J
BENZO(B)FLUORANTHENE	360 U	360 U	37000 U	380 U	140 J	120 J	400 U	56 J	460 U	98 J	120 J
BENZO(K)FLUORANTHENE	360 U	360 U	37000 U	380 U	110 J	87 J	400 U	430 U	460 U	95 J	59 J
BENZOIC ACID					2300 U	2300 U	2000 U	800 J	2300 U	2000 U	2200 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	360 U	37000 U	380 U	140 J	110 J	400 U	72 J	83 J	160 J	460 U
CHRYSENE	360 U	360 U	37000 U	380 U	81 J	81 J	400 U	430 U	460 U	400 U	68 J
DI-N-BUTYL PHTHALATE					80 J	82 J	400 U	430 U	460 U	400 U	460 U
INDENO(1,2,3-CD)PYRENE	360 U	360 U	37000 U	380 U	460 U	55 J	400 U	430 U	460 U	400 U	63 J
NAPHTHALENE	1 U	1 U	1 U	1 U	460 U	470 U	400 U	430 U	460 U	400 U	460 U
PENTACHLOROPHENOL	22 U	22 U	26	23 U	100 J	2300 U	2000 U	2100 U	2300 U	2000 U	2200 U
PYRENE	360 U	360 U	37000 U	380 U	100 J	64 J	400 U	430 U	460 U	400 U	91 J
Pesticides/PCBs (ug/kg)											
4,4'-DDD	87	76	1400000	45	110 U	23 U	49 U	53 U	110 U	650 J	4.7 J
4,4'-DDE	46	3.6	370000 U	14	30 J	7 J	5.2 J	6.5 J	110 U	2000 U	8.1 J
4,4'-DDT	1200	13	140000	7.4	110 U	9.7 J	49 U	53 U	110 U	2000 U	12 J
ALPHA-BHC	9.2	3.6 U	370000 U	3.8 U	56 U	11 U	24 U	26 U	56 U	980 U	11 U
ALPHA-CHLORDANE	18	41	370000 U	23	530 J	110 U	58 J	29 J	72 J	680 J	110 U
AROCLOR-1254	36 U	36 U	370000 U	38 U	1100 U	230 U	490 U	530 U	1100 U	20000 U	220 U
AROCLOR-1260	36 U	36 U	370000 U	64	1100 U	230 U	490 U	530 U	1100 U	20000 U	220 U
BETA-BHC	120	3.6 U	370000 U	3.8 U	56 U	11 U	24 U	26 U	56 U	980 U	11 U
CHLORDANE	140	410	370000 U	190							
DELTA-BHC	3.7	3.6 U	370000 U	3.8 U	56 U	11 U	24 U	26 U	56 U	980 U	11 U
DIAZINON	36 U	36 U	37 U	39 U							
DIELDRIN	6.8	3.6 U	370000 U	3.8 U	7.3 J	23 U	49 U	53 U	110 U	2000 U	22 U
DISULFOTON	36 U	36 U	37 U	39 U							
ENDOSULFAN II	3.6 U	3.6 U	370000 U	3.8 U	110 U	23 U	49 U	53 U	110 U	2000 U	22 U
GAMMA-BHC (LINDANE)	110	3.6 U	370000 U	3.8 U	56 U	11 U	24 U	26 U	56 U	980 U	11 U
GAMMA-CHLORDANE	15	52	370000 U	20	330 J	110 U	24 J	12 J	36 J	660 J	110 U
HEPTACHLOR EPOXIDE	3.6 U	3.6 U	370000 U	3.8 U	58 J	11 U	24 U	26 U	56 U	980 U	11 U
TOXAPHENE	72 U	650	8700000	410	1100 U	230 U	490 U	530 U	1100 U	20000 U	220 U
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)	22 U	22 U	80	23 U							
2,4-D	22 U	22 U	47	23 U							
3,5-DCBA	22 U	22 U	38	23 U							
4-NITROPHENOL	22 U	360 U	390	380 U							
DACTHAL	22 U	22 U	22 U	460							
MCPA	1100 U	1100 U	47000	1200 U							
MCPP	1100 U	1100 U	33000	1200 U							
PENTACHLOROPHENOL	22 U	22 U	26	23 U							
Inorganics (mg/kg)											
ALUMINUM	300	240	760	480	3370	2530	2700	2260	5170	4270	3110
ARSENIC	0.5 U	3 J	30	2.2	2 J	0.36 J	0.44 J	0.94 J	3	46.9	0.39 J
BARIUM	22 U	22 U	22 U	23 U	10 J	15.1 J	6.4 J	8.4 J	11.1 J	64 J	14.2 J
CADMIUM	1 U	1 U	1 U	1 U	4.5 J	0.44 UJ	0.39 UJ	0.41 UJ	0.43 UJ	0.37 UJ	0.45 UJ
CHROMIUM	1 U	1.3	3.9	1.7	7.6	4.3	4.8	4.8	8.7	19	5.7
COBALT	5 U	5 U	6 U	6 U	1.4 U	1.4 U	1.2 U	1.3 U	1.7 J	1.2 U	1.4 U
COPPER	5 U	5 U	6 U	6 U	10.8 J	5.3 J	3.6 J	5.3 J	8.3 J	9.4 J	74.4 J
CYANIDE					0.51 U	0.5 U	1 J	0.46 U	0.48 U	1.9 J	0.51 U
IRON	100	150	470	440	1860 J	798 J	1060 J	639 J	1090 J	2470 J	776 J
LEAD	1.4	4	18	10	22.5	9.7	4.9	47.4	22.8	19.4	11.8
MANGANESE	1.5	6	18	7.8	19.9	18.7	3.3 J	3.9	30	317	12
MERCURY	0.01 U	0.036	0.027	0.016 J	0.76	0.1 U	0.15	0.89	0.38	0.093 U	0.1 U
NICKEL	5 U	5 U	6 U	6 U	2 UJ	3 J	2.4 J	2 J	3.4 J	3 J	70.7 J
SELENIUM	2 U	4 U	2 U	2 U	0.5 J	0.5 J	0.6 J	0.37 J	0.34 J	0.3 J	0.38 J
SILVER	2 U	2 U	2 U	2 U	0.65 U	0.64 U	0.56 U	0.99 J	0.62 U	0.54 U	0.64 U
VANADIUM	1 U	1 U	1 U	1 U	2.1 J	1.8 J	3.3 J	1.6 J	3.3 J	15.5	2.9 J
ZINC	5 U	11	24	21	43.6 J	14.1 J	7.4 UJ	27.6 J	26.6 J	47.2 J	27.7 J
Petroleum Hydrocarbons (mg/kg)											
TRPH	25	120	3600	130							

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-001-01 04/29/99 0 - 1	SS-002-01 04/29/99 0 - 1	SS-003-01 04/29/99 0 - 1	SS-DUP01 04/29/99 0 - 1	SS-004-01 04/29/99 0 - 1	SS-005-01 04/29/99 0 - 1	SS-006-01 04/29/99 0 - 1	SS-007-01 04/29/99 0 - 1	SS-008-01 04/29/99 0 - 1	SS-009-01 04/29/99 0 - 1	SS-010-01 04/29/99 0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE							2.6 U				
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE							13 U				
BENZENE							2.6 U				
CHLOROFORM							2.6 U				
METHYLENE CHLORIDE							6.6 U				
TOLUENE							2.6 U				
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE							170 U				
1,3-DICHLOROBENZENE							170 U				
1,4-DICHLOROBENZENE							170 U				
2-METHYLPHENOL							170 U				
4-NITROPHENOL							860 U				
BENZO(A)PYRENE							86 U				
BENZO(B)FLUORANTHENE							170 U				
BENZO(K)FLUORANTHENE							170 U				
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE							170 U				
CHRYSENE							170 U				
DI-N-BUTYL PHTHALATE							170 U				
INDENO(1,2,3-CD)PYRENE							170 U				
NAPHTHALENE							170 U				
PENTACHLOROPHENOL							860 U				
PYRENE							170 U				
Pesticides/PCBs (ug/kg)											
4,4'-DDD	15 U	36 U	490 U	230 U	24100	7.6 U	1400 U	170 U	740 U	38 U	36 U
4,4'-DDE	15 U	36 U	490 U	230 U	39000 U	7.6 U	1400 U	317	740 U	38 U	36 U
4,4'-DDT	15 U	36 U	490 U	230 U	152000	7.6 U	1400 U	389	740 U	28.7 J	36 U
ALPHA-BHC	7.4 U	18 U	250 U	110 U	19000 U	3.8 U	690 U	86 U	370 U	19 U	18 U
ALPHA-CHLORDANE	31	254	1860 J	1090 J	39000 U	9.1	5580	618	3620	103	29.2 J
AROCLOR-1254							17000 U				
AROCLOR-1260							17000 U				
BETA-BHC	7.4 U	18 U	250 U	110 U	19000 U	3.8 U	690 U	86 U	370 U	19 U	18 U
CHLORDANE											
DELTA-BHC	7.4 U	18 U	250 U	110 U	19000 U	3.8 U	690 U	86 U	370 U	19 U	18 U
DIAZINON	800 U	620 U	830 U	840 U	620 U	670 U	730 U	680 U	680 U	750 U	760 U
DIELDRIN	7.4 U	18 U	250 U	110 U	19000 U	3.8 U	690 U	86 U	370 U	207	18 U
DISULFOTON	500 U	390 U	520 U	530 U	390 U	420 U	460 U	430 U	430 U	470 U	480 U
ENDOSULFAN II	15 U	36 U	490 U	230 U	39000 U	7.6 U	1400 U	170 U	740 U	38 U	36 U
GAMMA-BHC (LINDANE)	7.4 U	18 U	250 U	110 U	19000 U	3.8 U	690 U	86 U	370 U	19 U	18 U
GAMMA-CHLORDANE	29	214	1800 J	1000 J	39000 U	7.2 J	5370	634	4000	76.4	16.7 J
HEPTACHLOR EPOXIDE	7.4 U	18 U	250 U	110 U	19000 U	3.8 U	690 U	86 U	370 U	17 J	18 U
TOXAPHENE	740 U	1800 U	25000 U	11000 U	368000	380 U	69000 U	8600 U	37000 U	1500 J	1800 U
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)	14 U	11 U	14 U	14 U	12 U	13 U	12 U	12 U	13 U	13 U	14 U
2,4-D	100 U	80 U	100 U	100 U	83 U	90 U	88 U	85 U	93 U	93 U	95 U
3,5-DCBA											
4-NITROPHENOL	280 U	230 U	290 U	290 U	240 U	260 U	250 U	240 U	270 U	270 U	270 U
DACTHAL											
MCPA	5700 U	4600 U	5800 U	5700 U	4700 U	5100 U	500 U	4800 U	5300 U	5300 U	5400 U
MCPP	7100 U	5700 U	7200 U	7200 U	5900 U	6400 U	6300 U	6000 U	6700 U	6700 U	6800 U
PENTACHLOROPHENOL	14 U	11 U	14 U	14 U	12 U	13 U	12 U	12 U	13 U	13 U	14 U
Inorganics (mg/kg)											
ALUMINUM							1860				
ARSENIC	1.1 U	1.1 U	2.7	3	4.7	1.9	22.2	12	8.5	4.4	17.9
BARIUM							10.6				
CADMIUM							2.4				
CHROMIUM							7.6				
COBALT							0.24 U				
COPPER							12.5				
CYANIDE							0.52 U				
IRON							670				
LEAD							17.3				
MANGANESE							11.5				
MERCURY							0.1				
NICKEL							1.1				
SELENIUM							0.43 U				
SILVER							0.36				
VANADIUM	3.4	3.4	2.4	2.5	4.3	2.9	2.6	4.1	4.3	1.7	1.7
ZINC							20.9				
Petroleum Hydrocarbons (mg/kg)											
TRPH	140	150	152 J	110 UJ	286	109	90.2	153	93.2	95 U	97.8

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1)	SS-011-01	SS-012-01	SS-013-01	SS-DUP02	SS-014-01	SS-015-01	SS-016-01	SS-017-01	SS-018-01	SS-019-01	SS-020-01
Sample Date	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99
Depth Interval, feet bgs	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE	2.3 U		2.4 U	2.9 U			2.4 U				
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE	11 U		12 U	15 U			12 U				
BENZENE	2.3 U		2.4 U	2.9 U			2.4 U				
CHLOROFORM	2.3 U		2.4 U	2.9 U			2.4 U				
METHYLENE CHLORIDE	5.6 U		6 U	7.4 U			6 U				
TOLUENE	2.3 U		2.4 U	2.9 U			2.4 U				
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE	170 U		180 U	180 U			710 U				
1,3-DICHLOROBENZENE	170 U		180 U	180 U			710 U				
1,4-DICHLOROBENZENE	170 U		180 U	180 U			710 U				
2-METHYLPHENOL	170 U		180 U	180 U			710 U				
4-NITROPHENOL	870 U		880 U	880 U			3600 U				
BENZO(A)PYRENE	87 U		88 U	88 U			360 U				
BENZO(B)FLUORANTHENE	170 U		180 U	180 U			710 U				
BENZO(K)FLUORANTHENE	170 U		180 U	180 U			710 U				
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE	170 U		180 U	180 U			710 U				
CHRYSENE	170 U		180 U	180 U			710 U				
DI-N-BUTYL PHTHALATE	170 U		180 U	180 U			710 U				
INDENO(1,2,3-CD)PYRENE	170 U		180 U	180 U			710 U				
NAPHTHALENE	170 U		180 U	180 U			710 U				
PENTACHLOROPHENOL	870 U		880 U	880 U			3600 U				
PYRENE	170 U		180 U	180 U			710 U				
Pesticides/PCBs (ug/kg)											
4,4'-DDD	70 U	8800 U	71 U	71 U	3.5 U	17 U	278 J	3.7 U			
4,4'-DDE	70 U	8800 U	71 U	71 U	9.8	17 U	578	3.7 U			
4,4'-DDT	70 U	8800 U	71 U	71 U	7.1	17 U	1640	2.8 J			
ALPHA-BHC	35 U	4400 U	35 U	35 U	1.7 U	8.7 U	180 U	1.8 U			
ALPHA-CHLORDANE	243	54000	95.1	88.6	8.9	58.7	360 U	4.3			
AROCLOR-1254	170 U		1360 J	776 J			1800 U				
AROCLOR-1260	170 U		710 U	710 U			1800 U				
BETA-BHC	35 U	4400 U	35 U	35 U	1.7 U	8.7 U	180 U	1.8 U			
CHLORDANE											
DELTA-BHC	35 U	4400 U	35 U	35 U	1.7 U	8.7 U	180 U	1.8 U			
DIAZINON	750 U	670 U	600 U	600 U	680 U	660 U	610 U	810 U			
DIELDRIN	35 U	4400 U	301	266	8.4	8.7 U	180 U	1.8 U			
DISULFOTON	470 U	420 U	380 U	380 U	430 U	420 U	380 U	510 U			
ENDOSULFAN II	70 U	8800 U	71 U	71 U	3.5 U	17 U	360 U	3.7 U			
GAMMA-BHC (LINDANE)	35 U	4400 U	35 U	35 U	1.7 U	8.7 U	180 U	1.8 U			
GAMMA-CHLORDANE	262	54200	83.6	71.6	6.6	58.1	360 U	4.4			
HEPTACHLOR EPOXIDE	35 U	4400 U	35 U	35 U	1.7 U	8.7 U	180 U	1.8 U			
TOXAPHENE	3500 U	440000 U	2500 J	1700 J	170 U	870 U	18000 U	180 U			
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)	13 U	12 U	12 U	12 U	13 U	12 U	10 U	21 U			
2,4-D	91 U	86 U	84 U	84 U	91 U	83 U	74 U	140 U			
3,5-DCBA											
4-NITROPHENOL	260 U	250 U	240 U	240 U	260 U	240 U	210 U	420 U			
DACTHAL											
MCPA	5200 U	4900 U	4800 U	4800 U	5200 U	4800 U	4200 U	8300 U			
MCPP	6500 U	6200 U	6000 U	6000 U	6500 U	6000 U	5200 U	10000 U			
PENTACHLOROPHENOL	13 U	12 U	12 U	12 U	13 U	12 U	10 U	21 U			
Inorganics (mg/kg)											
ALUMINUM	1050		2090	2070			1150				
ARSENIC	3.1	3.9	6.2	5.7	2.5		10.2	10.9	3.2	1.8	0.62 U
BARIUM	11.1		11.5	10.5			17.7				
CADMIUM	0.5 U		0.77	0.47 U			2				
CHROMIUM	3.2		15.9	13.3			15.5				
COBALT	0.22 U		0.3 U	0.15 U			0.67 U				
COPPER	4.9		8.8	7.5			13.4				
CYANIDE	0.52 U		0.53 U	0.53 U			0.54 U				
IRON	438		592	496			6250				
LEAD	7.1		9.7	9.2			80.4				
MANGANESE	5.2		17.6	12.8			106				
MERCURY	0.06		0.04	0.11			0.04				
NICKEL	0.75		1.6	0.88			2.8				
SELENIUM	0.32 U		0.53 U	0.5 U			0.55 U				
SILVER	0.69		0.44	0.16			0.32				
VANADIUM	1.5	2.6	2.1	1.9	1.4		3.5	3.5			
ZINC	13.6		12.5	9.2			142				
Petroleum Hydrocarbons (mg/kg)											
TRPH	87 U	381	80.4 J	88 UJ	87 U	87 U	198	125			

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-021-01 04/29/99 0 - 1	SS-101-01 06/10/99 0 - 1	SS-102-01 06/10/99 0 - 1	SS-103-01 06/10/99 0 - 1	SS-104-01 06/10/99 0 - 1	SS-105-01 06/10/99 0 - 1	SS-DU01 06/10/99 0 - 1	SS-106-01 06/10/99 0 - 1	SS-107-01 06/10/99 0 - 1	SS-108-01 06/10/99 0 - 1	SS-109-01 06/10/99 0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD				200 U	200 U	18 U	18 U	34 U			
4,4'-DDE				200 U	200 U	18 U	18 U	34 U			
4,4'-DDT				200 U	200 U	18 U	18 U	34 U			
ALPHA-BHC				99 U	98 U	9 U	8.8 U	17 U			
ALPHA-CHLORDANE				615	590	22.2	31.7	34 U			
AROCLOR-1254				7900 U	7900 U	360 U	700 U	140 U			
AROCLOR-1260				7900 U	7900 U	360 U	700 U	140 U			
BETA-BHC				99 U	98 U	9 U	8.8 U	17 U			
CHLORDANE											
DELTA-BHC				99 U	98 U	9 U	8.8 U	17 U			
DIAZINON											
DIELDRIN				2790	1420	504	696	17 U			
DISULFOTON											
ENDOSULFAN II				200 U	200 U	18 U	18 U	34 U			
GAMMA-BHC (LINDANE)				99 U	98 U	9 U	8.8 U	17 U			
GAMMA-CHLORDANE				516	504	15.3 J	21.7	34 U			
HEPTACHLOR EPOXIDE				70.3 J	98 U	9 U	8.8 U	17 U			
TOXAPHENE				7530 J	9890	776 J	950	1700 U			
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	0.46 U	2.8	2.4 U	15.4	9.9	1.6 U	1.8 U	1.7 U	0.36 U	3	4.8
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-110-01 06/10/99 0 - 1	SS-110-02 06/10/99 1 - 2	SS-111-01 06/10/99 0 - 1	SS-DU02 06/10/99 0 - 1	SS-111-02 06/10/99 1 - 2	SS-112-01 06/10/99 0 - 1	SS-113-01 06/10/99 0 - 1	SS-114-02 06/10/99 1 - 2	SS-114-03 06/10/99 2 - 3	SS-115-02 06/10/99 1 - 2	SS-115-03 06/10/99 2 - 3
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD	45.9 J	3.8	14 U	14 U	48.5						
4,4'-DDE	73 U	18 U	14 U	14 U	108						
4,4'-DDT	311	15.7	14 U	14 U	33.7						
ALPHA-BHC	36 U	8.9 U	7 U	6.9 U	9 U						
ALPHA-CHLORDANE	144	11.6	14 U	14 U	18 U						
AROCLOR-1254	730 U	180 U	35 U	34 U	140 U						
AROCLOR-1260	730 U	180 U	35 U	34 U	36 U						
BETA-BHC	36 U	8.9 U	7 U	6.9 U	9 U						
CHLORDANE											
DELTA-BHC	36 U	8.9 U	7 U	6.9 U	9 U						
DIAZINON											
DIELDRIN	36 U	8.9 U	7 U	6.9 U	9 U						
DISULFOTON											
ENDOSULFAN II	73 U	18 U	14 U	14 U	18 U						
GAMMA-BHC (LINDANE)	36 U	8.9 U	7 U	6.9 U	9 U						
GAMMA-CHLORDANE	67 J	7.5	14 U	14 U	18 U						
HEPTACHLOR EPOXIDE	36 U	8.9 U	7 U	6.9 U	9 U						
TOXAPHENE	3600 U	890 U	700 U	690 U	900 U						
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	2.7	0.37 U	0.54 U	0.52 U	0.37 U	19.6	2.5	2.1 U	60.9	15.7	4
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-116-02 06/10/99 1 - 2	SS-116-03 06/10/99 2 - 3	SS-208-01 07/12/99 0 - 1	SS-209-01 07/12/99 0 - 1	SS-210-01 07/12/99 0 - 1	SS-211-01 07/12/99 0 - 1	SS-212-04 07/12/99 3 - 4	SS-213-04 07/12/99 3 - 4	SS-214-03 07/12/99 2 - 3	SS-DU04 07/13/99 2 - 3	SS-215-01 07/12/99 0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD											
4,4'-DDE											
4,4'-DDT											
ALPHA-BHC											
ALPHA-CHLORDANE											
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC											
CHLORDANE											
DELTA-BHC											
DIAZINON											
DIELDRIN											
DISULFOTON											
ENDOSULFAN II											
GAMMA-BHC (LINDANE)											
GAMMA-CHLORDANE											
HEPTACHLOR EPOXIDE											
TOXAPHENE											
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	131	136	1.6 U	6.2	19.1	1.6 U	39	65.8	10.5	12.8	9.6
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-216-01 07/12/99 0 - 1	SS-217-01 07/12/99 0 - 1	SS-DU03 07/13/99 0 - 1	SS-218-02 07/13/99 1 - 2	SS-301-01 09/10/99 0 - 1	SS-DU05 09/10/99 0 - 1	SS-302-01 09/10/99 0 - 1	SS-303-01 09/10/99 0 - 1	SS-304-01 09/10/99 0 - 1	SS-305-01 09/10/99 0 - 1	SS-306-01 09/10/99 0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD					8000 U	9100 U	4 U	17 U			
4,4'-DDE					8000 U	9100 U	2.3 J	22			
4,4'-DDT					8000 U	9100 U	11	14			
ALPHA-BHC					4000 U	4600 U	2 U	8.6 U			
ALPHA-CHLORDANE					36000	44800	4 U	14			
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC					4000 U	4600 U	2 U	8.6 U			
CHLORDANE											
DELTA-BHC					4000 U	4600 U	2 U	8.6 U			
DIAZINON											
DIELDRIN					4000 U	4600 U	1.8 J	10			
DISULFOTON											
ENDOSULFAN II					8000 U	9100 U	4 U	17 U			
GAMMA-BHC (LINDANE)					4000 U	4600 U	2 U	8.6 U			
GAMMA-CHLORDANE					40000	49700	4 U	7.4			
HEPTACHLOR EPOXIDE					4000 U	4600 U	2 U	8.6 U			
TOXAPHENE					400000 U	460000 U	200 U	860 U			
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	1.7 U	1.7 U	2.2 U	1.5	36.1	26.7	0.99 U	0.89 U	3.8 U	93.6	1.9 U
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-307-01 09/13/99 0 - 1	SS-308-01 09/13/99 0 - 1	SS-315-07 09/10/99 6 - 7	SS-316-02 09/10/99 1 - 2	SS-317-02 09/10/99 1 - 2	SS-318-02 09/13/99 1 - 2	SS-401-01 10/22/99 0 - 1	SS-501-01 01/24/00 0 - 1	SS-502-01 01/24/00 0 - 1	SS-503-01 01/24/00 0 - 1	SS-DU07 01/24/00 0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD				830 U	4.2 U	8.4 U		45 U	4.2 U	4 U	4 U
4,4'-DDE				830 U	4.2 U	8.4 U		45 U	2 J	2.8 J	3.8 J
4,4'-DDT				5740	4.2 U	8.4 U		45 U	4.2 U	2.5 J	3.1 J
ALPHA-BHC				420 U	2.1 U	4.2 U		22 U	2.1 U	2 U	2 U
ALPHA-CHLORDANE				830 U	4.2 U	33		282	18.4	4.4	5.3
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC				420 U	2.1 U	4.2 U		22 U	2.1 U	2 U	2 U
CHLORDANE											
DELTA-BHC				420 U	2.1 U	4.2 U		22 U	2.1 U	2 U	2 U
DIAZINON											
DIELDRIN				420 U	2.1 U	4.2 U		22 U	2.1 U	2 U	1.3 J
DISULFOTON											
ENDOSULFAN II				830 U	4.2 U	8.4 U		45 U	4.2 U	4 U	4 U
GAMMA-BHC (LINDANE)				420 U	2.1 U	4.2 U		22 U	2.1 U	2 U	2 U
GAMMA-CHLORDANE				830 U	4.2 U	34		261	12.1	2.4 J	3.3 J
HEPTACHLOR EPOXIDE				420 U	2.1 U	4.2 U		22 U	2.1 U	2 U	2 U
TOXAPHENE				3620 J	210 U	420 U		2200 U	210 U	200 U	200 U
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	4	3.9 U	0.53 U				1.9 U			19.3	15.8
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1)	SS-504-01	SS-505-01	SS-506-01	SS-507-01	SS-508-01	SS-509-01	SS-601-01	SS-602-01	SS-603-03	SS-701-01	SS-702-01
Sample Date	01/24/00	01/24/00	01/24/00	01/25/00	01/24/00	01/24/00	02/02/00	02/02/00	02/02/00	02/15/00	02/15/00
Depth Interval, feet bgs	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	2 - 3	0 - 1	0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD			37 U			460 U		1350			7.4 U
4,4'-DDE			20.2 J			790		1900 U			8.6
4,4'-DDT			37 U			547		8150			11.2
ALPHA-BHC			19 U			230 U		190 U			3.7 U
ALPHA-CHLORDANE			224			1890		1220			43.2 J
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC			19 U			230 U		190 U			3.7 U
CHLORDANE											
DELTA-BHC			19 U			230 U		190 U			3.7 U
DIAZINON											
DIELDRIN			19 U			230 U	2540	970 U			3.7 U
DISULFOTON											
ENDOSULFAN II			37 U			460 U		1900 U			7.4 U
GAMMA-BHC (LINDANE)			19 U			230 U		190 U			3.7 U
GAMMA-CHLORDANE			234			1970		1160			44.7 J
HEPTACHLOR EPOXIDE			19 U			230 U		190 U			1.8 J
TOXAPHENE			1900 U			23000 U		27600 J			370 U
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	1.2	1.6							5.3	3.6	
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM				1.2	1.3						
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-DU08 02/15/00 0 - 1	SS-801-02 06/17/00 1 - 2	SS-803-03 06/17/00 0 - 1	SS-804-02 06/17/00 1 - 2	SS-805-02 06/17/00 1 - 2	SS-806-02 06/17/00 1 - 2	SS-DUP3 06/17/00 1 - 2	SS-807-02 06/17/00 1 - 2	SS-809-02 06/17/00 1 - 2	SS-811-01 06/17/00 0 - 1	SS-812-01 06/17/00 0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD	3.6 U	1.5 J	88 U	2000 U	80 U	20 U	4500 U	3.5 U	24.8 J	24.3 J	3.5 U
4,4'-DDE	5.5	6.6	88 U	2000 U	72.3 J	20 U	4500 U	3.5 U	95 U	120	3.5 U
4,4'-DDT	6.9	1.7 J	88 U	2000 U	80 U	20 U	4500 U	3.5 U	433	222	3.5 U
ALPHA-BHC	1.8 U	2 U	44 U	1000 U	40 U	9.8 U	2200 U	1.7 U	48 U	34 U	1.8 U
ALPHA-CHLORDANE	21.9 J	6.9	88 U	11000	525	117 J	26500 J	3.5 U	95 U	210	1.9 J
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC	1.8 U	2 U	44 U	1000 U	40 U	9.8 U	2200 U	1.7 U	48 U	34 U	1.8 U
CHLORDANE											
DELTA-BHC	1.8 U	2 U	44 U	1000 U	40 U	9.8 U	2200 U	1.7 U	48 U	34 U	1.8 U
DIAZINON				100 U	100 U	100 U	100 U	100 U			
DIELDRIN	1.8 U	2 U	44 U	1000 U	17.3 J	12.9 J	2200 UJ	1.7 U	48 U	27.3 J	1.8 U
DISULFOTON				100 U	100 U	100 U	100 U	100 U			
ENDOSULFAN II	3.6 U	4 U	88 U	2000 U	80 U	20 U	4500 U	3.5 U	95 U	68 U	3.5 U
GAMMA-BHC (LINDANE)	1.8 U	2 U	44 U	1000 U	40 U	9.8 U	2200 U	1.7 U	48 U	34 U	1.8 U
GAMMA-CHLORDANE	19.6 J	5.6	88 U	13100	442	86.3 J	30600 J	3.5 U	95 U	222	1.5 J
HEPTACHLOR EPOXIDE	0.83 J	2 U	44 U	1000 U	40 U	9.8 U	2200 U	1.7 U	48 U	34 U	1.8 U
TOXAPHENE	180 U	200 U	4400 U	100000 U	4000 U	980 U	220000 U	170 U	4800 U	3400 U	180 U
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)			3.5 U								
2,4-D			18 U								
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC		19.9 J									
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY				0.63 J	0.11 J	0.4 J	5.4 J	0.02 U			
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH		10.8		83.9	131	292	200	14.2			

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1)	SS-813-01	SS-814-02	SS-815-01	SS-816-01	SS-817-02	SS-DUP1	SS-819-02	SS-DUP2	SS-820-02	SS-822-02	SS-823-02
Sample Date	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00
Depth Interval, feet bgs	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD	113 J	35 U	12.1 J	4.8 J	1800 U	170 U	37.1 J	160 U	3.5 U	3.5 U	
4,4'-DDE	516	35 U	31	1.4 J	1800 U	133 J	112 J	79.5 J	3.5 U	3.5 U	
4,4'-DDT	189 J	35 U	104 J	9.5 J	1800 U	170 U	58 J	160 U	3.5 U	3.5 U	
ALPHA-BHC	180 U	17 U	6.8 U	17 U	880 U	86 U	68 U	82 U	1.7 U	1.7 U	
ALPHA-CHLORDANE	1000	235	17.7	10 J	6960 J	603 J	506	639	3.5 U	2.4 J	
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC	180 U	17 U	6.8 U	17 U	880 U	86 U	68 U	82 U	1.7 U	1.7 U	
CHLORDANE											
DELTA-BHC	180 U	17 U	6.8 U	17 U	880 U	86 U	68 U	82 U	1.7 U	1.7 U	
DIAZINON								100 U			
DIELDRIN	2680	17 U	6.8 U	17 U	880 U	86 U	68 U	28.5 J	1.7 U	1.7 U	
DISULFOTON								100 U			
ENDOSULFAN II	360 U	35 U	14 U	34 U	1800 U	170 U	140 U	160 U	3.5 U	3.5 U	
GAMMA-BHC (LINDANE)	180 U	17 U	6.8 U	17 U	880 U	86 U	68 U	82 U	0.81 J	1.7 U	
GAMMA-CHLORDANE	1100	177	11 J	5.1 J	7360 J	635 J	506	586	3.5 U	2 J	
HEPTACHLOR EPOXIDE	180 U	17 U	6.8 U	17 U	880 U	86 U	68 U	82 U	1.7 U	1.7 U	
TOXAPHENE	18000 U	1700 U	680 U	1700 U	88000 U	8600 U	6800 U	8200 U	170 U	170 U	
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)					3.5 U	3.4 U	3.4 U		3.5 U	3.5 U	
2,4-D					18 U	17 U	17 U		17 U	17 U	
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC					18.1 J	3.8 J	2.7 J		2.3 J	0.37 U	0.47 J
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY								0.56 J			
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH					69.3 J	172 J	185	116	8.6 U	8.7 U	

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SS-825-02 06/17/00 0 - 1	SS-827-02 06/17/00 0 - 1	SS-831-01 06/17/00 0 - 1	SS-901-02 07/13/00 1 - 2	SS-904-01 07/13/00 0 - 1	SS-905-01 07/13/00 0 - 1	SS-906-01 07/13/00 0 - 1	SS-907-01 07/13/00 0 - 1	SS-919-02 08/18/00 1 - 2	SS-DU09 08/18/00 1 - 2	SS-922-02 08/18/00 0 - 1
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD			34 U	3.8 U	300 U	3.6 U	7.8 U	3.8 U			
4,4'-DDE			15 J	4.3 J	83.9 J	3.6 U	7.8 U	3.8 U			
4,4'-DDT			16.3 J	4.2 J	300 U	3.6 U	7.8 U	3.8 U			
ALPHA-BHC			17 U	1.9 U	150 U	1.8 U	3.9 U	1.9 U			
ALPHA-CHLORDANE			190	1.1 J	1190	7.6	23.8	3.8 U			
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC			17 U	1.9 U	150 U	1.8 U	3.9 U	1.9 U			
CHLORDANE											
DELTA-BHC			17 U	1.9 U	150 U	1.8 U	3.9 U	1.9 U			
DIAZINON											
DIELDRIN			14.9 J	1.9 U	150 U	0.85 J	3.9 U	1.9 U			
DISULFOTON											
ENDOSULFAN II			34 U	3.8 U	300 U	3.6 U	7.8 U	3.8 U			
GAMMA-BHC (LINDANE)			17 U	1.9 U	150 U	1.8 U	3.9 U	1.9 U			
GAMMA-CHLORDANE			211	1.4 J	1270	11.2	28	3.8 U			
HEPTACHLOR EPOXIDE			17 U	1.9 U	150 U	1.8 U	3.9 U	1.9 U			
TOXAPHENE			1700 U	190 U	15000 U	180 U	390 U	190 U			
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	0.87 J	0.4 U							57.2	54.7	39
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SU-311-5.5 09/13/99 4.5 - 5.5	SS-DU06 09/13/99 4.5 - 5.5	SU-312-06 09/13/99 5 -6	SU-313-07 09/13/99 6 - 7	SU-314-07 09/13/99 6 - 7	SU-402-03 10/22/99 2 - 3	SU-403-03 10/22/99 2 - 3	SU-404-03 10/22/99 2 - 3	SU-DU06 10/22/99 2 - 3	SU-802-03 06/17/00 2 - 3	SU-818-03 06/17/00 2 - 3
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD						4.2 U				3.6 UJ	1900 UJ
4,4'-DDE						4.2 U				3.6 UJ	437 J
4,4'-DDT						6.5				36 UJ	1900 UJ
ALPHA-BHC						2.1 U				1.8 UJ	960 UJ
ALPHA-CHLORDANE						4.2 U				3.6 UJ	7270 J
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC						2.1 U				1.8 UJ	960 UJ
CHLORDANE											
DELTA-BHC						2.1 U				1.8 UJ	960 UJ
DIAZINON											
DIELDRIN						2.1 U				1.8 UJ	960 UJ
DISULFOTON											
ENDOSULFAN II						4.2 U				3.6 UJ	1900 UJ
GAMMA-BHC (LINDANE)						2.1 U				1.8 UJ	960 UJ
GAMMA-CHLORDANE						4.2 U				3.6 UJ	7600 J
HEPTACHLOR EPOXIDE						2.1 U				1.8 UJ	960 UJ
TOXAPHENE						210 U				180 UJ	96000 UJ
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											3.8 UJ
2,4-D											19 UJ
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	1.5 U	1.6 U	0.42 U	0.4 U	0.46 U		0.95 U	0.42 U	0.87 U	1.7	19.9
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH										12 J	99.5 J

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SU-829-03 06/17/00 2 - 3	SS-DUP5 07/13/00 2 - 3	SU-902-03 07/13/00 2 - 3	SU-903-04 07/13/00 3 - 4	SU-908-02 07/13/00 1 - 2	SU-909-03 07/13/00 2 - 3	SU-910-04 07/13/00 3 - 4	SU-911-03 07/13/00 2 - 3	SS-DUP4 07/13/00 2 - 3	SU-912-04 07/13/00 3 - 4	SU-913-03 07/13/00 2 - 3
Volatile Organics (ug/kg)											
1,1-DICHLOROETHANE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
4-METHYL-2-PENTANONE											
BENZENE											
CHLOROFORM											
METHYLENE CHLORIDE											
TOLUENE											
Semivolatile Organics (ug/kg)											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
2-METHYLPHENOL											
4-NITROPHENOL											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(K)FLUORANTHENE											
BENZOIC ACID											
BIS(2-ETHYLHEXYL)PHTHALATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
INDENO(1,2,3-CD)PYRENE											
NAPHTHALENE											
PENTACHLOROPHENOL											
PYRENE											
Pesticides/PCBs (ug/kg)											
4,4'-DDD		3.9 U	3.9 U	3.9 U	15 U	20 U	16 U	1900 U	1900 U	20 U	314 J
4,4'-DDE		13.2 J	12.4	3.9 U	3.4 J	5.3 J	16 U	612 J	580 J	7.8 J	389 J
4,4'-DDT		12.8 J	12	3.9 U	15 U	20 U	16 U	1900 U	1900 U	20 U	1000 U
ALPHA-BHC		1.9 U	2 U	2 U	7.6 U	9.8 U	8 U	970 U	960 U	9.8 U	500 U
ALPHA-CHLORDANE		3.6 J	2.7 J	3.9 U	49.4	89.8	47.9	8980	9140	90.9	3100
AROCLOR-1254											
AROCLOR-1260											
BETA-BHC		1.9 U	2 U	2 U	7.6 U	9.8 U	8 U	970 U	960 U	9.8 U	500 U
CHLORDANE											
DELTA-BHC		1.9 U	2 U	2 U	7.6 U	9.8 U	8 U	970 U	960 U	9.8 U	500 U
DIAZINON											
DIELDRIN		1.9 U	2 U	2 U	7.6 U	9.8 U	8 U	970 U	960 U	9.8 U	500 U
DISULFOTON											
ENDOSULFAN II		3.9 U	3.9 U	3.9 U	15 U	20 U	16 U	1900 U	1900 U	20 U	1000 U
GAMMA-BHC (LINDANE)		1.9 U	2 U	2 U	7.6 U	9.8 U	8 U	970 U	960 U	9.8 U	500 U
GAMMA-CHLORDANE		3.6 J	2.8 J	3.9 U	53.5	96	52	9470	9660	83.6	3600
HEPTACHLOR EPOXIDE		1.9 U	2 U	2 U	7.6 U	9.8 U	8 U	970 U	960 U	9.8 U	500 U
TOXAPHENE		190 U	200 U	200 U	760 U	980 U	800 U	97000 U	96000 U	980 U	50000 U
Herbicides (ug/kg)											
2,4,5-TP (SILVEX)											
2,4-D											
3,5-DCBA											
4-NITROPHENOL											
DACTHAL											
MCPA											
MCPP											
PENTACHLOROPHENOL											
Inorganics (mg/kg)											
ALUMINUM											
ARSENIC	0.4 J										
BARIUM											
CADMIUM											
CHROMIUM											
COBALT											
COPPER											
CYANIDE											
IRON											
LEAD											
MANGANESE											
MERCURY											
NICKEL											
SELENIUM											
SILVER											
VANADIUM											
ZINC											
Petroleum Hydrocarbons (mg/kg)											
TRPH											

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	SU-914-04 07/13/00 3 - 4	SU-915-03 07/13/00 2 - 3	SU-916-04 07/13/00 3 - 4	SU-917-04 08/08/00 3 - 4	SU-918-05 08/08/00 4 - 5	SU-920-03 08/18/00 2 - 3	SU-921-04 08/18/00 3 - 4	SU-923-03 08/18/00 2 - 3	SU-924-04 08/18/00 3 - 4
Volatile Organics (ug/kg)									
1,1-DICHLOROETHANE									
1,2-DICHLOROBENZENE									
1,3-DICHLOROBENZENE									
1,4-DICHLOROBENZENE									
4-METHYL-2-PENTANONE									
BENZENE									
CHLOROFORM									
METHYLENE CHLORIDE									
TOLUENE									
Semivolatile Organics (ug/kg)									
1,2-DICHLOROBENZENE									
1,3-DICHLOROBENZENE									
1,4-DICHLOROBENZENE									
2-METHYLPHENOL									
4-NITROPHENOL									
BENZO(A)PYRENE									
BENZO(B)FLUORANTHENE									
BENZO(K)FLUORANTHENE									
BENZOIC ACID									
BIS(2-ETHYLHEXYL)PHTHALATE									
CHRYSENE									
DI-N-BUTYL PHTHALATE									
INDENO(1,2,3-CD)PYRENE									
NAPHTHALENE									
PENTACHLOROPHENOL									
PYRENE									
Pesticides/PCBs (ug/kg)									
4,4'-DDD	81 U	38 U	41 U	2100 U	34 U				
4,4'-DDE	23.9 J	10.6 J	13.1 J	2100 U	34 U				
4,4'-DDT	81 U	38 U	41 U	2100 U	34 U				
ALPHA-BHC	41 U	19 U	20 U	1000 U	17 U				
ALPHA-CHLORDANE	323	123	109	6010	126				
AROCLOR-1254									
AROCLOR-1260									
BETA-BHC	41 U	19 U	20 U	1000 U	17 U				
CHLORDANE				48300	1010				
DELTA-BHC	41 U	19 U	20 U	1000 U	17 U				
DIAZINON									
DIELDRIN	41 U	8.2 J	7.9 J	1000 U	17 U				
DISULFOTON									
ENDOSULFAN II	81 U	38 U	41 U	2100 U	34 U				
GAMMA-BHC (LINDANE)	41 U	19 U	20 U	1000 U	17 U				
GAMMA-CHLORDANE	366	119	90.2	6620	134				
HEPTACHLOR EPOXIDE	41 U	15 J	44.8	1000 U	17 U				
TOXAPHENE	4100 U	1900 U	2000 U	100000 U	1700 U				
Herbicides (ug/kg)									
2,4,5-TP (SILVEX)									
2,4-D									
3,5-DCBA									
4-NITROPHENOL									
DACTHAL									
MCPA									
MCPP									
PENTACHLOROPHENOL									
Inorganics (mg/kg)									
ALUMINUM									
ARSENIC				10.8	6.8	62.6	29.5	65.4	4.8
BARIUM									
CADMIUM									
CHROMIUM									
COBALT									
COPPER									
CYANIDE									
IRON									
LEAD									
MANGANESE									
MERCURY									
NICKEL									
SELENIUM									
SILVER									
VANADIUM									
ZINC									
Petroleum Hydrocarbons (mg/kg)									
TRPH									

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample Number (CEF-P21-)(Note 1) Sample Date Depth Interval, feet bgs	USEPA Region 9 Residential	USEPA Region 9 Industrial	FDEP Residential SCTL	FDEP Industrial SCTL	FDEP Leachability SCTL	Cecil Field IBDS
Volatile Organics (ug/kg)						
1,1-DICHLOROETHANE	590000	2100000	290000	2000000	400	none
1,2-DICHLOROBENZENE	370000	370000	650000	4600000	17000	none
1,3-DICHLOROBENZENE	13000	52000	27000	180000	300	none
1,4-DICHLOROBENZENE	3400	8100	6000	9000	2200	none
4-METHYL-2-PENTANONE	790000	2900000	220000	1500000	2600	none
BENZENE	650	1500	1100	1600	7	none
CHLOROFORM	240	520	400	500	30	none
METHYLENE CHLORIDE	8900	21000	16000	23000	20	none
TOLUENE	520000	520000	380000	2600000	500	none
Semivolatile Organics (ug/kg)						
1,2-DICHLOROBENZENE	370000	370000	650000	4600000	17000	none
1,3-DICHLOROBENZENE	13000	52000	27000	180000	300	none
1,4-DICHLOROBENZENE	3400	8100	6000	9000	2200	none
2-METHYLPHENOL	3100000	44000000	2400000	28000000	300	none
4-NITROPHENOL	490000	7000000	390000	4400000	300	none
BENZO(A)PYRENE	62	290	100	500	8000	none
BENZO(B)FLUORANTHENE	620	2900	1400	4800	10000	none
BENZO(K)FLUORANTHENE	6200	29000	15000	52000	25000	none
BENZOIC ACID	100000000	100000000	150000000	NA	110000	none
BIS(2-ETHYLHEXYL)PHTHALATE	35000	180000	76000	280000	3600000	none
CHRYSENE	62000	290000	140000	450000	77000	none
DI-N-BUTYL PHTHALATE	6100000	88000000	7300000	140000000	47000	none
INDENO(1,2,3-CD)PYRENE	620	2900	1500	5300	28000	none
NAPHTHALENE	56000	190000	40000	270000	1700	none
PENTACHLOROPHENOL	3000	11000	7700	23000	30	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
ALPHA-BHC	90	590	200	500	0.3	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
AROCLOR-1260	220	1000	500 T	2100 T	17000 T	none
BETA-BHC	320	2100	600	2100	1	none
CHLORDANE	1600 T	11000 T	3100 T	12000 T	9600 T	none
DELTA-BHC	none	none	22000	420000	200	none
DIAZINON	55000	790000	55000	760000	20	none
DIELDRIN	30	150	70	300	4	none
DISULFOTON	2400	35000	2900	56000	100	none
ENDOSULFAN II	370000E	5300000 E	410000 E	6700000 E	3800 E	none
GAMMA-BHC (LINDANE)	440	2900	700	2200	9	none
GAMMA-CHLORDANE	1600 T	11000 T	3100 T	12000 T	9600 T	none
HEPTACHLOR EPOXIDE	53	270	100	400	600	none
TOXAPHENE	440	2200	1000	3700	31000	none
Herbicides (ug/kg)						
2,4,5-TP (SILVEX)	490000	7000000	590000	12000000	5400	none
2,4-D	690000	12000000	670000	11000000	700	none
3,5-DCBA	none	none	none	none	none	none
4-NITROPHENOL	490000	7000000	390000	4400000	300	none
DACTHAL	610000	8800000	none	none	none	none
MCPA	31000	440000	30000	440000	20	none
MCPP	61000	880000	none	none	none	none
PENTACHLOROPHENOL	3000	11000	7700	23000	30	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
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	26	2	0.16
NICKEL	1600	41000	110	28000	130	3.89
SELENIUM	390	10000	390	10000	5	1.68
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

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

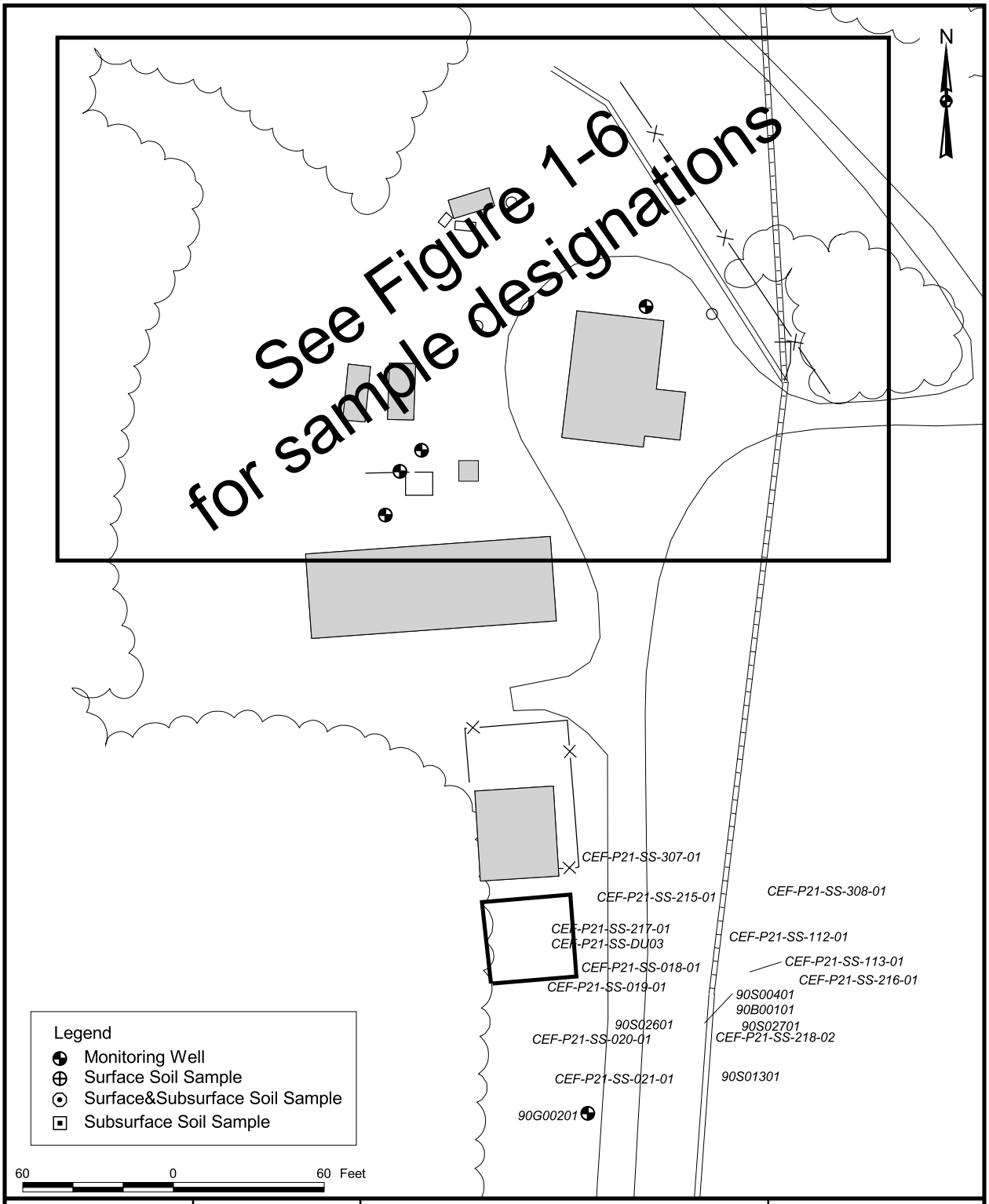
Notes:
1. Samples with "SS" or "SU" are preceded by this prefix.
2. Blank means not analyzed for.
3. U indicates not detected at the detection limit shown.
4. J indicates estimated value.
5. T indicates Total, such as total chlordane, total PCBs, and total chromium.
6. H indicates hexavalent chomium.

Duplicate samples, denoted by "DU", correspond to the sample in the preceding column.
PRG - Preliminary Remediation Goal
SCTL - Soil Cleanup Target Level
none - no value provided.
NA - not applicable.
IBDS - Inorganic Background Data Set

TABLE 1-2

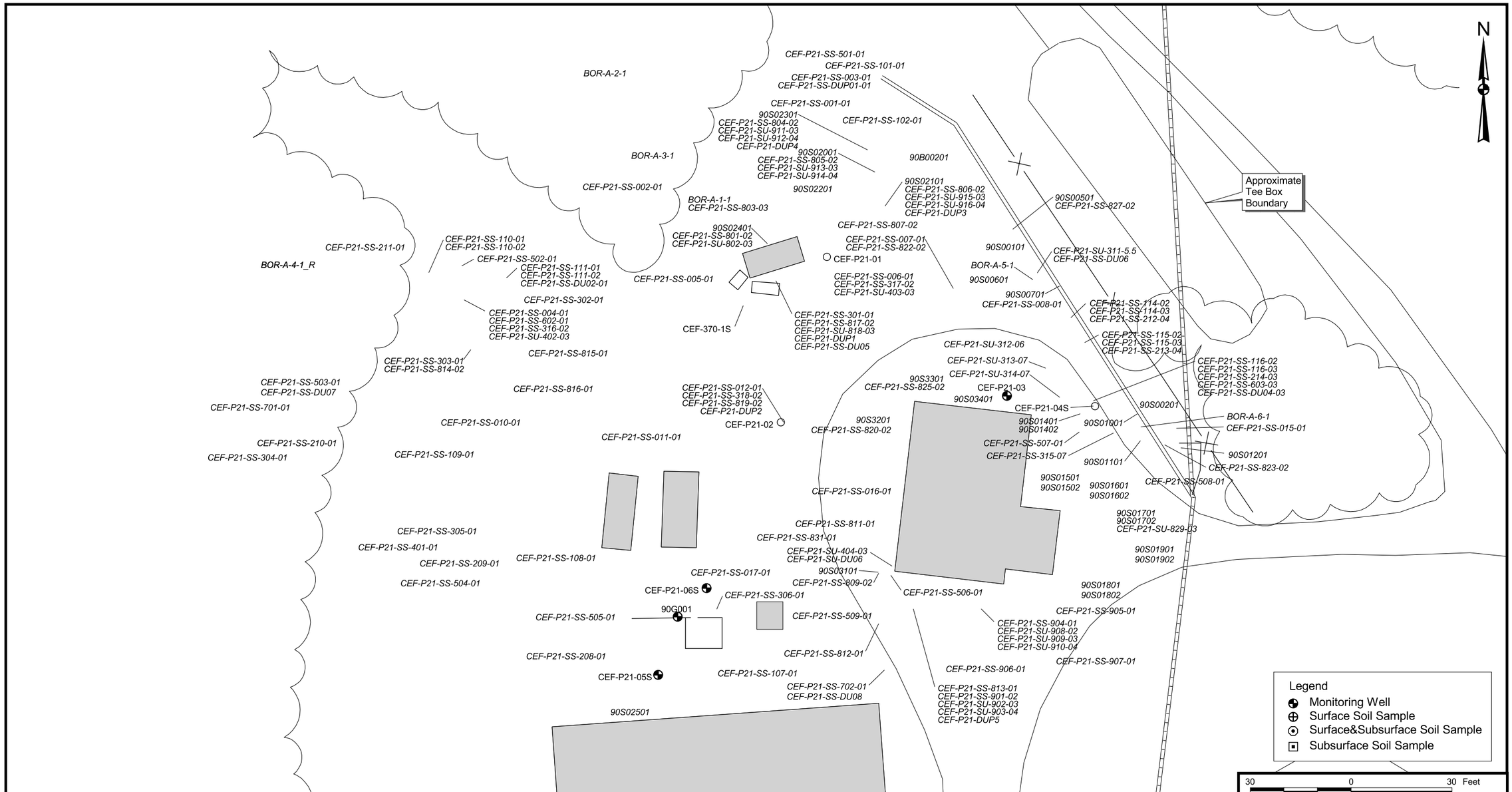
SOIL ANALYTICAL RESULTS SUMMARY (PRE-EXCAVATION)
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Parameter	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Average of Positive
Volatile Organic Compounds (ug/kg)				
1,1-Dichloroethane	1/22	1.4	90S3201	1.4
1,2-Dichlorobenzene	1/30	4.3	90S3201	4.3
1,4-Dichlorobenzene	2/30	4.3 - 5.8	90S3201	5.05
4-Methyl-2-pentanone	1/12	74	BOR-A-6-1 [11/05/91]	74
Benzene	1/22	2.9	90S3201	2.9
Chloroform	1/22	1	90S3201	1
Methylene Chloride	14/22	17 - 1100	BOR-A-7-1 [11/05/91]	183.714286
Toluene	2/22	1.4 - 2.1	90S03401	1.75
Semivolatile Organic Compounds(ug/kg)				
1,3-Dichlorobenzene	1/20	5.8	90S3201	5.8
2-Methylphenol	1/20	110	BOR-A-3-1 [11/05/91]	110
4-Nitrophenol	2/44	390	90S3201	390
Benzo(a)pyrene	3/20	67 - 86	BOR-A-7-1 [11/05/91]	78.333333
Benzo(b)fluoranthene	6/20	56 - 420	90S02001	159
Benzo(k)fluoranthene	5/20	59 - 410	90S02001	152.2
Benzoic Acid	1/7	800	BOR-A-4-1 [11/05/91]	800
Bis(2-Ethylhexyl)phthalate	5/20	72 - 160	BOR-A-6-1 [11/05/91]	113
Chrysene	3/20	68 - 81	BOR-A-1-1 [11/05/91]	76.666667
Chrysene	3/20	68 - 81	BOR-A-2-1 [11/05/91]	76.666667
Di-n-butyl phthalate	2/10	80 - 82	BOR-A-2-1 [11/05/91]	81
Indeno(1,2,3-cd)pyrene	2/20	55 - 63	BOR-A-7-1 [11/05/91]	59
Naphthalene	1/20	3.2	90S02401	3.2
Pyrene	3/20	64 - 100	BOR-A-1-1 [11/05/91]	85
Pesticides/PCBs (ug/kg)				
2,4'-DDD	7/7	0 - 290	BOR-A-6-1 [11/05/91]	41.428571
4,4'-DDD	22/88	1.5 - 1400000	90S3201	64876.88636
4,4'-DDE	42/88	1.4 - 790	CEF-P21-SS-509-01	110.62381
4,4'-DDT	34/88	1.7 - 152000	CEF-P21-SS-004-01	9153.019118
Alpha-Chlordane	70/88	1.1 - 54000	CEF-P21-SS-012-01	2504.441429
Aroclor-1260	1/24	64	90S3301	64
Chlordane	40/41	6.8 - 108200	CEF-P21-SS-012-01	7987.6775
Diazinon	1/29	44	90S02301	44
Dieldrin	19/88	0.8500 - 2680	CEF-P21-SS-813-01	161.45
Disulfoton	1/29	87	90S02301	87
Endosulfan II	1/88	4.1	90S02001	4.1
Gamma-Chlordane	69/88	1.4 - 54200	CEF-P21-SS-012-01	2708.312319
Heptachlor Epoxide	4/88	0.8300 - 58	BOR-A-1-1 [11/05/91]	29.77875
Total Chlordane	9/9	4 - 9700	90S02201	1263.777778
Toxaphene	7/88	100 - 8700000	90S3201	1300054.286
alpha-BHC	1/88	9.2	90S03101	9.2
beta-BHC	1/88	120	90S03101	120
delta-BHC	1/88	3.7	90S03101	3.7
gamma-BHC (Lindane)	2/88	0.81 - 110	90S03101	55.405
Inorganics (mg/kg)				
Aluminum	20/20	240 - 5170	BOR-A-5-1 [11/05/91]	2027
Arsenic	93/127	0.3600 - 136	CEF-P21-SS-116-03	16.217419
Barium	10/20	6.4 - 64	BOR-A-6-1 [11/05/91]	16.86
Cadmium	5/20	1.6 - 4.5	BOR-A-1-1 [11/05/91]	2.66
Calcium	18/20	1280 - 110000	BOR-A-6-1 [11/05/91]	20101.11111
Chromium	19/20	1.3 - 30	90S02401	8.721053
Cobalt	1/20	1.7	BOR-A-5-1 [11/05/91]	1.7
Copper	15/20	3.6 - 74.4	BOR-A-7-1 [11/05/91]	14.233333
Cyanide	2/10	1 - 1.9	BOR-A-6-1 [11/05/91]	1.45
Iron	20/20	100 - 6250	CEF-P21-SS-016-01	1321.05
Lead	20/20	1.4 - 80.4	CEF-P21-SS-016-01	19.99
Magnesium	18/20	74.9 - 17500	BOR-A-6-1 [11/05/91]	1928.494444
Manganese	20/20	1.5 - 317	BOR-A-6-1 [11/05/91]	38.29
Mercury	20/25	0.016 - 5.4	CEF-P21-SS-806-02-D	0.53455
Nickel	10/20	0.75 - 70.7	BOR-A-7-1 [11/05/91]	9.605
Potassium	10/20	39.9 - 389	BOR-A-6-1 [11/05/91]	102.76
Selenium	7/20	0.3000 - 0.6000	BOR-A-3-1 [11/05/91]	0.427143
Silver	4/20	0.32 - 0.9900	BOR-A-4-1 [11/05/91]	0.589999
Sodium	3/20	294 - 371	CEF-P21-SS-016-01	327.333333
Vanadium	27/32	1 - 15.5	BOR-A-6-1 [11/05/91]	3.194444
Zinc	18/20	11 - 910	90S02401	85.905556
Herbicides (ug/kg)				
2,4,5-TP (silvex)	1/30	80	90S3201	80
2,4-D	1/30	47	90S3201	47
3,5-DCBA	1/10	38	90S3201	38
Dacthal	1/10	460	90S3301	460
MCPA	1/24	47000	90S3201	47000
MCPP	1/24	33000	90S3201	33000
Pentachlorophenol	3/44	26 - 100	BOR-A-1-1 [11/05/91]	50.666667
Petroleum Hydrocarbons (mg/kg)				
Total Petroleum Hydrocarbons	10/10	25 - 3600	90S3201	673
TPH (c8-c40)	21/25	10.8 - 381	CEF-P21-SS-012-01	133.107143



DRAWN BY MJJ	DATE 08May00	EXISTING SAMPLE LOCATIONS SITE 21 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

P:\GIS\NAS_CecilField\psc21_RI.apr 26Jun00 MJJ 3_Sample Location Layout

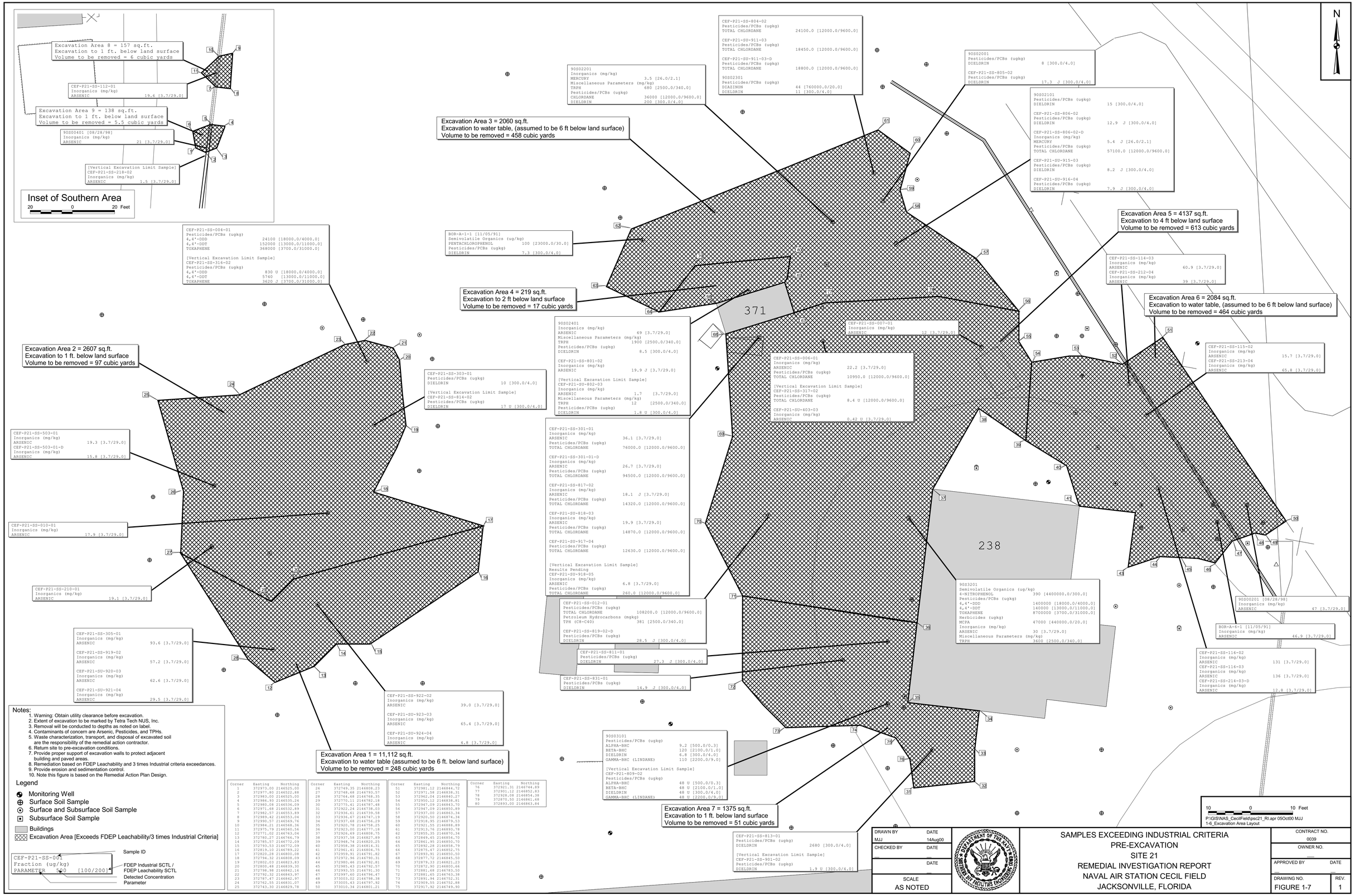


NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MJJ	DATE 12May00
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE AS NOTED	

EXISTING SAMPLE LOCATIONS - NORTHERN AREA
SITE 21
REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. 0039	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1-6	REV. 1



Notes:

1. Warning: Obtain utility clearance before excavation.
2. Extent of excavation to be marked by Tetra Tech NUS, Inc.
3. Removal will be conducted to depths as noted on label.
4. Contaminants of concern are Arsenic, Pesticides, and TPHs.
5. Waste characterization, transport, and disposal of excavated soil are the responsibility of the remedial action contractor.
6. Return site to pre-excavation conditions.
7. Provide proper support of excavation walls to protect adjacent building and paved areas.
8. Remediation based on FDEP Leachability and 3 times Industrial criteria exceedances.
9. Provide erosion and sedimentation control.
10. Note this figure is based on the Remedial Action Plan Design.

Legend

- Monitoring Well
- Surface Soil Sample
- Surface and Subsurface Soil Sample
- Subsurface Soil Sample
- Buildings
- Excavation Area [Exceeds FDEP Leachability/3 times Industrial Criteria]

CEF-P21-SS-005 — Sample ID
Fraction (ug/kg)
PARAMETER 500 [100/200] — FDEP Industrial SCTL / FDEP Leachability SCTL
Detected Concentration
Parameter

Corner	Easting	Northing
1	372973.00	2146525.00
2	372977.80	2146522.88
3	372983.00	2146525.00
4	372986.93	2146535.24
5	372980.08	2146536.09
6	372971.68	2146532.89
7	372982.57	2146553.89
8	372989.42	2146553.04
9	372990.57	2146569.76
10	372984.21	2146568.36
11	372975.79	2146560.56
12	372771.02	2146763.04
13	372780.27	2146766.79
14	372785.57	2146772.09
15	372793.53	2146772.09
16	372819.10	2146789.22
17	372820.28	2146800.08
18	372794.32	2146808.09
19	372802.03	2146823.83
20	372800.48	2146839.30
21	372798.98	2146842.16
22	372792.32	2146843.97
23	372787.47	2146842.97
24	372762.55	2146831.07
25	372743.30	2146829.78
26	372749.35	2146808.23
27	372748.68	2146793.57
28	372764.68	2146768.35
29	372770.11	2146782.18
30	372775.41	2146787.48
31	372922.24	2146738.03
32	372936.61	2146739.58
33	372936.67	2146747.19
34	372937.68	2146756.29
35	372920.78	2146758.25
36	372923.00	2146777.18
37	372926.69	2146808.75
38	372937.58	2146827.89
39	372948.74	2146820.25
40	372958.38	2146814.31
41	372961.41	2146804.75
42	372959.91	2146791.82
43	372972.96	2146790.31
44	372980.46	2146792.81
45	372985.43	2146792.57
46	372993.55	2146791.30
47	372997.60	2146796.47
48	373003.02	2146798.38
49	373005.43	2146797.92
50	373010.34	2146801.21
51	372981.12	2146844.72
52	372971.58	2146838.31
53	372962.04	2146840.27
54	372950.12	2146838.81
55	372947.09	2146843.70
56	372947.09	2146850.89
57	372937.00	2146863.34
58	372920.50	2146874.34
59	372918.95	2146879.53
60	372921.55	2146888.89
61	372913.76	2146893.78
62	372855.35	2146830.34
63	372849.45	2146856.70
64	372861.95	2146850.70
65	372892.28	2146858.79
66	372875.47	2146852.75
67	372893.91	2146850.50
68	372877.72	2146845.50
69	372879.33	2146821.23
70	372872.90	2146800.66
71	372881.68	2146783.50
72	372881.65	2146763.38
73	372891.94	2146752.31
74	372909.55	2146752.88
75	372917.92	2146749.90
76	372921.31	2146744.89
77	372901.12	2146852.83
78	372928.08	2146854.38
79	372870.50	2146861.68
80	372893.00	2146863.84

DRAWN BY MJJ	DATE 14Aug00
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SCALE AS NOTED	

SAMPLES EXCEEDING INDUSTRIAL CRITERIA
PRE-EXCAVATION
SITE 21
REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO.	0039
OWNER NO.	
APPROVED BY	DATE
DRAWING NO. FIGURE 1-7	REV. 1

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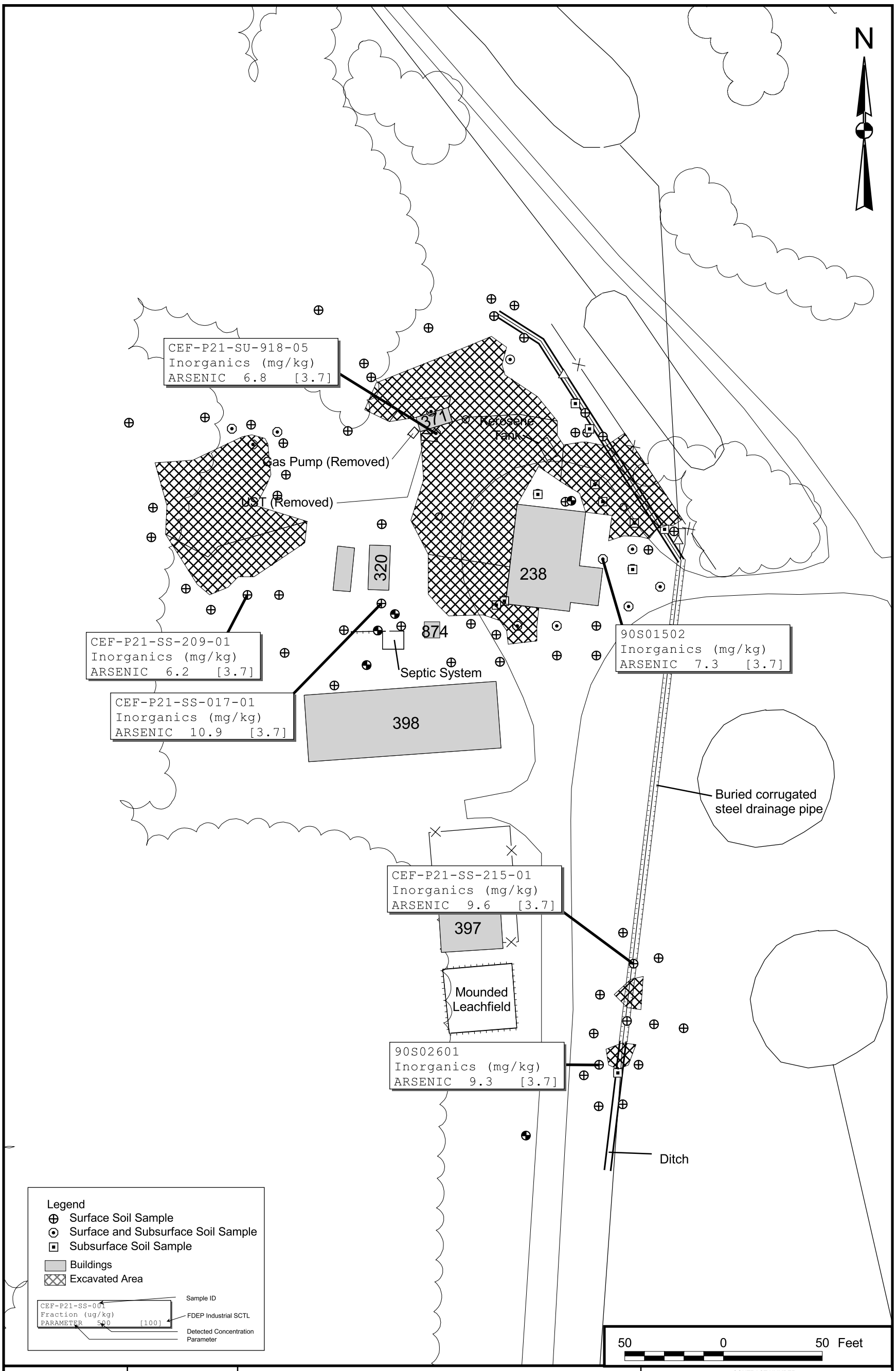

DRAWN BY MJJ	DATE 14Sept01	SOIL CONCENTRATIONS GREATER THAN INDUSTRIAL SCTLs (POST SOIL EXCAVATION) SITE 21, GOLF COURSE PESTICIDE MIXING AREA REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 1-8 REV 1

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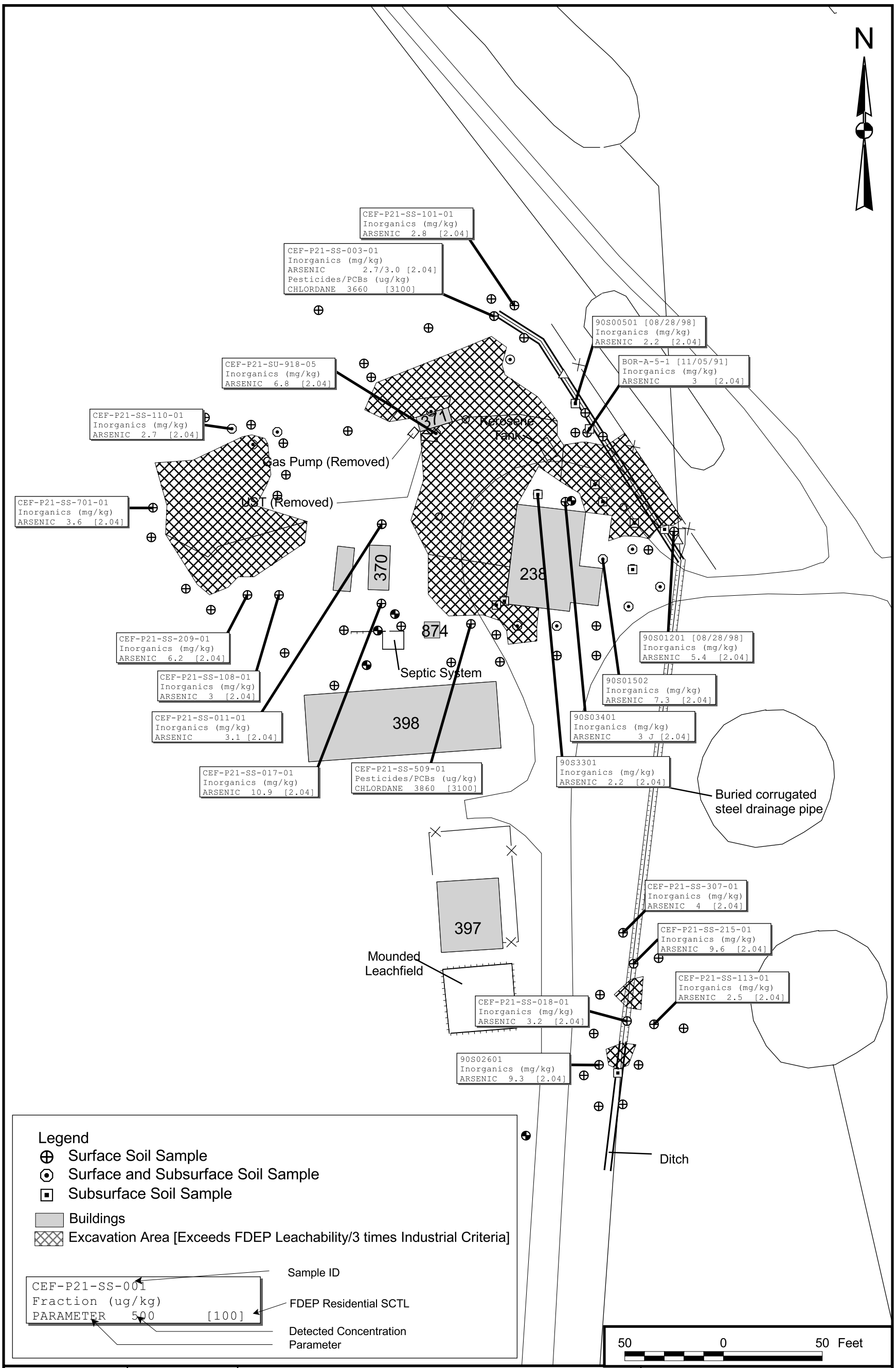


DRAWN BY MJJ	DATE 12Dec00	SAMPLES EXCEEDING RESIDENTIAL CRITERIA POST-EXCAVATION SITE 21 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 1-9 REV 1

TABLE 1-3

SUMMARY OF POSITIVE DETECTIONS IN EXISTING GROUNDWATER DATA
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	90G001	90G001	90G00201	CEF-P21-01	CEF-P21-01	CEF-P21-01	CEF-P21-02	CEF-P21-02	CEF-P21-03	90G001
Sample Number	90G00101	90G00101F	90G00201	CEF-P21-GW-001	CEF-P21-GW-001-2	CEF-P21-GW-DU05	CEF-P21-GW-002	CEF-P21-GW-DUP1	CEF-P21-GW-003	CEF-P21-GW-01S
Sampling Date	01/29/97	01/29/97	01/29/97	05/26/99	09/27/99	09/27/99	05/26/99	05/26/99	05/26/99	06/21/99
Depth, feet	15	15	15	13	13	13	13	13	13	15
Semivolatile Organics Compounds(ug/L)										
BIS(2-ETHYLHEXYL)PHTH	10 U		10 U	5 U			3.6 J	5.7	5 U	
Pesticides/PCBs (ug/L)										
4,4'-DDD	0.12 J		0.1 U	2.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
ALPHA-CHLORDANE[4]	1.9		0.05 U	2.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	**1.4**
ENDRIN KETONE	0.5 U		0.039 J	2.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
GAMMA-CHLORDANE[4]	1.5		0.05 U	2.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	**1.5**
HEPTACHLOR	0.19 J		0.05 U	1.2 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
HEPTACHLOR EPOXIDE	0.1 J		0.05 U	1.2 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
Inorganics (ug/L)										
ALUMINUM	3170	1180	182 J	259 U			1540	1140	200 U	
ANTIMONY	35.5 J	35.2 J	3 U	3 U			2.4 U	2.4 U	2.4 U	
ARSENIC	2.1 J	2 U	2.3 J	3.4 U			3.5	3.4 U	3.4 U	
BARIUM	14.9 J	13 J	32.6 J	92.8			102	109	32.1	
CALCIUM	55400	54600	43400	78300			32600	33900	23100	
CHROMIUM	2.9 J	1.5 J	1 U	1.9 U			5.9 U	3.4 U	2.1 U	
COBALT	1.1 J	1.2 J	1.2 J	1.2 U			1.1 U	1 U	1 U	
COPPER	4.2 J	3.5 J	1 U	0.75 U			1.8	0.75 U	0.75 U	
CYANIDE	2.7 J		3.4 J	5 U			5 U	5 U	5 U	
IRON	414	167	11 U	834			2020	1940	240	
LEAD	2.5 J	1 U	1 U	1.6 U			1.6 U	2.2 U	1.6 U	
MAGNESIUM	1770 J	1690 J	4860 J	12100			5040	5280	2260	
MANGANESE	5.3 J	5.2 J	35.1	**156**			94.9	95	**157**	
MERCURY	0.1 U	0.1 U	0.1 U	0.25 U			0.25 U	0.28	0.25 U	
POTASSIUM	1040 J	980 J	5250	24200			6450	6220	4770	
SODIUM	7520	6930	6210	7980			4890	4850	6370	
THALLIUM	3.6 J	3 U	6 J	4 U			2.7 U	2.7 U	6.3 U	
VANADIUM	11.2 J	9.2 J	2.3 J	3.5 U			8.5	8.2	1.8 U	
ZINC	6.3 J	13.7 J	4.2 J	26.9			44.8	42.8	32.2	

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 or IBDS value.
4. FDEP criteria for chlordane is for total chlordane, not the individual isomers.

TABLE 1-3

SUMMARY OF POSITIVE DETECTIONS IN EXISTING GROUNDWATER DATA
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

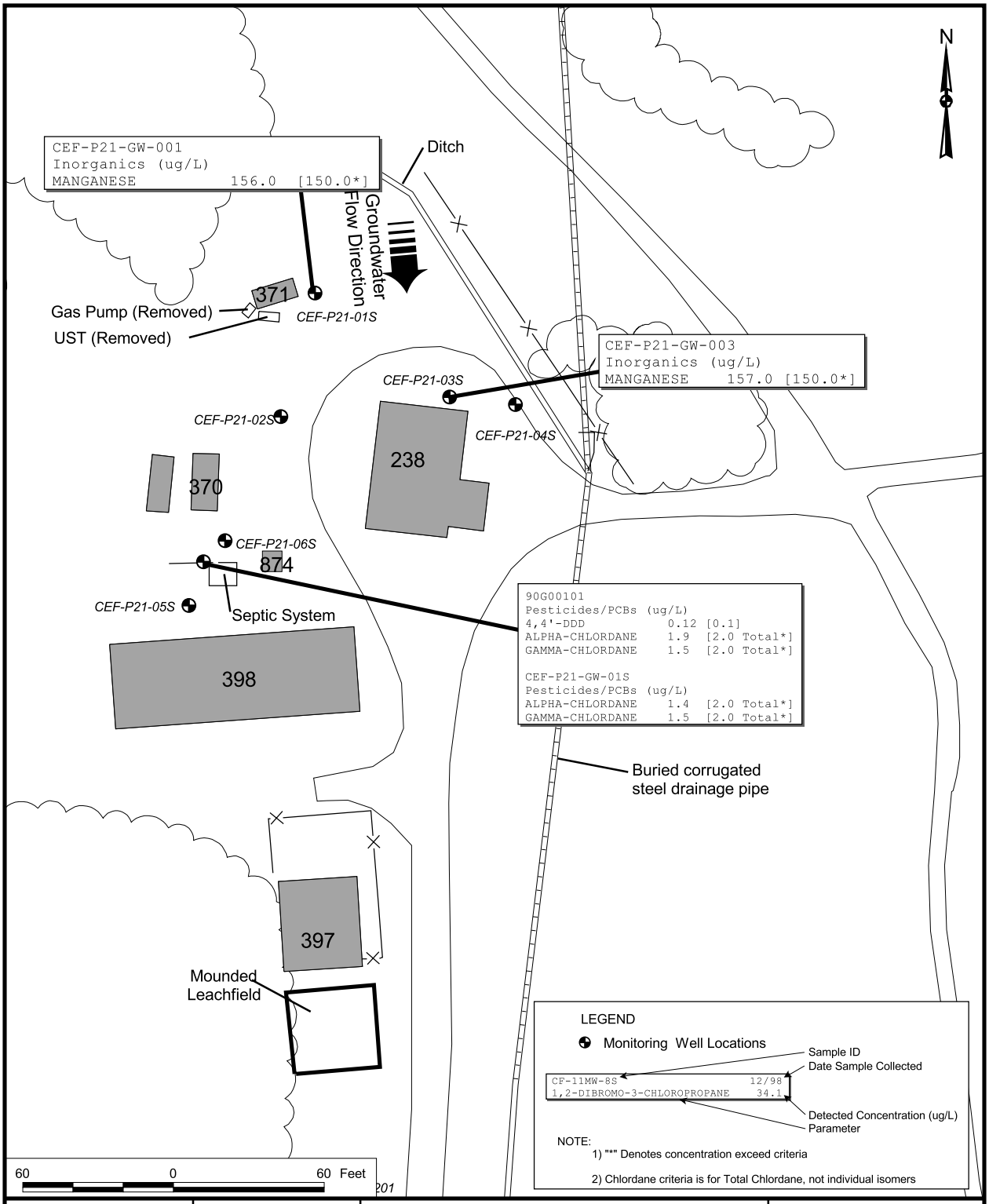
Location Sample Number Sampling Date Depth, feet	CEF-P21-04S CEF-P21-GW-04S-01 07/29/99 15	CEF-P21-04S CEF-P21-GW-DU02 07/29/99 15	CEF-P21-05S CEF-P21-GW-05S-01 08/25/99 12.5	CEF-P21-05S CEF-P21-GW-DU04 08/25/99 12.5	CEF-P21-06S CEF-P21-GW-06S-01 08/25/99 12.5	USEPA Maximum Contaminant Levels[4]	USEPA Region 9 PRGs[4]	FDEP Groundwater Cleanup Target Level, Groundwater Criteria[4]	NAS Cecil Field, IBDS Value
Semivolatile Organics Compounds(ug/L)									
BIS(2-ETHYLHEXYL)PHTHAL						6	4.8	6	
Pesticides/PCBs (ug/L)									
4,4'-DDD	0.1 U	0.1 U	1 U	1 U	0.2 U	None	0.28	0.1	
ALPHA-CHLORDANE[4]	0.1 U	0.1 U	1 U	1 U	0.2 U	2	0.19	2	
ENDRIN KETONE	0.1 U	0.1 U	1 U	1 U	0.2 U	None	None	2	
GAMMA-CHLORDANE[4]	0.1 U	0.1 U	1 U	1 U	0.2 U	2	0.19	2	
HEPTACHLOR	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U	0.4	0.015	0.4	
HEPTACHLOR EPOXIDE	0.055	0.057	0.5 U	0.5 U	0.1 U	0.2	14	0.2	
Inorganics (ug/L)									
ALUMINUM						None	36000	200	13100
ANTIMONY						6	15	6	44.5
ARSENIC	3.5 U	3.5 U				50	0.045	50	7.1
BARIUM						2000	2600	2000	88.2
CALCIUM						None	None	no criteria	81100
CHROMIUM						100	110	100	18
COBALT						None	2200	420	12.8
COPPER						1300	1400	1000	12.5
CYANIDE						200	6.2	200	22
IRON						None	11000	300	7760
LEAD						15	None	15	5.35
MAGNESIUM						None	None	no criteria	10000
MANGANESE						None	880	50	150
MERCURY						2	11	2	0.34
POTASSIUM						None	None	no criteria	4330
SODIUM						None	None	160000	16500
THALLIUM						2	2.4	2	13.3
VANADIUM						None	260	49	20.2
ZINC						None	11000	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. FDEP criteria for chlordane is for total chlordane, not the individual isomers.

TABLE 1-4

GROUNDWATER ANALYTICAL RESULTS SUMMARY (EXISTING DATA)
SITE 21 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
Semivolatile Organic Compounds (ug/L)				
Bis(2-Ethylhexyl)phthalate	1/5	3.6 - 5.7	CEF-P21-GW-002-D	5
Pesticides/PCBs (ug/L)				
4,4'-DDD	1/10	0.12	90G00101 [01/29/97]	0.1
Alpha-Chlordane	2/10	1.4 - 1.9	90G00101 [01/29/97]	2
Endrin Ketone	1/10	0.039	90G00201 [01/29/97]	0.0
Gamma-Chlordane	2/10	1.5	90G00101 [01/29/97]	2
Gamma-Chlordane	2/10	1.5	CEF-P21-GW-01S	2
Heptachlor	1/10	0.19	90G00101 [01/29/97]	0.2
Heptachlor Epoxide	2/10	0.055 - 0.1	90G00101 [01/29/97]	0.1
Inorganics (ug/L)				
Aluminum	3/5	182 - 3170	90G00101 [01/29/97]	1564
Antimony	1/5	35.5	90G00101 [01/29/97]	36
Arsenic	3/6	2.1 - 3.5	CEF-P21-GW-002	2
Barium	5/5	14.9 - 109	CEF-P21-GW-002-D	56
Calcium	5/5	23100 - 78300	CEF-P21-GW-001	46690
Chromium	1/5	2.9	90G00101 [01/29/97]	3
Cobalt	2/5	1.1 - 1.2	90G00201 [01/29/97]	1.2
Copper	2/5	1.8 - 4.2	90G00101 [01/29/97]	3
Iron	4/5	240 - 2020	CEF-P21-GW-002	867
Lead	1/5	2.5	90G00101 [01/29/97]	3
Magnesium	5/5	1770 - 12100	CEF-P21-GW-001	5230
Manganese	5/5	5.3 - 157	CEF-P21-GW-003	90
Mercury	1/5	0.28	CEF-P21-GW-002-D	0.2
Potassium	5/5	1040 - 24200	CEF-P21-GW-001	8319
Sodium	5/5	4850 - 7980	CEF-P21-GW-001	6590
Thallium	2/5	3.6 - 6	90G00201 [01/29/97]	5
Vanadium	3/5	2.3 - 11.2	90G00101 [01/29/97]	7
Zinc	5/5	4.2 - 44.8	CEF-P21-GW-002	23
Inorganics, Filtered (ug/L)				
Aluminum, Filtered	1/1	1180	90G00101F [01/29/97]	1180
Antimony, Filtered	1/1	35.2	90G00101F [01/29/97]	35
Barium, Filtered	1/1	13	90G00101F [01/29/97]	13
Calcium, Filtered	1/1	54600	90G00101F [01/29/97]	54600
Chromium, Filtered	1/1	1.5	90G00101F [01/29/97]	2
Cobalt, Filtered	1/1	1.2	90G00101F [01/29/97]	1.2
Copper, Filtered	1/1	3.5	90G00101F [01/29/97]	4
Cyanide	2/5	2.7 - 3.4	90G00201 [01/29/97]	3
Iron, Filtered	1/1	167	90G00101F [01/29/97]	167
Magnesium, Filtered	1/1	1690	90G00101F [01/29/97]	1690
Manganese, Filtered	1/1	5.2	90G00101F [01/29/97]	5
Potassium, Filtered	1/1	980	90G00101F [01/29/97]	980
Sodium, Filtered	1/1	6930	90G00101F [01/29/97]	6930
Vanadium, Filtered	1/1	9.2	90G00101F [01/29/97]	9
Zinc, Filtered	1/1	13.7	90G00101F [01/29/97]	14



DRAWN BY MJJ	DATE 18Nov99	EXISTING GROUNDWATER SAMPLE LOCATIONS AND RESULTS ABOVE CRITERIA SITE 21 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 1-10 / REV 1

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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. The inclusion of this information in one stand-alone section is designed to eliminate repetition of such general procedures elsewhere in the report.

Section 4.0, Physical Characteristics of the Study Area, conforms to the typical Section 3.0 of an 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 (PRE), describes the data evaluation, exposure assessment, and risk characterization.

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

Section 9.0, Summary and Conclusions, 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 21 was performed from April 6 to April 24, 2000. During the field investigation, one permanent monitoring well was installed and sampled, geotechnical soil samples were collected, and aquifer tests were conducted. Information collected during the investigation will be used to evaluate risks in the Preliminary Risk Evaluation (PRE) and to evaluate remedial alternatives in the FFS. The following sections discuss the field investigation activities. The site layout for Site 21 is shown on Figure 1-3. Sample locations are shown on Figure 2-1.

2.1 GROUNDWATER INVESTIGATION

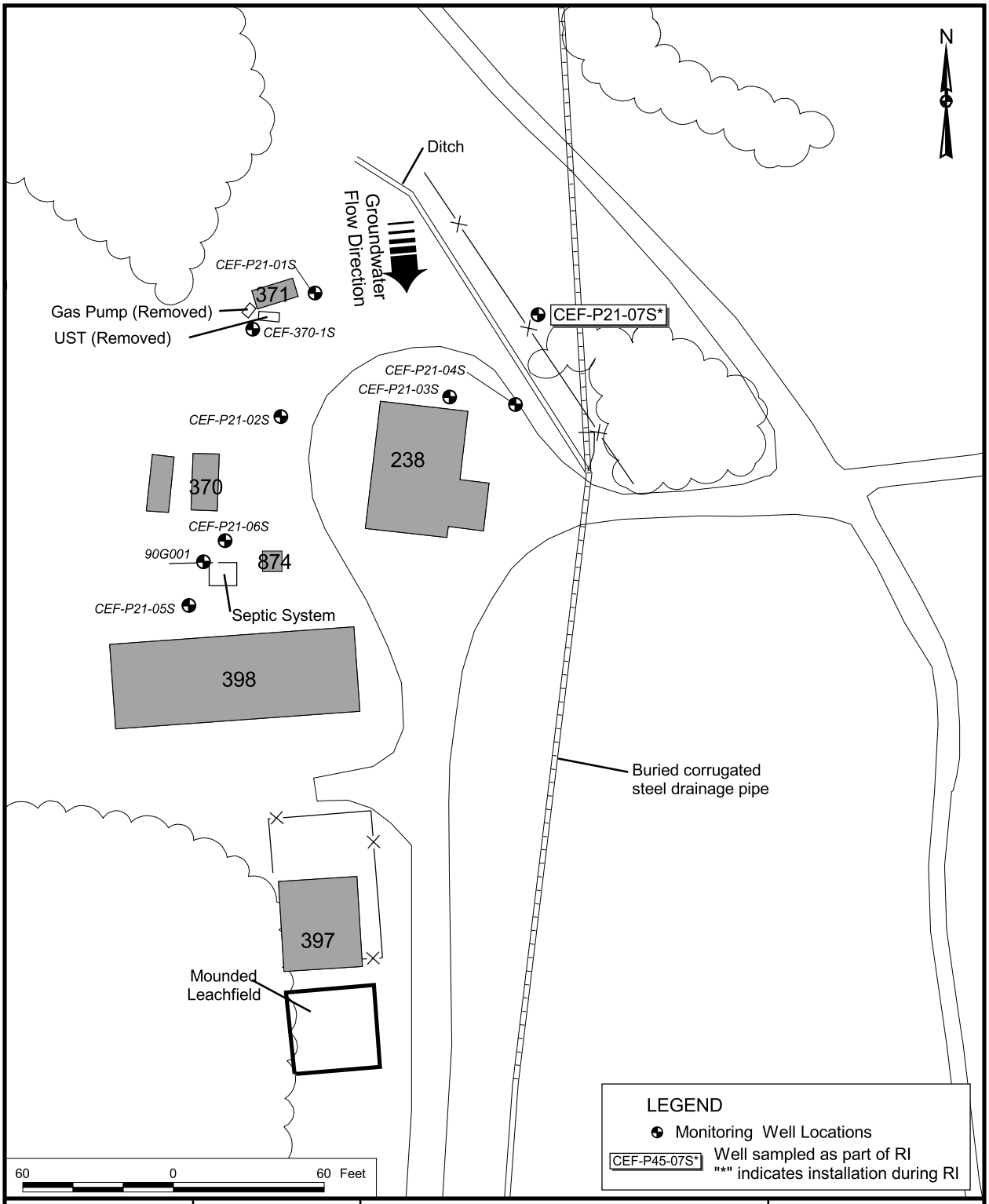
2.1.1 Monitoring Well Construction and Installation

Figure 1-5 presents exceedances of FDEP Groundwater Cleanup Target Levels (GCTLs) at Site 21. As shown in this figure, chlordane concentrations exceed the GCTL. However, no contaminants were detected in the upgradient and downgradient wells, so no additional wells were required to define the extent of contamination.

One well was installed at an SPLP sampling location that had a dieldrin concentration greater than the FDEP GCTL. Before the permanent well was installed, the proposed well location was reviewed and approved by the BCT. Table 2-1 lists the construction and installation details for the newly installed well and for 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.

The new monitoring well was constructed and 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 Procedure and Quality Assurance Manual (EISOPQAM)(USEPA, 1996a).

The shallow monitoring well was installed using hollow-stem auger (HSA) drilling techniques and was advanced to a depth of approximately 15 feet below ground surface (bgs). The monitoring well was 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 well was installed to monitor the top of the surficial aquifer. The top of the screened interval was placed above the water table to allow for the measurement of the thickness of free-phase petroleum product, if present.



DRAWN BY MJJ	DATE 02Oct00	SAMPLE LOCATIONS - RI SITE 21 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 DETAILS
SITE 21 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-P21-1S	Existing	13	3 to 13	76.09
CEF-P21-2S	Existing	13	3 to 13	75.55
CEF-P21-3S	Existing	13	3 to 13	75.88
CEF-P21-4S	Existing	15	5 to 15	75.90
CEF-P21-5S	Existing	12.5	2.5 to 12.5	75.06
CEF-P21-6S	Existing	12.5	2.5 to 12.5	75.20
CEF-P21-7S	New	14	4 to 14	79.40
90G00101	Existing	13	3 to 13	NM

NOTES
Elevation is referenced to 1988 NGVD
bgs - below ground surface
NM - Not measured

The well screen was 10 feet long with 0.010-inch slots. There is sufficient information from the existing monitoring wells to conclude that this well would be screened in fine-grained material (fine sand, silt, and some clay).

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 Sieves No. 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. The bentonite/cement grout was poured into the borehole from the land surface. The concrete used to form the protective pad filled the remaining annular space.

The monitoring well was completed with an 8-inch ID, flush-mounted, protective steel cover with a bolt-on lid. 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, the vertical elevation of the ground surface, protective cover, and the measuring point on the PVC well casing were surveyed. In addition, the horizontal position of the well was surveyed. The vertical elevations are based upon the National Geodetic Vertical Datum (NGVD) 1988, and the horizontal location is based upon the State Plan Coordinates for Florida East Zone, North American Datum, 1983/90. The survey data for the new and existing wells are listed in Appendix A. Well elevation data are included in Table 2-1.

2.1.2 Monitoring Well Development

Following installation, the monitoring well was developed to remove drill cuttings and formation fines from the area around the well screen. The monitoring well was developed 6 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 the well. The well was developed by pumping. During development, pH, temperature, turbidity, and specific conductivity measurements were collected after

each borehole volume was removed. The well was considered developed after these readings stabilized, as determined using the following criteria: pH ±0.1 unit, temperature ±1.0°C, turbidity ≤ 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 (assume 30 percent porosity) was removed. Water quality measurements and the volumes removed were recorded on the well development form, included in Appendix C.

2.1.3 Water-Level Measurements

One round of synoptic water level measurements was collected from the wells on April 24, 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 northern side of the PVC well casing. Water-level measurements were noted with the time and recorded to the nearest 0.01 foot. The logbook notations for the well measurements are included in Appendix C.

2.1.4 Groundwater Sampling

A groundwater sample was obtained from the new well, CEF-P21-7S. Groundwater sampling was conducted in accordance with Section 7.2.3 of the Field Sampling Plan (FSP) for Sites 36 and 37 (TtNUS, 1998), using low-flow sampling techniques. The sample was collected on April 24, 2000.

Before the groundwater sample was collected, 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).

The groundwater sample was collected from the monitoring well using dedicated medical-grade flexible silicon and rigid polyethylene tubing and a peristaltic pump. The tubing was lowered in the well to approximately the midpoint of the well screen. The well was 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 a Low-Flow Purge Data Sheet 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. Sample containers were immediately labeled and placed in a cooler with ice.

The 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).

The groundwater sample collected from the newly installed monitoring well at Site 21 as part of the RI was analyzed for pesticides by U.S. EPA Method SW-846 8081A. A modified method was used so that a low detection limit required for dieldrin could be obtained because the FDEP GCTL is very low.

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-P21-SS-011, to the north of Building 320, and analyzed for total organic carbon (TOC). Undisturbed soil samples (Shelby tube samples) were collected in general accordance with procedures outlined in Section 2.2.3 of the RI report for Sites 36 and 37 (TtNUS, 1998) and were analyzed for the following geotechnical parameters:

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

Shelby tube samples were collected during the installation of shallow well CEF-P21-7S at the intervals of 4 to 6 feet below ground surface (bgs) and 6 to 8 feet bgs. The Shelby tubes that were used consisted of a 3-inch ID by 24-inch-long, thin-walled, seamless aluminum sleeve that 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 it was slowly withdrawn to land surface. Upon retrieval of 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 in two monitoring wells, CEF-P21-4S and CEF-P21-5S. 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 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 that was 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 two. Therefore, the 10 percent frequency criterion was maintained.

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 42 data points were qualified as unusable), indicating that the data completeness objective for the project was achieved.

3.1.2 Field Quality Control Samples

The following field quality control (QC) samples were collected for the sampling efforts.

Field duplicates were obtained at a frequency of one per every ten samples (10% per matrix). Field duplicates for soil samples are two separate samples collected from the same source. Aqueous sample duplicates are collected simultaneously. Duplicates assess the overall precision of the sampling and analysis program.

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.

3.1.3.3.1 Organic Analyses

In general, analytical results for organic compounds were not qualified. Laboratory blank contamination was not noted for organic analyses.

3.1.3.3.2 Inorganic Analyses

In general, analytical results for inorganic compounds were not qualified. Laboratory blank contamination was not noted for inorganic analyses.

3.2 CHEMICAL FATE AND TRANSPORT ANALYSIS

Various aspects of contaminant fate and transport at Site 21 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 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 21 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

TABLE 3-1

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR ORGANIC CHEMICALS
SITE 21 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)
PESTICIDES						
Chlordane	1.61 (25°C)	1E-5 (25°C)	5.60E-02	6.03E+02	1.20E+05 (4)	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 (4)	3.89E-5 (25°C)
Dieldrin	1.75	1.8E-7 (25°C)	1.86E-01	1.23E+04	2.14E+04 (4)	5.84E-5 (25°C)
Toxaphene	1.66	2.00E-01	7.40E-01	3.16E+05	2.57E+05	6.00E-06
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 EPA, 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 USEPA, July 1996b, Soil Screening Guidance.

TABLE 3-2

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR INORGANIC CHEMICALS
SITES 21 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

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 sites, the ketones and some monocyclic aromatics have specific gravities less than 1. The halogenated aliphatics, polycyclic aromatic hydrocarbons (PAHs), PCBs, phthalate esters, and pesticides have specific gravities greater than 1.

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 data show that the various types of pesticides are the predominant contaminants.

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 Contaminant Persistence

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:

- Pesticides
- Metals

3.2.2.1 Pesticides

Whether pesticides are discharged, sprayed, dusted, or applied directly to the soil, the soil is the ultimate sink for the pesticides detected at Site 21. Bioconcentration of pesticides in the food chain is another important fate mechanism. Hydrolysis, oxidation, and photolysis are not generally important fate mechanisms for pesticides in soil or water. Hydrolysis half-lives for several pesticides are reported in periods of months to years (USEPA, 1979). Historically, some of the more common pesticides are discussed below.

- **Dieldrin** is an extremely persistent pesticide but is no longer registered for general use. In soil, dieldrin will persist for long periods of time (more than 7 years) and may slowly evaporate. It does not readily leach to groundwater. Once in surface waters (via runoff), dieldrin adsorbs strongly to sediments and bioconcentrates, and slowly photodegrades. Biodegradation and hydrolysis are not significant (Howard, 1991).

- **Chlordane** adsorbs to organic matter and volatilizes slowly over time. Chlordane does not leach significantly. It is persistent in soil. When volatilized, it readily degrades (ATSDR, 1993).

3.2.2.2 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 21. This discussion focuses on some of the major types of contaminants found at the site.

3.2.3.1 Pesticides

Pesticides were used at this site. Many of the detected compounds are no longer licensed for general sale and use in the United States. It is assumed that the compounds that have been detected are the result of handling of the chemicals and cleaning of application equipment.

The pesticides detected at Site 21 are not considered to be very mobile in the environment. These chemicals, upon application or disposal, tend to remain affixed to soil particles. Migration of pesticides occurs primarily by erosion via the action of wind or water.

3.2.3.2 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.

Metals, other than aluminum, calcium, iron, manganese, sodium and potassium, were not generally 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 21 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 21, groundwater is the focus of the investigation. Therefore, for groundwater, the residential receptor will be used to evaluate potential risks at the site.

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

3.3.1 Data Evaluation

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 21 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 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. 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 PSC 21 (CH2M Hill, 2001) identifies those soil locations that were removed according to the Action Memorandum (TtNUS, 2001).

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 identified the site for recreational uses, and, typically, meeting industrial risk requirements is also protective of recreational users. The post-excavation condition of the site is also evaluated for residential uses. 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 soil concentrations 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 21, 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 (Department of the Navy, 1999). The Site 21 assessment comprises Steps 1 through 3a of the ecological risk assessment process; these steps are described in the remainder of this section.

Step 1: Preliminary Problem Formulation and Ecological Effects Evaluation

- 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, and selection of analytes to be assessed.

- Preliminary Ecological Effects Evaluation - In this phase, medium-specific ecological screening guidelines for each analyte (i.e., concentrations of each contaminant above which adverse effects to ecological receptors may occur) are identified. Contaminant doses associated with toxicity to representative ecological receptors are also identified. This step is undertaken concurrently with the exposure assessment described below.

Step 2: Preliminary Exposure Assessment and Risk Calculation

- Preliminary Exposure Estimate - This portion of the ecological risk assessment includes the identification of data used to represent concentrations of contaminants to which ecological receptors may be exposed in various media and the selection of exposure point contaminant concentrations from those data.

- Preliminary Risk Calculation - In this step, exposure point concentrations are compared to guidelines in order to characterize potential risk to ecological receptors. Analytes that are found to pose potential risk after these comparisons are selected as ecological contaminants of potential concern (COPCs).

Due to the potential complexity of ecological risk assessments, they are often conducted using a tiered approach and punctuated with Scientific/Management Decision Point (SMDPs). SMDPs are meetings involving the risk managers and risk assessment team and are conducted to evaluate the work up to that point and to ensure that the ecological risk assessment is proceeding in an efficient manner. Information analyzed in one tier is evaluated to determine whether the objectives of the study have been met. The results are then used to identify the data required for the next tier, if necessary. The Tier 1 ecological risk assessment is also known as a screening risk assessment. The screening risk assessment uses conservative (i.e. stringent) assumptions to evaluate site data and determine whether additional ecological risk assessment or accelerated site cleanup may be warranted, or that the site poses negligible ecological risks.

The second tier is a baseline ecological risk assessment, which is conducted if the results of the screening-level ecological risk assessment indicate that additional study is warranted. The baseline ecological risk assessment is a more focused study of the initial COPCs, and comprises Steps 3 through 7 of the 8-step ecological risk assessment process. The baseline ecological risk assessment begins with what is commonly referred to as “Step 3a, Refinement of Preliminary Contaminants of Potential Concern” (USEPA, 2000; DON, 1999). Step 3a is a more balanced evaluation of the conservativeness inherent in the first two steps of the risk assessment process, and is described in Section 8.4.

At Site 21, a soil removal action has been conducted. The ecological risk evaluation will only consider the post-excavation conditions.

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

toward 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 these criteria.

3.6 SITE INORGANIC BACKGROUND CONCENTRATIONS

An inorganic background data set (IBDS) was developed for NAS Cecil Field (HLA, 1998). The NAS Cecil Field BCT agreed to a new approach for excluding constituents on the basis of comparison to background. This IBDS 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. The IBDS values are presented in Table 3-3.

For manganese, the BCT agreed that the screening value would be twice the average background concentration. The average background concentration was determined to be 75 µg/L so twice the background concentration is 150 µg/L.

TABLE 3-3

SITE-SPECIFIC INORGANIC BACKGROUND DATA SET
SITE 21 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

Site 21 is located at the center of the Golf Course, about 1,500 feet north of the clubhouse. The site is essentially flat, with very little change in elevation. The site and roads at the site are unpaved. As described in Section 2.0, there are several buildings on the site. The area adjacent to the east, north, and south of the site is generally open and consists of tee boxes, greens, and fairways. The area to the west of the site is wooded.

4.2 SURFACE HYDROLOGY/STORM SEWERS

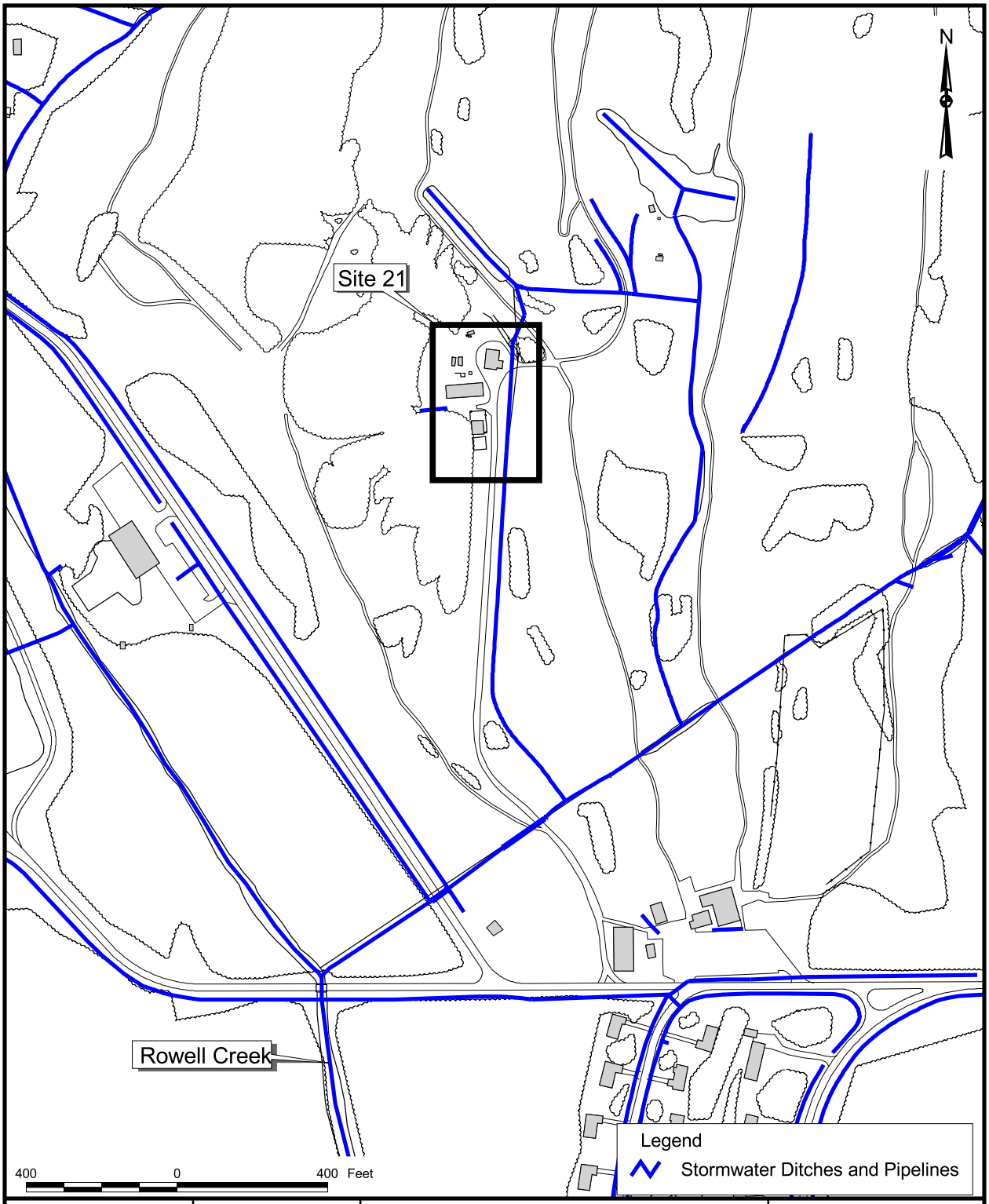
A shallow drainage ditch forms the northeastern and eastern borders of the site. This ditch receives runoff from most of the site and from the adjacent golf course. Runoff in the ditch flows to the south. East of Building 238, the ditch enters a large, shallow concrete structure. The ditch continues as a channel through the structure, then exits the structure through a 12-inch diameter buried pipe. The pipeline continues to the south for about 250 feet and discharges into a drainage ditch. Runoff from this ditch ultimately flows into Rowell Creek. Figure 4-1 shows the storm water drainage ditches.

Overflow from a pond and drainage system northeast of the site enters the ditch on the northeastern side of the site by way of an underground pipeline just north of the concrete structure.

Some of the drainage on the far western side of the site flows westward to a cypress dome (HLA, 1999b).

4.3 SOILS

Soils in the area of NAS Cecil Field occupied by Site 21 are classified as Albany fine sand (0 to 5 percent slopes) and Olustee fine sand (SCS, 1978). The Albany fine sand covers most of the site, and the Olustee fine sand covers a small portion of the southeastern side of the site. Albany fine sand is a nearly level to gently sloping somewhat poorly drained soil found on narrow to broad ridges and isolated knolls. Olustee fine sand is a nearly level, poorly drained soil in broad flatwood areas.



DRAWN BY MJJ	DATE 02Oct00	SURFACE WATER DRAINAGE SITE 21 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\psc21_RI.apr 26Jun00 MJJ 4-1_Surface Water Drainage Layout

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.

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 eight shallow wells (approximately 15 feet bgs) installed prior to and 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-P21-7S at approximately 4 to 6 feet bgs and approximately 6 to 8 feet bgs. Geotechnical analyses performed on these samples included sieve analysis, moisture content, pH, dry unit weight, specific gravity, and porosity.

The sieve analyses for the samples indicated that they were principally composed of fine sand (approximately 74 to 85 percent) and that the fines (silts and clays) composed 15 to 26 percent of the samples. The United Soil Classification System (USCS) soil classification for soils with these compositions is silty sand (SM). The specific gravity of the samples ranged from 2.64 to 2.73, which agrees with their overall composition (sand) and mineralogy (quartz). The porosity for the samples ranged from 37.9 to 42.3 percent.

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. The 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 to 95 feet thick beneath the site. They are susceptible to contamination because of their shallow depth.

4.5.2 <u>Site Hydrogeology</u>

4.5.2.1 General Description

Depth to groundwater at Site 21, as measured in April 2000, ranged from approximately 4.5 to 9.5 feet bgs. The surficial aquifer system in which the wells were installed is approximately 90 to 100 feet thick in the NAS Cecil Field area, although wells at Site 21 monitor only the upper portion to a depth of 15 feet bgs. Based on boring logs for wells installed at the site, aquifer materials consist of sediments ranging from silty fine sand with a trace to some clay to fine sand.

4.5.2.2 Aquifer Characteristics

Specific capacity (SPECAP) tests were performed on two wells (CEF-P21-MW-1S and CEF-P21-MW-5S). The tests were used to determine each well's specific capacity, hydraulic conductivity, and transmissivity.

TABLE 4-1

LOCAL HYDROSTRATIGRAPHY
SITE 21 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).

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 grained 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 2.8×10^{-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 1.7 feet/day and 4.9 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 24, 2000. 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 to the south, consistent with Site 11, a nearby site, and the groundwater gradient is approximately 0.0017.

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,

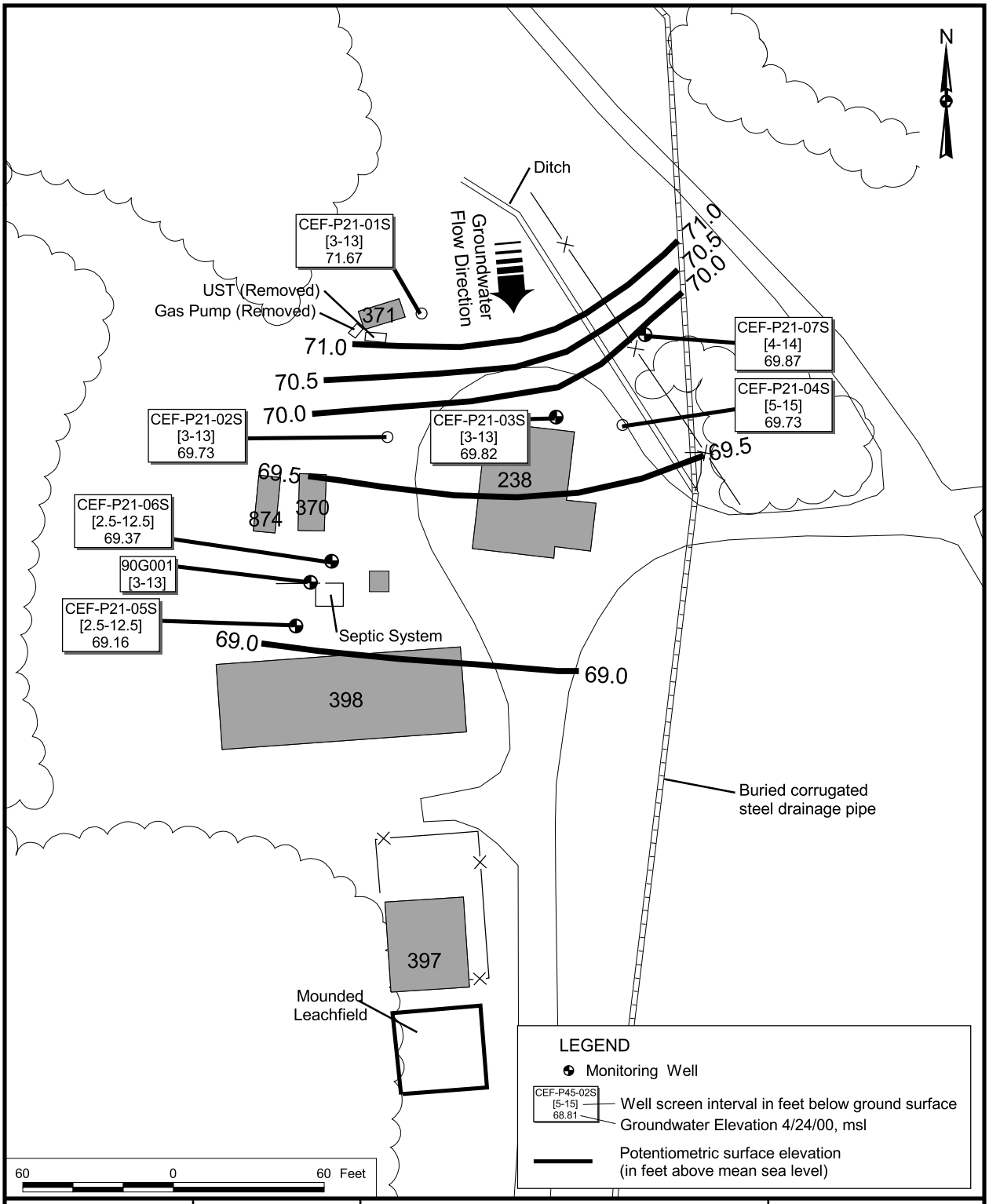
V_h is horizontal velocity, ft/day
K_h is horizontal hydraulic conductivity, ft/day
i is hydraulic gradient, dimensionless
n_e is effective porosity, dimensionless (assumed at 0.15 for fine sands)

TABLE 4-2

SYNOPTIC WATER LEVELS
SITE 21 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-P21-1S	13	3 to 13	76.09	4.42	71.67
CEF-P21-2S	13	3 to 13	75.55	5.82	69.73
CEF-P21-3S	13	3 to 13	75.88	6.06	69.82
CEF-P21-4S	15	10 to 15	75.90	6.17	69.73
CEF-P21-5S	12.5	2.5 to 12.5	75.06	5.90	69.16
CEF-P21-6S	12.5	2.5 to 12.5	75.20	5.83	69.37
CEF-P21-7S	15	10 to 15	79.40	9.53	69.87
90G00101	13	3 to 13	NM	-	-

NOTES
Elevation is referenced to 1988 NGVD
bgs - below ground surface
Depth to water from top of casing measured 4/24/00
NM - Not measured



DRAWN BY MJJ	DATE 02Oct00	POTENTIOMETRIC SURFACE MAP SITE 21 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

P:\GIS\NAS_CecilField\psc21_RI.apr 26Jun00 MJJ 4-2_Potentiometric Layout

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 is the average of values derived from the specific capacity test data for wells CEF-P21-1S and CEF-P21-5S.

K_h = 3.3 ft/day
i = 0.017
n_e = 0.15.

The resulting V_h is 0.37 ft/day or 136 ft/year.

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 21 (and the area around it) is for recreational purposes.

5.0 NATURE AND EXTENT OF CONTAMINATION

5.1 SOILS

Arsenic, TRPH, total chlordane, 4,4'-DDT, toxaphene, and dieldrin were detected at concentrations in excess of the industrial Soil Cleanup Target Levels (SCTLs) and/or FDEP leachability criteria for protection of groundwater. The BCT reviewed analytical results, and a decision was made to delineate the extent of contaminated soil. Additional site background information can be obtained in the Action Memorandum (TtNUS, 2001).

It was decided that soil samples with contaminant concentrations greater than three times the FDEP industrial SCTLs and greater than the leachability criteria would be excavated. Excavation of these soils will protect the groundwater and human health. Some soil samples still present on site may have concentrations in excess of the industrial SCTL, but the exposure concentration would still be less than the industrial SCTL.

The exposure concentration is represented best by the 95 percent upper confidence limit (UCL) of the mean. The excavated sample points were assumed to be replaced with clean fill having contaminant concentrations equal to one-half the contaminant's detection limit. If the UCL is less than the industrial SCTL for each contaminant, protection of human health criteria is met.

For Site 21, the UCLs are less than industrial SCTLs when samples with concentrations greater than three times their respective SCTLs are removed. In addition, samples with concentrations greater than leachability criteria were excavated. Therefore, the pickup levels for the COCs were the lesser of the leachability criteria and three times the industrial SCTL. This is described in the Action Memorandum (TTNUS, 2001).

This removal action was performed in May and June, 2001 (CH2M Hill, 2001). The UCLs of the concentrations of arsenic, TRPH, total chlordane, 4,4'-DDT, toxaphene, and dieldrin in the soil that remain will conform to FDEP industrial exposure criteria (TtNUS, 2001).

5.2 GROUNDWATER

A sample of groundwater was collected during the RI from one permanent monitoring well, CEF-P21-07S, at the location where a soil sample SPLP result suggested that dieldrin would leach into the groundwater. No dieldrin or other pesticides were detected in the groundwater sample. Chlordane in the groundwater

near well 90G00101 had been delineated during an investigation prior to the RI. A complete database summary is provided in Appendix D.

The RI and previous investigation results are depicted on Figure 5-1. This figure also includes the chlordane results from the previous investigation. 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 chlordane in FAC 62-777.

At well 90G00101, only chlordane had been detected at concentrations greater than FDEP criteria during previous investigations. The chlordane had been previously delineated, and appears to be limited to the shallow zone of the surficial aquifer. Because the concentration of chlordane was only slightly higher than the GCTL, no deeper wells were installed. During an earlier sampling event, DDD had been detected at a concentration of 0.12 µg/L compared to a GCTL of 0.1 µg/L. In a subsequent sampling event, the detection limit for DDD was greater than the GCTL. Because the previous concentration was so close to the GCTL and because of the presence of chlordane at a concentration greater than its GCTL, further analysis for DDD was not performed. No other organic compounds or inorganics were detected during previous investigations, and therefore, no other compounds were evaluated in the RI.

The manganese concentrations for two wells from the existing data set were slightly greater than twice the average background concentration. However, manganese is not believed to be a component of materials used at the site and, therefore, is not site related. These wells were not sampled during the RI and the existing data was used for further evaluation.

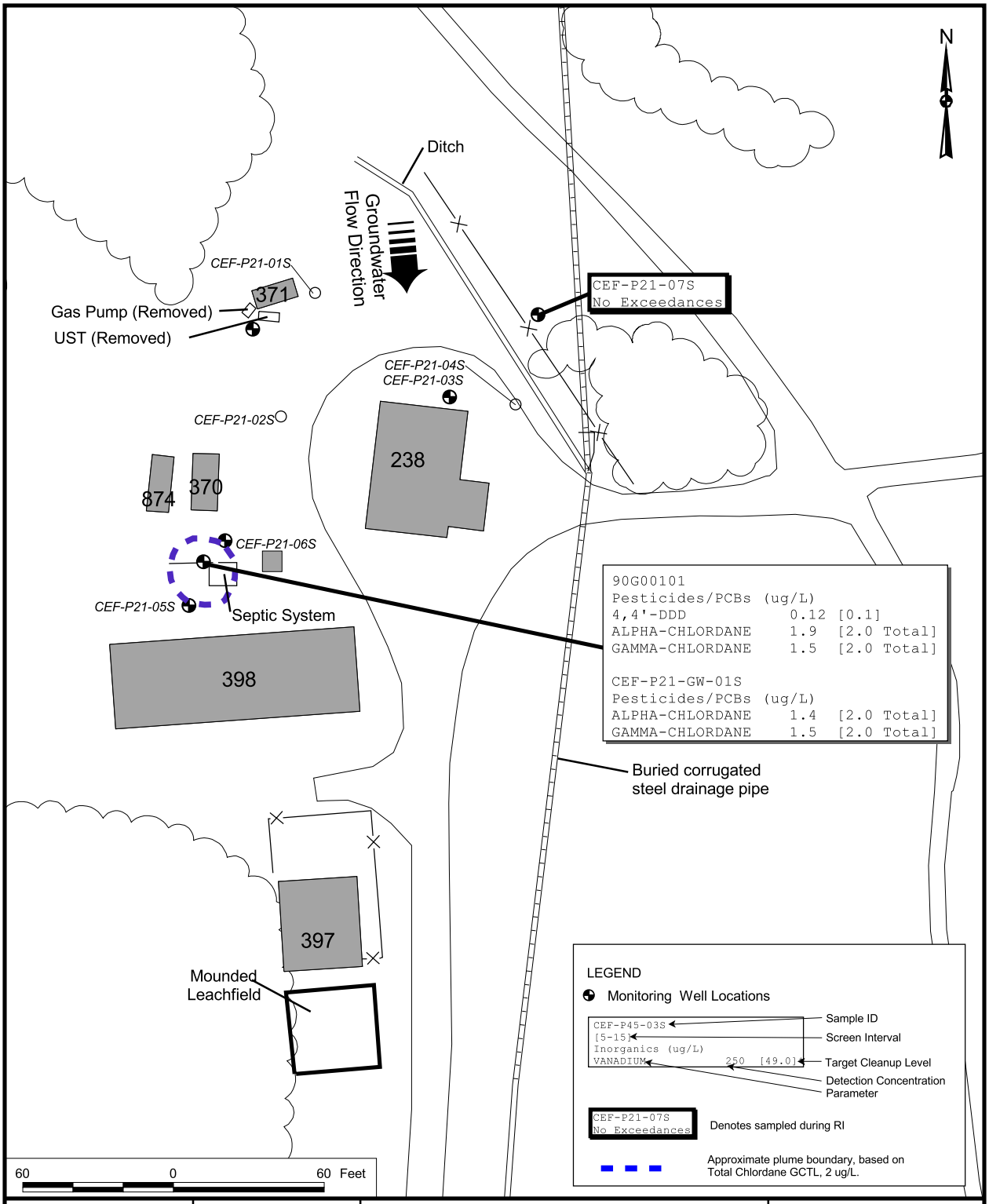
5.3 SUMMARY

One plume, as defined by the 2 µg/l total chlordane criterion, was identified. The plume is centered on the septic field south of Building 320 and is estimated to be less than 30 feet in diameter. The contamination appears to be limited to the shallow zone of the surficial aquifer. No other contaminants are present at concentration greater than the FDEP criteria.

5.4 COMPARISON TO STATE CRITERIA AND MCLS

The following were detected in at least one monitoring well sample at concentrations greater than the FDEP criteria.

- Total chlordane
- DDD



DRAWN BY MJJ	DATE 02Oct00	GROUNDWATER RESULTS ABOVE CRITERIA - EXISTING DATA AND RI DATA SITE 21 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 1

P:\GIS\NAS_CecilField\psc21_RI.apr 26Jun00 MJJ 5-1_RI Groundwater Results Layout

The following were detected in at least one monitoring well sample at concentrations greater than USEPA Maximum Contaminant Levels (MCLs).

- Total Chlordane

The existing data shows that the manganese concentration in two wells is greater than two times the average background manganese concentration.

6.0 CONTAMINANT FATE AND TRANSPORT

The analytical data for samples collected at Site 21 indicate that chemical migration may have occurred. Arsenic, TRPH, total chlordane, 4,4'-DDT, toxaphene, and dieldrin were detected in soil. Of these contaminants, only chlordane was detected in groundwater during the RI and previous investigations at concentrations exceeding criteria. TRPH, 4,4'-DDT, toxaphene, and dieldrin were not detected in groundwater, but this would not be unexpected because they are relatively immobile. The low concentration and minimal extent of the chlordane are consistent with the relative immobility of the compound. The absence of arsenic in the groundwater could be attributable to local site conditions that minimize the migration of arsenic into the groundwater.

Chlordane has been transported into the groundwater but concentrations greater than the GCTL appear to be limited to the shallow zone. Because of the low contaminant concentrations and based on observations of other groundwater plumes at NAS Cecil Field, no deeper wells were determined to be necessary to delineate the plume. The direction of horizontal groundwater flow is toward the south.

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

The size of the chlordane plume, based on the FDEP chlordane GCTL of 2 µg/L, is estimated to be less than 30 feet in diameter. The groundwater gradient is not very steep, and this also appears to have limited the expansion of the plume.

Several of the highest concentrations of chlordane in soil were found a distance from the plume. No chlordane was detected in groundwater samples from wells near the soil contamination. However, the chlordane groundwater contamination is centered on a septic field, which may be the source of the contamination. Soil contaminated with arsenic and pesticides was removed in accordance with the Action Memorandum (TtNUS, 2001) and as described in the Source Removal Report (CH2M Hill, 2001). The origin of the chlordane is likely from the handling of the pesticides in this area.

Rowell Creek is more than 1,400 feet to the south and west. Because of the large distance and relatively low contaminant concentration, it is unlikely that contaminants could reach the waterway.

7.0 HUMAN HEALTH 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 21. 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 21 (Table 7-1), no VOCs, SVOCs, 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 manganese and chlordane were detected at concentrations exceeding their FDEP criteria. In two groundwater samples (Table 7-2), manganese concentrations exceeded twice the background concentration.

To assess the potential risk associated with exposure to manganese and chlordane, the maximum concentrations of each constituent were compared to their respective Region 9 PRGs. The Region 9 PRG corresponds to a HQ of 1.0 for noncarcinogens and a risk level of 10^{-6} for carcinogens. With a maximum manganese concentration of 157 µg/L, the HQ is 0.2, which suggests that exposure to groundwater does not pose a significant noncarcinogenic risk to human health. Moreover, the average manganese concentration is less than the NAS Cecil Field IBDS concentration. With a maximum chlordane concentration of 0.46 µg/L, the risk level is 1.5×10^{-5}. This exceeds the target risk level for FDEP, but falls within EPA's target risk range.

7.2 SOIL EVALUATION

In the soil at Site 21 prior to the removal action (Table 7-3), no VOCs, SVOCs, or PCBs were detected at concentrations greater than the FDEP direct exposure residential or industrial/commercial criteria. Of the metals and pesticides, arsenic, 4,4'-DDT, chlordane, toxaphene, and dieldrin were detected at maximum concentrations greater than their direct exposure residential and industrial/commercial criteria. Constituents such as methylene chloride, 4-nitrophenol, alpha-BHC beta-BHC and gamma-BHC were detected at maximum concentrations greater than their leachability criteria, but not at concentrations greater than residential or industrial/commercial criteria. However, these constituents were not detected in groundwater. Moreover, except for methylene chloride, these constituents were infrequently detected

TABLE 7-1

GROUNDWATER ANALYTES DETECTED ABOVE SCREENING CRITERIA
SITE 21 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 9 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)								
Chlordane	2/10	2.9	-	2 MCL	2 P	0.19	15.3	C
Inorganic Analytes (ug/L)								
Manganese	4/5	157	150	50 SMCL	50 S	880	0.2	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 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

	Manganese	Chlordane
FDEP GCTL	50	2
Region IX PRG	880	0.19
NAS Cecil Field IBDS	150	NA
Maximum Detected	157	2.9
Average Concentration	111	0.46
Risk Ratio	0.2	15.3

90G00201	35.1	**0.025**
CEF-P21-GW-001	156	***0.025***
CEF-P21-GW-002	*95*	***0.05***
CEF-P21-GW-003	157	**0.05**
CEF-P21-GW-01S		2.9
CEF-P21-GW-04S		***0.05***
CEF-P21-GW-05S		***0.5***
CEF-P21-GW-06S		**0.1**
90G00101	5.3	

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

TABLE 7-3

SOIL ANALYTES DETECTED ABOVE SCREENING CRITERIA (PRE-REMOVAL)
SITE 21 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 (ug/Kg)								
Methylene chloride	14/23	1,100	NA	16,000	23,000	20	0.05	C
Semivolatile Organic Compounds (ug/Kg)								
4-Nitrophenol	2/47	390	NA	390,000	4,400,000	300	$9x10^{-5}$	N
Pesticides/PCBS (ug/Kg)								
4,4'-DDT	36/95	152,000	NA	3,300	13,000	11,000	11.7	C
Chlordane	76/95	108,200	NA	3,100	12,000	9,600	9.0	C
Dieldrin	26/96	2,680	NA	70	300	4	8.9	C
Toxaphene	12/95	8,700,000	NA	1,000	3,700	31,000	2351	C
Alpha-BHC	1/95	9.2	NA	200	500	0.3	0.02	C
Delta-BHC	1/95	120	NA	600	2,100	1	0.06	C
Gamma-BHC	1/95	110	NA	700	2,200	9	0.05	C
Inorganic Constituents (mg/Kg)								
Arsenic	102/138	136	2.04	0.8	3.7	29	36.7	C
Total Recoverable Petroleum Hydrocarbons (mg/Kg)								
TRPH	32/38	3,600	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

(detected in less than 5 percent of their samples). Methylene chloride is generally considered to be a common laboratory contaminant. 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 leachability criterion, but TRPH was not detected in groundwater at concentrations greater than its FDEP groundwater criterion.

Chlordane, 4,4'-DDT, dieldrin, toxaphene, 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 3×10^{-3} for industrial workers. This value is greater than EPA's target risk range and FDEP's target risk level of 10^{-6}. 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 Site 21, removal of soil with contaminant concentrations greater than three times their FDEP industrial SCTLs would result in UCL concentrations less than their respective industrial SCTLs. In addition, soils with contaminant concentrations greater than their respective leachability criteria were also removed. 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).

The removed soil at Site 21 was replaced with clean fill. Post-removal concentrations of constituents at Site 21 were derived by replacing the removed soil sample results with values equal to one-half the detection limit of the constituent.

The post-removal UCLs of all constituents of potential concern at Site 21 are less than their respective industrial SCTLs (Table 7-4). All samples have concentrations less than their respective leachability criteria.

Overall, for industrial exposure, the cumulative hazard index for the post-removal soil is 0.02, less than the target hazard index of 1.0. The cumulative cancer risk is 6.2×10^{-7}, less than the FDEP's and EPA's target risk.

TABLE 7-4

POST-REMOVAL ACTION RISK EVALUATION
INDUSTRIAL RECEPTOR
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Detected Minimum Concentration	Detected Maximum Concentration	Mean	UCL	FDEP Direct Exposure Industrial[1]	FDEP Leachability[1]	Risk Ratio[2]	Cancer Risk	Hazard Quotient
Arsenic (mg/kg)	0.36	11	1.51	1.54	3.7	29	0.4	4×10^{-7}	NA
4,4'-DDT	28	5740	91	101	13,000	11,000	0.008	8×10^{-9}	NA
Chlordane	8.7	3860	183	201	12,000	9,600	0.017	2×10^{-8}	NA
Dieldrin	0.85	1.8	9.5	10.1	300	4	0.034	3×10^{-8}	NA
Toxaphene	410	3620	515	552	3,700	31,000	0.15	2×10^{-7}	NA
TRPH	12	152	60	61	2,500	340	0.02	NA	0.02
							Total	6.2×10^{-7}	0.02

1 FDEP Draft Soil Cleanup Target Levels (FAC 62-777) (August 1999).
2 Ratio of UCL and FDEP Direct Exposure Industrial value.

The post-removal UCLs of 4,4'-DDT, chlordane, dieldrin, and TRPH are less than their respective residential PRGs. The post-removal UCL for arsenic exceeds its residential PRGs, but is less than its Cecil Field IBDS value. The post-removal UCL for toxaphene 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 5.7×10^{-6}, with arsenic at a UCL concentration less than 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 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Detected Minimum Concentration	Detected Maximum Concentration	Mean	UCL	EPA Region 9 Residential PRG[1]	FDEP Leachability[2]	Risk Ratio[3]	Cancer Risk	Hazard Quotient
Arsenic (mg/kg)	0.36	11	1.51	1.54	0.39	29	3.9	3.9×10^{-6}	NA
4,4'-DDT	28	5740	91	101	1,700	11,000	0.06	6×10^{-8}	NA
Chlordane	8.7	3860	183	201	1,600	9,600	0.1	1×10^{-7}	NA
Dieldrin	0.85	1.8	9.5	10.1	30	4	0.3	3×10^{-7}	NA
Toxaphene	410	3620	515	552	440	31,000	1.3	1.3×10^{-6}	NA
TRPH	12	152	60	61	340[2]	340	0.2	NA	0.2
							Total	5.7×10^{-6}	0.2

1 EPA Region 9 Preliminary Remediation Goal.
2 FDEP Draft Soil Cleanup Target Levels (FAC 62-777) (August 1999).
3 Ratio of UCL and FDEP Direct Exposure Industrial value.
4 All values µg/kg, except as noted.

8.0 ECOLOGICAL RISKS

A screening ecological risk assessment was conducted to evaluate the potential post-excavation risks to ecological receptors at Site 21 following recent soil remediation activities. Thus, all data evaluated herein were from samples collected outside the excavated areas. The ecological assessment was conducted in accordance with the guidance described by USEPA (USEPA, 1997) and USEPA Region 4 (USEPA, 2000) and the Navy (Department of the Navy, 1999) for Steps 1 through 3a of ecological risk assessments. Steps 1 through 3a consist of the following:

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

8.1 PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

Site 21 consists of approximately 1.5 acres of buildings, structures, gravel-covered areas, and turf grass (Figure 8-1). Approximately one-half of the site is vegetated with grass, weeds, and a few scattered slash pines (*Pinus elliottii*). A tee area, green, fairways, and sand traps associated with the 10th and 11th holes of the golf course are located immediately east of the site. A wooded area is located immediately west of the site. The overstory in most of the nearby wooded area is dominated by slash pine. Other trees in the wooded area include longleaf pine (*Pinus palustris*), sweetgum (*Liquidambar styraciflua*), and various oaks (*Quercus* spp.). The understory of the wooded area consists primarily of saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), greenbriar (*Smilax spp*.), and wild grape (*Vitis spp.*). The terrain in the vicinity of the site is flat.

Site 21 is used as a center of operations for maintenance of the golf course at NAS Cecil Field. The gravel-covered areas, buildings, and structures that cover approximately one-half of the site provide negligible habitat for ecological receptors. The turf grass areas at the site provide limited habitat of marginal quality for receptors such as terrestrial invertebrates, lizards, and songbirds. The nearby fairways also provide turf grass habitat for receptors such as terrestrial invertebrates, lizards, and songbirds.

The nearby wooded area provides habitat for species typically found in pine woods habitat throughout NAS Cecil Field. Birds such as the brown-headed nuthatch (*Sitta pusilla*), prairie warbler (*Dendroica discolor*), rufous-sided towhee (*Pipilo erythrophthalmus*), red-bellied woodpecker (*Melanerpes carolinus*) and various other species utilize the wooded area. Mammals such as the gray squirrel (Sciurus

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DRAWN BY MJJ	DATE 01Dec00	AERIAL PHOTO MAP SITE 21 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
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SCALE AS NOTED			DRAWING NO. FIGURE 8-1 / REV 1

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carolinensis), cotton rat (*Sigmodon hispidus*), cotton mouse (*Peromyscus gossypinus*), short-tailed shrew (*Blarina carolinensis*), and red fox (*Vulpes vulpes*) would be expected to utilize this habitat, at least occasionally. Amphibians and reptiles such as the oak toad (Bufo quercicus), box turtle (*Terrapene carolina*), and black racer (*Coluber constrictor*) would also be expected here. Most of the same species of birds, mammals, reptiles, and amphibians present in the wooded area would also be expected to occasionally forage in the weedy areas at the edge of the wooded area.

The contaminant source at Site 21 is the pesticide mixing area. The nature and extent of contamination were discussed in Section 5.0. The contaminant migration pathways applicable at the site include volatilization, erosion, overland runoff and infiltration. Contaminants in the soil could volatilize from surficial material or become airborne through wind erosion, although the gravel and grass covering most of the pesticide mixing area, as well as the vegetation and pine needles in the wooded area, minimize the wind erosion pathway. Surface soil, if disturbed, could serve as a source for airborne transport of contaminants, which could then be transported to downwind locations. Precipitation runoff could carry contaminants to off-site locations. However, the flat topography throughout the site minimizes this migration pathway. Infiltrating precipitation could cause contamination of subsurface soil and groundwater. Groundwater from the site could eventually discharge to surface water. However, considering the low concentrations and the distance to Rowell Creek (1,000 feet), it is unlikely that the contaminant plume could reach surface water. The groundwater-to-surface water migration pathway will be investigated in the Technical Memorandum report for PSC 51, which will investigate the surrounding golf course.

Animals could be exposed to site-related soil contaminants through the ingestion of contaminated food items. Animals could also incidentally ingest soil while grooming fur, preening feathers, digging, grazing close to the soil, or feeding on items to which soil has adhered (such as roots and tubers). Terrestrial vegetation could be exposed to contaminants via direct aerial deposition and root translocation. Exposure to contaminants in the soil via dermal contact may occur but is unlikely to represent a major exposure pathway because fur, feathers, and chitinous exoskeletons minimize transfer of contaminants across dermal tissue.

All analytes (except calcium, magnesium, potassium, and sodium) detected in surface soil samples collected from locations outside the remediation areas were evaluated. Calcium, magnesium, potassium, and sodium were excluded since they are essential nutrients that are toxic only at extremely high concentrations. The limited toxicity data available indicate that high dietary intake of these nutrients is well tolerated.

One of the tasks in preliminary problem formulation is the selection of preliminary assessment and measurement endpoints. An assessment endpoint is defined as "an explicit expression of actual environmental values that are to be protected" (USEPA, 1997). Region 4 has specified that assessment endpoints for the screening-level assessment should be broad and generic. For this screening level assessment, the assessment endpoint is the protection of terrestrial organisms from adverse effects of chemicals on their growth, survival, and reproduction. Measurement endpoints represent the assessment endpoints chosen for a site, and are measures of biological effects (USEPA, 1997). Measurement endpoints for the screening level assessment are chemical concentrations in surface soil associated with adverse effects on growth, survival, and reproduction of terrestrial organisms. The measurement endpoints are represented by EPA Region 4 ecological screening values for surface soil.

The objective of the assessment was to determine if exposure to contaminants present in surface soil at Site 21 is likely to result in declines in ecological receptor populations.

8.2 PRELIMINARY EXPOSURE ESTIMATE AND RISK CALCULATION

Maximum chemical concentrations in surface soils were compared to conservative ecological screening values established by USEPA Region 4 (USEPA, 2000). The ratio of the chemical concentration to the screening value is called the hazard quotient (HQ). When the HQ exceeded 1.0, adverse impacts were considered possible, and the chemical was selected as a COPC.

8.3 SCREENING RESULTS

The results of the screening-level comparisons are presented in Table 8-1. The data set from which Table 8-1 was generated consists of all surface soil samples collected from outside the remediation areas. Table 1-1, however, presents data for all soil samples (surface and subsurface), and includes samples collected from areas that were later targeted for excavation. Thus, some values differ between the two tables.

Two VOCs were detected in Site 21soils; concentrations of these two analytes were less than EPA Region 4 ecological screening values (Table 8-1). Thus, based on these results, ecological risks from VOCs at Site 21 are negligible. Chemicals with maximum concentrations that exceeded USEPA Region 4 ecological screening values consisted of two SVOCs, four pesticides, one PCB, and eight inorganics (Table 8-1 and Figure 8-2). In addition, screening values were not available for two SVOCs, four pesticides, and one herbicide that were detected in Site 21 soils. Table 8-2 presents the range of detection limits for non-detected chemicals in surface soil at the site.

TABLE 8-1

SELECTION OF CONTAMINANTS OF POTENTIAL CONCERN
SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

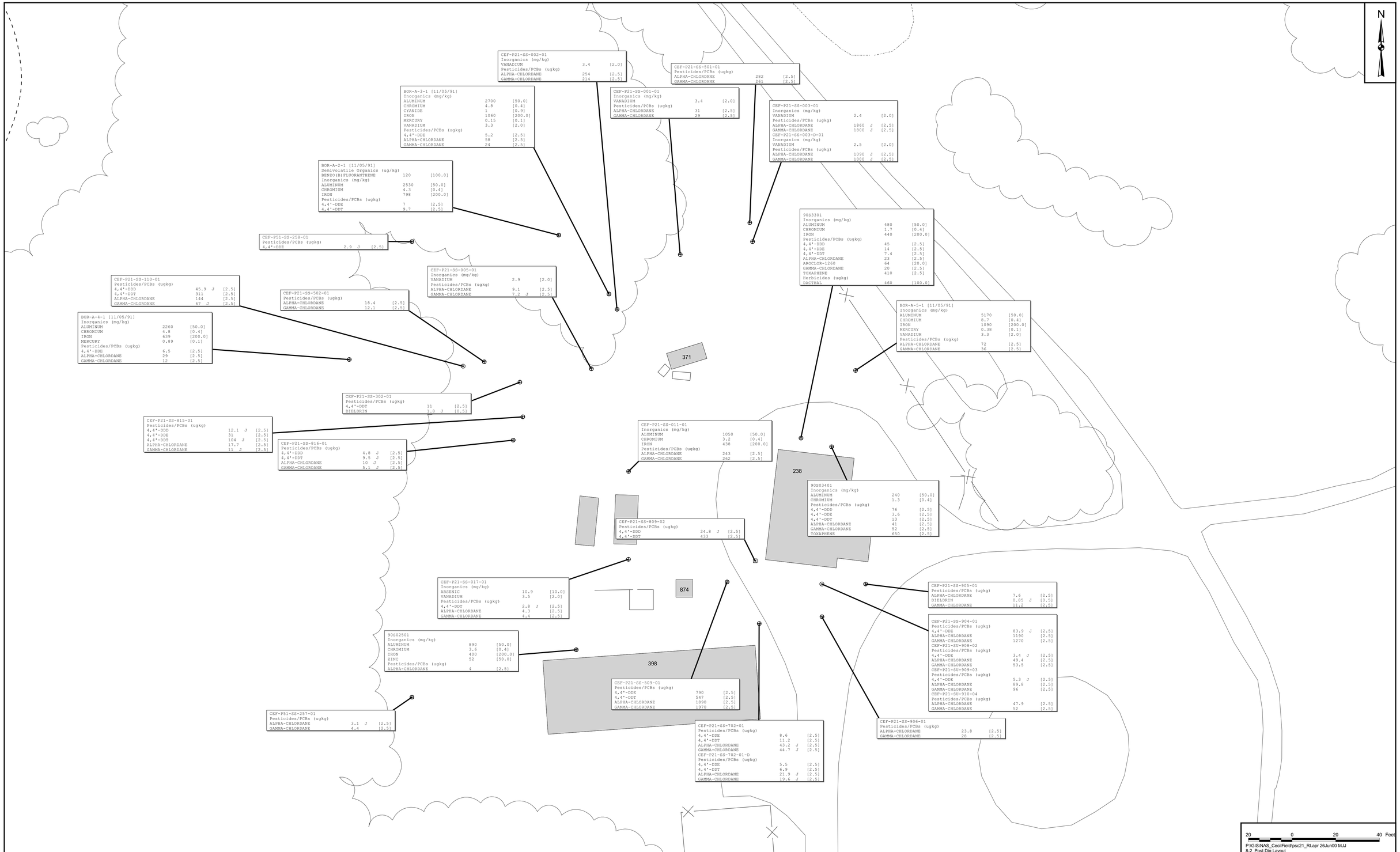
Analyte	Frequency of Detection	Range of Detection		Range of Detection Limits	Location of Maximum	EPA Region 4 Screening Value	Maximum Hazard Quotient	Selected as COPC (Yes/No?)
		Minimum	Maximum					
Volatile Organics (µg/kg)								
Methylene Chloride	6/9	17	740	5.6 - 170	BOR-A-2-1 [11/05/91]	2000	0.4	No
Toluene	1/9	2.1	2.1	1 - 21	90S03401	50	0.04	No
Semivolatile Organics (µg/kg)								
2-Methylphenol	1/8	110	110	170 - 470	BOR-A-3-1 [11/05/91]	NA	NA	Yes
Benzo(a)pyrene	1/8	67	67	87 - 460	BOR-A-2-1 [11/05/91]	100	0.7	No
Benzo(b)fluoranthene	2/8	56	120	170 - 460	BOR-A-2-1 [11/05/91]	100[a]	1.2	Yes
Benzo(k)fluoranthene	1/8	87	87	170 - 460	BOR-A-2-1 [11/05/91]	100[a]	0.9	No
Benzoic acid	1/4	800	800	2000 - 2300	BOR-A-4-1 [11/05/91]	NA	NA	Yes
Bis(2-ethylhexyl)phthalate	3/8	72	110	170 - 400	BOR-A-2-1 [11/05/91]	100[b]	1.1	Yes
Chrysene	1/8	81	81	170 - 460	BOR-A-2-1 [11/05/91]	100[a]	0.8	No
Di-n-butyl phthalate	1/5	82	82	170 - 460	BOR-A-2-1 [11/05/91]	200,000	0.0004	No
Indeno(1,2,3-cd)pyrene	1/8	55	55	170 - 460	BOR-A-2-1 [11/05/91]	100[a]	0.6	No
Pyrene	1/8	64	64	170 - 460	BOR-A-2-1 [11/05/91]	100	0.6	No
Pesticides/PCBs (µg/kg)								
4,4'-DDD	5/26	4.8	76	3.5 - 490	90S03401	2.5	30.4	Yes
4,4'-DDE	12/26	1.4	790	3.5 - 490	CEF-P21-SS-509-01	2.5	316.0	Yes
4,4'-DDT	10/26	2.8	547	3.5 - 490	CEF-P21-SS-509-01	2.5	218.8	Yes
Alpha-Chlordane	22/26	1.9	1890	3.8 - 110	CEF-P21-SS-509-01	NA	NA	Yes
Aroclor-1260	1/10	64	64	34 - 1100	90S3301	20[c]	3.2	Yes
Dieldrin	2/26	0.85	1.8	1.8 - 250	CEF-P21-SS-302-01	0.5	3.6	Yes
Gamma-Chlordane	21/26	1.5	1970	3.6 - 110	CEF-P21-SS-509-01	NA	NA	Yes
Heptachlor epoxide	1/26	1.3	1.3	1.8 - 250	CEF-P21-SS-702-01 AVG	NA	NA	Yes
Toxaphene	2/26	410	650	72 - 25000	90S03401	NA	NA	Yes
Herbicides (µg/kg)								
Dacthal	1/3	460	460	22	90S3301	NA	NA	Yes
Inorganics (mg/kg)								
Aluminum	8/8	240	5170	0	BOR-A-5-1 [11/05/91]	50	103.4	Yes
Arsenic	33/51	0.36	10.9	0.36 - 3.9	CEF-P21-SS-017-01	10	1.1	Yes
Barium	5/8	6.4	15.1	22 - 23	BOR-A-2-1 [11/05/91]	165	0.1	No

TABLE 8-1

SELECTION OF CONTAMINANTS OF POTENTIAL CONCERN
SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Detection		Range of Detection Limits	Location of Maximum	EPA Region 4 Screening Value	Maximum Hazard Quotient	Selected as COPC (Yes/No?)
		Minimum	Maximum					
Chromium	8/8	1.3	8.7	0	BOR-A-5-1 [11/05/91]	0.4	21.8	Yes
Cobalt	1/8	1.7	1.7	0.22 - 6	BOR-A-5-1 [11/05/91]	20	0.1	No
Copper	5/8	3.6	8.3	5 - 6	BOR-A-5-1 [11/05/91]	40	0.2	No
Cyanide	1/5	1	1	0.46 - 0.52	BOR-A-3-1 [11/05/91]	0.9	1.1	Yes
Iron	8/8	150	1090	0	BOR-A-5-1 [11/05/91]	200	5.5	Yes
Lead	8/8	4	47.4	0	BOR-A-4-1 [11/05/91]	50	0.9	No
Manganese	8/8	3.3	30	0	BOR-A-5-1 [11/05/91]	100	0.3	No
Mercury	7/8	0.016	0.89	0.1	BOR-A-4-1 [11/05/91]	0.1	8.9	Yes
Nickel	5/8	0.75	3.4	5 - 6	BOR-A-5-1 [11/05/91]	30	0.1	No
Selenium	4/8	0.34	0.6	0.32 - 4	BOR-A-3-1 [11/05/91]	0.81	0.7	No
Silver	2/8	0.69	0.99	0.56 - 2	BOR-A-4-1 [11/05/91]	2	0.5	No
Vanadium	11/14	1.3	3.5	1	CEF-P21-SS-017-01	2	1.8	Yes
Zinc	7/8	11	52	7.4	90S02501	50	1.04	Yes

NA = Not available
a = Benzo(a)pyrene used as a surrogate.
b = Value for total phthalates
c = Value for total PCBs



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POST DIG & HAUL SURFACE SOIL SAMPLES
EXCEEDING ECO CRITERIA
SITE 21, GOLF COURSE PESTICIDE MIXING AREA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO.	
0039	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 8-2	1

TABLE 8-2

RANGE OF DETECTION LIMITS FOR ANALYTES
NOT DETECTED IN SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATON REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Non-Detects	EPA Region 4 Screening Value
Volatile Organic Compounds (ug/kg)			
1,1,1,2-Tetrachloroethane	0/3	1	NA
1,1,1-Trichloroethane	0/10	1 - 21	NA
1,1,2,2-Tetrachloroethane	0/7	2.3 - 21	NA
1,1,2-Trichloroethane	0/10	1 - 21	NA
1,1-Dichloroethane	0/10	1 - 21	NA
1,1-Dichloroethene	0/10	1 - 21	NA
1,2-Dibromo-3-chloropropane	0/1	2.1	NA
1,2-Dichloroethane	0/10	1 - 21	400
1,2-Dichloroethene (total)	0/5	6 - 21	NA
1,2-Dichloropropane	0/10	1 - 21	700,000
2-Butanone	0/7	11 - 42	NA
2-Hexanone	0/7	11 - 42	NA
4-Methyl-2-pentanone	0/7	11 - 42	NA
Acetone	0/5	14 - 110	NA
Benzene	0/10	1 - 21	50
Bromodichloromethane	0/10	1 - 21	NA
Bromoform	0/10	1 - 21	NA
Bromomethane	0/10	1 - 42	NA
Carbon Disulfide	0/7	6 - 21	NA
Carbon Tetrachloride	0/10	1 - 21	1,000,000
Chlorobenzene	0/10	1 - 21	50
Chlorodibromomethane	0/10	1 - 21	NA
Chloroethane	0/10	1 - 42	NA
Chloroform	0/10	1 - 21	1
Chloromethane	0/10	1 - 42	NA
Dichlorodifluoromethane	0/3	2	NA
Ethylbenzene	0/10	1 - 21	50
M+p-Xylenes	0/3	2	50
Methyl Tert-Butyl Ether	0/3	6 - 7	NA
Styrene	0/7	2.3 - 21	100
Tetrachloroethene	0/10	2.3 - 21	NA
Trans-1,2-dichloroethene	0/5	1 - 2.9	NA
Trans-1,3-dichloropropene	0/10	1 - 21	NA
Trichloroethene	0/10	1 - 21	NA
Trichlorofluoromethane	0/3	2	NA
Vinyl Acetate	0/5	11 - 42	NA
Vinyl Chloride	0/10	1 - 42	10
Xylenes, Total	0/7	6 - 21	50
cis-1,2-dichloroethene	0/5	1 - 2.9	NA
cis-1,3-dichloropropene	0/10	1 - 21	NA
o-Xylene	0/3	1	50

TABLE 8-2

RANGE OF DETECTION LIMITS FOR ANALYTES
NOT DETECTED IN SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATON REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Non-Detects	EPA Region 4 Screening Value
Semivolatile Organic Compounds (ug/kg)			
1,2,4-Trichlorobenzene	0/9	1 - 470	10
1,2-Dichlorobenzene	0/12	1 - 470	10
1,2-Diphenylhydrazine	0/4	400 - 470	NA
1,3-Dichlorobenzene	0/9	1 - 470	10
1,3-Dinitrobenzene	0/3	1	NA
1,4-Dichlorobenzene	0/12	1 - 470	10
1-Methylnaphthalene	0/3	360 - 380	NA
2,2'-Oxybis(1-chloropropane)	0/9	170 - 470	NA
2,4,5-Trichlorophenol	0/9	170 - 2300	4,000
2,4,6-Trichlorophenol	0/9	170 - 470	10,000
2,4-Dichlorophenol	0/9	160 - 470	3000
2,4-Dimethylphenol	0/9	350 - 470	NA
2,4-Dinitrophenol	0/9	870 - 2300	20,000
2,4-Dinitrotoluene	0/9	170 - 470	NA
2,6-Dinitrotoluene	0/9	170 - 470	NA
2-Chloronaphthalene	0/9	170 - 470	1,000
2-Chlorophenol	0/9	170 - 470	NA
2-Methylnaphthalene	0/9	170 - 470	NA
2-Nitroaniline	0/9	170 - 2300	NA
2-Nitrophenol	0/9	170 - 470	NA
3&4-Methylphenol	0/3	360 - 380	NA
3,3'-Dichlorobenzidine	0/9	350 - 940	NA
3-Nitroaniline	0/9	170 - 2300	NA
4,6-Dinitro-2-methylphenol	0/9	350 - 2300	NA
4-Bromophenyl Phenyl Ether	0/9	170 - 470	NA
4-Chloro-3-methylphenol	0/9	350 - 470	NA
4-Chloroaniline	0/9	170 - 470	NA
4-Chlorophenyl Phenyl Ether	0/9	170 - 470	NA
4-Methylphenol	0/6	170 - 470	NA
4-Nitroaniline	0/9	170 - 2300	NA
4-Nitrophenol	0/20	22 - 2300	7,000
Acenaphthene	0/9	170 - 470	20,000
Acenaphthylene	0/9	170 - 470	NA
Anthracene	0/9	170 - 470	100
Benzo(a)anthracene	0/9	170 - 470	NA
Benzo(g,h,i)perylene	0/9	170 - 470	NA
Benzyl Alcohol	0/4	400 - 470	NA
Bis(2-Chloroethoxy)methane	0/9	170 - 470	NA
Bis(2-Chloroethyl)ether	0/9	170 - 470	NA
Butyl Benzyl Phthalate	0/9	170 - 470	NA
Carbazole	0/2	170 - 180	NA

TABLE 8-2

RANGE OF DETECTION LIMITS FOR ANALYTES
NOT DETECTED IN SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATON REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Non-Detects	EPA Region 4 Screening Value
Di-n-octyl phthalate	0/9	170 - 470	NA
Dibenzo(a,h)anthracene	0/9	87 - 470	NA
Dibenzofuran	0/9	170 - 470	NA
Diethyl Phthalate	0/9	170 - 470	100,000
Dimethyl Phthalate	0/9	170 - 470	200,000
Fluoranthene	0/9	170 - 470	100
Fluorene	0/9	170 - 470	NA
Hexachlorobenzene	0/9	170 - 470	2.5
Hexachlorobutadiene	0/9	1 - 470	NA
Hexachlorocyclopentadiene	0/9	170 - 470	NA
Hexachloroethane	0/9	170 - 470	NA
Isophorone	0/9	170 - 470	NA
N-Nitroso-di-n-propylamine	0/9	63 - 470	NA
N-Nitrosodiphenylamine	0/9	170 - 470	NA
Naphthalene	0/9	1 - 470	100
Nitrobenzene	0/9	170 - 470	40,000
Pentachlorophenol	0/20	11 - 2300	2
Phenanthrene	0/9	170 - 470	100
Phenol	0/9	170 - 470	50
Pyridine	0/3	360 - 380	100
Pesticides/PCBs (µg/kg)			
Aldrin	0/34	1.7 - 250	2.5
Aroclor-1016	0/12	34 - 2000	NA
Aroclor-1016/1242	0/3	36 - 38	NA
Aroclor-1221	0/15	34 - 2000	NA
Aroclor-1232	0/15	34 - 2000	NA
Aroclor-1242	0/12	34 - 2000	NA
Aroclor-1248	0/15	34 - 2000	NA
Bolstar	0/12	36 - 400	NA
Chlorpyrifos	0/12	36 - 440	NA
Coumaphos	0/12	36 - 2200	NA
Demeton	0/12	36 - 420	NA
Diazinon	0/12	36 - 840	NA
Dichlorvos	0/12	36 - 380	NA
Dimethoate	0/12	36 - 170	NA
Disulfoton	0/12	36 - 530	NA
Endosulfan I	0/34	1.7 - 250	NA
Endosulfan II	0/34	3.5 - 490	NA
Endosulfan Sulfate	0/34	3.5 - 490	NA
Endrin	0/34	3.5 - 490	1
Endrin Aldehyde	0/30	3.5 - 490	NA
Endrin Ketone	0/34	3.5 - 490	NA

TABLE 8-2

RANGE OF DETECTION LIMITS FOR ANALYTES
NOT DETECTED IN SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATON REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Non-Detects	EPA Region 4 Screening Value
Epn	0/12	36 - 190	NA
Ethion	0/3	36 - 39	NA
Ethoprop	0/12	36 - 750	NA
Ethyl Parathion	0/12	36 - 200	NA
Fensulfothion	0/12	36 - 1700	NA
Fenthion	0/12	36 - 300	NA
Heptachlor	0/34	1.7 - 250	NA
Isodrin	0/3	3.6 - 3.8	NA
Malathion	0/12	36 - 350	NA
Merphos	0/12	36 - 660	NA
Methoxychlor	0/34	3.6 - 990	NA
Methyl Azinphos	0/12	36 - 1900	NA
Methyl Parathion	0/9	57 - 580	NA
Mevinphos	0/12	36 - 660	NA
Mirex	0/3	3.6 - 3.8	NA
Monocrotophos	0/3	36 - 39	NA
Naled	0/12	36 - 1300	NA
Phorate	0/12	36 - 480	NA
Ronnel	0/12	36 - 480	NA
Stirophos	0/12	36 - 2500	NA
Sulfotepp	0/12	36 - 320	NA
Tepp	0/12	36 - 2200	NA
Tokuthion	0/12	36 - 700	NA
Trichloronate	0/12	36 - 420	NA
alpha-BHC	0/34	1.7 - 250	2.5
beta-BHC	0/34	1.7 - 250	1.0
delta-BHC	0/34	1.7 - 250	NA
gamma-BHC (Lindane)	0/34	1.7 - 250	0.5
Metals (mg/kg)			
Antimony	0/9	0.3500 - 11	3.5
Beryllium	0/9	0.025 - 1	1.1
Thallium	0/9	0.34 - 2	1
Herbicides (µg/kg)			
2,4,5-T	0/12	11 - 23	NA
2,4,5-Tp (silvex)	0/12	11 - 23	NA
2,4-D	0/12	22 - 140	NA
2,4-Db	0/12	22 - 210	NA
3,5-Dcba	0/3	22 - 23	NA
Actifluorfen	0/3	22 - 23	NA
Bentazon	0/3	22 - 23	NA
Chloramben	0/3	22 - 23	NA
Dalapon	0/12	22 - 420	NA

TABLE 8-2

RANGE OF DETECTION LIMITS FOR ANALYTES
NOT DETECTED IN SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATON REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Non-Detects	EPA Region 4 Screening Value
Dicamba	0/12	22 - 42	NA
Dichloroprop	0/12	22 - 100	NA
Dinoseb	0/12	22 - 42	NA
MCPA	0/12	1100 - 8300	NA
MCPP	0/12	1100 - 10000	NA
Picloram	0/3	22 - 23	NA

8.4 STEP 3A: REFINEMENT OF PRELIMINARY CONTAMINANTS OF POTENTIAL CONCERN

8.4.1 Step 3a Overview

Subsequent to the initial screening, other factors were considered to further refine COPCs. These factors included background data for inorganics, toxicological evaluation of COPCs, frequency of detection, spatial analysis of detections, comparisons of COPCs to alternate guidelines, and food chain modeling.

Facility-wide background concentrations of inorganics were taken from the NAS Cecil Field Inorganic Background Data Set (HLA, 1998).

The Region 4 ecological screening values for soil are generally the lowest value available from Friday's (1998) review of several sources. Thus, the Region 4 screening values are designed to be conservative. Less conservative screening guidelines for soil from Friday's (1998) review are presented in Table 8-3 and are used in Step 3a of this assessment. These guidelines include soil screening values identified by Oak Ridge National Laboratory (ORNL), Beyer (1990), and Dutch "target" and "intervention" values (MHSPE, 1994). The ORNL values were developed to be protective of soil invertebrates and microbial processes (Efroymson et al. 1997a) and terrestrial plants (Efroymson et al. 1997b). Beyer's (1990) "A" values in Table 8-3 refer to back-ground concentrations in soil or detection limits, while "B" values refer to moderate soil contamination that requires additional study. The Dutch target values in Table 8-3 represent "clean" soil and indicate the soil quality required for the full restoration of the soil's functionality for human, animal, and plant life (MHSPE, 1994; Swartjes, 1999). Dutch intervention values represent seriously contaminated soil, while the concentration midway between the target and intervention values is known as the intermediate value (Swartjes, 1999). Under the Dutch standards, concentrations greater than the target value but less than the intermediate value require no further investigation (but minor restrictions may be applied on soil use), while concentrations greater than the intermediate value and less than the intervention value indicate that further investigation is required (Swartjes, 1999). The use of these less conservative guidelines provides balance to the risk assessment.

8.4.2 Food Chain Modeling

USEPA Region 2 (USEPA, 2000) suggests that food chain modeling be conducted as part of COPC refinement for screening-level COPCs that are known to bioaccumulate or biomagnify. Several organochlorine pesticides and metals present in Site 21 soils are known to bioaccumulate or biomagnify under certain conditions. These COPCs could pose risks to birds and mammals via consumption of plants and soil invertebrates in which site contaminants have accumulated. These birds and mammals could then become prey items for carnivorous birds and mammals. Therefore, food chain modeling was conducted to evaluate potential risks to upper level receptors. Food chain modeling consists of

TABLE 8-3

COPC REFINEMENT - SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATON REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COPC	Concentrations		EPA Region IV ESV	Average Hazard Quotient	# Samples Exceding Region 4 ESV	Range of Detection Limits	Background Conc.	ORNL ESVs		Beyer (1990) ESVs		Dutch Target & Intervention Values (MHSPE, 1994)	Retained as COPC in Surface Soil?[b]
	Max	Average						Soil Inverts[a]	Plants	"A" Value	"B" Value		
Semivolatile Organics (µg/kg)													
2-Methyphenol	110	178	NA	NA	NA	170-470		NA	NA	NA	NA	NA	No
Benzoic acid	800	1025	NA	NA	NA	2000-2300		NA	NA	NA	NA	NA	No
Benzo(b)fluoranthene	120	155	100[c]	1.6	1	170-460		NA	NA	100[c]	1000[c]	NA	No
Bis(2-Ethylhexyl) phthalate	110	138	100[d]	1.4	1	170-400		NA	NA	NA	NA	100[d]; 60,000[d]	No
Pesticides/PCBs (µg/kg)													No
4,4'-DDD	76	37	2.5	14.7	5	3.5-490		NA	NA	NA	NA	2.5; 4,000	Yes
4,4'-DDE	790	50	2.5	20.2	9	3.5-490		NA	NA	NA	NA	2.5; 4,000	Yes
4,4'-DDT	547	59	2.5	23.8	10	3.5-490		NA	NA	NA	NA	2.5; 4,000	Yes
Alpha-Chlordane	1890	217	NA	NA	NA	3.8-110		NA	NA	NA	NA	NA	Yes
Aroclor-1260	64	174	20[e]	8.7	1	34 - 1100		NA	40,000[e]	50[e]	1000[e]	20[e]; 1,000[e]	No
Dieldrin	1.8	18.4	0.5	36.8	2	1.8-250		NA	NA	NA	NA	0.5; NA	No
Gamma-Chlordane	1970	213	NA	NA	NA	3.6-110		NA	NA	NA	NA	NA	Yes
Heptachlor epoxide	1.3	16	NA	NA	NA	1.8-250		NA	NA	NA	NA	NA	No
Toxaphene	650	1451	NA	NA	NA	72-25000		NA	NA	NA	NA	NA	No
Herbicides (µg/kg)													
Dacthal	460	161	NA	NA	NA	22		NA	NA	NA	NA	NA	No
Inorganics (mg/kg)													
Aluminum	5170	1915	50	38.3	8	0	4430	600	50	NA	NA	NA	No
Arsenic	10.9	2.1	10	0.2	1	0.36-3.9	2.04	60	10	20	30	29; 55	No
Chromium	8.7	4.1	0.4	10.1	8	0	7.75	0.4	1.0	100	250	100; 380	No
Cyanide	1	0.4	0.9	0.4	1	0.46-0.52	1.19	NA	NA	1.0	10	1.0; 20	No
Iron	1090	627	200	3.1	7	0	1490	200	NA	NA	NA	NA	No
Mercury	0.89	0.21	0.1	2.1	3	0.1	0.16	0.1	0.3	0.5	2.0	0.3; 10	Yes
Vanadium	3.5	2.1	2	1.1	7	1	6.3	20	2.0	NA	NA	NA	No
Zinc	52	21	50	0.4	1	7.4	37	100	50	200	500	140; 720	No

COPC = Contaminant of potential concern.
ESV = Ecological screening value
Hazard quotient = chemical concentration ÷ ESV
NA = ESV not available
Background concentrations of inorganics at NAS Cecil Field are from HLA (1998); background concentrations are not available for organic compounds at NAS Cecil Field.
ORNL = Oak Ridge National Laboratory (Efroymson et al, 1997a; b)
a = Lowest of earthworm and microorganism screening values
b = See Section 8.2.4 of text for discussion of COPCs and rationale for yes/no decisions.
c = Benzo(a)pyrene used as a surrogate.
d = ESV for total phthalates.
e = ESV for total PCBs.

comparisons of estimated chemical doses for representative receptors to potentially toxic doses obtained from the literature. The methods used in the food chain model, including the estimated doses for representative receptors, and the selection of toxicity reference values (TRVs), are described in Appendix H. The assessment endpoint associated with the food chain modeling was the protection of the following groups of receptors from adverse effects of COPCs on growth, survival, and reproduction:

- Insectivorous/vermivorous birds
- Insectivorous/vermivorous mammals
- Herbivorous mammals
- Carnivorous birds
- Carnivorous mammals
- Omnivorous birds

The associated measurement endpoints were doses of COPCs associated with adverse effects on growth, survival, and reproduction of these receptor groups. COPCs at Site 21 that were investigated via food chain modeling consisted of arsenic, chromium, mercury, zinc, Aroclor-1260, and organochlorine pesticides.

8.4.3 Food Chain Modeling Results

4,4'-DDT, 4,4'-DDE, 4,4'-DDT, Aroclor-1260, arsenic, chromium, mercury, and zinc had at least one HQ greater than 1.0 for the food chain modeling using maximum and average concentrations of surface soil COPCs (Tables 8-4 and 8-5). Alpha-chlordane and gamma-chlordane had HQs greater than 1.0 using maximum concentrations but not using average concentrations (Tables 8-4 and 8-5). The average concentrations, which were calculated using one-half the detection limit in "non-detects", exceeded the maximum detected concentrations for Aroclor-1260, dieldrin, heptachlor epoxide, and toxaphene (Table 8-3). As a result, two food chain HQs exceeded 1.0 using the average dieldrin concentration but all dieldrin food chain HQs were less than 1.0 using maximum concentrations (Tables 8-4 and 8-5).

8.4.4 Discussion - Semivolatile Organic Compounds

The maximum concentration of bis(2-ethylhexyl)phthalate exceeded the USEPA Region 4 ecological screening value for total phthalates in only one sample (BOR-A-2-1). The maximum screening HQ was relatively low, however (HQ = 1.1). Phthalates are common environmental contaminants due to their use in plastics. The value for total detected phthalates in sample BOR-A-2-1 (i.e., the sum of all detected concentrations) was 192 µg/kg. This value is much less than the Dutch "intervention" value for total phthalates (60,000 µg/kg) and is also well below the Dutch "intermediate" value for total phthalates of 30,050 µg/kg (MHSPE, 1994).

TABLE 8-4

RESULTS OF FOOD CHAIN MODELING
MAXIMUM CONCENTRATIONS
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Ecological Contaminant of Potential Concern	Shrew		Mouse		Robin		Hawk		Fox		Woodcock	
	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Pesticides/PCBs												
4,4'-DDD	1.76E-01	3.53E-02	7.85E-04	1.57E-04	**2.95E+01**	**2.95E+00**	**1.18E+01**	**1.18E+00**	5.16E-02	1.03E-02	**6.39E+01**	**6.39E+00**
4,4'-DDE	9.83E-01	1.97E-01	8.16E-03	1.63E-03	**1.65E+02**	**1.65E+01**	**6.32E+01**	**6.32E+00**	2.78E-01	5.56E-02	**3.53E+02**	**3.53E+01**
4,4'-DDT	2.65E-01	5.29E-02	5.65E-03	1.13E-03	**4.47E+01**	**4.47E+00**	**1.47E+01**	**1.47E+00**	6.64E-02	1.33E-02	**9.23E+01**	**9.23E+00**
Alpha-chlordane	3.87E-01	1.93E-01	2.47E-03	1.23E-03	4.84E-01	9.67E-02	8.53E-02	1.71E-02	5.08E-02	2.54E-02	**1.04E+00**	2.09E-01
Aroclor-1260	**3.45E+00**	3.45E-01	3.59E-02	3.59E-03	7.82E-01	7.82E-02	9.88E-01	9.88E-02	**3.25E+00**	3.25E-01	**1.66E+00**	1.66E-01
Dieldrin	3.32E-01	3.32E-02	1.23E-03	1.23E-04	5.05E-02	5.05E-03	1.72E-03	1.72E-04	8.56E-03	8.56E-04	1.10E-01	1.10E-02
Gamma-chlordane	4.03E-01	2.02E-01	2.57E-03	1.29E-03	5.04E-01	1.01E-01	8.89E-02	1.78E-02	5.30E-02	2.65E-02	**1.09E+00**	2.18E-01
Heptachlor epoxide	8.04E-03	8.04E-04	9.30E-05	9.30E-06	NA	NA	NA	NA	6.71E-04	6.71E-05	NA	NA
Toxaphene	**2.99E-01**	2.99E-02	1.11E-03	1.11E-04	NA	NA	NA	NA	8.93E-02	8.93E-03	NA	NA
Metals												
Arsenic	**1.74E+01**	**1.74E+00**	**9.30E+00**	9.30E-01	**1.40E+00**	4.68E-01	1.09E-02	3.63E-03	3.09E-02	1.03E-02	**1.04E+00**	3.46E-01
Chromium (total)	6.50E-01	6.50E-02	1.58E-02	1.58E-03	**1.23E+00**	2.46E-01	8.18E-02	1.64E-02	1.36E-01	2.71E-02	**2.53E+00**	5.06E-01
Mercury	**5.88E+01**	**3.53E+01**	**1.08E+01**	**6.51E+00**	**1.29E+02**	**1.29E+01**	2.58E-01	2.58E-02	8.66E-01	8.66E-02	**1.73E+02**	**1.73E+01**
Zinc	5.86E-01	2.93E-01	3.41E-02	1.71E-02	**4.47E+00**	4.94E-01	**2.64E+00**	2.93E-01	**3.30E+00**	3.65E-01	**8.19E+00**	9.07E-01

NA = NOAEL/LOAEL not available

TABLE 8-5

RESULTS OF FOOD CHAIN MODELING
AVERAGE CONCENTRATIONS
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Ecological Contaminant of Potential Concern	Shrew		Mouse		Robin		Hawk		Fox		Woodcock	
	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Pesticides/PCBs												
4,4'-DDD	8.50E-02	1.70E-02	3.79E-04	7.57E-05	**1.42E+01**	**1.42E+00**	**2.85E+00**	2.85E-01	1.26E-02	2.51E-03	**3.08E+01**	**3.08E+00**
4,4'-DDE	6.27E-02	1.25E-02	5.21E-04	1.04E-04	**1.05E+01**	**1.05E+00**	**2.03E+00**	2.03E-01	9.04E-03	1.81E-03	**2.25E+01**	**2.25E+00**
4,4'-DDT	2.88E-02	5.75E-03	6.14E-04	1.23E-04	**4.86E+00**	4.86E-01	8.10E-01	8.10E-02	3.81E-03	7.62E-04	**1.00E+01**	1.00E+00
Alpha-chlordane	4.44E-02	2.22E-02	2.84E-04	1.42E-04	5.56E-02	1.11E-02	4.90E-03	9.81E-04	3.02E-03	1.51E-03	1.20E-01	2.40E-02
Aroclor-1260	**9.40E+00**	9.40E-01	9.78E-02	9.78E-03	**2.13E+00**	2.13E-01	**1.37E+00**	1.37E-01	**4.51E+00**	4.51E-01	**4.52E+00**	4.52E-01
Dieldrin	**3.39E+00**	3.39E-01	1.26E-02	1.26E-03	5.17E-01	5.17E-02	8.82E-03	8.82E-04	4.58E-02	4.58E-03	**1.12E+00**	1.12E-01
Gamma-chlordane	4.36E-02	2.18E-02	2.78E-04	1.39E-04	5.45E-02	1.09E-02	4.81E-03	9.62E-04	2.96E-03	1.48E-03	1.18E-01	2.35E-02
Heptachlor epoxide	9.95E-02	9.95E-03	1.15E-03	1.15E-04	NA	NA	NA	NA	4.49E-03	4.49E-04	NA	NA
Toxaphene	6.68E-01	6.68E-02	2.49E-03	2.49E-04	NA	NA	NA	NA	1.00E-01	1.00E-02	NA	NA
Metals												
Arsenic	**3.29E+00**	3.29E-01	**1.76E+00**	1.76E-01	2.66E-01	8.86E-02	2.76E-03	9.20E-04	1.31E-01	1.31E-02	1.97E-01	6.56E-02
Chromium (total)	3.03E-01	3.03E-02	7.35E-03	7.35E-04	5.73E-01	1.15E-01	1.91E-02	3.83E-03	1.21E-02	1.21E-03	**1.18E+00**	2.35E-01
Mercury	**1.37E+01**	**8.21E+00**	**2.52E+00**	**1.51E+00**	**3.00E+01**	**3.00E+00**	4.16E-02	4.16E-03	7.62E-02	4.57E-02	**4.03E+01**	**4.03E+00**
Zinc	2.39E-01	1.19E-01	1.39E-02	6.96E-03	**1.82E+00**	2.02E-01	6.01E-01	6.65E-02	6.81E-02	3.40E-02	**3.34E+00**	3.70E-01

NA = NOAEL/LOAEL not available

The maximum concentration of benzo(b)fluoranthene exceeded the screening value of benzo(a)pyrene (a surrogate for high-molecular weight PAHs) only in sample BOR-A-2-1. The maximum screening HQ (1.2) was relatively low, however. The ecological screening value of 100 µg/kg is the "A" value indicative of "background concentrations in soil or detection limits" (Beyer, 1990). The "B" value indicative of "moderate soil contamination that requires additional study" is 1,000 µg/kg for benzo(a)pyrene (Beyer, 1990). The concentration of total PAHs in sample BOR-A-2-1 (474 µg/kg) is well below the Dutch B value.

Ecological screening values were not available for 2-methylphenol or benzoic acid. The absence of toxicity data for these two compounds prevents a complete assessment of their potential ecological risks. However, these two compounds, as well as bis(2-ethylhexyl)phthalate and benzo(b)fluoranthene, do not accumulate in animal tissue or biomagnify in the food web at the concentrations measured at Site 21. Thus, potential risks from these four compounds are limited to plants and soil invertebrates. The infrequent detections and/or relatively low concentrations suggest, however, that potential risks to plants and soil invertebrates from these four SVOCs are negligible.

8.4.5 Discussion - Pesticides and PCBs

PCBs

Aroclor-1260 was the only PCB detected in soil samples collected outside the remediation areas. Aroclor-1260 was detected in 1 of 10 samples, with a screening HQ of 3.2. The detection limits for this compound in non-detected samples ranged from 34 to 1,100 µg/kg, exceeding the Region 4 ecological screening value of 20 µg/kg (Table 8-1). Thus, the elevated detection limits add uncertainty to the quantitative assessment of ecological risk. However, PCBs were analyzed using SW846 8082, which is the analytical method presented in the approved work plan.

Some food chain HQs were greater than 1.0 in the food chain modeling (Tables 8-4 and 8-5). Food chain HQs were highest for the shrew, with an HQ of 9.4 using the average concentration of Aroclor-1260, and an HQ of 3.45 using the maximum concentration of Aroclor-1260. Food chain HQs using average concentrations of Aroclor-1260 were greater than those using maximum concentrations because detection limits in some non-detected samples were greater than the maximum detected concentration, resulting in an average value that exceeded the maximum detected concentration.

Aroclor-1260 was detected only in sample 90SS301, which is located approximately 5 feet north of Building 238, the golf course maintenance building (Figure 8-2). The habitat at this location consists of a gravel road (Figure 8-1). Thus, minimal habitat in the vicinity of sample 90SS301 represents an essentially incomplete exposure pathway for mammals and birds. Many of the samples with elevated

Aroclor detection limits are also located in areas of minimal habitat. With these factors in mind, PCBs do not appear to pose significant potential risks at the site.

DDT, DDD, and DDE

Concentrations of 4,4'-DDT, 4,4'-DDD, and 4,4'-DDE (hereafter referred to as DDT, DDD, and DDE, or collectively as DDTR) were elevated in some samples. Maximum screening HQs were 30.4 (DDD), 316 (DDE), and 218.8 (DDT) (Table 8-1). DDD was detected in 5 of 26 samples and exceeded the Region 4 ecological screening value in all five samples. DDE was detected in 12 of 26 samples and exceeded the Region 4 ecological screening value in 9 samples. DDT was detected in 10 of 26 samples and exceeded the Region 4 ecological screening value in all 10 samples. All food chain HQs for mammals were less than 1.0, while all food chain HQs for birds exceeded 1.0 using maximum DDTR concentrations and most food chain HQs for birds exceeded 1.0 using average DDTR concentrations (Tables 8-4 and 8-5). Maximum food chain HQs were especially elevated for the robin (DDE HQ = 165) and the woodcock (DDE HQ = 353) (Table 8-4).

Although DDTR concentrations exceeded the Region 4 ecological screening value (2.5 µg/kg) in several samples, concentrations in most samples were relatively low (< 10 µg/kg) (Figure 8-2 and Table 8-6). Concentrations were greatest in two areas: near Building 238 and west of Building 371 (Figure 8-2). Habitat in the vicinity of Building 238, where DDTR concentrations in samples CEF-P21-SS-509, CEF-P21-SS-904 and 90S3301 were elevated, consists largely of a gravel parking area (Figure 8-1). The exposure pathway in this area would be essentially incomplete. However, the DDTR "hotspot" west of Building 371 consists of a weedy area near the edge of the wooded area, and could provide habitat for various ecological receptors. DDTR concentrations were elevated in two surface soil samples in this area: CEF-P21-SS-110 and CEF-P21-SS-815. DDTR concentrations were relatively low in three other samples (CEF-P21-SS-502, CEF-P21-SS-302, and CEF-P21-SS-816) collected near these two samples, suggesting that the hotspot is small in areal extent. A square encompassing samples CEF-P21-SS-110 and CEF-P21-SS-815 would comprise approximately 0.04 acres, and could extend to approximately 0.2 acres if the square is conservatively extended in all four directions to other sample locations where DDTR concentrations were relatively low.

The woodcock, robin, and hawk (as well as other vermivorous, insectivorous, omnivorous, and carnivorous bird species) generally forage over areas of relatively large areas. The home range of the woodcock ranged from 8 to 182 acres in a review of several studies (USEPA, 1993). The average home range of the robin was not available, but can be as little as 0.4 to 2.0 acres during the summer nesting season, while robins routinely forage over a distance of 0.5 to 2 miles during winter (USEPA, 1993). Red-tailed hawks generally forage over areas of 900 acres or more (USEPA, 1993). The avian HQs in Tables 8-4 and 8-5 are based on maximum and average concentrations and assume that the representative

TABLE 8-6

SUMMARY OF ANALYTICAL RESULTS FOR PESTICIDES AND PCBs DETECTED IN SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

SAMPLE NUMBER	4,4'-DDD	4,4'-DDE	4,4'-DDT	Alpha-chlordane	Aroclor-1260	Dieldrin	Gamma-chlordane	Heptachlor epoxide	Toxaphene
90B00201									
90S00101 [08/28/98]									
90S00501 [08/28/98]									
90S00601 [08/28/98]									
90S00701 [08/28/98]									
90S01301 [08/28/98]									
90S01501									
90S01601									
90S01701									
90S01801									
90S01901									
90S02501	3.6 U	3.6 U	3.6 U	4	36 U	3.6 U	3.6 U	3.6 U	72 U
90S02601									
90S02701									
90S03401	76	3.6	13	41	36 U	3.6 U	52	3.6 U	650
90S3301	45	14	7.4	23	64	3.8 U	20	3.8 U	410
BOR-A-2-1 [11/05/91]	23 U	7	9.7	110 U	230 U	23 U	110 U	11 U	230 U
BOR-A-3-1 [11/05/91]	49 U	5.2	49 U	58	490 U	49 U	24	24 U	490 U
BOR-A-4-1 [11/05/91]	53 U	6.5	53 U	29	530 U	53 U	12	26 U	530 U
BOR-A-4-1_R [11/05/91]									
BOR-A-5-1 [11/05/91]	110 U	110 U	110 U	72	1100 U	110 U	36	56 U	1100 U
CEF-P21-SS-001-01	15 U	15 U	15 U	31		7.4 U	29	7.4 U	740 U
CEF-P21-SS-002-01	36 U	36 U	36 U	254		18 U	214	18 U	1800 U
CEF-P21-SS-003-01	490 U	490 U	490 U	1860 J		250 U	1800 J	250 U	25000 U
CEF-P21-SS-003-D-01	230 U	230 U	230 U	1090 J		110 U	1000 J	110 U	11000 U
CEF-P21-SS-005-01	7.6 U	7.6 U	7.6 U	9.1		3.8 U	7.2 J	3.8 U	380 U
CEF-P21-SS-011-01	70 U	70 U	70 U	243	170 U	35 U	262	35 U	3500 U
CEF-P21-SS-017-01	3.7 U	3.7 U	2.8 J	4.3		1.8 U	4.4	1.8 U	180 U
CEF-P21-SS-018-01									
CEF-P21-SS-019-01									
CEF-P21-SS-020-01									
CEF-P21-SS-021-01									
CEF-P21-SS-102-01									
CEF-P21-SS-107-01									
CEF-P21-SS-108-01									
CEF-P21-SS-110-01	45.9 J	73 U	311	144	730 U	36 U	67 J	36 U	3600 U
CEF-P21-SS-111-01	14 U	14 U	14 U	14 U	35 U	7 U	14 U	7 U	700 U
CEF-P21-SS-111-01-D	14 U	14 U	14 U	14 U	34 U	6.9 U	14 U	6.9 U	690 U
CEF-P21-SS-113-01									
CEF-P21-SS-208-01									
CEF-P21-SS-209-01									
CEF-P21-SS-211-01									
CEF-P21-SS-215-01									
CEF-P21-SS-216-01									
CEF-P21-SS-217-01									
CEF-P21-SS-217-01-D									
CEF-P21-SS-302-01	4 U	2.3 J	11	4 U		1.8 J	4 U	2 U	200 U
CEF-P21-SS-304-01									
CEF-P21-SS-306-01									
CEF-P21-SS-307-01									
CEF-P21-SS-308-01									
CEF-P21-SS-401-01									
CEF-P21-SS-501-01	45 U	45 U	45 U	282		22 U	261	22 U	2200 U
CEF-P21-SS-502-01	4.2 U	2 J	4.2 U	18.4		2.1 U	12.1	2.1 U	210 U
CEF-P21-SS-504-01									
CEF-P21-SS-505-01									
CEF-P21-SS-508-01									
CEF-P21-SS-509-01	460 U	790	547	1890		230 U	1970	230 U	23000 U
CEF-P21-SS-701-01									

TABLE 8-6

SUMMARY OF ANALYTICAL RESULTS FOR PESTICIDES AND PCBs DETECTED IN SURFACE SOIL
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

SAMPLE NUMBER	4,4'-DDD	4,4'-DDE	4,4'-DDT	Alpha-chlordane	Aroclor-1260	Dieldrin	Gamma-chlordane	Heptachlor epoxide	Toxaphene
CEF-P21-SS-702-01	7.4 U	8.6	11.2	43.2 J		3.7 U	44.7 J	1.8 J	370 U
CEF-P21-SS-702-01-D	3.6 U	5.5	6.9	21.9 J		1.8 U	19.6 J	0.83 J	180 U
CEF-P21-SS-812-01	3.5 U	3.5 U	3.5 U	1.9 J		1.8 U	1.5 J	1.8 U	180 U
CEF-P21-SS-815-01	12.1 J	31	104 J	17.7		6.8 U	11 J	6.8 U	680 U
CEF-P21-SS-816-01	4.8 J	1.4 J	9.5 J	10 J		17 U	5.1 J	17 U	1700 U
CEF-P21-SS-904-01	300 U	83.9 J	300 U	1190		150 U	1270	150 U	15000 U
CEF-P21-SS-905-01	3.6 U	3.6 U	3.6 U	7.6		0.85 J	11.2	1.8 U	180 U
CEF-P21-SS-906-01	7.8 U	7.8 U	7.8 U	23.8		3.9 U	28	3.9 U	390 U
CEF-P21-SS-907-01	3.8 U	3.8 U	3.8 U	3.8 U		1.9 U	3.8 U	1.9 U	190 U
CEF-P21-SS-TOC-01									
CF11SS22 [05/21/96]									

birds forage exclusively at Site 21. However, the western DDTR hot spot (approximately 0.04 to 0.2 acres) comprises only a small portion of the home ranges of vermivorous and omnivorous birds and an even smaller portion of the home range of carnivorous birds. Table 8-7 indicates the food chain HQs that result when the maximum concentrations of DDTR in the western hot spot (DDD: 45.9 µg/kg; DDE: 31 µg/kg, and DDT: 311 µg/kg) are input into the food chain model.

The avian food chain HQs in Tables 8-4, 8-5 and 8-7 would be considerably lower if the sizes of home ranges were incorporated into the food chain model. Using a "worst case" area for the western hot spot (i.e., 0.2 acres), the habitat within the hot spot would comprise approximately 0.02 per cent (0.2 acres ÷ 900 acres = 0.0002) of a hawk's total foraging area. This value, when multiplied by the sum of NOAEL DDTR HQs for the hawk (17.9; Table 8-7), results in an HQ of 0.004. Similarly, the habitat within the hot spot comprises approximately 2.5 per cent (0.2 acres ÷ 8 acres = 0.025) of a woodcock's total foraging area (assuming an 8-acre foraging area). This value, when multiplied by the sum of NOAEL DDTR HQs for the woodcock (105; Table 8-7), results in an HQ of 2.6, or an HQ of 0.12 assuming an 182-acre foraging area. Similar calculations are not included for the robin since the robin's foraging range was not available.

The detection limits for DDTR in non-detected samples ranged from 3.5 to 490 µg/kg, which exceeded the Region 4 ecological screening value of 2.5 µg/kg (Table 8-1). Thus, the elevated detection limits add some uncertainty to the quantitative assessment of ecological risk. However, as previously discussed, the analytical methods followed the approved work plan (e.g., pesticides were analyzed using SW846 8081A).

In summary, the screening HQs for DDTR were elevated, with a maximum screening HQ of 316 for DDE. The USEPA Region 4 ecological screening values are target values established by the Dutch government (MHSPE, 1994). The Dutch intervention value for each of the same three compounds is 4,000 µg/kg, and the intermediate value is 2001.25 µg/kg (MHSPE, 1994; Swartjes, 1999). Although most detected concentrations (and detection limits in non-detected samples) exceeded the Dutch target values, they were much less than the intermediate and intervention values (the maximum concentration was 790 µg/kg DDE). DDTR concentrations are elevated in two areas, but only one of these areas provides habitat where the exposure pathway from soil to ecological receptors is complete. This single hot spot consists of approximately 0.04 to 0.2 acres of weedy habitat near the edge of a wooded area. Soil excavation is scheduled for the area immediately south of this hot spot, thereby further reducing the size of the area in which potential DDTR-related risk exists. Thus, the hot spot comprises an extremely small area of contamination. DDTR concentrations in this small area pose potential risk to soil invertebrates but pose negligible risk to mammals. DDTR-related risk to birds appears to be limited to birds with seasonal home ranges (i.e., nesting season) that encompass the hot spot

TABLE 8-7

RESULTS OF FOOD CHAIN MODELING USING MAXIMUM CONCENTRATIONS OF DDD, DDE, AND DDT IN SAMPLES CEF-P21-SS-110-01 AND CEF-P21-SS-815-01
SITE 21 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Ecological	Shrew		Mouse		Robin		Hawk		Fox		Woodcock	
Contaminant of	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Potential Concern	HQ	HQ	HQ	HQ	HQ	HQ	HQ	HQ	HQ	HQ	HQ	HQ
Pesticides/PCBs												
4,4'-DDD	1.07E-01	2.13E-02	4.74E-04	9.49E-05	**1.78E+01**	**1.78E+00**	**7.12E+00**	7.12E-01	3.12E-02	6.23E-03	**3.86E+01**	**3.86E+00**
4,4'-DDE	3.86E-02	7.71E-03	3.20E-04	6.41E-05	**6.46E+00**	6.46E-01	**2.48E+00**	2.48E-01	1.09E-02	2.18E-03	**1.38E+01**	**1.38E+00**
4,4'-DDT	1.51E-01	3.01E-02	3.21E-03	6.43E-04	**2.54E+01**	**2.54E+00**	**8.34E+00**	8.34E-01	3.77E-02	7.55E-03	**5.25E+01**	**5.25E+00**
Sum of HQs					**4.97E+01**	**4.97E+00**	**1.79E+01**	**1.79E+00**			**1.05E+02**	**1.05E+01**

Alpha-Chlordane and Gamma-Chlordane

Alpha-and gamma-chlordane were detected in 22 of 26 and 21 of 26 samples, respectively. USEPA Region 4 ecological screening values are not available for these compounds. Although not shown in Table 8-3, Beyer's (1990) "B" value for organochlorine pesticides (which indicates "moderate soil contamination that requires additional study") is 500 µg/kg. This value was exceeded in two samples: CEF-P21-SS-003 and CEF-P21-SS-509 (Table 8-6). Sample CEF-P21-SS-003 is located in the northern portion of the site (northeast of Building 371) and CEF-P21-SS-509 is located between Buildings 238 and 398 at the center of the site (Figures 8-1 and 8-2). Concentrations of alpha-and gamma-chlordane were moderately elevated in two other samples (CEF-P21-SS-501 and CEF-P21-SS-002) to the west of CEF-P21-SS-003 and in several samples in the vicinity of Building 238 at the center of the site.

Food chain HQs exceeded 1.0 only for the woodcock using maximum concentrations, with a maximum HQ of 1.09 (Table 8-4). Using average concentrations, all food chain HQs were less than 1.0 (Table 8-5). Based on the poor habitat quality at the center of the site (where alpha-and gamma-chlordane concentrations are greatest) and the relatively low food chain HQs, concentrations of these compounds in the central "hot spot" pose negligible risk to ecological receptors. The hot spot in the northern portion of the site presumably poses potential risk to soil invertebrates, although a complete assessment of the risks to soil invertebrates is precluded by the scarcity of soil toxicity data. Food chain modeling suggests negligible risks to upper level receptors in the northern hot spot.

Dieldrin

Dieldrin was detected in 2 of 26 samples, with a maximum screening HQ of 3.6. The detection limits for dieldrin in non-detected samples ranged from 1.8 to 250 µg/kg, which exceeded the USEPA Region 4 ecological screening value of 0.5 µg/kg (Table 8-1). Thus, the elevated detection limits add uncertainty to the quantitative assessment of ecological risk. However, as previously discussed, the analytical methods followed the approved work plan.

All food chain HQs were less than 1.0 using the maximum detected concentration of dieldrin (Table 8-4). The elevated detection limits in some non-detected samples resulted in food chain HQs greater than 1.0 for the shrew (3.39) and woodcock (1.12) (Table 8-5). Although the elevated detection limits prevent definite conclusions regarding the potential risks from this compound, the detection limits in most samples (Table 8-6) were low enough to suggest that this compound poses minimal risk to upper level receptors via the food chain. Furthermore, the detected concentrations and detection limits were well below Beyer's (1990) "B" value for organochlorinated pesticides (500 µg/kg) indicative of "moderate soil

contamination that requires additional study". In summary, dieldrin appears to pose only minor (at worst) potential risks to ecological receptors.

Heptachlor Epoxide

Heptachlor epoxide was detected in 1 of 26 samples, at a concentration of 1.8 µg/kg and 0.83 µg/kg in its duplicate. Ecological screening values were not available for this compound. The detected concentration, as well as the detection limits in most non-detected samples, were less than the "A" value (100 µg/kg) indicative of "background concentrations in soil or detection limits" for organochlorinated pesticides (Beyer, 1990). All detection limits were well below the "B" value for organochlorinated pesticides (500 µg/kg) indicative of "moderate soil contamination that requires additional study" (Beyer, 1990). All mammal food chain HQs were less than 1.0. Food chain HQs for birds could not be calculated since avian TRVs were not available. Although a complete assessment of heptachlor epoxide is hindered by a lack of toxicity data and elevated detection limits in some non-detected samples, the single detected concentration and detection limits in non-detected samples indicate that ecological risks from this compound are not significant.

Toxaphene

Toxaphene was detected in 2 of 26 samples, at concentrations of 410 and 650 µg/kg. Ecological screening values were not available for this compound. All mammal food chain HQs were less than 1.0. Food chain HQs for birds could not be calculated since avian TRVs were not available.

The detection limits for toxaphene in non-detected samples cover a wide range of values, from 72 to 25,000 µg/kg. Toxaphene is an insecticide containing over 670 chemicals. The identification and quantification of toxaphene in environmental samples are complicated by changes in the numbers and relative sizes of constituent peaks (components) due to the difference in their rates of degradation, sorption, and volatilization in the environment. Furthermore, contamination from other organochlorine pesticides, which are also complex multi-isomeric chemicals, often interferes with the analysis of toxaphene. Hence, quantification of toxaphene almost invariably involves rigorous sample preparation and clean-up procedures prior to analysis (ATSDR, 1997). Toxaphene was used primarily in the southern United States as an insecticide on cotton and other crops, and was also used to control insect pests on livestock and to kill unwanted fish species in lakes. The USEPA banned all uses of toxaphene in the United States in 1990 because of evidence that it harms human and animal health (ATSDR, 1997).

The two detected concentrations (410 and 650 µg/kg) were measured in samples 90S3301 and 90S03401, respectively. Both of these samples are located in a gravel-covered area immediately north of Building 238 (Figure 8-2), where minimal habitat exists. Although soil screening values for toxaphene are

not available, the presence of this insecticide in these two samples poses negligible risks to soil invertebrates and to other receptors.

Cumulative Toxicity of Pesticides and PCBs

Concentrations of several pesticides were elevated at Site 21; thus, toxicity from the cumulative effects of these pesticides should be considered. Cumulative concentrations of pesticides were elevated in three areas (see Figure 8-2):

- the vicinity of Building 238 (five samples)
- the northern portion of the site (three samples)
- the western portion of the site (one sample)

The habitat in the vicinity of Building 238, in which samples 90S3301, 90S03401, CEF-P21-SS-904, CEF-P21-SS-509, and CEF-P21-SS-011 were collected, consists primarily of buildings, structures, and gravel parking areas, and is subject to frequent human activity. Under current conditions, the use of this area by ecological receptors is minimal. Therefore, pesticides pose negligible risks to ecological receptors in the vicinity of Building 238.

Alpha- and gamma-chlordane were elevated in samples CEF-P21-SS-003, CEF-P21-SS-501, and CEF-P21-SS-002, which were collected in the northern portion of the site. Other pesticides were not detected in these samples, so risk from cumulative pesticide toxicity would appear to be limited to alpha- and gamma-chlordane. However, detection limits for non-detected pesticides were elevated in sample CEF-P21-SS-003 (Table 8-6), adding some uncertainty to the evaluation of this sample. An assessment of potential chlordane-related risk is limited by a lack of soil guidelines for this pesticide and its isomers, but the sum of alpha- and gamma-chlordane concentrations in sample CEF-P21-SS-002 (468 µg/kg) was less than Beyer's (1990) "B" value for organochlorine pesticides (500 µg/kg). The "B" values indicate "moderate soil contamination that requires additional study" (Beyer, 1990). The "B" value for *total* organochlorine pesticides is 1,000 µg/kg (Beyer, 1990). The sum of alpha- and gamma-chlordane concentrations in sample CEF-P21-SS-501 (543 µg/kg) exceeded the "B" value for organochlorine pesticides but was well below the "B" value for *total* organochlorine pesticides. The sum of alpha- and gamma-chlordane concentrations in sample CEF-P21-SS-003 (3,660 µg/kg; 2,090 in the duplicate sample) exceeded both the "B" value for organochlorine pesticides and the "B" value for *total* organochlorine pesticides. In summary, potential pesticide-related risk from cumulative toxicity in the northern hot spot is limited to soil invertebrates. Food chain modeling suggests negligible pesticide-related risks to upper level receptors at this location.

DDT, DDD, alpha-chlordane, and gamma-chlordane were moderately elevated in sample CEF-P21-SS-110, which was collected in a weedy area near the tree line in the western portion of the site. The potential risks from DDT and DDD at this location was discussed above. Concentrations of alpha-and gamma-chlordane in this sample (144 µg/kg and 67 µg/kg, respectively) were not elevated relative to Beyer's (1990) "B" values, but could nevertheless pose some incremental risk via cumulative toxicity at this location. Other pesticides were not detected in this sample, but detection limits were especially high for toxaphene and the PCB Aroclor-1260 (Table 8-6). In summary, cumulative pesticide-related toxicity in the western hot spot (one soil sample) could exist for soil invertebrates. Food chain modeling suggests negligible pesticide-related risks to mammals. Cumulative pesticide-related risk to birds could exist, but is limited to birds with seasonal home ranges (i.e., nesting season) that encompass sample CEF-P21-SS-110. The hot spot comprises an extremely small area of contamination.

8.4.6 Discussion - Herbicides

Dacthal, a pre-emergence herbicide, was detected in 1 of 3 samples collected in 1998. Dacthal has a low acute toxicity to mammals and birds, with LD_{50} values of >3,000,000 µg/kg in rats, >10,000,000 µg/kg in rabbits and dogs, and 5,500,000 µg/kg in young bobwhite quail (Extoxnet, 1996). Available data indicate that dacthal does not cause reproductive effects and has a low chronic toxicity (Extoxnet, 1996). Although ecological screening values in soil are not available, dacthal does not appear to be a contaminant of concern at the concentration detected in one sample from Site 21.

8.4.7 Discussion - Inorganics

Aluminum

Aluminum concentrations exceeded the Region 4 ecological screening value in all samples for which it was analyzed, but concentrations exceeded the background value (4,430 mg/kg) in only one sample. Aluminum is not readily absorbed through the skin, and gastrointestinal absorption of ingested aluminum is poor due to the transformation of aluminum salts into insoluble aluminum phosphate (Venugopal and Luckey, 1978). Thus, aluminum generally does not bioaccumulate or biomagnify in the food chain. Aluminum compounds are generally not harmful to most terrestrial organisms and are considered to be toxicologically inert, except in cases of high experimental doses or prolonged inhalation (Venugopal and Luckey, 1978). With this in mind, ecological risks from aluminum are negligible at Site 21.

Arsenic

Arsenic concentrations exceeded the Region 4 ecological screening value in only 1 of 33 samples in which it was detected, and the maximum concentration was relatively low, with a screening HQ of 1.1 (Tables 8-1 and 8-3). Some food chain HQs were greater than 1.0 but were relatively low (maximum

HQ = 3.29) using the average concentration (Tables 8-4 and 8-5). All arsenic concentrations were less than alternate screening values (Table 8-3). Because arsenic concentrations exceeded the most conservative ecological screening value in only one sample and were less than other screening values, and since arsenic at the site does not appear to pose significant risks to upper level receptors considering the conservative assumptions used in the food chain model, arsenic poses negligible ecological risk at the site.

Chromium

Chromium concentrations exceeded the Region 4 ecological screening value in all samples for which it was analyzed, but concentrations exceeded the background value (7.75 mg/kg) in only one sample. Food chain HQs were slightly greater than 1.0 for the robin (HQ = 1.23) and woodcock (HQ = 2.53), based on the maximum concentration (Table 8-4). Based on the average concentration, the maximum food chain HQ was 1.18 for the shrew (Table 8-5). The two lowest screening values shown in Table 8-3 (0.4 and 1.0 mg/kg) are for hexavalent chromium (Efroymson et al., 1997a; 1997b). Trivalent chromium, however, is the predominant form of this metal in most soils and is not bioavailable (Eisler, 1986). The screening value protective of soil microorganisms is 10 mg/kg for trivalent chromium (Efroymson et al., 1997a). The maximum concentration of chromium at the site (8.7 mg/kg) was less than the trivalent chromium guideline. With these considerations in mind, chromium does not appear to pose significant ecological risks at the site.

Cyanide

Cyanide concentrations exceeded the Region 4 ecological screening value in one sample, with a screening HQ of 1.1 (Tables 8-1 and 8-3). The maximum concentration (1.0 mg/kg) was less than the background value (1.19 mg/kg), suggesting that concentrations are not site-related. Cyanide does not bioaccumulate or biomagnify in the food chain. With these factors in mind, ecological risks from cyanide are negligible at Site 21.

Iron

Iron concentrations exceeded the Region 4 ecological screening value 7 of 8 samples. The maximum concentration (1,090 mg/kg) was less than the background value (1,490 mg/kg), suggesting that concentrations are not site-related. Iron does not bioaccumulate or biomagnify in the food chain. Although ecological guidelines are sparse, data from Site 21 samples indicate that site-related iron concentrations in surface soil do not pose significant potential risks to ecological receptors.

Mercury

Mercury concentrations exceeded the Region IV ecological screening value in three samples, with a maximum screening HQ of 8.9 (Tables 8-1 and 8-3). The background value (0.16 mg/kg) was exceeded in two samples (BOR-A-4-1: 0.89 mg/kg, and BOR-A-5-1: 0.38 mg/kg). Most food chain HQs were greater than 1.0 based on the maximum concentration, and food chain HQs were especially elevated for the woodcock (NOAEL HQ = 173), robin (NOAEL HQ = 129), and shrew (NOAEL HQ = 58.8) (Table 8-4). Using the average mercury concentration (0.21 mg/kg), food chain NOAEL HQs were 40.3 for the woodcock, 30.1 for the robin, and 13.7 for the shrew (Table 8-5).

Sample BOR-A-5-1 was collected approximately 40 feet north of Building 238, slightly north of a gravel road and within a vehicle parking area. Habitat in the vicinity of this location is of marginal quality. Habitat in the vicinity of sample BOR-A-4-1 is of much higher quality, however. This sample was collected from the wooded area in western portion of the site. While the vicinity of sample BOR-A-5-1 would not be significantly utilized by most ecological receptor species, the vicinity of sample BOR-A-4-1 would probably provide habitat for terrestrial invertebrates as well as upper level receptors such as birds and mammals.

The 0.89 mg/kg mercury concentration in sample BOR-A-4-1 exceeds most alternate guidelines shown in Table 8-3. This concentration, however, is well below the Dutch intervention value for mercury (10 mg/kg) ands is also less than the Dutch intermediate value of 5.15 mg/kg, which is midway between the Dutch intervention and target values (MHSPE, 1994; Swartjes, 1999).

Mercury was not analyzed in the samples nearest to sample BOR-A-4-1. However, mercury was not elevated in two samples within 80 feet of BOR-A-4-1. Specifically, mercury was not detected in BOR-A-2-1 (detection limit = 0.1 mg/kg), which is located approximately 80 feet to the northeast. The mercury concentration in BOR-A-3-1, which is located approximately 80 feet to the east-northeast, was less than the background concentration. Mercury was not detected in any of 10 soil samples collected from Site 11; the detection limits in the Site 11 samples ranged from 0.05 to 0.06 mg/kg (ABB-ES, 1996; 1997). The nearest Site 11 samples were located approximately 180 feet west of BOR-A-4-1. Thus, available data suggest that the slightly elevated mercury concentration in sample BOR-A-4-1 is an isolated occurrence.

In summary, the mercury concentration in sample BOR-A-4-1 (0.89 mg/kg) exceeds ORNL values considered to be protective of soil invertebrates and plants (Table 8-3). The concentration in this sample is greater than some guidelines but less than others. Results of food chain modeling indicate potential risk to small mammals represented by the shrew, but available data suggest that elevated mercury concentrations are limited to an extremely small area. Although the shrew has a small home range

(approximately 1 to 2.4 acres), shrews and other small mammals would forage over a larger area than the immediate vicinity of sample BOR-A-4-1. Birds would forage over areas much larger than the area of available habitat in the vicinity of this sample. The overall risks from mercury at the site appear to be limited to soil invertebrates and plants in the vicinity of sample BOR-A-4-1.

Vanadium

Vanadium concentrations exceeded the Region 4 ecological screening value in seven samples, with a maximum screening HQ of 1.8 (Tables 8-1 and 8-3). The maximum vanadium concentration (3.5 mg/kg) was less than the background value (6.3 mg/kg). Therefore, slightly elevated concentrations of vanadium do not appear to be site related. Vanadium does not bioaccumulate or biomagnify in the food chain. With these factors in mind, site-related concentrations of vanadium in surface soil do not pose significant ecological risks at Site 21.

Zinc

Zinc concentrations exceeded the Region 4 ecological screening value and the background value in only one sample (90S02501), with a relatively low screening HQ of 1.04 (Tables 8-1 and 8-3). Sample 90S02501 was collected approximately 5 feet north of Building 398 in a maintenance vehicle parking area (Figures 8-1 and 8-2). All concentrations were well below alternate screening values (Table 8-3). Some food chain HQs were greater than 1.0 using maximum and average concentrations, with a maximum HQ of 8.19 for the woodcock (Tables 8-4 and 8-5). The habitat in the vicinity of sample 90S02501 would only rarely (if ever) be utilized by the representative receptors with food chain HQs greater than 1.0 (robin, hawk, fox, and woodcock). With the above factors in mind, potential ecological risks from zinc appear to be negligible.

8.4.8 Ecological Risk Summary

Several inorganic and organic compounds were present in Site 21 surface soil samples at concentrations that exceeded USEPA Region 4 ecological screening values and were, therefore, initially retained as COPCs. Several other compounds were initially retained as COPCs since screening levels were not available. Potential ecological risks from most COPCs were determined to be negligible in Step 3a of the risk assessment process for one or more reasons, such as low frequency of detection, concentrations comparable to background values (inorganics), or concentrations less than alternative screening values.

Elevated concentrations of pesticides were present in samples collected from the central portion of the site, where ecological habitat is minimal. Specifically, habitat in this portion of the site consists largely of

gravel covered areas, building, roads, and turf grass. Potential toxicity is negligible under current conditions in this area. These locations are indicated on Figure 8-2.

Concentrations of alpha- and gamma-chlordane could pose risks to soil invertebrates in the northern portion of the site. However, a paucity of toxicity data for chlordane and its isomers prevents a complete assesment of this pesticide regarding its toxicity to soil invertebrates. Potential risks appear to be minor, however, based on comparisons of detected concentrations to Beyer's (1990) guidelines. Potential risks to upper level receptors in the northern portion of the site are negligible. These locations are indicated on Figure 8-2.

Concentrations of pesticides (primarily DDD, DDE, and DDT, pose potential risk to soil invertebrates in the vicinity of one sample (CEF-P21-SS-110) in the western portion of the site. Risks to upper level receptors at this location are limited to birds with small home ranges and/or birds with seasonal home ranges (i.e., nesting season) that encompass this sample. This location is indicated on Figure 8-2.

Mercury could pose risk to soil invertebrates and plants, but only in vicinity of sample BOR-A-4-1, the westernmost sample at the site. This location is indicated on Figure 8-2.

9.0 SUMMARY AND CONCLUSIONS

9.1 SUMMARY

9.1.1 Nature and Extent of Contamination

Soil

Soil contaminated with arsenic, TRPH, total chlordane, 4,4'-DDT, toxaphene, and dieldrin had been previously delineated and removed such that the site UCLs of the contaminants meet FDEP industrial criteria. Arsenic, TRPH, total chlordane, 4,4'-DDT, toxaphene, and dieldrin still remain in the soil but at concentrations that do not pose a risk to human health (based on industrial use) or the environment. The concentrations of these contaminants in some individual samples are greater than the residential SCTLs.

Groundwater

Chlordane was detected in groundwater samples at concentrations greater than the FDEP GCTL. Monitoring wells were used to delineate the horizontal extent of the plume. The maximum concentration of chlordane was 2.9 µg/l. The plume, as defined by the GCTL of 2 µg/L for chlordane, is less than 30 feet in diameter. The contaminant appears to be limited to the shallow groundwater depths. Because of the low contaminant concentrations, the low mobility of the contaminants, and based on observations of groundwater contaminant plumes at other NAS Cecil Field Sites, the installation of deeper wells was determined by the BCT not to be necessary for delineating vertical extent.

DDD was detected at a concentration slightly above its GCTL during one sampling event but during a second event the detection limit was greater than the GCTL. Because the concentration was so close to the GCTL, and because the chlordane is present at a higher concentration at the same location, DDD was not retained as a COC.

The source of the chlordane in the groundwater appears to be a septic field. Since the site was used for handling pesticides at the golf course, the presence of chlordane in the groundwater was probably the result of improper handing of the chemical.

Manganese was detected in the groundwater but is not believed to be a component of materials used at the site. Therefore, no further action is required for the manganese.

9.1.2 Fate and Transport

Chlordane was detected in groundwater at concentrations greater than the FDEP criterion but in a small area. Other chemicals have been detected in the soil elsewhere on the site, but not in groundwater. This finding is consistent with the low mobility of these types of compounds.

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 6.2×10^{-7} and the cumulative hazard index is significantly less than 1.0.

However, the UCLs of the contaminants at the site are greater than FDEP residential SCTLs. The cumulative cancer risk is 5.7×10^{-6} and the cumulative hazard index is less than 1.0.

The PRE for groundwater indicates that sample concentrations of chlordane in groundwater exceed the FDEP GCTL. The manganese concentrations in two groundwater samples exceed twice the background value but not the Region 9 PRG. The average manganese concentration is less than twice the site average background concentration and is also less than the Region 9 PRG. The Region 9 PRG for manganese corresponds to a hazard quotient of 1.0. Therefore, exposure to the maximum concentration of manganese would not pose a significant risk to human health.

9.1.4 Ecological Risk Assessment

Exposure to surface soil contaminants poses minimal risks to ecological receptors at the site. Concentrations of pesticides in some surface soil samples were elevated relative to EPA Region 4 ecological screening values. Potential pesticide-related risks in most of these samples are minor, however, based on comparisons to other soil guidelines. The greatest pesticide concentrations were in samples collected from the central portion of the site, where ecological habitat is essentially absent. Thus, pesticide-related risks in the central portion of the site are negligible.

Concentrations of pesticides (primarily DDD, DDE, and DDT) were elevated in sample CEF-P21-SS-110, collected from the western portion of the site. However, pesticide concentrations were relatively low in nearby samples, indicating that potential risk at this location is minimal due to the extremely small area represented by this sample. Similarly, mercury was slightly elevated in sample BOR-A-4-1. However, mercury was not detected in samples collected to the west, and was below site-wide background concentrations in samples collected to the east of this location. Thus, potential risk from mercury in sample BOR-A-4-1 is negligible due to the extremely small area represented by this sample.

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 showed that chlordane was the primary contaminant.

Because the 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 chlordane and site geology.

Soil sampling indicated the presence of arsenic, TRPH, total chlordane, 4,4'-DDT, toxaphene, and dieldrin in the soil that was later delineated to industrial criteria and removed. Because this delineation is complete, no additional soil sampling is needed.

9.2.2 Recommended Remedial Action Objectives

Based on the results of the investigation, the following Remedial Action Objective is recommended:

- Prevent ingestion of groundwater having total chlordane concentrations greater than the FDEP criteria of 2 µg/l.
- Prevent residential exposure to site soils having arsenic, toxaphene, chlordane, and dieldrin 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 the use of the site for residential purposes.
- 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 Name: Site 21 Ceail Field
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[X] Other Well Type:
[] QA Sample Type:

Sample ID No.: CEF-P21-GW-075
Sample Location: CEF-P21-75'
Sampled By: M. DALE / A. PATE
C.O.C. No.: P21-16
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal.	Other
	Visual	Standard	mS/cm	°C	NTU	mg/l	%	NA
Date: 4/24/00								
Time: 1625								
Method: Peristaltic pump	cldy	5.96	0.273	20.4	140	0.18	—	—

PURGE DATA:

	TIME	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Volume
Date: 4/24/00								
Method: Peristaltic pump								
Monitor Reading (ppm): 3.6								
Well Casing Diameter & Material								
Type: 2 in. PVC			See Low Flow Purge Sheet					
Total Well Depth (TD): 17.75								
Static Water Level (WL): 9.53								
One Casing Volume(gal/L): 5								
Start Purge (hrs): 1418								
End Purge (hrs): 1624								
Total Purge Time (min): 126								
Total Vol. Purged (gal/L): 25								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Pesticides	4°C / none	1 - 1L glass amber	yes
Dieldrin	4°C / none	2 - 1L glass amber	yes

OBSERVATIONS / NOTES:

Stick up of riser above ground level (AGL): ~3 ft.

Tubing at 14 FT. BTOC. Approx. 3.75 ft. off bottom.

17.75
− 9.53
8.22 ft. of water column
Vol = 5 liters or 1.3 gallons.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
MSMSD08	CEF-P21-GW-DU09

Signature(s): Merrin Dale

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS ~~JACKSONVILLE~~ CECIL FIELD
PROJECT NUMBER: ~~0255~~ 0039

WELL ID.: CEF-PZ1-75
DATE: 4/24/00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Sal. (%)	Comments	Cum. Vol. (Liters)
1418	9.53	—	—	—	—	—	—	—	start	0
1421	9.88	250	5.73	0.243	20	1.04	21.8	—		0.75
1426	—	200	5						slow pump	1.50
1428	9.98		5.85	0.242	21	0.81	21.4	—		1.90
1438	10.04	200	5.78	0.254	77	0.47	21.0	—		3.90
1448	10.04	200	5.85	0.259	156	0.28	20.5	—	cldy.	5.90
1458	~~12.0~~ 10.19	200	5.89	0.266	134	0.30	20.2	—	cldy.	7.90
1508	10.22	200	5.94	0.270	253	0.41	20.3	—	cldy.	9.9
1518	10.21	200	5.95	0.272	231	0.19	20.5	—	cldy.	11.9
1528	10.22	200	5.96	0.272	75	0.23	20.7	—	cldy.	13.9
1538	10.22	200	5.95	0.273	45	0.20	20.7	—	cldy.	15.9
1548	10.22	200	5.94	0.273	37	0.20	20.8	—	cldy.	17.9
1558	10.22	200	5.94	0.271	32	0.20	20.6	—	cldy.	19.9
1608	10.22	200	5.95	0.272	30	0.20	20.3	—	cldy.	21.9
1618	10.22	200	5.95	0.273	69	0.19	20.5	—	cldy.	23.9
MD 1628	10.22	200	5.96	0.273	140	0.18	20.4	—	cldy.	25
1625 – sample @ 5 volumes										

SIGNATURE(S): M. W. Dale

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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER P21-16 | PAGE 1 OF 1

PROJECT NO: N0039
SITE NAME: PSC21
PROJECT MANAGER AND PHONE NUMBER: Joe Logan 412 921 7231
LABORATORY NAME AND CONTACT: Accutest H. Behbadi
SAMPLERS (SIGNATURE): Melvin W. Dale
FIELD OPERATIONS LEADER AND PHONE NUMBER: MELVIN DALE 904 281 0400
ADDRESS: 4405 Vineland Rd C-15
CARRIER/WAYBILL NUMBER: Fedex 8147 6077 7334
CITY, STATE: ORLANDO, FL 32811

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

FG348

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL Pesticides SW846 8081A	TYPE OF ANALYSIS: Dieldrin only ⊗ SW846 Modified 8081A							COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G							
PRESERVATIVE USED						none	none							
1 4/24	1625	CEF-P21-GW-07S	GW	G	3	1	2							Cool to 4°C
2 4/24	0000	CEF-P21-GW-DU09	GW	G	3	1	2							
1 4/24	1625	CEF-P21-GW-MSMSD08	GW	G	6	2	4							Work Release 13

⊗ Dieldrin only by special method. Requires special preparation.

AGPC cleanup step may be required prior to sample analysis, consult with PM.

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: Melvin W. Dale	4/24/00	1830	1. RECEIVED BY: Mike Fenell	4/24/00	1000
2. RELINQUISHED BY:			2. RECEIVED BY: cooler 3.2	4/25/00	
3. RELINQUISHED BY:			3. RECEIVED BY:		

OSE.300

YELLOW (FIELD COPY) PINK (FILE COPY) 3/99

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER P21-13 | PAGE 1 OF 1

PROJECT NO: N0039	SITE NAME: PSC 21
PROJECT MANAGER AND PHONE NUMBER	JOE LOGAN 412 921 7231
LABORATORY NAME AND CONTACT:	H.B. Lydell Accutest
SAMPLERS (SIGNATURE)	Melvin W. Dale
FIELD OPERATIONS LEADER AND PHONE NUMBER	MERV DAVE 904 281 0400
ADDRESS	4405 Vineland Rd C-15
CARRIER/WAYBILL NUMBER	Fedex 8100 4594 3740
CITY, STATE	ORLANDO, FL 32811

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G

PRESERVATIVE USED: —

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TOC								COMMENTS
3/3	1607	CEF-P21-SS-TOC-01	Soil	G	1	1			FS9193-1					Cool to 4°C
														Work Release 11.

°C

1. RELINQUISHED BY Melvin W. Dale	DATE 3/3/00	TIME 1800	1. RECEIVED BY Mike Farell	DATE 3/4/00	TIME 0935
RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
NQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

TS N0039. DSO. DSP. 520

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

3/99
FORM NO. TINUS-001

A.3 Survey Data

SURVEY DATA
MONITORING WELLS
SITE 21
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Well	NORTHING	EASTING	GROUND SURFACE EL, Feet	TOP OF CASING EL, Feet
CEF-P21-01S	2146851.7100	372900.4500	76.10	76.09
CEF-P21-02S	2146802.5000	372886.8200	75.70	75.55
CEF-P21-03S	2146810.4200	372954.0500	76.10	75.88
CEF-P21-04S	2146807.3440	372980.3140	76.00	75.80
CEF-P21-05S	2146727.3800	372850.3200	75.50	75.07
CEF-P21-06S	2146753.1600	372864.6400	75.40	75.20
CEF-P21-07S	2146843.0100	372989.2700	76.20	79.40
90G001	2146744.7500	372856.0800	NM	NM

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

MW1

BORING LOG

PROJECT NAME: NASCF PSC 21
PROJECT NUMBER: N0039
DRILLING COMPANY: PARTRIDGE
DRILLING RIG: 90
BORING NUMBER: 0003
DATE: 05/24/99
GEOLOGIST: M. DAVE
DRILLER: M. NICHOLSON

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 (Hollow Stem)	ID/FID Reading (ppm): Sample	Sampler BZ	Borehole*	Driller BZ*
	0-2	N/A	N/A		—	GRY	Pebble/Rocks w/ Fine Sand	SP	dry HAND AUGER				0.2
	2-3					LT. GRY	SILTY FINE SAND	SM	dry REF.				0.2
	3-4					BRN	CLAYEY FINE SAND	SC	moist BLS.				0.2
	4-7						SAME		Wet ~ 4 FT. BLS.				0.2
	7-13					LT. BRN	SILTY FINE SAND	SM	wet				0.2
							EOB = 13 FT. BLS.						

MW Dale

* 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): 0.2

Converted to Well: Yes ✓ No _____ Well I.D. #: ~~PSC~~ CEF-P21-MW01

BORING LOG

Page 1 of 1

CEF-PZ1-MW02

PROJECT NAME: PSC 21 - GOLF CSE PESTICIDE
PROJECT NUMBER: N0039
DRILLING COMPANY: PARTRIDGE DRILLING
DRILLING RIG: 90
BORING NUMBER: 0001
DATE: 05/24/99
GEOLOGIST: MKR / DALE
DRILLER: Mike Nicholson

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	Sample	Sampler BZ	Borehole**	Driller BZ**	Sample Depth
	0-1	HA	N/A		N/A	LT. GRY	LT. FINE SAND	SP	DRY HA-					
	1-2.5					LT. GRAY	FINE SILTY SAND	SM	~~MOIST~~ DAMP MP	0		—	0	2 FT.
	2.5-3					GRAY	FINE SILTY SAND	SM	MOIST					
	3-4						SAME	SM	MOIST					
	4-4.5	3												
	4.5-5	4	1'/2'											
	5-5.5	5	50%			LT. BRN	FINE SAND WITH CLAY	SM-SC	SPLIT SPOON HA WET @ ~4-4.5 ft.	0		0	0	4 FT.
	5.5-6	12												
	6-6.5	6				LT. GRAY	FINE SILTY SAND	SM	WET SS 6-8					
	6.5-7	14	1.5/2 =											
	7-7.5	14	75%							NS		—	—	7 FT.
	7.5-8	11												
	8-8.5	4				LT. GRAY	FINE SILTY SAND	SM	WET SS 8-10					
	8.5-9	8												
	9-9.5	9	1.5/2 =							NS		—	—	
	9.5-10	6	75%											
	10-10.5	3				LT. GRAY	FINE SILTY SAND	SM	WET SS 10-12					
	10.5-11	4												
	11-11.5	4	1.5/2 =							0		—	—	11 FT.
	11.5-12	4	75%											
	12-12.5	3				LT. GRAY	FINE SILTY SAND	SM	WET SS-12-14					
	12.5-13	4												
	13-13.5	5	100%							0		—	—	13 FT.
	13.5-14	6												
							EOB = 14 FT. BLS.							

* When rock coring, enter rock brokeness.
** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: HA = hand Auger NS = NOT SAMPLED

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: CEF-PZ1-MW02

Tetra Tech NUS, Inc.

BORING LOG

MW3

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: FARTRIOGS
DRILLING RIG: 90
BORING NUMBER: 0002
DATE: 05/24/99
GEOLOGIST: M. DACK
DRILLER: M. NICHOLSON

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 (Hollow Stem)	PID/FID Reading (ppm) Sample	Sample BZ	Borehole	Driller BZ
	0-1					GRAY	FINE SAND	SP	DRY Hand Auger to 4 FT. BGS.				Q
	1-3					RED BRN	FINE SILTY SAND	SM	DRY				Q
	3-4					BRN	FINE SILTY SAND	SM	DRY				Q
	4-5						SAME						
	5-12					LT. BRN	FINE SAND W/ CLAY	SM-SC	MOIST / WET				Q
	12-13					BRN	FINE SILTY SAND	SM	WET				—
							EOB = 13 FT. BLS.						

Middle

* 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): Q

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: OLF-P21-MW03

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: Hollow-Stem Diedrich D-120

BORING NUMBER: CEF-P21-~~SW~~ 045
DATE: 7/21/99
GEOLOGIST: JASON MCCANN
DRILLER: JEFF ZEIGLER

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**
		HAND Auger				DK. gray	Fine-grained sand	SP	organic debris, dry, No odor				
	2'					Brown to DK. Brown							
	4'					Brown to Lt. Brown			Moist, No odor			0.0	0.0
		Drilling					Silty sand w/clay	SM					
	6'					Lt. Brown	Silty sand w/Traces of clay		Water table ~ 6' No odor				
	8'												
	10'											0.0	0.0
	12'												
	14'												
	15'												

* 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-P21-~~SW~~ 045

Tetra Tech NUS, Inc.

BORING LOG

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

BORING NUMBER: CEF-P21-~~MW~~-55
DATE: 8/19/99
GEOLOGIST: L. KNIGHT
DRILLER: SHANE 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	Sampler BZ	Breathing Zone	Driller BZ
	0-3					Lt GRAY	FINE SAND		DRY	0-2' 0'			
	3-4					Lt Yel-Brown	SILTY SAND		DAMP				
	4-8					Pale Y-Br	FINE SAND w/ SOME CLAY		SATURATED	2-4' 0'			
	8-12					TAN	SILTY SAND		SATURATED				
							EOB						

hen 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:

Converted to Well: Yes ✓ No ____ Well I.D. #: CEF-P21-~~MW~~-55

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GROUNDWATER PROTECTION
DRILLING RIG: DIEDRICH D-25

BORING NUMBER: CEF - P21 - MW65
DATE: 8/19/99 9AM
GEOLOGIST: L KNIGHT
DRILLER: SHANE 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	Sampler BZ	Borehole	Driller BZ
	0-2					Lt Br/ Gray	FINE SAND		DRY	0	0		
	2-4					Yel Brown	FINE SAND		DAMP @ 3.5	0			
	4-6					Pale BR	FINE SAND w/ trace CLAY		WET				
	6-10					GRN/ TAN	SILTY SAND; v. fine		SATURATED				
	10-12.5					Or/ Br	FINE SAND		SATURATED				
							EOB						

When rock coring, enter rock brokeness.

* Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0.00

Remarks:

Converted to Well: Yes ✓ No -

Well I.D. #: CEF-P21-MW65

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GROUNDWATER PROTECTION INC.
DRILLING RIG: DIEDRICH D-25

BORING NUMBER: 001
DATE: 4/6/00
GEOLOGIST: LOUIS KNIGHT
DRILLER: NICK SMARRITO (GPI)

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**
	0-2.5					DK GY BRN	SAND, very fine	SP	DAMP				
	2.5-4				Medium	yel. brn	SAND, fine & very fine	SP					
	4-6		2/2				NOT DESCRIBED		COLLECT SHELBY				
									TUBE FOR ANALYSIS.				
	6-15					PALE BRN	SAND, VERY FINE	SP	Saturated at 6 to				
									7 feet bls.				
							EOB @ 15 feet 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):

Remarks: Shelby tube collected at 4-6 ft. interval.
Attempted Shelby tube sample from 6-8 ft. interval - collected disturbed sample.

Converted to Well: Yes X No

Well I.D. #: CEF-P21-7S

B.2 Monitoring Well Construction Sheets

Tetra Tech NUS, Inc.

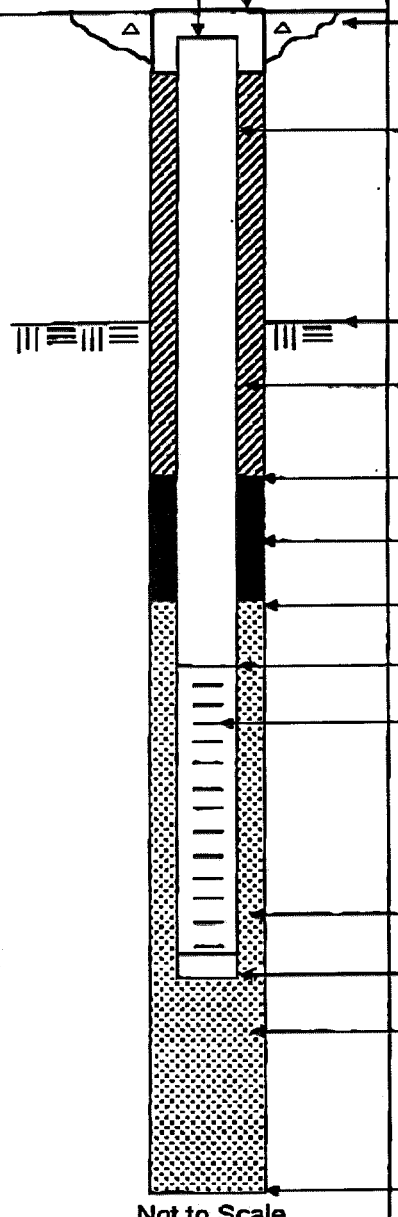
WELL No.: CEF-P21-MW01

MONITORING WELL SHEET

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	PARTRIDGE	BORING No.:	0003
PROJECT No.:	0039	DRILLER:	M. NICHOLSON	DATE COMPLETED:	5/24/99
SITE:	PSC 21	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	M. DALE	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser: 1 3IN.

Elevation / Height of Top of Surface Casing: 1 0

I.D. of Surface Casing: 2 IN.

Type of Surface Casing: Std

Type of Surface Seal: Quikrete

I.D. of Riser: 2 IN.

Type of Riser: PVC

Borehole Diameter: 8 IN.

~~Elevation / Depth Top of Rock:~~ N/A 1

Type of Backfill: Portland Cement Type I

Elevation / Depth of Seal: 1 18 IN.

Type of Seal: BENTONITE CHIPS

Elevation / Depth of Top of Filter Pack: 1 2 FT.

Elevation / Depth of Top of Screen: 1 3 FT.

Type of Screen: PVC

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

I.D. of Screen: 2 INCH

Type of Filter Pack: Standard Sand 20/30 grade

Elevation / Depth of Bottom of Screen: 1 13 FT.

Elevation / Depth of Bottom of Filter Pack: 1 13 FT.

Type of Backfill Below Well: NATIVE SOIL

Elevation / Total Depth of Borehole: 1 13 FT.

Tetra Tech NUS, Inc.

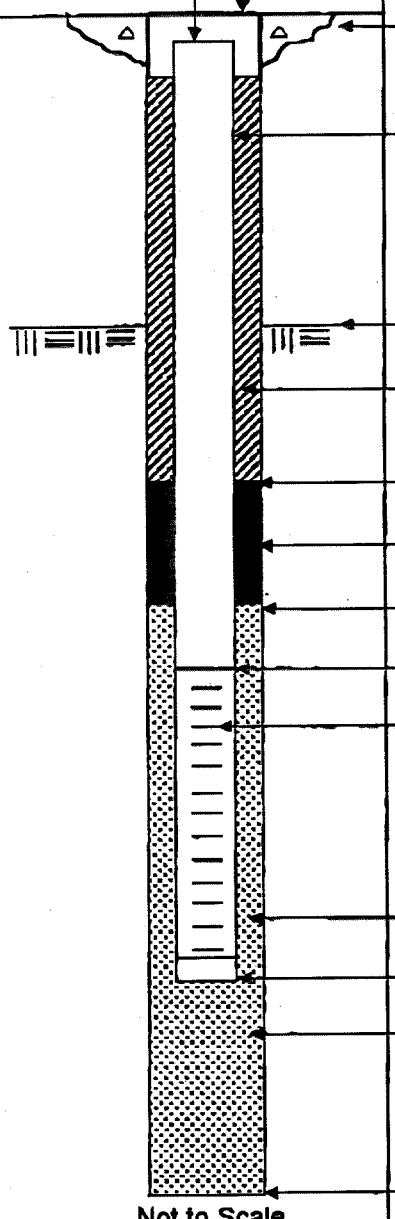
WELL No.: CEF-P21-MW02

MONITORING WELL SHEET

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	PARTRIDGE	BORING No.:	0001
PROJECT No.:	0039 PSC21	DRILLER:	Mike Nicholson	DATE COMPLETED:	5/24/99
SITE:	PESTICIDE	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	M. DALE	DEV. METHOD:	Centrifugal pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser: 1 3 IN.

Elevation / Height of Top of Surface Casing: 1 0

I.D. of Surface Casing: 8 IN.

Type of Surface Casing: Steel

Type of Surface Seal: Quikrete

I.D. of Riser: 2 IN.

Type of Riser: PVC

Borehole Diameter: 8 IN. O.D. / 4.25 IN. I.D.

~~Elevation / Depth Top of Rock:~~ N/A 1

Type of Backfill: Portland Cement Type I

Elevation / Depth of Seal: 1 18 IN.

Type of Seal: BENTONITE CHIPS

Elevation / Depth of Top of Filter Pack: 1 2 FT.

Elevation / Depth of Top of Screen: 1 3 FT.

Type of Screen: PVC

Slot Size x Length: 0.010" x 10'

I.D. of Screen: 2 IN.

Type of Filter Pack: STD. SAND 20-30 grade

Elevation / Depth of Bottom of Screen: 1 13 FT.

Elevation / Depth of Bottom of Filter Pack: 1 13 FT.

Type of Backfill Below Well: NATIVE SOIL

Elevation / Total Depth of Borehole: 1 13 FT.

Tetra Tech NUS, Inc.

WELL No.: CEF-P21-MWQ3

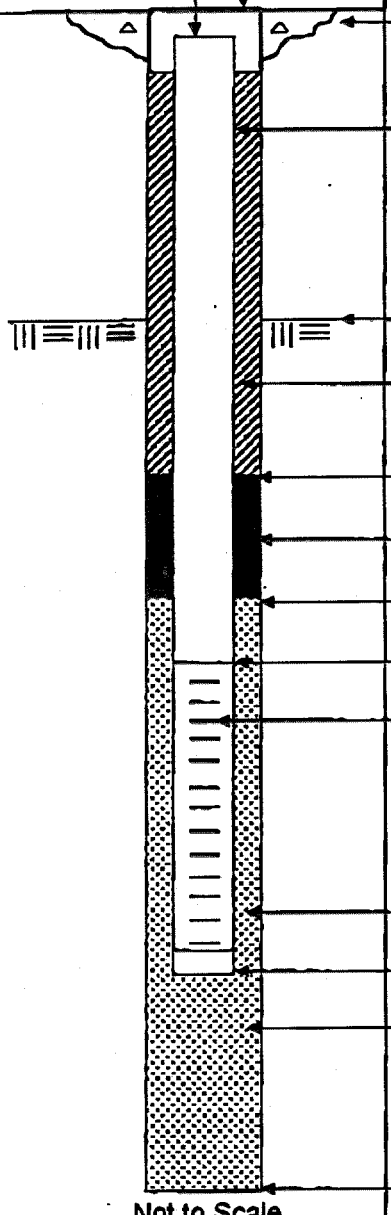
MONITORING WELL SHEET

PROJECT: NAS CECIL FIELD
PROJECT No.: 0039
SITE: PSC 21
GEOLOGIST: M. DALE

DRILLING Co.: PARTRIDGE
DRILLER: Mike Nicholson
DRILLING METHOD: Hollow Stem Auger
DEV. METHOD: Submersible

BORING No.: 0002
DATE COMPLETED: 05/24/99
NORTHING:
EASTING:

Ground Elevation =
Datum:



Not to Scale

Elevation / Depth of Top of Riser: 1 3 IN.

Elevation / Height of Top of Surface Casing: 1 0

I.D. of Surface Casing: 8 IN.

Type of Surface Casing: Steel

Type of Surface Seal: Quikrete

I.D. of Riser: 2 IN.

Type of Riser: PVC

Borehole Diameter: 8 IN. O.D. / 4.25 IN. I.D.

~~Elevation~~ / ~~Depth Top of Rock~~: N/A 1

Type of Backfill: Portland Cement Type I

Elevation / Depth of Seal: 1 18 IN.

Type of Seal: BENTONITE CHIPS

Elevation / Depth of Top of Filter Pack: 1 2 FT.

Elevation / Depth of Top of Screen: 1 3 FT.

Type of Screen: PVC

Slot Size x Length: 0.010 IN X 10 FT.

I.D. of Screen: 2 IN.

Type of Filter Pack: STD. SAND 20-30 grade

Elevation / Depth of Bottom of Screen: 1 13 FT.

Elevation / Depth of Bottom of Filter Pack: 1 13 FT.

Type of Backfill Below Well: NATIVE SOIL

Elevation / Total Depth of Borehole: 1 13 FT.

Tetra Tech NUS, Inc.

WELL No.: CEF-P21-~~MW~~-045

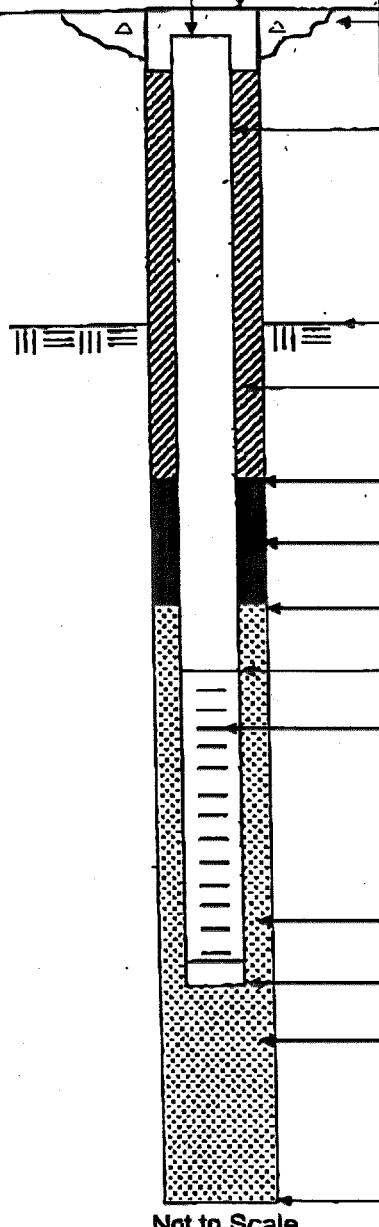
MONITORING WELL SHEET

PROJECT: NAS CECIL FIELD
PROJECT No.: 0039
SITE: PSC 21
GEOLOGIST: JASON McCann

DRILLING Co.: GPI
DRILLER: Jeff Zeigler
DRILLING METHOD: Hollow-Stem Auger
DEV. METHOD: pumping

BORING No.: CEF-P21-~~MW~~-045
DATE COMPLETED: 7/21/99
NORTHING:
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:
Type of Surface Casing: Flush Mount
Type of Surface Seal: concrete PAd
I.D. of Riser: 2"
Type of Riser: PVC
Borehole Diameter: 8.25"
Elevation / Depth Top of Rock: /
Type of Backfill: Portland cement
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
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: /
Type of Backfill Below Well:
Elevation / Total Depth of Borehole: /

Tetra Tech NUS, Inc.

WELL No.: CEF-P21-MW55

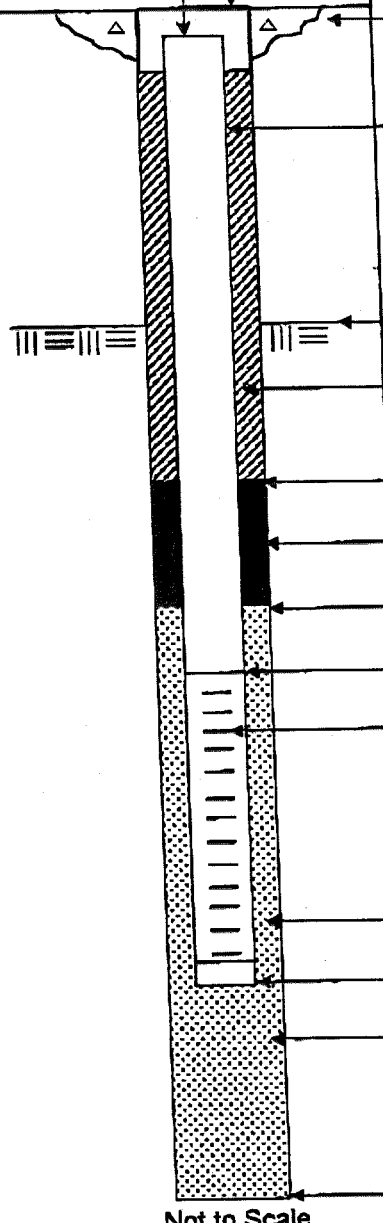
MONITORING WELL SHEET

PROJECT: NAS CECIL FIELD
PROJECT No.: 0039
SITE: P5C21
GEOLOGIST: L. Knight

DRILLING Co.: GW Protection
DRILLER: Shane Newlen
DRILLING METHOD: HSA
DEV. METHOD:

BORING No.: CEF-P21-MW55
DATE COMPLETED: 8/19/99
NORTHING:
EASTING:

Ground Elevation =
Datum:



Not to Scale

Elevation / Depth of Top of Riser: 16"
Elevation / Height of Top of Surface Casing: NA
I.D. of Surface Casing:
Type of Surface Casing:
Type of Surface Seal:
I.D. of Riser: 2"
Type of Riser: SCH 40 PVC
Borehole Diameter: 8"
Elevation / Depth Top of Rock: NA
Type of Backfill: QUIKRETE
Elevation / Depth of Seal: — 112"
Type of Seal: 30/65 SAND ~~QUIKRETE~~
Elevation / Depth of Top of Filter Pack: — 118"
Elevation / Depth of Top of Screen: 12.5' (30")
Type of Screen: SCH 40 PVC
Slot Size x Length: .010
I.D. of Screen: 2"
Type of Filter Pack: 20/30 SAND
Elevation / Depth of Bottom of Screen: 112.5'
Elevation / Depth of Bottom of Filter Pack: 112.5'
Type of Backfill Below Well:
Elevation / Total Depth of Borehole: 112.5'

Tetra Tech NUS, Inc.

WELL No.: CEF-PZ1-MW65

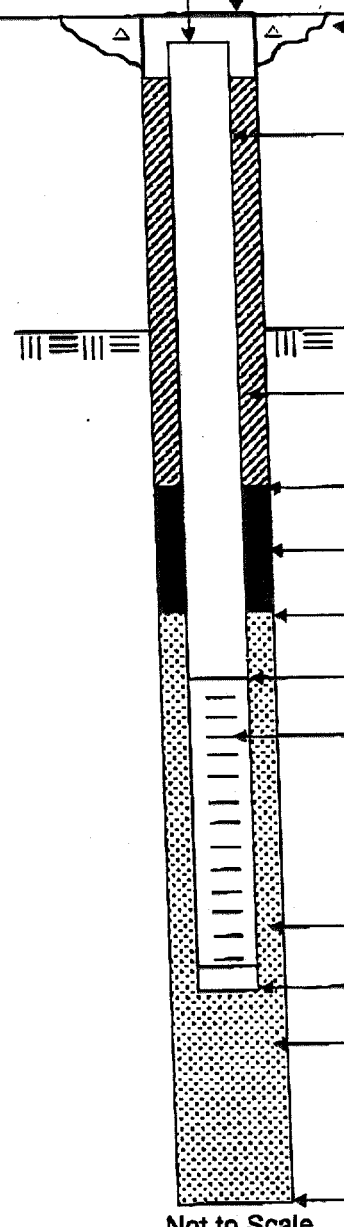
MONITORING WELL SHEET

PROJECT: NAS CECIL FIELD
PROJECT No.: 0039
SITE: PSC 21
GEOLOGIST: L. Knight

DRILLING Co.: GW PROTECTION
DRILLER: SHANE NOWLEN
DRILLING METHOD: HSA
DEV. METHOD:

BORING No.: CEF-PZ1-MW65
DATE COMPLETED: 8/19/99
NORTHING:
EASTING:

Ground Elevation =
Datum:



Not to Scale

Elevation / Depth of Top of Riser: 1 6"
Elevation / Height of Top of Surface Casing: 1
I.D. of Surface Casing:
Type of Surface Casing:
Type of Surface Seal: QUIKRETE
I.D. of Riser: 2"
Type of Riser: SCH 40 PVC
Borehole Diameter: 8"
Elevation / Depth Top of Rock: 1
Type of Backfill: QUIKRETE
Elevation / Depth of Seal: 1 12"
Type of Seal: 30/65 SAND
Elevation / Depth of Top of Filter Pack: 1 18"
Elevation / Depth of Top of Screen: 1 2.5'
Type of Screen: SCH 40 PVC
Slot Size x Length: .010
I.D. of Screen: 2"
Type of Filter Pack: 20/30 STANDARD SAND
Elevation / Depth of Bottom of Screen: 112.5ft
Elevation / Depth of Bottom of Filter Pack: 1 12.5ft
Type of Backfill Below Well:
Elevation / Total Depth of Borehole: 1 12.5ft

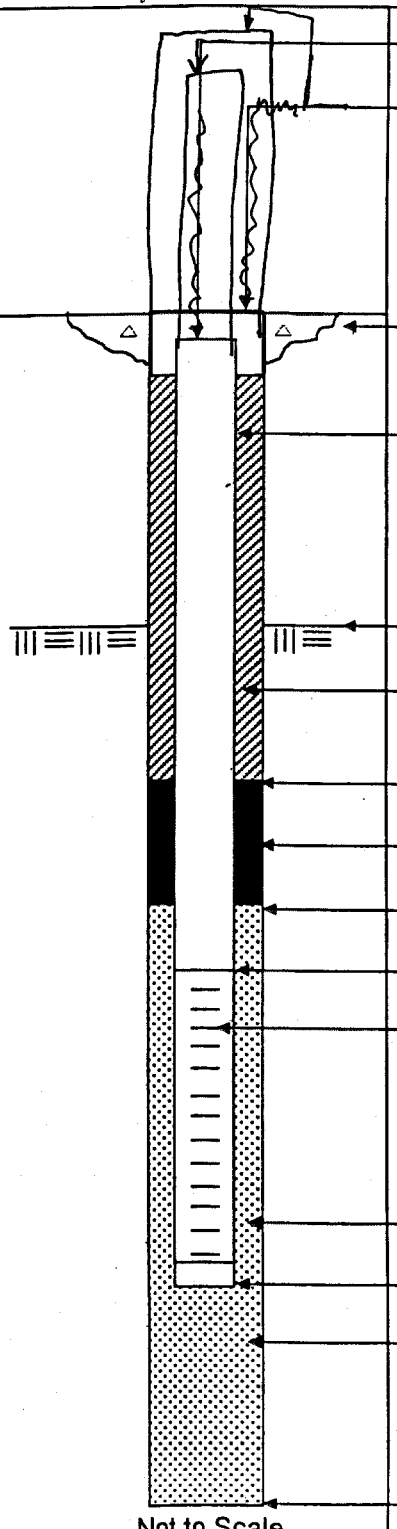
Tetra Tech NUS, Inc.

STICKUP

MONITORING WELL SHEET

WELL No.: CEF-P21-7S

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	GPI	BORING No.:	001
PROJECT No.:	0039	DRILLER:	NICK SMARRITO	DATE COMPLETED:	4/6/00
SITE:	PSC 21	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	Louis Knight	DEV. METHOD:	Submersible	EASTING:	



Ground Elevation =

Datum:

Not to Scale

Elevation / ~~Depth~~ Height of Top of Riser: 1

Elevation / Height of Top of ~~Surface~~ Above ground Casing: 1

I.D. of Surface Casing: 4 IN.

Type of Surface Casing: 4" SQUARE STEEL

Type of Surface Seal: CONCRETE PAD

I.D. of Riser: 2" SCH 40 PVC

Type of Riser: PVC

Borehole Diameter: 8"

Elevation / Depth Top of Rock: N/A 1

Type of Backfill: PORTLAND CEMENT

Elevation / Depth of Seal: 11.5'

Type of Seal: 30/65 FINE SAND

Elevation / Depth of Top of Filter Pack: 12.5'

Elevation / Depth of Top of Screen: 1 ~~14~~ 4'

Type of Screen: PVC (SCH 40)

Slot Size x Length: .010" x 10'

I.D. of Screen: 2"

Type of Filter Pack: 20/30 SILICA SAND

Elevation / Depth of Bottom of Screen: 14'

Elevation / Depth of Bottom of Filter Pack: 1 ~~14.5~~ 15'

Type of Backfill Below Well: 20/30 SILICA SAND

Elevation / Total Depth of Borehole: ~~14.5~~ 15'

MA

B.3 Conformance Reports

CERTIFICATE OF CONFORMANCE

Well Designation: CEF- P21-75
Site Name: PSC 21 Cecil Field
Date Installed: 4/6/00
Project Name: PSC 21

Site Geologist: Louie Knight
Drilling Company: Groundwater Protection
Driller: Nick Smarritto
Project Number: N0039. PS0. 05P. S20

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	2" I.D. SCH 40 PVC	TONEY'S DRILLING SUPPLY	NO
Well Screen	" " " , 0.010 IN. SLOTS	" " "	NO
End Cap	" " "	" " "	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A	N/A	
Annular Filter Pack	20/30 SILICA SAND	STANDARD	NO
Bentonite Seal	N/A (FINE SAND [30/45])	STANDARD	NO
Annular Grout	PORTLAND CEMENT	HOLNAM	NO
Surface Cement	QUIKRETE	COMMERCIAL	NO
Protective Casing	N/A	N/A	
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: Louie Knight

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-P21-MW075
Site: PSC 21, CECIL FIELD
Date Installed: 4-6-00
Date Developed: 4/12/00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 14
Static Water Level Before (ft.):
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: LOUIS KNIGHT / JENNIFER 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.)
1550			—	—	—	—	>K	
1555		7.5		19.6	5.69	.311	>K	
1600		15		19.5	5.46	.311	>K	
1602								DRY.. STOP PUMP
1610				19.7	5.46	.310	>K	RESUME PUMPING
1614	STOP (DRY)							DRY
1617	START			19.7	5.33	.304	>K	
1620	STOP (DRY)							
1623	START	20		19.6	5.35	.306	>K	
1627	STOP (DRY)							
1631	START	LLK 21		19.2	5.34	.305	900	
1634	STOP (DRY)							
1639	START	LLK 22		19.3	5.26	.289	654	
1642	STOP (DRY)			19.0	5.33	.305	669	
1646	START			19.1	5.29	.303	605	
1648	STOP (DRY)							
1654	START							
1657	STOP (DRY)							

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P21-MW 07S
Site: PSC 21, Cecil Field
Date Installed: 4-6-00
Date Developed: 4/12/00
Dev. Method: Pump
Pump Type: Submersible

Depth to Bottom (ft.): 14
Static Water Level Before (ft.):
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: LOUIS KNIGHT / JENNIFER
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.)
1701	START	28		19.6	5.37	.312	450	
1704	STOP (DRY)							
1710	START	30		19.1	5.32	.299	408	
1713	STOP (DRY							
	~	30	GALLONS	PUMPED	IN	83 MINUTES		

C.2 Synoptic Groundwater Level Measurements

CTO 78 (N0039) Site 21 Proj. No. N0039
Book No. 1259

0730 M. DALE CALLED J.A. JONES (Mike Halil) and asked for Site 3 and 16 systems to be turned off. Mike said he would get Randy to do it this morning.

0800 Alan Pate finished loading supplies for Site 3 and 16, 142 gw. sampling on F150.

0825 AT Lil chemp to fill up F150.

0840 Depart for Cecil

0850 AT DNC, Bldg. 1.
Calibrate horibas (906024) PRE-CAL 4.02 POST-CAL 3.99.
PID (Field ENV. 00030) Pre cal 0.1 ppm / Post cal 100 ppm
CALIBED w/ 100 ppm isobutylene
Load equipment. per sampling field check list.

0930 HASP meeting on OU1 (Site 102) and Site 21.

1130 Finish HASP. Leave for Site 21.

1150 AT. Site 21 BEGIN UNCAPPING WELLS AND TAKE PID LEVELS.
BEGIN WATER LEVELS. (FT. BTOC)

Well I.D.	Time	WATER LEVEL	PID (PPM)	ID. (FT. BTOC)
CEF-370 1S	1238	4.56	1.3	1S
CEF-P21-1S	1235	4.42	1.3	1S
P21-2S	1240	5.82	1.4	2S
3S	1246	6.06	0.6 ~~1.7~~ MD	3S
4S	1248	6.17	0.5 ~~0.7~~ MD	4S
5S	1245	5.90	1.7	5S
6S	1241	5.83	1.7	6S
7S	1250	9.53	3.6	7S ← 17.75
90G00101	1243	5.91	0.7	90G00101
BACKGROUND	0.3			

1235 BEGIN WATER LEVELS.

1256 Lunch.

1357 BACK from lunch. Set up on well 7S.

1418 ~~START~~ Purging well 7S. Sample for TCL Pesticides

cont. to pg. 149

M.W. Dale

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-P21-01S

```
WELL DIAMETER (IN) =          2
STATIC WATER LEVEL (FT) =     4.58
DEPTH TO WATER DURING TEST (FT) =          5.51
THE LENGTH OF THE TEST (HR) =              .73
PUMPING RATE (GPM) =          .11
THICKNESS OF AQUIFER (FT) =                85
OPEN INTERVAL (FT) =          10
STORAGE COEFFICIENT =         .15
WELL-LOSS COEFFICIENT =       1
```

```
SPECIFIC CAPACITY (GPM/FT) =  .1182795

TRANSMISSIVITY:  (FT*FT/SEC) =  1.66824E-03
                 (FT*FT/DAY) =  144.136
                 (GAL/DAY/FT) =  1078.209
           USING A STORAGE COEFFICIENT =  .15
           NUMBER OF ITERATIONS =  3

HYDRAULIC CONDUCTIVITY:  (FT/SEC) =  1.962636E-05
                         (FT/DAY) =  1.695717
                         (GAL/DAY/FT*FT) =  11.26553
```

WELL NUMBER CEF-P21-05S

```
WELL DIAMETER (IN) =          2
STATIC WATER LEVEL (FT) =     6.45
DEPTH TO WATER DURING TEST (FT) =          6.87
THE LENGTH OF THE TEST (HR) =              .14
PUMPING RATE (GPM) =          .12
THICKNESS OF AQUIFER (FT) =                84
OPEN INTERVAL (FT) =          8.12
STORAGE COEFFICIENT =         .15
WELL-LOSS COEFFICIENT =       1
```

```
SPECIFIC CAPACITY (GPM/FT) =  .2857143

TRANSMISSIVITY:  (FT*FT/SEC) =  4.764588E-03
```

```
            (FT*FT/DAY) =  411.6604
            (GAL/DAY/FT) =  3079.425
      USING A STORAGE COEFFICIENT =  .15
      NUMBER OF ITERATIONS =  3

HYDRAULIC CONDUCTIVITY:  (FT/SEC) =  5.672128E-05
                         (FT/DAY) =  4.900719
                         (GAL/DAY/FT*FT) =  32.55802

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

Site 21 SPECAP, Well 001 NAS, Book 1299

0800 C. Walker / M. Dale depart office in F150. Cell ph. 614-4442.

Rental equipment:

Hermit 3000 (Pine Environmental) Pine S/N 587.
with 3 transducers and computer download package.
Geopump 2 # 00006 from Field Inv. w/ 3 batteries/chargers.
Water level indicator (In Situ, Inc. 100 ft.) from JTX office.
PID (Photovac 2020) Nu 10848 from Pitt office.

0845 Arrive at Cecil Field, Bldg. 1. Load remaining equipment.

0850 Met ARC near Bldg. 1 (doing RA current). He said they were here yesterday and will be here today. (Not tomorrow.).
Calibrate PID pre-cal = 125 post cal = 120 w/ 100 ppm isobutylene.

0910 Depart for site 21.

0913 on site. Begin Health and Safety tailgate discussion.
Topics: emergency planning, 911, CPR, physical hazards, heat stress, wear PPE, etc.

0926 Hermit device info.
Hermit 3000, Serial # (In Situ) = 45299,
Device name = Hermit 3000 #2
Date Mfg = 4/8/99
Date Calibrated = 4/9/99
Hardware version = 2.00
Software version = 7.05
Battery type = Alkaline

0938 Date time set to 05/04/00 @ 0938.
Water level in well CEF-P21-001 is 4.62 ft. btoc. (Flush mt.).
Pump set up, spill pan, buckets, etc. Using 55-gal. drum to contain purge water.
Note: well in 2 IN. PVC, borehole = 8 in., 10 foot screen.
Set peristaltic pump with tubing to about 13 feet btoc.
Pump head on 600 rpm slot (pump is variable speed).
Total Depth = 13.08 FT. BTOC.
Pressure X-ducer set at ~ 12 ft. btoc.
Probe settings

Cont to pg 155

M. W. Dale

5/4/00
~~5/3/00~~ MD

Weather: partly cloudy, low 60's, no wind.

Work continued from Page 154

~~TIME DRAWDOWN (FT.) FLOW RATE (ML/min.) Estimated Cum. Vol. (LITERS)~~

0938 (cont.) Probe settings continued

Probe type = pressure, probe units = ft H_2O, Probe Name = PXD-260.
Linearity = 0.2843, Scale = 29.4717, offset = -0.0822,
Warming seconds = 0
Warming milliseconds = 50
Compensation = Absolute
Sp. Gravity = 1.0000
Mode = Surface
Ref = 0.0000 ft. H_2O
Manual head = 0.0000 ft. H_2O
When to Ref = At start of test

1022 check math (insert probe).
current reading probe = 7.428 ft. H_2O
probe at 12 ft btoc
water level at 4.62 ft.
12 - 7.428 ft = 4.57 ft.
4.57 ≅ 4.62 ✓

1034 Test Setup
Test # 1P21-001
Test type = Log
Test Name
Measurements in DD/HH:MM:SS
Sample int = 10 sec. (Min is 10 sec).
Start = Manual.

1048 Water level @ 4.58 ft. btoc. PID in background = 0.0 ppm
in well = 0.3 ppm
1054 Start Test (Hermanton).

TIME	DRAWDOWN (FT)	FLOW RATE (ml/min)	Est. Cum. Vol. (Liters)
1055	Stop test		
1105:10	Start test	500	0
1106:30	4.66	—	—
35	4.71	—	—
45	4.72	—	—

Work continued to Page 156

SIGNATURE Marvin W. Dale DATE 5/4/00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Site 21, SPECAP Well 001

NC034
Book 1299

Time (HH:MM:SS)	Depth FT. BTOC	Flow rate	Cum. Vol. (liters)
55	4.75	500 ml/min	
1107 20	4.79		
30	4.81		
40	4.82		
50	4.84		
1108	4.86		
10		500 ~~450~~ ml/min ~~1 liter~~	1 liter
20	4.89		
30	4.9		
40	4.92		
1111:40	5.12	change flow rate to 300 ml/min	2.75
1115:30	5.15	300	3.95
1117	5.17	300	—
1125	5.28	300	6.9
1130	5.36	300	8.4
1138	5.44	300	10.8

Note: 1138 call in site @ 1800-446-7488. To discuss units reading at 41.XXX. Units are decreasing as level decreases in accord with drawdown. JASON (in situ) believes a programming error has occurred but this can be fixed/adjusted once we download the data to a PC.

1144	5.47	300	12.6	check flow rate
1150	5.51	Stop test (recovery phase)		stop pump @ 1150
210	5.42			
220	5.40			
230	5.39			
240	5.36			
250	5.34			

Memorial Dr. Site

cont. on pg. 157 (Station)

Work continued from Page 156

~~HSP co~~. Continue Recovery Phase

Time	Depth (FT. BTOC)
1151:00	5.32
20	5.30
40	5.28
1152:00	5.26
:30	5.24
1153:00	5.21
:30	5.18
1154:00	5.16
:30	5.14
1155:00	5.12
:30	5.11
1157:00	5.06
1158:00	5.02
1159:00	4.98
1200:00	4.96
1201:00	4.95
1202:00	~~4.90~~ MO
1203:00	4.91
1204:00	4.90
1205:00	4.89
1206:00	4.88
1207:00	4.86
1208:00	4.84
1209:00	4.83
1210:00	4.82
1211:00	4.80
1212:00	4.80
1213:00	4.78
1214:00	4.77
1215:00	4.76
1216:00	4.76
1217:00	4.75

Time (cont)	Depth (Ft. BTOC) (cont)
1218	4.75
1223	4.72
1228	4.70

Stop test

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 5/4/00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Site 21 CT078 SIRCAP Well 001 / CT072 NC039 Book 1299

cont from 157

1228 Test Stopped. Breakdown and load in truck.

(cont.)

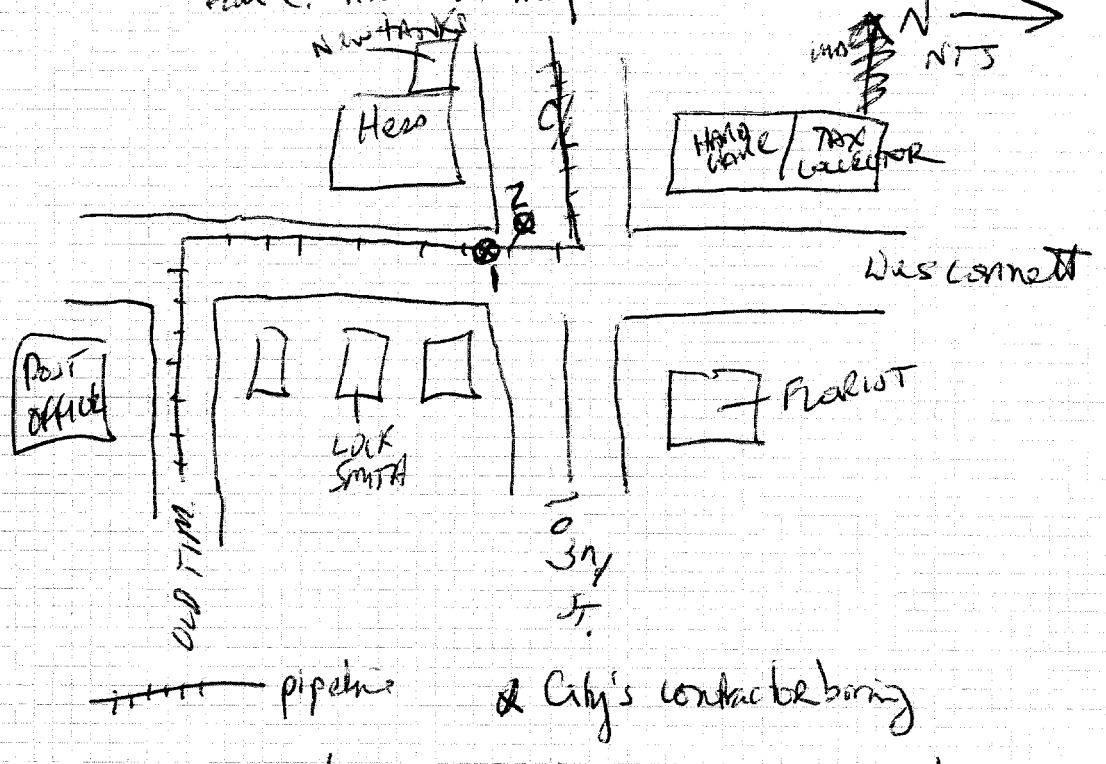
1243 Go to lunch.

1323 Depart for meeting at 103rd / Wesconnett w/ Paul Callison

1328 on site. (CT072)

Met w/ Jeffrey Cunningham, P.E. (City of JAX traffic engineer). He pointed out several locations where their contractor took borings to locate pipeline for future (1.5 years away) road widening (plan to make Wes Connett a 3-lane road with sidewalks).

Paul C. has his map.



pipeline & City's contractor boring

Boring 1 looks to be right to have located pipeline. and the contractor says it had a strong odor.

Boring 2 looks to be in wrong place for locating pipeline.

cont. to pg 159

M. W. Dale

5/4/00

Work continued from Page 158

1417 Depart 103rd St.
1430 on site PSC 21 / Site 21 Set up on well CEF-P21-055.
1450 DTW = 6.46 FT. BTOC (Flush mt.)
TD = 12.37 FT. BTOC
Set tubing at about 12 ft. btoc.
Set up same probe (#4) PXD-260
setup test - Test #2 P21-055
Included probe 4 - excluded all others.
Relays disabled.
Time set up in DD:HH:MM:SS
Sample interval at minimum 10sec.
Start cond. = MANUAL

PID in background = 0.0 ppm
in well = 9.3 ppm

1501 insert probe (note: decontaminated w/ soap/water after last run). to bottom (softly) and pulled up one foot.
1503 Hermit says 4.616 ft. H2O for probe #4. (note: ref is zero at probe depth so it's measuring water overhead).

50 6.46
+ 4.616
11.076 ← Depth of probe below top of casing.

12.37 - 1 ft. pulled up = 11.37 (close check) ✓

Set "Test #2 P21-055" for drawdown
Set Test #3 - labeled "REC-P21-055" for recovery.
1515 water level = 6.45 ft btoc
15:18:00 start test 2
15:18:10 pump kicked on.
15:44:00 start test - turn off pump at same time.
15:~~44~~59 stop test.

Work continued to Page 160

SIGNATURE Michael W. Acle DATE 5/4/00
DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Site 21 Spec cap on well 055

Cont from pg. 159.

N0039
Book 1299

Time HH MM SS	Depth (FT. BTOC)	Flow rate ml/min	Cum. Vol (L)
1518:			
:10	~~6.45~~ 6.50	450	
:20	6.52		
:40	6.53		
:50	6.55		
1519	6.56		
:10	6.58		
:20	6.59		
:40	6.61		
:55	6.63		
1520: 10	6.64		
30	6.66		
50	6.68		
1521: 10	6.69		
:30	6.70	450	
1521 :50	6.72		
1522: 10	6.73		
1522: 30	6.74		
:50	6.75		
1523: 10	6.76		
:30	—		
:50	6.77		
1524: 10	6.78		
24: 30	6.78		
:50	6.79	450	
25: 10	6.79		
:30	6.80		
:50	6.81		

Q start test @ 1518
start pump @ 1518:10

M.W. [illegible]

cont. to pg. 161

5/4/00

Work continued from Page

Time HH:MM:SS	Depth Ft BTOC	Flow Rate ml/min
15:26:10	6.81	450
:30	6.81	
:50	6.82	
15:27:10	6.82	
:30	6.83	
:50	6.83	
15:28:10	6.83	
:30	6.84	
:50	6.84	
15:29:10	6.84	
:30	6.84	450
:50	6.84	
15:30:10	6.84	
30	6.84	
50	6.85	
15:31:10	6.85	
30	6.85	
15:32:10	6.85	
30	6.85	
:50	6.85	
15:33:10	6.85	
:30	6.86	
15:34:30	6.86	
15:35:30	6.86	
36:20	6.87	
15:37:30	6.87	
15:39:00	6.87	
15:40:00	6.87	
41:30	6.87	
43:00	6.88	stop pump @ time 44.
44:00	6.76	RECOV. Start Test 3
:30	6.75	
:40	6.73	

Time (continue Recovery test)	Depth (Ft.)
15:45:00	6.70
:15	6.68
:45	6.65
15:46:00	6.64
:15	6.63
:30	6.62
:45	6.61
15:47:00	6.60
:15	6.59
:45	6.58
15:48:15	6.57
15:48:45	6.56
49:15	6.55
15:49:45	6.54
15:50:15	6.53
:45	6.53
15:51:38	6.52
15:52:34	6.51
15:53:12	6.50
15:54:25	6.49
58:57	6.48 Stop test

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page 162

SIGNATURE Marvin W. Dale DATE 5/4/00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

 Site 21 SPECAP (well 055) MJ 0039 Book 1299

1559 (cont.) Test was stopped. Loading / cleaning equip. next.
1620 Depart site, wells secure, purge water (8 gallons) from wells 001 & 055 put in drum 21-13 - Drum left on site next to drum of soil from well 75.
1626 AT PWC, Bldg. 1
1635 Depart PWC (Bldg 1 secured on Times side).
1709 BACK AT OFFICE.

M. W. Dale

5/4/00

IN_SITU INC. Hermit 3000

Report generated: 05/12/00 11:25:19
Report from file: C:\WINDOWS\TEMP\~bin3113.TMP
DataMgr Version 2.18.0.0

Serial number: 00045299
Firmware Version 7.05
Unit name: HERMIT 3000#2

Test name: Test #2P21-05S

Test defined on: 05/04/00 15:09:30
Test started on: 05/04/00 15:17:58
Test stopped on: 05/04/00 15:43:53
Test extracted on: 05/12/00 11:25:00

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 206

TOTAL DATA SAMPLES 206

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
05/04/00	15:17:58	0.0000	11.013	30.070
05/04/00	15:17:58	0.0110	11.012	30.070
05/04/00	15:17:59	0.0220	11.013	30.070
05/04/00	15:17:59	0.0330	11.012	30.070
05/04/00	15:18:00	0.0440	11.012	30.072
05/04/00	15:18:01	0.0550	11.012	30.070
05/04/00	15:18:01	0.0660	11.012	30.070
05/04/00	15:18:02	0.0770	11.012	30.068
05/04/00	15:18:03	0.0880	11.012	30.070
05/04/00	15:18:03	0.0990	11.013	30.070
05/04/00	15:18:04	0.1100	11.013	30.070
05/04/00	15:18:05	0.1210	11.011	30.068
05/04/00	15:18:05	0.1320	11.011	30.068
05/04/00	15:18:06	0.1430	11.011	30.068
05/04/00	15:18:07	0.1540	11.011	30.068
05/04/00	15:18:07	0.1650	11.011	30.068
05/04/00	15:18:08	0.1760	11.012	30.068
05/04/00	15:18:09	0.1870	11.010	30.066
05/04/00	15:18:09	0.1980	11.010	30.066
05/04/00	15:18:10	0.2090	11.011	30.066
05/04/00	15:18:11	0.2200	11.010	30.066
05/04/00	15:18:11	0.2310	11.010	30.066
05/04/00	15:18:12	0.2427	11.011	30.066
05/04/00	15:18:13	0.2552	11.010	30.066

05/04/00	15:18:14	0.2683	11.010	30.066
05/04/00	15:18:14	0.2823	11.010	30.066
05/04/00	15:18:15	0.2972	11.011	30.064
05/04/00	15:18:16	0.3128	11.009	30.064
05/04/00	15:18:17	0.3295	11.009	30.064
05/04/00	15:18:18	0.3472	11.009	30.064
05/04/00	15:18:19	0.3658	11.009	30.062
05/04/00	15:18:21	0.3857	11.009	30.062
05/04/00	15:18:22	0.4067	11.009	30.064
05/04/00	15:18:23	0.4288	11.009	30.064
05/04/00	15:18:25	0.4523	11.012	30.064
05/04/00	15:18:26	0.4772	11.011	30.062
05/04/00	15:18:28	0.5035	11.008	30.060
05/04/00	15:18:29	0.5315	11.012	30.060
05/04/00	15:18:31	0.5612	11.012	30.064
05/04/00	15:18:33	0.5925	11.011	30.062
05/04/00	15:18:35	0.6257	11.012	30.060
05/04/00	15:18:37	0.6608	11.012	30.060
05/04/00	15:18:39	0.6982	11.012	30.060
05/04/00	15:18:42	0.7377	11.011	30.057
05/04/00	15:18:44	0.7795	11.011	30.057
05/04/00	15:18:47	0.8238	11.011	30.060
05/04/00	15:18:50	0.8708	11.010	30.057
05/04/00	15:18:53	0.9207	11.009	30.055
05/04/00	15:18:56	0.9733	11.011	30.055
05/04/00	15:18:59	1.0292	11.010	30.053
05/04/00	15:19:03	1.0883	11.009	30.053
05/04/00	15:19:07	1.1510	11.009	30.053
05/04/00	15:19:11	1.2173	11.009	30.053
05/04/00	15:19:15	1.2877	11.008	30.051
05/04/00	15:19:19	1.3622	11.008	30.051
05/04/00	15:19:24	1.4412	11.008	30.051
05/04/00	15:19:29	1.5248	11.007	30.051
05/04/00	15:19:34	1.6133	11.007	30.051
05/04/00	15:19:40	1.7072	11.006	30.049
05/04/00	15:19:46	1.8065	11.005	30.049
05/04/00	15:19:52	1.9118	11.005	30.049
05/04/00	15:19:59	2.0233	11.004	30.047
05/04/00	15:20:06	2.1415	11.003	30.049
05/04/00	15:20:14	2.2667	11.003	30.049
05/04/00	15:20:21	2.3992	11.003	30.047
05/04/00	15:20:30	2.5397	11.002	30.049
05/04/00	15:20:39	2.6885	11.001	30.049
05/04/00	15:20:48	2.8460	10.998	30.045
05/04/00	15:20:58	3.0127	11.000	30.055
05/04/00	15:21:08	3.1793	11.004	30.066
05/04/00	15:21:18	3.3460	11.005	30.074
05/04/00	15:21:28	3.5127	11.009	30.086
05/04/00	15:21:38	3.6793	11.008	30.086
05/04/00	15:21:48	3.8460	11.011	30.094
05/04/00	15:21:58	4.0127	11.012	30.096
05/04/00	15:22:08	4.1793	11.010	30.096
05/04/00	15:22:18	4.3460	11.012	30.100
05/04/00	15:22:28	4.5127	11.014	30.108
05/04/00	15:22:38	4.6793	11.011	30.106
05/04/00	15:22:48	4.8460	11.011	30.110
05/04/00	15:22:58	5.0127	11.011	30.108
05/04/00	15:23:08	5.1793	11.013	30.114
05/04/00	15:23:18	5.3460	11.011	30.114
05/04/00	15:23:28	5.5127	11.012	30.117
05/04/00	15:23:38	5.6793	11.010	30.114
05/04/00	15:23:48	5.8460	11.011	30.119
05/04/00	15:23:58	6.0127	11.012	30.121
05/04/00	15:24:08	6.1793	11.010	30.119
05/04/00	15:24:18	6.3460	11.011	30.121
05/04/00	15:24:28	6.5127	11.011	30.121
05/04/00	15:24:38	6.6793	11.010	30.121
05/04/00	15:24:48	6.8460	11.010	30.123
05/04/00	15:24:58	7.0127	11.010	30.121
05/04/00	15:25:08	7.1793	11.008	30.121

05/04/00	15:25:18	7.3460	11.011	30.125
05/04/00	15:25:28	7.5127	11.010	30.125
05/04/00	15:25:38	7.6793	11.010	30.125
05/04/00	15:25:48	7.8460	11.010	30.131
05/04/00	15:25:58	8.0127	11.008	30.125
05/04/00	15:26:08	8.1793	11.008	30.125
05/04/00	15:26:18	8.3460	11.010	30.125
05/04/00	15:26:28	8.5127	11.010	30.129
05/04/00	15:26:38	8.6793	11.010	30.131
05/04/00	15:26:48	8.8460	11.009	30.131
05/04/00	15:26:58	9.0127	11.011	30.135
05/04/00	15:27:08	9.1793	11.010	30.133
05/04/00	15:27:18	9.3460	11.009	30.131
05/04/00	15:27:28	9.5127	11.008	30.131
05/04/00	15:27:38	9.6793	11.008	30.131
05/04/00	15:27:48	9.8460	11.008	30.131
05/04/00	15:27:58	10.0127	11.008	30.131
05/04/00	15:28:08	10.1793	11.008	30.131
05/04/00	15:28:18	10.3460	11.008	30.131
05/04/00	15:28:28	10.5127	11.008	30.131
05/04/00	15:28:38	10.6793	11.007	30.131
05/04/00	15:28:48	10.8460	11.007	30.131
05/04/00	15:28:58	11.0127	11.007	30.131
05/04/00	15:29:08	11.1793	11.007	30.131
05/04/00	15:29:18	11.3460	11.007	30.131
05/04/00	15:29:28	11.5127	11.007	30.131
05/04/00	15:29:38	11.6793	11.007	30.131
05/04/00	15:29:48	11.8460	11.007	30.131
05/04/00	15:29:58	12.0127	11.007	30.131
05/04/00	15:30:08	12.1793	11.007	30.131
05/04/00	15:30:18	12.3460	11.007	30.131
05/04/00	15:30:28	12.5127	11.006	30.129
05/04/00	15:30:38	12.6793	11.007	30.131
05/04/00	15:30:48	12.8460	11.007	30.131
05/04/00	15:30:58	13.0127	11.007	30.131
05/04/00	15:31:08	13.1793	11.005	30.133
05/04/00	15:31:18	13.3460	11.005	30.133
05/04/00	15:31:28	13.5127	11.005	30.133
05/04/00	15:31:38	13.6793	11.005	30.133
05/04/00	15:31:48	13.8460	11.005	30.133
05/04/00	15:31:58	14.0127	11.004	30.131
05/04/00	15:32:08	14.1793	11.005	30.133
05/04/00	15:32:18	14.3460	11.005	30.135
05/04/00	15:32:28	14.5127	11.005	30.133
05/04/00	15:32:38	14.6793	11.005	30.133
05/04/00	15:32:48	14.8460	11.005	30.133
05/04/00	15:32:58	15.0127	11.003	30.131
05/04/00	15:33:08	15.1793	11.003	30.131
05/04/00	15:33:18	15.3460	11.005	30.133
05/04/00	15:33:28	15.5127	11.003	30.133
05/04/00	15:33:38	15.6793	11.003	30.133
05/04/00	15:33:48	15.8460	11.003	30.131
05/04/00	15:33:58	16.0127	11.003	30.131
05/04/00	15:34:08	16.1793	11.005	30.133
05/04/00	15:34:18	16.3460	11.003	30.133
05/04/00	15:34:28	16.5127	11.003	30.133
05/04/00	15:34:38	16.6793	11.003	30.133
05/04/00	15:34:48	16.8460	11.004	30.135
05/04/00	15:34:58	17.0127	11.003	30.133
05/04/00	15:35:08	17.1793	11.003	30.131
05/04/00	15:35:18	17.3460	11.003	30.133
05/04/00	15:35:28	17.5127	11.005	30.133
05/04/00	15:35:38	17.6793	11.003	30.131
05/04/00	15:35:48	17.8460	11.003	30.133
05/04/00	15:35:58	18.0127	11.003	30.133
05/04/00	15:36:08	18.1793	11.004	30.131
05/04/00	15:36:18	18.3460	11.003	30.133
05/04/00	15:36:28	18.5127	11.003	30.131
05/04/00	15:36:38	18.6793	11.003	30.131
05/04/00	15:36:48	18.8460	11.001	30.131

05/04/00	15:36:58	19.0127	11.001	30.131
05/04/00	15:37:08	19.1793	11.001	30.129
05/04/00	15:37:18	19.3460	11.003	30.131
05/04/00	15:37:28	19.5127	11.001	30.131
05/04/00	15:37:38	19.6793	11.002	30.133
05/04/00	15:37:48	19.8460	11.002	30.133
05/04/00	15:37:58	20.0127	11.003	30.131
05/04/00	15:38:08	20.1793	10.998	30.117
05/04/00	15:38:18	20.3460	10.994	30.106
05/04/00	15:38:28	20.5127	10.991	30.098
05/04/00	15:38:38	20.6793	10.989	30.092
05/04/00	15:38:48	20.8460	10.988	30.088
05/04/00	15:38:58	21.0127	10.986	30.084
05/04/00	15:39:08	21.1793	10.986	30.078
05/04/00	15:39:18	21.3460	10.983	30.074
05/04/00	15:39:28	21.5127	10.982	30.072
05/04/00	15:39:38	21.6793	10.981	30.070
05/04/00	15:39:48	21.8460	10.981	30.068
05/04/00	15:39:58	22.0127	10.981	30.066
05/04/00	15:40:08	22.1793	10.979	30.064
05/04/00	15:40:18	22.3460	10.981	30.064
05/04/00	15:40:28	22.5127	10.981	30.064
05/04/00	15:40:38	22.6793	10.979	30.066
05/04/00	15:40:48	22.8460	10.984	30.078
05/04/00	15:40:58	23.0127	10.987	30.088
05/04/00	15:41:08	23.1793	10.989	30.092
05/04/00	15:41:18	23.3460	10.989	30.096
05/04/00	15:41:28	23.5127	10.993	30.102
05/04/00	15:41:38	23.6793	10.993	30.106
05/04/00	15:41:48	23.8460	10.994	30.108
05/04/00	15:41:58	24.0127	10.996	30.110
05/04/00	15:42:08	24.1793	10.995	30.112
05/04/00	15:42:18	24.3460	10.996	30.114
05/04/00	15:42:28	24.5127	10.995	30.112
05/04/00	15:42:38	24.6793	10.996	30.117
05/04/00	15:42:48	24.8460	10.997	30.119
05/04/00	15:42:58	25.0127	10.998	30.121
05/04/00	15:43:08	25.1793	10.997	30.119
05/04/00	15:43:18	25.3460	10.998	30.121
05/04/00	15:43:28	25.5127	10.996	30.117
05/04/00	15:43:38	25.6793	10.996	30.121
05/04/00	15:43:48	25.8460	11.000	30.127

IN_SITU INC. Hermit 3000

Report generated: 05/12/00 11:26:21
Report from file: C:\WINDOWS\TEMP\~bin333F.TMP
DataMgr Version 2.18.0.0

Serial number: 00045299
Firmware Version 7.05
Unit name: HERMIT 3000#2

Test name: REC-P21-05S

Test defined on: 05/04/00 15:12:29
Test started on: 05/04/00 15:43:53
Test stopped on: 05/04/00 15:59:52
Test extracted on: 05/12/00 11:25:58

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 146

TOTAL DATA SAMPLES 146

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	
05/04/00	15:43:53	0.0000	10.994	30.121	
05/04/00	15:43:53	0.0110	10.993	30.119	
05/04/00	15:43:54	0.0220	10.993	30.119	
05/04/00	15:43:54	0.0330	10.993	30.119	
05/04/00	15:43:55	0.0440	10.992	30.117	
05/04/00	15:43:56	0.0550	10.992	30.117	
05/04/00	15:43:56	0.0660	10.993	30.114	
05/04/00	15:43:57	0.0770	10.992	30.112	
05/04/00	15:43:58	0.0880	10.992	30.112	
05/04/00	15:43:58	0.0990	10.992	30.112	
05/04/00	15:43:59	0.1100	10.992	30.110	
05/04/00	15:44:00	0.1210	10.992	30.110	
05/04/00	15:44:00	0.1320	10.991	30.108	
05/04/00	15:44:01	0.1430	10.991	30.108	
05/04/00	15:44:02	0.1540	10.992	30.106	
05/04/00	15:44:02	0.1650	10.990	30.106	
05/04/00	15:44:03	0.1760	10.991	30.104	
05/04/00	15:44:04	0.1870	10.991	30.104	
05/04/00	15:44:04	0.1980	10.991	30.104	
05/04/00	15:44:05	0.2090	10.991	30.104	
05/04/00	15:44:06	0.2200	10.990	30.102	
05/04/00	15:44:06	0.2310	10.989	30.100	
05/04/00	15:44:07	0.2427	10.989	30.100	
05/04/00	15:44:08	0.2552	10.989	30.100	

05/04/00	15:44:09	0.2683	10.991	30.100
05/04/00	15:44:09	0.2823	10.989	30.098
05/04/00	15:44:10	0.2972	10.989	30.098
05/04/00	15:44:11	0.3128	10.989	30.098
05/04/00	15:44:12	0.3295	10.990	30.098
05/04/00	15:44:13	0.3472	10.989	30.096
05/04/00	15:44:14	0.3658	10.989	30.094
05/04/00	15:44:16	0.3857	10.989	30.094
05/04/00	15:44:17	0.4067	10.988	30.092
05/04/00	15:44:18	0.4288	10.989	30.092
05/04/00	15:44:20	0.4523	10.991	30.092
05/04/00	15:44:21	0.4772	10.989	30.090
05/04/00	15:44:23	0.5035	10.989	30.090
05/04/00	15:44:24	0.5315	10.990	30.088
05/04/00	15:44:26	0.5612	10.991	30.090
05/04/00	15:44:28	0.5925	10.990	30.088
05/04/00	15:44:30	0.6257	10.990	30.086
05/04/00	15:44:32	0.6608	10.989	30.084
05/04/00	15:44:34	0.6982	10.990	30.082
05/04/00	15:44:37	0.7377	10.990	30.082
05/04/00	15:44:39	0.7795	10.989	30.080
05/04/00	15:44:42	0.8238	10.989	30.080
05/04/00	15:44:45	0.8708	10.990	30.078
05/04/00	15:44:48	0.9207	10.990	30.078
05/04/00	15:44:51	0.9733	10.989	30.076
05/04/00	15:44:54	1.0292	10.988	30.074
05/04/00	15:44:58	1.0883	10.989	30.072
05/04/00	15:45:02	1.1510	10.989	30.072
05/04/00	15:45:06	1.2173	10.989	30.070
05/04/00	15:45:10	1.2877	10.989	30.070
05/04/00	15:45:14	1.3622	10.989	30.068
05/04/00	15:45:19	1.4412	10.988	30.066
05/04/00	15:45:24	1.5248	10.989	30.064
05/04/00	15:45:29	1.6133	10.989	30.066
05/04/00	15:45:35	1.7072	10.989	30.064
05/04/00	15:45:41	1.8065	10.988	30.062
05/04/00	15:45:47	1.9118	10.988	30.062
05/04/00	15:45:54	2.0233	10.987	30.060
05/04/00	15:46:01	2.1415	10.989	30.057
05/04/00	15:46:09	2.2667	10.989	30.057
05/04/00	15:46:16	2.3992	10.988	30.057
05/04/00	15:46:25	2.5397	10.988	30.055
05/04/00	15:46:34	2.6885	10.988	30.055
05/04/00	15:46:43	2.8460	10.986	30.053
05/04/00	15:46:53	3.0127	10.993	30.068
05/04/00	15:47:03	3.1793	10.996	30.078
05/04/00	15:47:13	3.3460	11.000	30.086
05/04/00	15:47:23	3.5127	11.004	30.092
05/04/00	15:47:33	3.6793	11.004	30.098
05/04/00	15:47:43	3.8460	11.006	30.100
05/04/00	15:47:53	4.0127	11.008	30.104
05/04/00	15:48:03	4.1793	11.009	30.108
05/04/00	15:48:13	4.3460	11.011	30.108
05/04/00	15:48:23	4.5127	11.012	30.112
05/04/00	15:48:33	4.6793	11.011	30.112
05/04/00	15:48:43	4.8460	11.013	30.114
05/04/00	15:48:53	5.0127	11.013	30.117
05/04/00	15:49:03	5.1793	11.013	30.117
05/04/00	15:49:13	5.3460	11.014	30.119
05/04/00	15:49:23	5.5127	11.014	30.119
05/04/00	15:49:33	5.6793	11.015	30.121
05/04/00	15:49:43	5.8460	11.015	30.121
05/04/00	15:49:53	6.0127	11.016	30.125
05/04/00	15:50:03	6.1793	11.015	30.123
05/04/00	15:50:13	6.3460	11.017	30.123
05/04/00	15:50:23	6.5127	11.017	30.125
05/04/00	15:50:33	6.6793	11.017	30.123
05/04/00	15:50:43	6.8460	11.017	30.125
05/04/00	15:50:53	7.0127	11.018	30.127
05/04/00	15:51:03	7.1793	11.017	30.125

05/04/00	15:51:13	7.3460	11.019	30.125
05/04/00	15:51:23	7.5127	11.019	30.125
05/04/00	15:51:33	7.6793	11.018	30.123
05/04/00	15:51:43	7.8460	11.017	30.125
05/04/00	15:51:53	8.0127	11.018	30.127
05/04/00	15:52:03	8.1793	11.018	30.127
05/04/00	15:52:13	8.3460	11.019	30.129
05/04/00	15:52:23	8.5127	11.017	30.125
05/04/00	15:52:33	8.6793	11.018	30.127
05/04/00	15:52:43	8.8460	11.018	30.127
05/04/00	15:52:53	9.0127	11.018	30.127
05/04/00	15:53:03	9.1793	11.019	30.129
05/04/00	15:53:13	9.3460	11.020	30.127
05/04/00	15:53:23	9.5127	11.020	30.127
05/04/00	15:53:33	9.6793	11.020	30.127
05/04/00	15:53:43	9.8460	11.020	30.129
05/04/00	15:53:53	10.0127	11.020	30.129
05/04/00	15:54:03	10.1793	11.020	30.129
05/04/00	15:54:13	10.3460	11.020	30.129
05/04/00	15:54:23	10.5127	11.021	30.131
05/04/00	15:54:33	10.6793	11.020	30.129
05/04/00	15:54:43	10.8460	11.021	30.131
05/04/00	15:54:53	11.0127	11.020	30.129
05/04/00	15:55:03	11.1793	11.020	30.129
05/04/00	15:55:13	11.3460	11.022	30.129
05/04/00	15:55:23	11.5127	11.022	30.131
05/04/00	15:55:33	11.6793	11.022	30.131
05/04/00	15:55:43	11.8460	11.022	30.129
05/04/00	15:55:53	12.0127	11.022	30.129
05/04/00	15:56:03	12.1793	11.021	30.131
05/04/00	15:56:13	12.3460	11.021	30.131
05/04/00	15:56:23	12.5127	11.020	30.129
05/04/00	15:56:33	12.6793	11.020	30.129
05/04/00	15:56:43	12.8460	11.020	30.127
05/04/00	15:56:53	13.0127	11.020	30.129
05/04/00	15:57:03	13.1793	11.020	30.129
05/04/00	15:57:13	13.3460	11.022	30.131
05/04/00	15:57:23	13.5127	11.022	30.129
05/04/00	15:57:33	13.6793	11.020	30.129
05/04/00	15:57:43	13.8460	11.022	30.131
05/04/00	15:57:53	14.0127	11.022	30.131
05/04/00	15:58:03	14.1793	11.022	30.129
05/04/00	15:58:13	14.3460	11.023	30.129
05/04/00	15:58:23	14.5127	11.023	30.129
05/04/00	15:58:33	14.6793	11.024	30.131
05/04/00	15:58:43	14.8460	11.024	30.131
05/04/00	15:58:53	15.0127	11.023	30.129
05/04/00	15:59:03	15.1793	11.023	30.127
05/04/00	15:59:13	15.3460	11.026	30.133
05/04/00	15:59:23	15.5127	11.025	30.129
05/04/00	15:59:33	15.6793	11.021	30.114
05/04/00	15:59:43	15.8460	11.018	30.106

IN_SITU INC. Hermit 3000

Report generated: 05/12/00 11:23:25
Report from file: C:\WINDOWS\TEMP\~bin1E01.TMP
DataMgr Version 2.18.0.0

Serial number: 00045299
Firmware Version 7.05
Unit name: HERMIT 3000#2

Test name: Test #1P21-001

Test defined on: 05/04/00 11:02:07
Test started on: 05/04/00 11:06:10
Test stopped on: 05/04/00 12:29:19
Test extracted on: 05/12/00 11:21:23

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 549

TOTAL DATA SAMPLES 549

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
05/04/00	11:06:10	0.0000	11.949	30.082
05/04/00	11:06:10	0.0110	11.948	30.082
05/04/00	11:06:11	0.0220	11.947	30.082
05/04/00	11:06:11	0.0330	11.945	30.082
05/04/00	11:06:12	0.0440	11.944	30.082
05/04/00	11:06:13	0.0550	11.944	30.082
05/04/00	11:06:13	0.0660	11.941	30.082
05/04/00	11:06:14	0.0770	11.940	30.082
05/04/00	11:06:15	0.0880	11.940	30.082
05/04/00	11:06:15	0.0990	11.939	30.082
05/04/00	11:06:16	0.1100	11.937	30.084
05/04/00	11:06:17	0.1210	11.936	30.084
05/04/00	11:06:17	0.1320	11.935	30.082
05/04/00	11:06:18	0.1430	11.932	30.082
05/04/00	11:06:19	0.1540	11.931	30.082
05/04/00	11:06:19	0.1650	11.932	30.084
05/04/00	11:06:20	0.1760	11.930	30.082
05/04/00	11:06:21	0.1870	11.928	30.082
05/04/00	11:06:21	0.1980	11.928	30.082
05/04/00	11:06:22	0.2090	11.928	30.082
05/04/00	11:06:23	0.2200	11.926	30.082
05/04/00	11:06:23	0.2310	11.926	30.082
05/04/00	11:06:24	0.2427	11.924	30.082
05/04/00	11:06:25	0.2552	11.924	30.082

05/04/00	11:06:26	0.2683	11.920	30.082
05/04/00	11:06:26	0.2823	11.919	30.082
05/04/00	11:06:27	0.2972	11.920	30.084
05/04/00	11:06:28	0.3128	11.919	30.082
05/04/00	11:06:29	0.3295	11.919	30.082
05/04/00	11:06:30	0.3472	11.915	30.082
05/04/00	11:06:31	0.3658	11.915	30.084
05/04/00	11:06:33	0.3857	11.915	30.084
05/04/00	11:06:34	0.4067	11.913	30.084
05/04/00	11:06:35	0.4288	11.912	30.084
05/04/00	11:06:37	0.4523	11.912	30.084
05/04/00	11:06:38	0.4772	11.912	30.084
05/04/00	11:06:40	0.5035	11.911	30.084
05/04/00	11:06:41	0.5315	11.911	30.084
05/04/00	11:06:43	0.5612	11.909	30.084
05/04/00	11:06:45	0.5925	11.906	30.082
05/04/00	11:06:47	0.6257	11.905	30.084
05/04/00	11:06:49	0.6608	11.906	30.086
05/04/00	11:06:51	0.6982	11.902	30.082
05/04/00	11:06:54	0.7377	11.903	30.084
05/04/00	11:06:56	0.7795	11.900	30.084
05/04/00	11:06:59	0.8238	11.899	30.084
05/04/00	11:07:02	0.8708	11.898	30.084
05/04/00	11:07:05	0.9207	11.895	30.084
05/04/00	11:07:08	0.9733	11.894	30.086
05/04/00	11:07:11	1.0292	11.894	30.086
05/04/00	11:07:15	1.0883	11.892	30.086
05/04/00	11:07:19	1.1510	11.890	30.084
05/04/00	11:07:23	1.2173	11.886	30.084
05/04/00	11:07:27	1.2877	11.885	30.086
05/04/00	11:07:31	1.3622	11.884	30.086
05/04/00	11:07:36	1.4412	11.881	30.084
05/04/00	11:07:41	1.5248	11.879	30.086
05/04/00	11:07:46	1.6133	11.877	30.086
05/04/00	11:07:52	1.7072	11.875	30.086
05/04/00	11:07:58	1.8065	11.872	30.086
05/04/00	11:08:04	1.9118	11.869	30.088
05/04/00	11:08:11	2.0233	11.866	30.088
05/04/00	11:08:18	2.1415	11.862	30.088
05/04/00	11:08:26	2.2667	11.859	30.086
05/04/00	11:08:33	2.3992	11.857	30.088
05/04/00	11:08:42	2.5397	11.854	30.086
05/04/00	11:08:51	2.6885	11.846	30.086
05/04/00	11:09:00	2.8460	11.836	30.078
05/04/00	11:09:10	3.0127	11.840	30.092
05/04/00	11:09:20	3.1793	11.837	30.106
05/04/00	11:09:30	3.3460	11.835	30.112
05/04/00	11:09:40	3.5127	11.833	30.117
05/04/00	11:09:50	3.6793	11.832	30.125
05/04/00	11:10:00	3.8460	11.830	30.129
05/04/00	11:10:10	4.0127	11.829	30.133
05/04/00	11:10:20	4.1793	11.826	30.139
05/04/00	11:10:30	4.3460	11.824	30.141
05/04/00	11:10:40	4.5127	11.822	30.143
05/04/00	11:10:50	4.6793	11.822	30.145
05/04/00	11:11:00	4.8460	11.818	30.147
05/04/00	11:11:10	5.0127	11.819	30.151
05/04/00	11:11:20	5.1793	11.813	30.147
05/04/00	11:11:30	5.3460	11.811	30.153
05/04/00	11:11:40	5.5127	11.816	30.155
05/04/00	11:11:50	5.6793	11.817	30.153
05/04/00	11:12:00	5.8460	11.815	30.155
05/04/00	11:12:10	6.0127	11.819	30.157
05/04/00	11:12:20	6.1793	11.818	30.157
05/04/00	11:12:30	6.3460	11.814	30.157
05/04/00	11:12:40	6.5127	11.813	30.157
05/04/00	11:12:50	6.6793	11.815	30.159
05/04/00	11:13:00	6.8460	11.815	30.163
05/04/00	11:13:10	7.0127	11.818	30.161
05/04/00	11:13:20	7.1793	11.818	30.161

05/04/00	11:13:30	7.3460	11.816	30.163
05/04/00	11:13:40	7.5127	11.814	30.161
05/04/00	11:13:50	7.6793	11.816	30.165
05/04/00	11:14:00	7.8460	11.812	30.163
05/04/00	11:14:10	8.0127	11.810	30.163
05/04/00	11:14:20	8.1793	11.811	30.163
05/04/00	11:14:30	8.3460	11.810	30.165
05/04/00	11:14:40	8.5127	11.814	30.167
05/04/00	11:14:50	8.6793	11.808	30.165
05/04/00	11:15:00	8.8460	11.807	30.167
05/04/00	11:15:10	9.0127	11.810	30.167
05/04/00	11:15:20	9.1793	11.806	30.167
05/04/00	11:15:30	9.3460	11.809	30.165
05/04/00	11:15:40	9.5127	11.805	30.167
05/04/00	11:15:50	9.6793	11.805	30.167
05/04/00	11:16:00	9.8460	11.805	30.169
05/04/00	11:16:10	10.0127	11.804	30.169
05/04/00	11:16:20	10.1793	11.801	30.169
05/04/00	11:16:30	10.3460	11.803	30.171
05/04/00	11:16:40	10.5127	11.803	30.171
05/04/00	11:16:50	10.6793	11.801	30.169
05/04/00	11:17:00	10.8460	11.803	30.169
05/04/00	11:17:10	11.0127	11.801	30.169
05/04/00	11:17:20	11.1793	11.800	30.169
05/04/00	11:17:30	11.3460	11.801	30.171
05/04/00	11:17:40	11.5127	11.799	30.171
05/04/00	11:17:50	11.6793	11.803	30.174
05/04/00	11:18:00	11.8460	11.794	30.171
05/04/00	11:18:10	12.0127	11.796	30.171
05/04/00	11:18:20	12.1793	11.792	30.171
05/04/00	11:18:30	12.3460	11.795	30.174
05/04/00	11:18:40	12.5127	11.791	30.174
05/04/00	11:18:50	12.6793	11.790	30.174
05/04/00	11:19:00	12.8460	11.794	30.180
05/04/00	11:19:10	13.0127	11.788	30.165
05/04/00	11:19:20	13.1793	11.787	30.155
05/04/00	11:19:30	13.3460	11.784	30.147
05/04/00	11:19:40	13.5127	11.778	30.139
05/04/00	11:19:50	13.6793	11.777	30.133
05/04/00	11:20:00	13.8460	11.776	30.131
05/04/00	11:20:10	14.0127	11.771	30.125
05/04/00	11:20:20	14.1793	11.773	30.123
05/04/00	11:20:30	14.3460	11.768	30.119
05/04/00	11:20:40	14.5127	11.767	30.114
05/04/00	11:20:50	14.6793	11.765	30.114
05/04/00	11:21:00	14.8460	11.765	30.110
05/04/00	11:21:10	15.0127	11.765	30.108
05/04/00	11:21:20	15.1793	11.764	30.110
05/04/00	11:21:30	15.3460	11.759	30.108
05/04/00	11:21:40	15.5127	11.761	30.108
05/04/00	11:21:50	15.6793	11.756	30.106
05/04/00	11:22:00	15.8460	11.759	30.104
05/04/00	11:22:10	16.0127	11.755	30.102
05/04/00	11:22:20	16.1793	11.755	30.100
05/04/00	11:22:30	16.3460	11.755	30.102
05/04/00	11:22:40	16.5127	11.753	30.102
05/04/00	11:22:50	16.6793	11.754	30.100
05/04/00	11:23:00	16.8460	11.751	30.100
05/04/00	11:23:10	17.0127	11.751	30.100
05/04/00	11:23:20	17.1793	11.754	30.098
05/04/00	11:23:30	17.3460	11.749	30.100
05/04/00	11:23:40	17.5127	11.749	30.096
05/04/00	11:23:50	17.6793	11.751	30.096
05/04/00	11:24:00	17.8460	11.747	30.096
05/04/00	11:24:10	18.0127	11.750	30.096
05/04/00	11:24:20	18.1793	11.750	30.096
05/04/00	11:24:30	18.3460	11.746	30.096
05/04/00	11:24:40	18.5127	11.748	30.094
05/04/00	11:24:50	18.6793	11.748	30.094
05/04/00	11:25:00	18.8460	11.743	30.096

05/04/00	11:25:10	19.0127	11.747	30.094
05/04/00	11:25:20	19.1793	11.741	30.092
05/04/00	11:25:30	19.3460	11.742	30.092
05/04/00	11:25:40	19.5127	11.743	30.092
05/04/00	11:25:50	19.6793	11.741	30.092
05/04/00	11:26:00	19.8460	11.737	30.092
05/04/00	11:26:10	20.0127	11.739	30.094
05/04/00	11:26:20	20.1793	11.738	30.092
05/04/00	11:26:30	20.3460	11.738	30.092
05/04/00	11:26:40	20.5127	11.736	30.094
05/04/00	11:26:50	20.6793	11.736	30.094
05/04/00	11:27:00	20.8460	11.731	30.090
05/04/00	11:27:10	21.0127	11.731	30.092
05/04/00	11:27:20	21.1793	11.731	30.092
05/04/00	11:27:30	21.3460	11.733	30.092
05/04/00	11:27:40	21.5127	11.727	30.092
05/04/00	11:27:50	21.6793	11.728	30.090
05/04/00	11:28:00	21.8460	11.727	30.090
05/04/00	11:28:10	22.0127	11.727	30.092
05/04/00	11:28:20	22.1793	11.725	30.092
05/04/00	11:28:30	22.3460	11.727	30.090
05/04/00	11:28:40	22.5127	11.725	30.090
05/04/00	11:28:50	22.6793	11.726	30.092
05/04/00	11:29:00	22.8460	11.720	30.090
05/04/00	11:29:10	23.0127	11.722	30.090
05/04/00	11:29:20	23.1793	11.719	30.090
05/04/00	11:29:30	23.3460	11.722	30.090
05/04/00	11:29:40	23.5127	11.722	30.090
05/04/00	11:29:50	23.6793	11.721	30.088
05/04/00	11:30:00	23.8460	11.716	30.088
05/04/00	11:30:10	24.0127	11.720	30.088
05/04/00	11:30:20	24.1793	11.718	30.090
05/04/00	11:30:30	24.3460	11.716	30.088
05/04/00	11:30:40	24.5127	11.716	30.088
05/04/00	11:30:50	24.6793	11.716	30.090
05/04/00	11:31:00	24.8460	11.713	30.088
05/04/00	11:31:10	25.0127	11.714	30.090
05/04/00	11:31:20	25.1793	11.715	30.090
05/04/00	11:31:30	25.3460	11.712	30.090
05/04/00	11:31:40	25.5127	11.713	30.088
05/04/00	11:31:50	25.6793	11.712	30.090
05/04/00	11:32:00	25.8460	11.712	30.088
05/04/00	11:32:10	26.0127	11.711	30.090
05/04/00	11:32:20	26.1793	11.708	30.090
05/04/00	11:32:30	26.3460	11.709	30.088
05/04/00	11:32:40	26.5127	11.707	30.090
05/04/00	11:32:50	26.6793	11.707	30.090
05/04/00	11:33:00	26.8460	11.706	30.088
05/04/00	11:33:10	27.0127	11.706	30.090
05/04/00	11:33:20	27.1793	11.708	30.090
05/04/00	11:33:30	27.3460	11.706	30.090
05/04/00	11:33:40	27.5127	11.705	30.090
05/04/00	11:33:50	27.6793	11.706	30.088
05/04/00	11:34:00	27.8460	11.704	30.088
05/04/00	11:34:10	28.0127	11.705	30.088
05/04/00	11:34:20	28.1793	11.706	30.090
05/04/00	11:34:30	28.3460	11.705	30.090
05/04/00	11:34:40	28.5127	11.706	30.090
05/04/00	11:34:50	28.6793	11.699	30.088
05/04/00	11:35:00	28.8460	11.703	30.088
05/04/00	11:35:10	29.0127	11.702	30.090
05/04/00	11:35:20	29.1793	11.701	30.088
05/04/00	11:35:30	29.3460	11.701	30.088
05/04/00	11:35:40	29.5127	11.700	30.088
05/04/00	11:35:50	29.6793	11.701	30.090
05/04/00	11:36:00	29.8460	11.696	30.088
05/04/00	11:36:10	30.0127	11.698	30.090
05/04/00	11:36:20	30.1793	11.697	30.088
05/04/00	11:36:30	30.3460	11.697	30.088
05/04/00	11:36:40	30.5127	11.713	30.088

05/04/00	11:36:50	30.6793	11.708	30.090
05/04/00	11:37:00	30.8460	11.705	30.088
05/04/00	11:37:10	31.0127	11.708	30.088
05/04/00	11:37:20	31.1793	11.705	30.092
05/04/00	11:37:30	31.3460	11.703	30.088
05/04/00	11:37:40	31.5127	11.707	30.100
05/04/00	11:37:50	31.6793	11.712	30.110
05/04/00	11:38:00	31.8460	11.714	30.119
05/04/00	11:38:10	32.0127	11.713	30.125
05/04/00	11:38:20	32.1793	11.715	30.131
05/04/00	11:38:30	32.3460	11.718	30.133
05/04/00	11:38:40	32.5127	11.717	30.135
05/04/00	11:38:50	32.6793	11.718	30.137
05/04/00	11:39:00	32.8460	11.718	30.143
05/04/00	11:39:10	33.0127	11.717	30.145
05/04/00	11:39:20	33.1793	11.719	30.147
05/04/00	11:39:30	33.3460	11.718	30.147
05/04/00	11:39:40	33.5127	11.718	30.151
05/04/00	11:39:50	33.6793	11.724	30.153
05/04/00	11:40:00	33.8460	11.721	30.153
05/04/00	11:40:10	34.0127	11.722	30.155
05/04/00	11:40:20	34.1793	11.721	30.157
05/04/00	11:40:30	34.3460	11.724	30.157
05/04/00	11:40:40	34.5127	11.722	30.159
05/04/00	11:40:50	34.6793	11.723	30.159
05/04/00	11:41:00	34.8460	11.721	30.161
05/04/00	11:41:10	35.0127	11.725	30.161
05/04/00	11:41:20	35.1793	11.724	30.161
05/04/00	11:41:30	35.3460	11.724	30.161
05/04/00	11:41:40	35.5127	11.723	30.163
05/04/00	11:41:50	35.6793	11.723	30.163
05/04/00	11:42:00	35.8460	11.723	30.165
05/04/00	11:42:10	36.0127	11.723	30.163
05/04/00	11:42:20	36.1793	11.721	30.163
05/04/00	11:42:30	36.3460	11.721	30.165
05/04/00	11:42:40	36.5127	11.723	30.165
05/04/00	11:42:50	36.6793	11.720	30.165
05/04/00	11:43:00	36.8460	11.723	30.165
05/04/00	11:43:10	37.0127	11.721	30.165
05/04/00	11:43:20	37.1793	11.721	30.169
05/04/00	11:43:30	37.3460	11.723	30.169
05/04/00	11:43:40	37.5127	11.722	30.167
05/04/00	11:43:50	37.6793	11.720	30.169
05/04/00	11:44:00	37.8460	11.720	30.169
05/04/00	11:44:10	38.0127	11.720	30.169
05/04/00	11:44:20	38.1793	11.718	30.169
05/04/00	11:44:30	38.3460	11.718	30.169
05/04/00	11:44:40	38.5127	11.724	30.176
05/04/00	11:44:50	38.6793	11.719	30.163
05/04/00	11:45:00	38.8460	11.715	30.151
05/04/00	11:45:10	39.0127	11.712	30.143
05/04/00	11:45:20	39.1793	11.706	30.137
05/04/00	11:45:30	39.3460	11.709	30.131
05/04/00	11:45:40	39.5127	11.704	30.127
05/04/00	11:45:50	39.6793	11.705	30.125
05/04/00	11:46:00	39.8460	11.702	30.121
05/04/00	11:46:10	40.0127	11.698	30.117
05/04/00	11:46:20	40.1793	11.701	30.117
05/04/00	11:46:30	40.3460	11.698	30.112
05/04/00	11:46:40	40.5127	11.697	30.110
05/04/00	11:46:50	40.6793	11.698	30.108
05/04/00	11:47:00	40.8460	11.699	30.108
05/04/00	11:47:10	41.0127	11.694	30.106
05/04/00	11:47:20	41.1793	11.694	30.104
05/04/00	11:47:30	41.3460	11.698	30.104
05/04/00	11:47:40	41.5127	11.692	30.104
05/04/00	11:47:50	41.6793	11.693	30.102
05/04/00	11:48:00	41.8460	11.696	30.102
05/04/00	11:48:10	42.0127	11.693	30.102
05/04/00	11:48:20	42.1793	11.692	30.102

05/04/00	11:48:30	42.3460	11.694	30.100
05/04/00	11:48:40	42.5127	11.691	30.100
05/04/00	11:48:50	42.6793	11.690	30.100
05/04/00	11:49:00	42.8460	11.690	30.098
05/04/00	11:49:10	43.0127	11.688	30.096
05/04/00	11:49:20	43.1793	11.686	30.094
05/04/00	11:49:30	43.3460	11.687	30.096
05/04/00	11:49:40	43.5127	11.687	30.096
05/04/00	11:49:50	43.6793	11.690	30.096
05/04/00	11:50:00	43.8460	11.703	30.096
05/04/00	11:50:10	44.0127	11.715	30.094
05/04/00	11:50:20	44.1793	11.722	30.094
05/04/00	11:50:30	44.3460	11.728	30.094
05/04/00	11:50:40	44.5127	11.733	30.094
05/04/00	11:50:50	44.6793	11.740	30.094
05/04/00	11:51:00	44.8460	11.743	30.094
05/04/00	11:51:10	45.0127	11.747	30.094
05/04/00	11:51:20	45.1793	11.749	30.094
05/04/00	11:51:30	45.3460	11.752	30.092
05/04/00	11:51:40	45.5127	11.755	30.092
05/04/00	11:51:50	45.6793	11.752	30.084
05/04/00	11:52:00	45.8460	11.760	30.096
05/04/00	11:52:10	46.0127	11.767	30.108
05/04/00	11:52:20	46.1793	11.773	30.117
05/04/00	11:52:30	46.3460	11.779	30.125
05/04/00	11:52:40	46.5127	11.784	30.131
05/04/00	11:52:50	46.6793	11.786	30.133
05/04/00	11:53:00	46.8460	11.791	30.137
05/04/00	11:53:10	47.0127	11.793	30.139
05/04/00	11:53:20	47.1793	11.799	30.143
05/04/00	11:53:30	47.3460	11.802	30.145
05/04/00	11:53:40	47.5127	11.805	30.145
05/04/00	11:53:50	47.6793	11.809	30.149
05/04/00	11:54:00	47.8460	11.811	30.151
05/04/00	11:54:10	48.0127	11.813	30.151
05/04/00	11:54:20	48.1793	11.815	30.153
05/04/00	11:54:30	48.3460	11.817	30.155
05/04/00	11:54:40	48.5127	11.820	30.155
05/04/00	11:54:50	48.6793	11.822	30.157
05/04/00	11:55:00	48.8460	11.823	30.157
05/04/00	11:55:10	49.0127	11.825	30.159
05/04/00	11:55:20	49.1793	11.828	30.159
05/04/00	11:55:30	49.3460	11.829	30.159
05/04/00	11:55:40	49.5127	11.831	30.161
05/04/00	11:55:50	49.6793	11.834	30.161
05/04/00	11:56:00	49.8460	11.835	30.161
05/04/00	11:56:10	50.0127	11.839	30.163
05/04/00	11:56:20	50.1793	11.840	30.163
05/04/00	11:56:30	50.3460	11.842	30.163
05/04/00	11:56:40	50.5127	11.844	30.163
05/04/00	11:56:50	50.6793	11.844	30.163
05/04/00	11:57:00	50.8460	11.848	30.165
05/04/00	11:57:10	51.0127	11.850	30.165
05/04/00	11:57:20	51.1793	11.850	30.163
05/04/00	11:57:30	51.3460	11.852	30.165
05/04/00	11:57:40	51.5127	11.855	30.165
05/04/00	11:57:50	51.6793	11.855	30.165
05/04/00	11:58:00	51.8460	11.857	30.167
05/04/00	11:58:10	52.0127	11.858	30.165
05/04/00	11:58:20	52.1793	11.860	30.167
05/04/00	11:58:30	52.3460	11.861	30.167
05/04/00	11:58:40	52.5127	11.862	30.167
05/04/00	11:58:50	52.6793	11.863	30.167
05/04/00	11:59:00	52.8460	11.863	30.167
05/04/00	11:59:10	53.0127	11.866	30.167
05/04/00	11:59:20	53.1793	11.869	30.167
05/04/00	11:59:30	53.3460	11.868	30.169
05/04/00	11:59:40	53.5127	11.871	30.169
05/04/00	11:59:50	53.6793	11.872	30.169
05/04/00	12:00:00	53.8460	11.872	30.169

05/04/00	12:00:10	54.0127	11.875	30.169
05/04/00	12:00:20	54.1793	11.875	30.167
05/04/00	12:00:30	54.3460	11.876	30.169
05/04/00	12:00:40	54.5127	11.877	30.169
05/04/00	12:00:50	54.6793	11.879	30.171
05/04/00	12:01:00	54.8460	11.879	30.169
05/04/00	12:01:10	55.0127	11.880	30.169
05/04/00	12:01:20	55.1793	11.881	30.169
05/04/00	12:01:30	55.3460	11.883	30.169
05/04/00	12:01:40	55.5127	11.883	30.171
05/04/00	12:01:50	55.6793	11.884	30.169
05/04/00	12:02:00	55.8460	11.885	30.169
05/04/00	12:02:10	56.0127	11.885	30.169
05/04/00	12:02:20	56.1793	11.885	30.169
05/04/00	12:02:30	56.3460	11.886	30.169
05/04/00	12:02:40	56.5127	11.888	30.171
05/04/00	12:02:50	56.6793	11.888	30.169
05/04/00	12:03:00	56.8460	11.890	30.171
05/04/00	12:03:10	57.0127	11.890	30.171
05/04/00	12:03:20	57.1793	11.891	30.171
05/04/00	12:03:30	57.3460	11.892	30.171
05/04/00	12:03:40	57.5127	11.894	30.171
05/04/00	12:03:50	57.6793	11.894	30.171
05/04/00	12:04:00	57.8460	11.896	30.171
05/04/00	12:04:10	58.0127	11.897	30.174
05/04/00	12:04:20	58.1793	11.898	30.174
05/04/00	12:04:30	58.3460	11.898	30.171
05/04/00	12:04:40	58.5127	11.899	30.171
05/04/00	12:04:50	58.6793	11.900	30.174
05/04/00	12:05:00	58.8460	11.899	30.171
05/04/00	12:05:10	59.0127	11.901	30.174
05/04/00	12:05:20	59.1793	11.901	30.174
05/04/00	12:05:30	59.3460	11.902	30.174
05/04/00	12:05:40	59.5127	11.904	30.174
05/04/00	12:05:50	59.6793	11.904	30.174
05/04/00	12:06:00	59.8460	11.904	30.174
05/04/00	12:06:10	60.0127	11.905	30.174
05/04/00	12:06:20	60.1793	11.906	30.174
05/04/00	12:06:30	60.3460	11.906	30.174
05/04/00	12:06:40	60.5127	11.908	30.174
05/04/00	12:06:50	60.6793	11.908	30.174
05/04/00	12:07:00	60.8460	11.908	30.171
05/04/00	12:07:10	61.0127	11.909	30.174
05/04/00	12:07:20	61.1793	11.909	30.171
05/04/00	12:07:30	61.3460	11.911	30.174
05/04/00	12:07:40	61.5127	11.911	30.171
05/04/00	12:07:50	61.6793	11.911	30.174
05/04/00	12:08:00	61.8460	11.912	30.171
05/04/00	12:08:10	62.0127	11.913	30.174
05/04/00	12:08:20	62.1793	11.913	30.174
05/04/00	12:08:30	62.3460	11.913	30.174
05/04/00	12:08:40	62.5127	11.913	30.174
05/04/00	12:08:50	62.6793	11.913	30.174
05/04/00	12:09:00	62.8460	11.915	30.174
05/04/00	12:09:10	63.0127	11.915	30.174
05/04/00	12:09:20	63.1793	11.917	30.174
05/04/00	12:09:30	63.3460	11.918	30.174
05/04/00	12:09:40	63.5127	11.916	30.171
05/04/00	12:09:50	63.6793	11.919	30.174
05/04/00	12:10:00	63.8460	11.917	30.174
05/04/00	12:10:10	64.0127	11.918	30.174
05/04/00	12:10:20	64.1793	11.919	30.174
05/04/00	12:10:30	64.3460	11.919	30.174
05/04/00	12:10:40	64.5127	11.920	30.171
05/04/00	12:10:50	64.6793	11.921	30.171
05/04/00	12:11:00	64.8460	11.920	30.171
05/04/00	12:11:10	65.0127	11.920	30.171
05/04/00	12:11:20	65.1793	11.921	30.171
05/04/00	12:11:30	65.3460	11.922	30.174
05/04/00	12:11:40	65.5127	11.922	30.174

05/04/00	12:11:50	65.6793	11.924	30.171
05/04/00	12:12:00	65.8460	11.925	30.171
05/04/00	12:12:10	66.0127	11.925	30.174
05/04/00	12:12:20	66.1793	11.925	30.174
05/04/00	12:12:30	66.3460	11.924	30.171
05/04/00	12:12:40	66.5127	11.926	30.171
05/04/00	12:12:50	66.6793	11.926	30.171
05/04/00	12:13:00	66.8460	11.929	30.171
05/04/00	12:13:10	67.0127	11.929	30.171
05/04/00	12:13:20	67.1793	11.928	30.171
05/04/00	12:13:30	67.3460	11.928	30.169
05/04/00	12:13:40	67.5127	11.928	30.169
05/04/00	12:13:50	67.6793	11.927	30.169
05/04/00	12:14:00	67.8460	11.932	30.171
05/04/00	12:14:10	68.0127	11.930	30.169
05/04/00	12:14:20	68.1793	11.932	30.167
05/04/00	12:14:30	68.3460	11.932	30.167
05/04/00	12:14:40	68.5127	11.934	30.171
05/04/00	12:14:50	68.6793	11.934	30.171
05/04/00	12:15:00	68.8460	11.936	30.171
05/04/00	12:15:10	69.0127	11.936	30.171
05/04/00	12:15:20	69.1793	11.936	30.171
05/04/00	12:15:30	69.3460	11.938	30.174
05/04/00	12:15:40	69.5127	11.937	30.171
05/04/00	12:15:50	69.6793	11.935	30.169
05/04/00	12:16:00	69.8460	11.937	30.171
05/04/00	12:16:10	70.0127	11.936	30.169
05/04/00	12:16:20	70.1793	11.937	30.171
05/04/00	12:16:30	70.3460	11.938	30.169
05/04/00	12:16:40	70.5127	11.936	30.169
05/04/00	12:16:50	70.6793	11.938	30.169
05/04/00	12:17:00	70.8460	11.938	30.169
05/04/00	12:17:10	71.0127	11.939	30.174
05/04/00	12:17:20	71.1793	11.939	30.174
05/04/00	12:17:30	71.3460	11.938	30.169
05/04/00	12:17:40	71.5127	11.940	30.174
05/04/00	12:17:50	71.6793	11.940	30.174
05/04/00	12:18:00	71.8460	11.936	30.169
05/04/00	12:18:10	72.0127	11.944	30.176
05/04/00	12:18:20	72.1793	11.944	30.176
05/04/00	12:18:30	72.3460	11.944	30.174
05/04/00	12:18:40	72.5127	11.943	30.171
05/04/00	12:18:50	72.6793	11.945	30.176
05/04/00	12:19:00	72.8460	11.944	30.174
05/04/00	12:19:10	73.0127	11.945	30.174
05/04/00	12:19:20	73.1793	11.945	30.174
05/04/00	12:19:30	73.3460	11.945	30.174
05/04/00	12:19:40	73.5127	11.946	30.176
05/04/00	12:19:50	73.6793	11.946	30.176
05/04/00	12:20:00	73.8460	11.945	30.174
05/04/00	12:20:10	74.0127	11.945	30.174
05/04/00	12:20:20	74.1793	11.945	30.174
05/04/00	12:20:30	74.3460	11.946	30.176
05/04/00	12:20:40	74.5127	11.946	30.176
05/04/00	12:20:50	74.6793	11.945	30.174
05/04/00	12:21:00	74.8460	11.947	30.174
05/04/00	12:21:10	75.0127	11.947	30.174
05/04/00	12:21:20	75.1793	11.947	30.174
05/04/00	12:21:30	75.3460	11.948	30.176
05/04/00	12:21:40	75.5127	11.947	30.171
05/04/00	12:21:50	75.6793	11.949	30.176
05/04/00	12:22:00	75.8460	11.949	30.176
05/04/00	12:22:10	76.0127	11.948	30.174
05/04/00	12:22:20	76.1793	11.948	30.174
05/04/00	12:22:30	76.3460	11.948	30.174
05/04/00	12:22:40	76.5127	11.948	30.176
05/04/00	12:22:50	76.6793	11.948	30.174
05/04/00	12:23:00	76.8460	11.949	30.174
05/04/00	12:23:10	77.0127	11.947	30.174
05/04/00	12:23:20	77.1793	11.948	30.174

05/04/00	12:23:30	77.3460	11.949	30.174
05/04/00	12:23:40	77.5127	11.951	30.174
05/04/00	12:23:50	77.6793	11.951	30.176
05/04/00	12:24:00	77.8460	11.951	30.174
05/04/00	12:24:10	78.0127	11.951	30.174
05/04/00	12:24:20	78.1793	11.951	30.174
05/04/00	12:24:30	78.3460	11.952	30.174
05/04/00	12:24:40	78.5127	11.951	30.176
05/04/00	12:24:50	78.6793	11.951	30.176
05/04/00	12:25:00	78.8460	11.951	30.174
05/04/00	12:25:10	79.0127	11.951	30.174
05/04/00	12:25:20	79.1793	11.950	30.171
05/04/00	12:25:30	79.3460	11.950	30.171
05/04/00	12:25:40	79.5127	11.951	30.174
05/04/00	12:25:50	79.6793	11.950	30.171
05/04/00	12:26:00	79.8460	11.951	30.174
05/04/00	12:26:10	80.0127	11.951	30.171
05/04/00	12:26:20	80.1793	11.951	30.171
05/04/00	12:26:30	80.3460	11.951	30.171
05/04/00	12:26:40	80.5127	11.953	30.178
05/04/00	12:26:50	80.6793	11.952	30.174
05/04/00	12:27:00	80.8460	11.952	30.174
05/04/00	12:27:10	81.0127	11.953	30.176
05/04/00	12:27:20	81.1793	11.953	30.178
05/04/00	12:27:30	81.3460	11.953	30.178
05/04/00	12:27:40	81.5127	11.953	30.176
05/04/00	12:27:50	81.6793	11.953	30.176
05/04/00	12:28:00	81.8460	11.955	30.178
05/04/00	12:28:10	82.0127	11.955	30.176
05/04/00	12:28:20	82.1793	11.957	30.176
05/04/00	12:28:30	82.3460	11.959	30.178
05/04/00	12:28:40	82.5127	11.958	30.176
05/04/00	12:28:50	82.6793	11.957	30.178
05/04/00	12:29:00	82.8460	11.956	30.165
05/04/00	12:29:10	83.0127	11.951	30.155

APPENDIX D

DATABASE

GROUNDWATER DATA PRIOR TO APRIL 2000

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	001	002	003	004	005
site	21	21	21	21	21
location	90G001	90G001	90G00201	CEF-P21-01	CEF-P21-01
nsample	90G00101 [01/29/97]	90G00101F [01/29/97]	90G00201 [01/29/97]	CEF-P21-GW-001	CEF-P21-GW-001-2
sample	90G00101	90G00101F	90G00201	CEF-P21-GW-001	CEF-P21-GW-001-2
sample_dat	01/29/97	01/29/97	01/29/97	05/26/99	09/27/99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP
matrix	GW	GW	GW	GW	GW
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**
Volatile Organics (ug/L)					
1,1,1-TRICHLOROETHANE	10 U		10 U	1 U	
1,1,2,2-TETRACHLOROETHANE	10 U		10 U	1 U	
1,1,2-TRICHLOROETHANE	10 U		10 U	1 U	
1,1-DICHLOROETHANE	10 U		10 U	1 U	
1,1-DICHLOROETHENE	10 U		10 U	1 U	
1,2-DICHLOROETHANE	10 U		10 U	1 U	
1,2-DICHLOROETHENE (TOTAL)	10 U		10 U		
1,2-DICHLOROPROPANE	10 U		10 U	1 U	
2-BUTANONE	10 U		10 U	5 UR	
2-HEXANONE	10 U		10 U	5 U	
4-METHYL-2-PENTANONE	10 U		10 U	5 U	
ACETONE	10 U		10 U	5 UR	
BENZENE	10 U		10 U	1 U	
BROMODICHLOROMETHANE	10 U		10 U	1 U	
BROMOFORM	10 U		10 U	1 U	
BROMOMETHANE	10 U		10 U	1 U	
CARBON DISULFIDE	10 U		10 U	5 U	
CARBON TETRACHLORIDE	10 U		10 U	1 U	
CHLOROBENZENE	10 U		10 U	1 U	
CHLOROETHANE	10 U		10 U	1 U	
CHLOROFORM	10 U		10 U	1 U	
CHLOROMETHANE	10 U		10 U	1 U	
CIS-1,2-DICHLOROETHENE				1 U	
CIS-1,3-DICHLOROPROPENE	10 U		10 U	1 U	
DIBROMOCHLOROMETHANE	10 U		10 U	1 U	
ETHYLBENZENE	10 U		10 U	1 U	
METHYLENE CHLORIDE	10 U		10 U	5 U	
STYRENE	10 U		10 U	1 U	
TETRACHLOROETHENE	10 U		10 U	1 U	
TOLUENE	10 U		10 U	1 U	
TRANS-1,2-DICHLOROETHENE				1 U	
TRANS-1,3-DICHLOROPROPENE	10 U		10 U	1 U	
TRICHLOROETHENE	10 U		10 U	1 U	
VINYL CHLORIDE	10 U		10 U	1 U	
XYLENES, TOTAL	10 U		10 U	3 U	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	001	002	003	004	005
site	21	21	21	21	21
location	90G001	90G001	90G00201	CEF-P21-01	CEF-P21-01
nsample	90G00101 [01/29/97]	90G00101F [01/29/97]	90G00201 [01/29/97]	CEF-P21-GW-001	CEF-P21-GW-001-2
sample	90G00101	90G00101F	90G00201	CEF-P21-GW-001	CEF-P21-GW-001-2
sample_dat	01/29/97	01/29/97	01/29/97	05/26/99	09/27/99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP
matrix	GW	GW	GW	GW	GW
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**
Semivolatile Organics (ug/L)					
1,2,4-TRICHLOROBENZENE	10 U		10 U	5 U	
1,2-DICHLOROBENZENE	10 U		10 U	5 U	
1,3-DICHLOROBENZENE	10 U		10 U	5 U	
1,4-DICHLOROBENZENE	10 U		10 U	5 U	
1-METHYLNAPHTHALENE				5 U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U		10 U		
2,4,5-TRICHLOROPHENOL	25 U		25 U	4 U	
2,4,6-TRICHLOROPHENOL	10 U		10 U	5 U	
2,4-DICHLOROPHENOL	10 U		10 U	4 U	
2,4-DIMETHYLPHENOL	10 U		10 U	10 U	
2,4-DINITROPHENOL	25 U		25 U	25 U	
2,4-DINITROTOLUENE	10 U		10 U	0.2 U	
2,6-DINITROTOLUENE	10 U		10 U	0.2 U	
2-CHLORONAPHTHALENE	10 U		10 U	5 U	
2-CHLOROPHENOL	10 U		10 U	5 U	
2-METHYLNAPHTHALENE	10 U		10 U	5 U	
2-METHYLPHENOL	10 U		10 U	5 U	
2-NITROANILINE	25 U		25 U	5 U	
2-NITROPHENOL	10 U		10 U	5 U	
3,3'-DICHLOROBENZIDINE	10 U		10 U	7.5 U	
3-NITROANILINE	25 U		25 U	5 U	
4,6-DINITRO-2-METHYLPHENOL	25 U		25 U	25 U	
4-BROMOPHENYL PHENYL ETHER	10 U		10 U	5 U	
4-CHLORO-3-METHYLPHENOL	10 U		10 U	10 U	
4-CHLOROANILINE	10 U		10 U	5 U	
4-CHLOROPHENYL PHENYL ETHER	10 U		10 U	5 U	
4-METHYLPHENOL	10 U		10 U	5 U	
4-NITROANILINE	25 U		25 U	5 U	
4-NITROPHENOL	25 U		25 U		
4-NITROPHENOL (OS)				15 U	
ACENAPHTHENE	10 U		10 U	5 U	
ACENAPHTHYLENE	10 U		10 U	5 U	
ANTHRACENE	10 U		10 U	5 U	
BENZO(A)ANTHRACENE	10 U		10 U	5 U	
BENZO(A)PYRENE	10 U		10 U	5 U	
BENZO(B)FLUORANTHENE	10 U		10 U	5 U	
BENZO(G,H,I)PERYLENE	10 U		10 U	5 U	
BENZO(K)FLUORANTHENE	10 U		10 U	5 U	
BIS(2-CHLOROETHOXY)METHANE	10 U		10 U	5 U	
BIS(2-CHLOROETHYL)ETHER	10 U		10 U	1.5 U	
BIS(2-CHLOROISOPROPYL) ETHER				5 U	
BIS(2-ETHYLHEXYL)PHTHALATE	10 U		10 U	5 U	
BUTYLBENZYL PHTHALATE	10 U		10 U	5 U	
CARBAZOLE	10 U		10 U	4 U	
CHRYSENE	10 U		10 U	5 U	
DI-N-BUTYL PHTHALATE	10 U		10 U	5 U	
DI-N-OCTYL PHTHALATE	10 U		10 U	5 U	
DIBENZO(A,H)ANTHRACENE	10 U		10 U	5 U	
DIBENZOFURAN	10 U		10 U	5 U	
DIETHYL PHTHALATE	10 U		10 U	5 U	
DIMETHYL PHTHALATE	10 U		10 U	5 U	
FLUORANTHENE	10 U		10 U	5 U	
FLUORENE	10 U		10 U	5 U	
HEXACHLOROBENZENE	10 U		10 U	1 U	
HEXACHLOROBUTADIENE	10 U		10 U	5 U	
HEXACHLOROCYCLOPENTADIENE	10 U		10 U	5 U	
HEXACHLOROETHANE	10 U		10 U	5 U	
INDENO(1,2,3-CD)PYRENE	10 U		10 U	5 U	
ISOPHORONE	10 U		10 U	5 U	
N-NITROSO-DI-N-PROPYLAMINE	10 U		10 U	4 U	
N-NITROSODIPHENYLAMINE	10 U		10 U	5 U	
NAPHTHALENE	10 U		10 U	5 U	
NITROBENZENE	10 U		10 U	4 U	
PENTACHLOROPHENOL	25 U		25 U		
PENTACHLOROPHENOL (OS)				1 U	
PHENANTHRENE	10 U		10 U	5 U	
PHENOL	10 U		10 U	5 U	
PYRENE	10 U		10 U	5 U	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	001	002	003	004	005
site	21	21	21	21	21
location	90G001	90G001	90G00201	CEF-P21-01	CEF-P21-01
nsample	90G00101 [01/29/97]	90G00101F [01/29/97]	90G00201 [01/29/97]	CEF-P21-GW-001	CEF-P21-GW-001-2
sample	90G00101	90G00101F	90G00201	CEF-P21-GW-001	CEF-P21-GW-001-2
sample_dat	01/29/97	01/29/97	01/29/97	05/26/99	09/27/99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP
matrix	GW	GW	GW	GW	GW
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**
Pesticides/PCBs (ug/L)					
4,4'-DDD	0.12 J		0.1 U	2.5 U	0.5 U
4,4'-DDE	0.5 U		0.1 U	2.5 U	0.5 U
4,4'-DDT	0.5 U		0.1 U	2.5 U	0.5 U
ALDRIN	0.25 U		0.05 U	1.2 U	0.25 U
ALPHA-BHC	0.25 U		0.05 U	1.2 U	0.25 U
ALPHA-CHLORDANE	1.9		0.05 U	2.5 U	0.5 U
AROCLOR-1016	5 U		1 U	12 U	
AROCLOR-1221	10 U		2 U	12 U	
AROCLOR-1232	5 U		1 U	12 U	
AROCLOR-1242	5 U		1 U	12 U	
AROCLOR-1248	5 U		1 U	12 U	
AROCLOR-1254	5 U		1 U	12 U	
AROCLOR-1260	5 U		1 U	12 U	
BETA-BHC	0.25 U		0.05 U	1.2 U	0.25 U
BOLSTAR				2 U	
CHLORPYRIFOS				2 U	
COUMAPHOS				4.1 U	
DELTA-BHC	0.25 U		0.05 U	1.2 U	0.25 U
DEMETON-S				2.7 U	
DIAZINON				3.3 U	
DICHLORVOS				2.9 UJ	
DIELDRIN	0.5 U		0.1 U	1.2 U	0.25 U
DIMETHOATE				1 U	
DISULFOTON				2.2 U	
ENDOSULFAN I	0.25 U		0.05 U	1.2 U	0.25 U
ENDOSULFAN II	0.5 U		0.1 U	2.5 U	0.5 U
ENDOSULFAN SULFATE	0.5 U		0.1 U	2.5 U	0.5 U
ENDRIN	0.5 U		0.1 U	2.5 U	0.5 U
ENDRIN ALDEHYDE	0.5 U		0.1 U	2.5 U	0.5 U
ENDRIN KETONE	0.5 U		0.039 J	2.5 U	0.5 U
EPN				0.7 U	
ETHOPROP				2.3 U	
ETHYL PARATHION				0.5 U	
FENSULFOTHION				6 U	
FENTHION				2 U	
GAMMA-BHC (LINDANE)	0.25 U		0.05 U	1.2 U	0.25 U
GAMMA-CHLORDANE	1.5		0.05 U	2.5 U	0.5 U
HEPTACHLOR	0.19 J		0.05 U	1.2 U	0.25 U
HEPTACHLOR EPOXIDE	0.1 J		0.05 U	1.2 U	0.25 U
MALATHION				1.2 U	
MERPHOS				2.9 UJ	
METHOXYCHLOR	2.5 U		0.5 U	5 U	1 U
METHYL AZINPHOS				2.6 U	
METHYL PARATHION				0.4 U	
MEVINPHOS				4.7 U	
NALED				5 UJ	
PHORATE				1.8 U	
RONNEL				4.1 U	
STIROPHOS				5.7 U	
SULFOTEP				1.8 U	
TEPP				25 U	
TOKUTHION				3.4 U	
TOXAPHENE	25 U		5 U	62 U	12 U
TRICHLORONATE				2 U	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	001	002	003	004	005
site	21	21	21	21	21
location	90G001	90G001	90G00201	CEF-P21-01	CEF-P21-01
nsample	90G00101 [01/29/97]	90G00101F [01/29/97]	90G00201 [01/29/97]	CEF-P21-GW-001	CEF-P21-GW-001-2
sample	90G00101	90G00101F	90G00201	CEF-P21-GW-001	CEF-P21-GW-001-2
sample_dat	01/29/97	01/29/97	01/29/97	05/26/99	09/27/99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP
matrix	GW	GW	GW	GW	GW
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**
Herbicides (ug/L)					
2,4,5-T				0.82 U	
2,4,5-TP (SILVEX)				0.51 U	
2,4-D				2.6 U	
2,4-DB				4.6 U	
4-NITROPHENOL (HERB)				2.6 U	
DALAPON				8.2 U	
DICAMBA				1 U	
DICHLOROPROP				1.5 U	
DINOSEB				1 U	
MCPA				100 U	
MCPP				71 U	
PENTACHLOROPHENOL (HERB)				0.51 U	
Inorganics (ug/L)					
ALUMINUM	3170	1180	182 J	259 U	
ANTIMONY	35.5 J	35.2 J	3 U	3 U	
ARSENIC	2.1 J	2 U	2.3 J	3.4 U	
BARIUM	14.9 J	13 J	32.6 J	92.8	
BERYLLIUM	1 U	1 U	1 U	1.5 U	
CADMIUM	1 U	1 U	1 U	0.33 U	
CALCIUM	55400	54600	43400	78300	
CHROMIUM	2.9 J	1.5 J	1 U	1.9 U	
COBALT	1.1 J	1.2 J	1.2 J	1.2 U	
COPPER	4.2 J	3.5 J	1 U	0.75 U	
CYANIDE	2.7 J		3.4 J	5 U	
IRON	414	167	11 U	834	
LEAD	2.5 J	1 U	1 U	1.6 U	
MAGNESIUM	1770 J	1690 J	4860 J	12100	
MANGANESE	5.3 J	5.2 J	35.1	156	
MERCURY	0.1 U	0.1 U	0.1 U	0.25 U	
NICKEL	2 U	2 U	2 U	3.7 U	
POTASSIUM	1040 J	980 J	5250	24200	
SELENIUM	4 U	4 U	4 U	2 U	
SILVER	1 U	1 U	1 U	1.1 U	
SODIUM	7520	6930	6210	7980	
THALLIUM	3.6 J	3 U	6 J	4 U	
VANADIUM	11.2 J	9.2 J	2.3 J	3.5 U	
ZINC	6.3 J	13.7 J	4.2 J	26.9	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	006	007	008	009	010
site	21	21	21	21	21
location	CEF-P21-01	CEF-P21-02	CEF-P21-02	CEF-P21-03	90G001
nsample	CEF-P21-GW-001-2-D	CEF-P21-GW-002	CEF-P21-GW-002-D	CEF-P21-GW-003	CEF-P21-GW-01S
sample	CEF-P21-GW-DU05	CEF-P21-GW-002	CEF-P21-GW-DUP1	CEF-P21-GW-003	CEF-P21-GW-01S
sample_dat	09/27/99	05/26/99	05/26/99	05/26/99	06/21/99
sacode	DUP	DUP	DUP	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**
Volatile Organics (ug/L)					
1,1,1-TRICHLOROETHANE		1 U	1 U	1 U	
1,1,2,2-TETRACHLOROETHANE		1 U	1 U	1 U	
1,1,2-TRICHLOROETHANE		1 U	1 U	1 U	
1,1-DICHLOROETHANE		1 U	1 U	1 U	
1,1-DICHLOROETHENE		1 U	1 U	1 U	
1,2-DICHLOROETHANE		1 U	1 U	1 U	
1,2-DICHLOROETHENE (TOTAL)					
1,2-DICHLOROPROPANE		1 U	1 U	1 U	
2-BUTANONE		5 UR	5 UR	5 UR	
2-HEXANONE		5 U	5 U	5 U	
4-METHYL-2-PENTANONE		5 U	5 U	5 U	
ACETONE		5 UR	5 UR	5 UR	
BENZENE		1 U	1 U	1 U	
BROMODICHLOROMETHANE		1 U	1 U	1 U	
BROMOFORM		1 U	1 U	1 U	
BROMOMETHANE		1 U	1 U	1 U	
CARBON DISULFIDE		5 U	5 U	5 U	
CARBON TETRACHLORIDE		1 U	1 U	1 U	
CHLOROBENZENE		1 U	1 U	1 U	
CHLOROETHANE		1 U	1 U	1 U	
CHLOROFORM		1 U	1 U	1 U	
CHLOROMETHANE		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	
DIBROMOCHLOROMETHANE		1 U	1 U	1 U	
ETHYLBENZENE		1 U	1 U	1 U	
METHYLENE CHLORIDE		5 U	5 U	5 U	
STYRENE		1 U	1 U	1 U	
TETRACHLOROETHENE		1 U	1 U	1 U	
TOLUENE		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	
TRICHLOROETHENE		1 U	1 U	1 U	
VINYL CHLORIDE		1 U	1 U	1 U	
XYLENES, TOTAL		3 U	3 U	3 U	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	006	007	008	009	010
site	21	21	21	21	21
location	CEF-P21-01	CEF-P21-02	CEF-P21-02	CEF-P21-03	90G001
nsample	CEF-P21-GW-001-2-D	CEF-P21-GW-002	CEF-P21-GW-002-D	CEF-P21-GW-003	CEF-P21-GW-01S
sample	CEF-P21-GW-DU05	CEF-P21-GW-002	CEF-P21-GW-DUP1	CEF-P21-GW-003	CEF-P21-GW-01S
sample_dat	09/27/99	05/26/99	05/26/99	05/26/99	06/21/99
sacode	DUP	DUP	DUP	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**
Semivolatile Organics (ug/L)					
1,2,4-TRICHLOROBENZENE		5 U	5 U	5 U	
1,2-DICHLOROBENZENE		5 U	5 U	5 U	
1,3-DICHLOROBENZENE		5 U	5 U	5 U	
1,4-DICHLOROBENZENE		5 U	5 U	5 U	
1-METHYLNAPHTHALENE		5 U	5 U	5 U	
2,2'-OXYBIS(1-CHLOROPROPANE)					
2,4,5-TRICHLOROPHENOL		4 U	4 U	4 U	
2,4,6-TRICHLOROPHENOL		5 U	5 U	5 U	
2,4-DICHLOROPHENOL		4 U	4 U	4 U	
2,4-DIMETHYLPHENOL		10 U	10 U	10 U	
2,4-DINITROPHENOL		25 U	25 U	25 U	
2,4-DINITROTOLUENE		0.2 U	0.2 U	0.2 U	
2,6-DINITROTOLUENE		0.2 U	0.2 U	0.2 U	
2-CHLORONAPHTHALENE		5 U	5 U	5 U	
2-CHLOROPHENOL		5 U	5 U	5 U	
2-METHYLNAPHTHALENE		5 U	5 U	5 U	
2-METHYLPHENOL		5 U	5 U	5 U	
2-NITROANILINE		5 U	5 U	5 U	
2-NITROPHENOL		5 U	5 U	5 U	
3,3'-DICHLOROBENZIDINE		7.5 U	7.5 U	7.5 U	
3-NITROANILINE		5 U	5 U	5 U	
4,6-DINITRO-2-METHYLPHENOL		25 U	25 U	25 U	
4-BROMOPHENYL PHENYL ETHER		5 U	5 U	5 U	
4-CHLORO-3-METHYLPHENOL		10 U	10 U	10 U	
4-CHLOROANILINE		5 U	5 U	5 U	
4-CHLOROPHENYL PHENYL ETHER		5 U	5 U	5 U	
4-METHYLPHENOL		5 U	5 U	5 U	
4-NITROANILINE		5 U	5 U	5 U	
4-NITROPHENOL					
4-NITROPHENOL (OS)		15 U	15 U	15 U	
ACENAPHTHENE		5 U	5 U	5 U	
ACENAPHTHYLENE		5 U	5 U	5 U	
ANTHRACENE		5 U	5 U	5 U	
BENZO(A)ANTHRACENE		5 U	5 U	5 U	
BENZO(A)PYRENE		5 U	5 U	5 U	
BENZO(B)FLUORANTHENE		5 U	5 U	5 U	
BENZO(G,H,I)PERYLENE		5 U	5 U	5 U	
BENZO(K)FLUORANTHENE		5 U	5 U	5 U	
BIS(2-CHLOROETHOXY)METHANE		5 U	5 U	5 U	
BIS(2-CHLOROETHYL)ETHER		1.5 U	1.5 U	1.5 U	
BIS(2-CHLOROISOPROPYL) ETHER		5 U	5 U	5 U	
BIS(2-ETHYLHEXYL)PHTHALATE		3.6 J	5.7	5 U	
BUTYLBENZYL PHTHALATE		5 U	5 U	5 U	
CARBAZOLE		4 U	4 U	4 U	
CHRYSENE		5 U	5 U	5 U	
DI-N-BUTYL PHTHALATE		5 U	5 U	5 U	
DI-N-OCTYL PHTHALATE		5 U	5 U	5 U	
DIBENZO(A,H)ANTHRACENE		5 U	5 U	5 U	
DIBENZOFURAN		5 U	5 U	5 U	
DIETHYL PHTHALATE		5 U	5 U	5 U	
DIMETHYL PHTHALATE		5 U	5 U	5 U	
FLUORANTHENE		5 U	5 U	5 U	
FLUORENE		5 U	5 U	5 U	
HEXACHLOROBENZENE		1 U	1 U	1 U	
HEXACHLOROBUTADIENE		5 U	5 U	5 U	
HEXACHLOROCYCLOPENTADIENE		5 U	5 U	5 U	
HEXACHLOROETHANE		5 U	5 U	5 U	
INDENO(1,2,3-CD)PYRENE		5 U	5 U	5 U	
ISOPHORONE		5 U	5 U	5 U	
N-NITROSO-DI-N-PROPYLAMINE		4 U	4 U	4 U	
N-NITROSODIPHENYLAMINE		5 U	5 U	5 U	
NAPHTHALENE		5 U	5 U	5 U	
NITROBENZENE		4 U	4 U	4 U	
PENTACHLOROPHENOL					
PENTACHLOROPHENOL (OS)		1 U	1 U	1 U	
PHENANTHRENE		5 U	5 U	5 U	
PHENOL		5 U	5 U	5 U	
PYRENE		5 U	5 U	5 U	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	006	007	008	009	010
site	21	21	21	21	21
location	CEF-P21-01	CEF-P21-02	CEF-P21-02	CEF-P21-03	90G001
nsample	CEF-P21-GW-001-2-D	CEF-P21-GW-002	CEF-P21-GW-002-D	CEF-P21-GW-003	CEF-P21-GW-01S
sample	CEF-P21-GW-DU05	CEF-P21-GW-002	CEF-P21-GW-DUP1	CEF-P21-GW-003	CEF-P21-GW-01S
sample_dat	09/27/99	05/26/99	05/26/99	05/26/99	06/21/99
sacode	DUP	DUP	DUP	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**
Pesticides/PCBs (ug/L)					
4,4'-DDD	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
4,4'-DDE	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
4,4'-DDT	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
ALDRIN	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
ALPHA-BHC	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
ALPHA-CHLORDANE	0.5 U	0.1 U	0.1 U	0.1 U	1.4
AROCLOR-1016		0.5 U	0.5 U	0.5 U	
AROCLOR-1221		0.5 U	0.5 U	0.5 U	
AROCLOR-1232		0.5 U	0.5 U	0.5 U	
AROCLOR-1242		0.5 U	0.5 U	0.5 U	
AROCLOR-1248		0.5 U	0.5 U	0.5 U	
AROCLOR-1254		0.5 U	0.5 U	0.5 U	
AROCLOR-1260		0.5 U	0.5 U	0.5 U	
BETA-BHC	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
BOLSTAR		2 U	2 U	2 U	
CHLORPYRIFOS		2 U	2 U	2 U	
COUMAPHOS		4.1 U	4.1 U	4.1 U	
DELTA-BHC	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
DEMETON-S		2.7 U	2.7 U	2.7 U	
DIAZINON		3.3 U	3.3 U	3.3 U	
DICHLORVOS		2.9 UJ	2.9 UJ	2.9 UJ	
DIELDRIN	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
DIMETHOATE		1 U	1 U	1 U	
DISULFOTON		2.2 U	2.2 U	2.2 U	
ENDOSULFAN I	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
ENDOSULFAN II	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
ENDOSULFAN SULFATE	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
ENDRIN	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
ENDRIN ALDEHYDE	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
ENDRIN KETONE	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U
EPN		0.7 U	0.7 U	0.7 U	
ETHOPROP		2.3 U	2.3 U	2.3 U	
ETHYL PARATHION		0.5 U	0.5 U	0.5 U	
FENSULFOTHION		6 U	6 U	6 U	
FENTHION		2 U	2 U	2 U	
GAMMA-BHC (LINDANE)	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
GAMMA-CHLORDANE	0.5 U	0.1 U	0.1 U	0.1 U	1.5
HEPTACHLOR	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
HEPTACHLOR EPOXIDE	0.25 U	0.05 U	0.05 U	0.05 U	0.2 U
MALATHION		1.2 U	1.2 U	1.2 U	
MERPHOS		2.9 UJ	2.9 UJ	2.9 UJ	
METHOXYCHLOR	1 U	0.2 U	0.2 U	0.2 U	0.8 U
METHYL AZINPHOS		2.6 U	2.6 U	2.6 U	
METHYL PARATHION		0.4 U	0.4 U	0.4 U	
MEVINPHOS		4.7 U	4.7 U	4.7 U	
NALED		5 UJ	5 UJ	5 UJ	
PHORATE		1.8 U	1.8 U	1.8 U	
RONNEL		4.1 U	4.1 U	4.1 U	
STIROPHOS		5.7 U	5.7 U	5.7 U	
SULFOTEP		1.8 U	1.8 U	1.8 U	
TEPP		25 U	25 U	25 U	
TOKUTHION		3.4 U	3.4 U	3.4 U	
TOXAPHENE	12 U	2.5 U	2.5 U	2.5 U	10 U
TRICHLORONATE		2 U	2 U	2 U	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	006	007	008	009	010
site	21	21	21	21	21
location	CEF-P21-01	CEF-P21-02	CEF-P21-02	CEF-P21-03	90G001
nsample	CEF-P21-GW-001-2-D	CEF-P21-GW-002	CEF-P21-GW-002-D	CEF-P21-GW-003	CEF-P21-GW-01S
sample	CEF-P21-GW-DU05	CEF-P21-GW-002	CEF-P21-GW-DUP1	CEF-P21-GW-003	CEF-P21-GW-01S
sample_dat	09/27/99	05/26/99	05/26/99	05/26/99	06/21/99
sacode	DUP	DUP	DUP	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**
Herbicides (ug/L)					
2,4,5-T		0.81 U	0.81 U	0.82 U	
2,4,5-TP (SILVEX)		0.5 U	0.5 U	0.51 U	
2,4-D		2.5 U	2.5 U	2.6 U	
2,4-DB		4.5 U	4.5 U	4.6 U	
4-NITROPHENOL (HERB)		2.5 U	2.5 U	2.6 U	
DALAPON		8.1 U	8.1 U	8.2 U	
DICAMBA		1 U	1 U	1 U	
DICHLOROPROP		1.5 U	1.5 U	1.5 U	
DINOSEB		1 U	1 U	1 U	
MCPA		100 U	100 U	100 U	
MCPP		71 U	71 U	71 U	
PENTACHLOROPHENOL (HERB)		0.5 U	0.5 U	0.51 U	
Inorganics (ug/L)					
ALUMINUM		1540	1140	200 U	
ANTIMONY		2.4 U	2.4 U	2.4 U	
ARSENIC		3.5	3.4 U	3.4 U	
BARIUM		102	109	32.1	
BERYLLIUM		1.5 U	1.5 U	1.3 U	
CADMIUM		0.33 U	0.33 U	0.33 U	
CALCIUM		32600	33900	23100	
CHROMIUM		5.9 U	3.4 U	2.1 U	
COBALT		1.1 U	1 U	1 U	
COPPER		1.8	0.75 U	0.75 U	
CYANIDE		5 U	5 U	5 U	
IRON		2020	1940	240	
LEAD		1.6 U	2.2 U	1.6 U	
MAGNESIUM		5040	5280	2260	
MANGANESE		94.9	95	157	
MERCURY		0.25 U	0.28	0.25 U	
NICKEL		5.5 U	2.2 U	3 U	
POTASSIUM		6450	6220	4770	
SELENIUM		2 U	2 U	2 U	
SILVER		0.96 U	0.96 U	0.96 U	
SODIUM		4890	4850	6370	
THALLIUM		2.7 U	2.7 U	6.3 U	
VANADIUM		8.5	8.2	1.8 U	
ZINC		44.8	42.8	32.2	

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	011	012	013	014	015
site	21	21	21	21	21
location	CEF-P21-04S	CEF-P21-04S	CEF-P21-05S	CEF-P21-05S	CEF-P21-06S
nsample	CEF-P21-GW-04S-01	CEF-P21-GW-04S-01-D	CEF-P21-GW-05S-01	CEF-P21-GW-05S-01-D	CEF-P21-GW-06S-01
sample	CEF-P21-GW-04S-01	CEF-P21-GW-DU02	CEF-P21-GW-05S-01	CEF-P21-GW-DU04	CEF-P21-GW-06S-01
sample_dat	07/29/99	07/29/99	08/25/99	08/25/99	08/25/99
sacode	DUP	DUP	DUP	DUP	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_011**	**c_012**	**c_013**	**c_014**	**c_015**
Volatile Organics (ug/L)					
1,1,1-TRICHLOROETHANE					
1,1,2,2-TETRACHLOROETHANE					
1,1,2-TRICHLOROETHANE					
1,1-DICHLOROETHANE					
1,1-DICHLOROETHENE					
1,2-DICHLOROETHANE					
1,2-DICHLOROETHENE (TOTAL)					
1,2-DICHLOROPROPANE					
2-BUTANONE					
2-HEXANONE					
4-METHYL-2-PENTANONE					
ACETONE					
BENZENE					
BROMODICHLOROMETHANE					
BROMOFORM					
BROMOMETHANE					
CARBON DISULFIDE					
CARBON TETRACHLORIDE					
CHLOROBENZENE					
CHLOROETHANE					
CHLOROFORM					
CHLOROMETHANE					
CIS-1,2-DICHLOROETHENE					
CIS-1,3-DICHLOROPROPENE					
DIBROMOCHLOROMETHANE					
ETHYLBENZENE					
METHYLENE CHLORIDE					
STYRENE					
TETRACHLOROETHENE					
TOLUENE					
TRANS-1,2-DICHLOROETHENE					
TRANS-1,3-DICHLOROPROPENE					
TRICHLOROETHENE					
VINYL CHLORIDE					
XYLENES, TOTAL					

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	011	012	013	014	015
site	21	21	21	21	21
location	CEF-P21-04S	CEF-P21-04S	CEF-P21-05S	CEF-P21-05S	CEF-P21-06S
nsample	CEF-P21-GW-04S-01	CEF-P21-GW-04S-01-D	CEF-P21-GW-05S-01	CEF-P21-GW-05S-01-D	CEF-P21-GW-06S-01
sample	CEF-P21-GW-04S-01	CEF-P21-GW-DU02	CEF-P21-GW-05S-01	CEF-P21-GW-DU04	CEF-P21-GW-06S-01
sample_dat	07/29/99	07/29/99	08/25/99	08/25/99	08/25/99
sacode	DUP	DUP	DUP	DUP	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_011**	**c_012**	**c_013**	**c_014**	**c_015**
Semivolatile Organics (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					
4-NITROPHENOL (OS)					
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-CHLOROISOPROPYL) 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					
PENTACHLOROPHENOL (OS)					
PHENANTHRENE					
PHENOL					
PYRENE					

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	011	012	013	014	015
site	21	21	21	21	21
location	CEF-P21-04S	CEF-P21-04S	CEF-P21-05S	CEF-P21-05S	CEF-P21-06S
nsample	CEF-P21-GW-04S-01	CEF-P21-GW-04S-01-D	CEF-P21-GW-05S-01	CEF-P21-GW-05S-01-D	CEF-P21-GW-06S-01
sample	CEF-P21-GW-04S-01	CEF-P21-GW-DU02	CEF-P21-GW-05S-01	CEF-P21-GW-DU04	CEF-P21-GW-06S-01
sample_dat	07/29/99	07/29/99	08/25/99	08/25/99	08/25/99
sacode	DUP	DUP	DUP	DUP	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_011**	**c_012**	**c_013**	**c_014**	**c_015**
Pesticides/PCBs (ug/L)					
4,4'-DDD	0.1 U	0.1 U	1 U	1 U	0.2 U
4,4'-DDE	0.1 U	0.1 U	1 U	1 U	0.2 U
4,4'-DDT	0.1 U	0.1 U	1 U	1 U	0.2 U
ALDRIN	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
ALPHA-BHC	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
ALPHA-CHLORDANE	0.1 U	0.1 U	1 U	1 U	0.2 U
AROCLOR-1016					
AROCLOR-1221					
AROCLOR-1232					
AROCLOR-1242					
AROCLOR-1248					
AROCLOR-1254					
AROCLOR-1260					
BETA-BHC	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
BOLSTAR					
CHLORPYRIFOS					
COUMAPHOS					
DELTA-BHC	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
DEMETON-S					
DIAZINON					
DICHLORVOS					
DIELDRIN	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
DIMETHOATE					
DISULFOTON					
ENDOSULFAN I	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
ENDOSULFAN II	0.1 U	0.1 U	1 U	1 U	0.2 U
ENDOSULFAN SULFATE	0.1 U	0.1 U	1 U	1 U	0.2 U
ENDRIN	0.1 U	0.1 U	1 U	1 U	0.2 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	1 U	1 U	0.2 U
ENDRIN KETONE	0.1 U	0.1 U	1 U	1 U	0.2 U
EPN					
ETHOPROP					
ETHYL PARATHION					
FENSULFOTHION					
FENTHION					
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
GAMMA-CHLORDANE	0.1 U	0.1 U	1 U	1 U	0.2 U
HEPTACHLOR	0.05 U	0.05 U	0.5 U	0.5 U	0.1 U
HEPTACHLOR EPOXIDE	0.055	0.057	0.5 U	0.5 U	0.1 U
MALATHION					
MERPHOS					
METHOXYCHLOR	0.2 U	0.2 U	2 U	2 U	0.4 U
METHYL AZINPHOS					
METHYL PARATHION					
MEVINPHOS					
NALED					
PHORATE					
RONNEL					
STIROPHOS					
SULFOTEP					
TEPP					
TOKUTHION					
TOXAPHENE	2.5 U	2.5 U	25 U	25 U	5 U
TRICHLORONATE					

NAS CECIL FIELD - SITE 21
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL 2000

order	011	012	013	014	015
site	21	21	21	21	21
location	CEF-P21-04S	CEF-P21-04S	CEF-P21-05S	CEF-P21-05S	CEF-P21-06S
nsample	CEF-P21-GW-04S-01	CEF-P21-GW-04S-01-D	CEF-P21-GW-05S-01	CEF-P21-GW-05S-01-D	CEF-P21-GW-06S-01
sample	CEF-P21-GW-04S-01	CEF-P21-GW-DU02	CEF-P21-GW-05S-01	CEF-P21-GW-DU04	CEF-P21-GW-06S-01
sample_dat	07/29/99	07/29/99	08/25/99	08/25/99	08/25/99
sacode	DUP	DUP	DUP	DUP	NORMAL
matrix	GW	GW	GW	GW	GW
sort	**c_011**	**c_012**	**c_013**	**c_014**	**c_015**
Herbicides (ug/L)					
2,4,5-T					
2,4,5-TP (SILVEX)					
2,4-D					
2,4-DB					
4-NITROPHENOL (HERB)					
DALAPON					
DICAMBA					
DICHLOROPROP					
DINOSEB					
MCPA					
MCPP					
PENTACHLOROPHENOL (HERB)					
Inorganics (ug/L)					
ALUMINUM					
ANTIMONY					
ARSENIC	3.5 U	3.5 U			
BARIUM					
BERYLLIUM					
CADMIUM					
CALCIUM					
CHROMIUM					
COBALT					
COPPER					
CYANIDE					
IRON					
LEAD					
MAGNESIUM					
MANGANESE					
MERCURY					
NICKEL					
POTASSIUM					
SELENIUM					
SILVER					
SODIUM					
THALLIUM					
VANADIUM					
ZINC					

GROUNDWATER DATA AFTER TO APRIL 2000

NAS CECIL FIELD - SITE 21
SUMMARY OF RESULTS - AFTER APRIL 2000

order	**016**	**017**
site	21	21
location	CEF-P21-07S	CEF-P21-07S
nsample	CEF-P21-GW-07S	CEF-P21-GW-07S-D
dup	CEF-P21-GW-07S-D	CEF-P21-GW-07S
sample	CEF-P21-GW-07S	CEF-P21-GW-DU09
sample_dat	04/24/00	04/24/00
sacode	DUP	DUP
matrix	GW	GW
sort	**c_016**	**c_017**
Pesticides/PCBs (ug/L)		
4,4'-DDD	0.1 U	0.11 U
4,4'-DDE	0.1 U	0.11 U
4,4'-DDT	0.1 U	0.11 U
ALDRIN	0.05 U	0.055 U
ALPHA-BHC	0.05 U	0.055 U
ALPHA-CHLORDANE	0.1 U	0.11 U
BETA-BHC	0.05 U	0.055 U
DELTA-BHC	0.05 U	0.055 U
DIELDRIN	0.001 U	0.0011 U
ENDOSULFAN I	0.05 U	0.055 U
ENDOSULFAN II	0.1 U	0.11 U
ENDOSULFAN SULFATE	0.1 U	0.11 U
ENDRIN	0.1 U	0.11 U
ENDRIN ALDEHYDE	0.1 U	0.11 U
ENDRIN KETONE	0.1 U	0.11 U
GAMMA-BHC (LINDANE)	0.05 U	0.055 U
GAMMA-CHLORDANE	0.1 U	0.11 U
HEPTACHLOR	0.05 U	0.055 U
HEPTACHLOR EPOXIDE	0.05 U	0.055 U
METHOXYCHLOR	0.2 U	0.22 U
TOXAPHENE	2.5 U	2.8 U

SOIL DATA

SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S021		90S022		90S023		90S024		90S025		90S031	
Sample	90S02001		90S02101		90S02201		90S02301		90S02401		90S02501		90S03101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Volatile Organic Compounds														
1,1,1,2-TETRACHLOROETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,1-TRICHLOROETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-TETRACHLOROETHANE														
1,1,2-TRICHLOROETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-DICHLOROETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-DICHLOROETHENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-DICHLOROBENZENE	1	U	1	U	1	U	1	U	1	U	1	U	360	U
1,2-DICHLOROETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-DICHLOROPROPANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-DICHLOROBENZENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-DICHLOROBENZENE	1	U	450	U	1	U	400	U	1	U	1	U	1	U
2-BUTANONE														
2-HEXANONE														
4-METHYL-2-PENTANONE														
ACETONE														
BENZENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
BROMODICHLOROMETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
BROMOFORM	1	U	1	U	1	U	1	U	1	U	1	U	1	U
BROMOMETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CARBON DISULFIDE														
CARBON TETRACHLORIDE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CHLOROBENZENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CHLORODIBROMOMETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CHLOROETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CHLOROFORM	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CHLOROMETHANE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CIS-1,2-DICHLOROETHENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
CIS-1,3-DICHLOROPROPENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
DICHLORODIFLUOROMETHANE	2	U	3	U	2	U	2	U	2	U	2	U	2	U
ETHYLBENZENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
M+P-XYLENES	2	U	3	U	2	U	2	U	2	U	2	U	2	U
METHYL TERT-BUTYL ETHER	8	U	8	U	7	U	7	U	8	U	6	U	6	U
METHYLENE CHLORIDE	18		22		24		22		20		17		20	
O-XYLENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
STYRENE														
TETRACHLOROETHENE	4	U	4	U	3	U	4	U	4	U	3	U	3	U
TOLUENE	1	U	1	U	1	U	1	U	1	U	1	U	1.4	J
TOTAL 1,2-DICHLOROETHENE														
TOTAL XYLENES														
TRANS-1,2-DICHLOROETHENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
TRANS-1,3-DICHLOROPROPENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
TRICHLOROETHENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
TRICHLOROFLUOROMETHANE	2	U	3	U	2	U	2	U	2	U	2	U	2	U
VINYL ACETATE														
VINYL CHLORIDE	1	U	1	U	1	U	1	U	1	U	1	U	1	U

SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S032		90S033		90S034		BOR-A-1-1		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1	
Sample	90S3201		90S3301		90S03401		BOR-A-1-1		BOR-A-1-1_R		BOR-A-2-1		BOR-A-3-1	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		11/5/91		11/5/91		11/5/91		11/5/91	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Volatile Organic Compounds														
1,1,1,2-TETRACHLOROETHANE	1	U	1	U	1	U								
1,1,1-TRICHLOROETHANE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
1,1,2,2-TETRACHLOROETHANE							6	UJ	6	UJ	21	U	6	U
1,1,2-TRICHLOROETHANE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
1,1-DICHLOROETHANE	1.4	J	1	U	1	U	6	UJ	6	UJ	21	U	6	U
1,1-DICHLOROETHENE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
1,2-DICHLOROBENZENE	7	U	1	U	360	U								
1,2-DICHLOROETHANE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
1,2-DICHLOROPROPANE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
1,3-DICHLOROBENZENE	5.8		1	U	1	U								
1,4-DICHLOROBENZENE	4.3		380	U	1	U								
2-BUTANONE							13	UJ	13	UJ	42	U	11	U
2-HEXANONE							13	UJ	13	UJ	42	U	11	U
4-METHYL-2-PENTANONE							13	UJ	13	UJ	42	U	11	U
ACETONE							22	UJ	13	UJ	42	U	110	U
BENZENE	2.9		1	U	1	U	6	UJ	6	UJ	21	U	6	U
BROMODICHLOROMETHANE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
BROMOFORM	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
BROMOMETHANE	1	U	1	U	1	U	13	UJ	13	UJ	42	U	11	U
CARBON DISULFIDE							6	UJ	6	UJ	21	U	6	U
CARBON TETRACHLORIDE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
CHLOROBENZENE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
CHLORODIBROMOMETHANE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
CHLOROETHANE	1	U	1	U	1	U	13	UJ	13	UJ	42	U	11	U
CHLOROFORM	1	J	1	U	1	U	6	UJ	6	UJ	21	U	6	U
CHLOROMETHANE	1	U	1	U	1	U	13	UJ	13	UJ	42	U	11	U
CIS-1,2-DICHLOROETHENE	1	U	1	U	1	U								
CIS-1,3-DICHLOROPROPENE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
DICHLORODIFLUOROMETHANE	2	U	2	U	2	U								
ETHYLBENZENE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
M+P-XYLENES	2	U	2	U	2	U								
METHYL TERT-BUTYL ETHER	1	U	7	U	6	U								
METHYLENE CHLORIDE	43		30		26		170	UJ	90	UJ	740		18	U
O-XYLENE	1	U	1	U	1	U								
STYRENE							6	UJ	6	UJ	21	U	6	U
TETRACHLOROETHENE	3	U	3	U	3	U	6	UJ	6	UJ	21	U	6	U
TOLUENE	1	U	1	U	2.1	J	6	UJ	6	UJ	21	U	6	U
TOTAL 1,2-DICHLOROETHENE							6	UJ	6	UJ	21	U	6	U
TOTAL XYLENES							6	UJ	6	UJ	21	U	6	U
TRANS-1,2-DICHLOROETHENE	1	U	1	U	1	U								
TRANS-1,3-DICHLOROPROPENE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
TRICHLOROETHENE	1	U	1	U	1	U	6	UJ	6	UJ	21	U	6	U
TRICHLOROFLUOROMETHANE	2	U	2	U	2	U								
VINYL ACETATE							13	UJ	13	UJ	42	U	11	U
VINYL CHLORIDE	1	U	1	U	1	U	13	UJ	13	UJ	42	U	11	U

SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	BOR-A-4-1		BOR-A-4-1		BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-006		CEF-P21-SS-011	
Sample	BOR-A-4-1		BOR-A-4-1_R		BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-006-01		CEF-P21-SS-011-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/5/91		11/5/91		11/5/91		11/5/91		11/5/91		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Volatile Organic Compounds														
1,1,1,2-TETRACHLOROETHANE														
1,1,1-TRICHLOROETHANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
1,1,2,2-TETRACHLOROETHANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
1,1,2-TRICHLOROETHANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
1,1-DICHLOROETHANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
1,1-DICHLOROETHENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
1,2-DICHLOROBENZENE														
1,2-DICHLOROETHANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
1,2-DICHLOROPROPANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
2-BUTANONE	27	UJ	27	UJ	14	U	13	U	77	UJ	13	U	11	U
2-HEXANONE	27	UJ	27	UJ	14	U	13	U	77	UJ	13	U	11	U
4-METHYL-2-PENTANONE	27	UJ	27	UJ	14	U	74		77	UJ	13	U	11	U
ACETONE	27	UJ	27	UJ	14	U	84	U	77	UJ	66	UR	56	UR
BENZENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
BROMODICHLOROMETHANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
BROMOFORM	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
BROMOMETHANE	27	UJ	27	UJ	14	U	13	U	77	UJ	6.6	U	5.6	U
CARBON DISULFIDE	14	UJ	14	UJ	7	U	6	U	38	UJ	13	U	11	U
CARBON TETRACHLORIDE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
CHLOROBENZENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
CHLORODIBROMOMETHANE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
CHLOROETHANE	27	UJ	27	UJ	14	U	13	U	77	UJ	2.6	U	2.3	U
CHLOROFORM	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
CHLOROMETHANE	27	UJ	27	UJ	14	U	13	U	77	UJ	6.6	U	5.6	U
CIS-1,2-DICHLOROETHENE											2.6	U	2.3	U
CIS-1,3-DICHLOROPROPENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
DICHLORODIFLUOROMETHANE														
ETHYLBENZENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
M+P-XYLENES														
METHYL TERT-BUTYL ETHER														
METHYLENE CHLORIDE	320	J	170	UJ	170		40	U	1,100	J	6.6	U	5.6	U
O-XYLENE														
STYRENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
TETRACHLOROETHENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
TOLUENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
TOTAL 1,2-DICHLOROETHENE	14	UJ	14	UJ	7	U	6	U	38	UJ				
TOTAL XYLENES	14	UJ	14	UJ	7	U	6	U	38	UJ	7.9	U	6.8	U
TRANS-1,2-DICHLOROETHENE											2.6	U	2.3	U
TRANS-1,3-DICHLOROPROPENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
TRICHLOROETHENE	14	UJ	14	UJ	7	U	6	U	38	UJ	2.6	U	2.3	U
TRICHLOROFLUOROMETHANE														
VINYL ACETATE	27	UJ	27	UJ	14	U	13	U	77	UJ				
VINYL CHLORIDE	27	UJ	27	UJ	14	U	13	U	77	UJ	6.6	U	5.6	U

SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-013		CEF-P21-SS-013		CEF-P21-SS-016	
Sample	CEF-P21-SS-013		CEF-P21-SS-013-D		CEF-P21-SS-016-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG	
Volatile Organic Compounds						
1,1,1,2-TETRACHLOROETHANE						
1,1,1-TRICHLOROETHANE	2.4	U	2.9	U	2.4	U
1,1,2,2-TETRACHLOROETHANE	2.4	U	2.9	U	2.4	U
1,1,2-TRICHLOROETHANE	2.4	U	2.9	U	2.4	U
1,1-DICHLOROETHANE	2.4	U	2.9	U	2.4	U
1,1-DICHLOROETHENE	2.4	U	2.9	U	2.4	U
1,2-DICHLOROBENZENE						
1,2-DICHLOROETHANE	2.4	U	2.9	U	2.4	U
1,2-DICHLOROPROPANE	2.4	U	2.9	U	2.4	U
1,3-DICHLOROBENZENE						
1,4-DICHLOROBENZENE						
2-BUTANONE	12	U	15	U	12	U
2-HEXANONE	12	U	15	U	12	U
4-METHYL-2-PENTANONE	12	U	15	U	12	U
ACETONE	60	UR	74	UR	60	UR
BENZENE	2.4	U	2.9	U	2.4	U
BROMODICHLOROMETHANE	2.4	U	2.9	U	2.4	U
BROMOFORM	2.4	U	2.9	U	2.4	U
BROMOMETHANE	6	U	7.4	U	6	U
CARBON DISULFIDE	12	U	15	U	12	U
CARBON TETRACHLORIDE	2.4	U	2.9	U	2.4	U
CHLOROBENZENE	2.4	U	2.9	U	2.4	U
CHLORODIBROMOMETHANE	2.4	U	2.9	U	2.4	U
CHLOROETHANE	2.4	U	2.9	U	2.4	U
CHLOROFORM	2.4	U	2.9	U	2.4	U
CHLOROMETHANE	6	U	7.4	U	6	U
CIS-1,2-DICHLOROETHENE	2.4	U	2.9	U	2.4	U
CIS-1,3-DICHLOROPROPENE	2.4	U	2.9	U	2.4	U
DICHLORODIFLUOROMETHANE						
ETHYLBENZENE	2.4	U	2.9	U	2.4	U
M+P-XYLENES						
METHYL TERT-BUTYL ETHER						
METHYLENE CHLORIDE	6	U	7.4	U	6	U
O-XYLENE						
STYRENE	2.4	U	2.9	U	2.4	U
TETRACHLOROETHENE	2.4	U	2.9	U	2.4	U
TOLUENE	2.4	U	2.9	U	2.4	U
TOTAL 1,2-DICHLOROETHENE						
TOTAL XYLENES	7.3	U	8.8	U	7.1	U
TRANS-1,2-DICHLOROETHENE	2.4	U	2.9	U	2.4	U
TRANS-1,3-DICHLOROPROPENE	2.4	U	2.9	U	2.4	U
TRICHLOROETHENE	2.4	U	2.9	U	2.4	U
TRICHLOROFLUOROMETHANE						
VINYL ACETATE						
VINYL CHLORIDE	6	U	7.4	U	6	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S021		90S022		90S023		90S024		90S025		90S031	
Sample	90S02001		90S02101		90S02201		90S02301		90S02401		90S02501		90S03101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
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	U	1	U	1	U	1	U	4,100	U	360	U	1	U
1,2-DICHLOROBENZENE	1	U	1	U	1	U	1	U	1	U	1	U	360	U
1,2-DIPHENYLHYDRAZINE														
1,3-DICHLOROBENZENE														
1,3-DINITROBENZENE	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-DICHLOROBENZENE	1	U	450	U	1	U	400	U	1	U	1	U	1	U
1-METHYLNAPHTHALENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2,2'-OXYBIS(1-CHLOROPROPANE)	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2,4,5-TRICHLOROPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2,4,6-TRICHLOROPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2,4-DICHLOROPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2,4-DIMETHYLPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2,4-DINITROPHENOL	2,100	U	2,200	U	18,000	U	2,000	U	210,000	U	1,800	U	1,800	U
2,4-DINITROTOLUENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2,6-DINITROTOLUENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2-CHLORONAPHTHALENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2-CHLOROPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2-METHYLNAPHTHALENE	410	U	1	U	1	U	1	U	4,100	U	360	U	360	U
2-METHYLPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2-NITROANILINE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
2-NITROPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
3&4-METHYLPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
3,3'-DICHLOROBENZIDINE	820	U	890	U	7,400	U	800	U	8,200	U	720	U	720	U
3-NITROANILINE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
4,6-DINITRO-2-METHYLPHENOL	1,200	U	1,300	U	11,000	U	1,200	U	120,000	U	1,100	U	1,100	U
4-BROMOPHENYL PHENYL ETHER	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
4-CHLORO-3-METHYLPHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
4-CHLOROANILINE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
4-CHLOROPHENYL PHENYL ETHER	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
4-METHYLPHENOL														
4-NITROANILINE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
4-NITROPHENOL	25	U	27	U	22	U	400	U	4,100	U	22	U	22	U
ACENAPHTHENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
ACENAPHTHYLENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
ANTHRACENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
BENZO(A)ANTHRACENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
BENZO(A)PYRENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
BENZO(B)FLUORANTHENE	420		450	U	3,700	U	400	U	4,100	U	360	U	360	U
BENZO(G,H,I)PERYLENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
BENZO(K)FLUORANTHENE	410		450	U	3,700	U	400	U	4,100	U	360	U	360	U
BENZOIC ACID														
BENZYL ALCOHOL														
BIS(2-CHLOROETHOXY)METHANE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
BIS(2-CHLOROETHYL)ETHER	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
BIS(2-ETHYLHEXYL)PHTHALATE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
BUTYL BENZYL PHTHALATE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S021		90S022		90S023		90S024		90S025		90S031	
Sample	90S02001		90S02101		90S02201		90S02301		90S02401		90S02501		90S03101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
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														
CARBAZOLE														
CHRYSENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
DIBENZO(A,H)ANTHRACENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
DIBENZOFURAN	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
DIETHYL PHTHALATE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
DIMETHYL PHTHALATE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
FLUORANTHENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
FLUORENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
HEXACHLOROBENZENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
HEXACHLOROBUTADIENE	1	U	1	U	3,700	U	1	U	1	U	1	U	1	U
HEXACHLOROCYCLOPENTADIENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
HEXACHLOROETHANE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
INDENO(1,2,3-CD)PYRENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
ISOPHORONE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
NAPHTHALENE	410	U	450	U	3,700	U	400	U	3.2		1	U	1	U
NITROBENZENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
N-NITROSO-DI-N-PROPYLAMINE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
N-NITROSODIPHENYLAMINE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
PENTACHLOROPHENOL	25	U	27	U	22	U	24	U	4,100	U	22	U	22	U
PHENANTHRENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
PHENOL	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
PYRENE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U
PYRIDINE	410	U	450	U	3,700	U	400	U	4,100	U	360	U	360	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S032		90S033		90S034		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Sample	90S3201		90S3301		90S03401		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		11/5/91		11/5/91		11/5/91		11/5/91	
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	37,000	U	1	U	1	U	460	U	470	U	400	U	430	U
1,2-DICHLOROBENZENE	4.3		1	U	360	U	460	U	470	U	400	U	430	U
1,2-DIPHENYLHYDRAZINE							460	U	470	U	400	U	430	U
1,3-DICHLOROBENZENE							460	U	470	U	400	U	430	U
1,3-DINITROBENZENE	1	U	1	U	1	U								
1,4-DICHLOROBENZENE	5.8		380	U	1	U	460	U	470	U	400	U	430	U
1-METHYLNAPHTHALENE	37,000	U	380	U	360	U								
2,2'-OXYBIS(1-CHLOROPROPANE)	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2,4,5-TRICHLOROPHENOL	370,000	U	380	U	360	U	2,300	U	2,300	U	2,000	U	2,100	U
2,4,6-TRICHLOROPHENOL	370,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2,4-DICHLOROPHENOL	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2,4-DIMETHYLPHENOL	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2,4-DINITROPHENOL	180,000	U	1,900	U	1,800	U	2,300	U	2,300	U	2,000	U	2,100	U
2,4-DINITROTOLUENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2,6-DINITROTOLUENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2-CHLORONAPHTHALENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2-CHLOROPHENOL	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
2-METHYLNAPHTHALENE	37,000	U	380	U	360	U	460	U	470	UJ	400	UJ	430	UJ
2-METHYLPHENOL	370,000	U	380	U	360	U	460	U	470	U	110	J	430	U
2-NITROANILINE	37,000	U	380	U	360	U	2,300	U	2,300	U	2,000	U	2,100	U
2-NITROPHENOL	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
3&4-METHYLPHENOL	370,000	U	380	U	360	U								
3,3'-DICHLOROBENZIDINE	73,000	U	770	U	720	U	930	U	940	U	810	U	870	U
3-NITROANILINE	37,000	U	380	U	360	U	2,300	U	2,300	U	2,000	U	2,100	U
4,6-DINITRO-2-METHYLPHENOL	111,000	U	1,200	U	1,100	U	2,300	U	2,300	U	2,000	U	2,100	U
4-BROMOPHENYL PHENYL ETHER	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
4-CHLORO-3-METHYLPHENOL	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
4-CHLOROANILINE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
4-CHLOROPHENYL PHENYL ETHER	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
4-METHYLPHENOL							460	U	470	U	400	U	430	U
4-NITROANILINE	37,000	U	380	U	360	U	2,300	U	2,300	U	2,000	U	2,100	U
4-NITROPHENOL	390		380	U	360	U	2,300	U	2,300	U	2,000	U	2,100	U
ACENAPHTHENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
ACENAPHTHYLENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
ANTHRACENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
BENZO(A)ANTHRACENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
BENZO(A)PYRENE	37,000	U	380	U	360	U	460	U	67	J	400	U	430	U
BENZO(B)FLUORANTHENE	37,000	U	380	U	360	U	140	J	120	J	400	U	56	J
BENZO(G,H,I)PERYLENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
BENZO(K)FLUORANTHENE	37,000	U	380	U	360	U	110	J	87	J	400	U	430	U
BENZOIC ACID							2,300	U	2,300	U	2,000	U	800	J
BENZYL ALCOHOL							460	U	470	U	400	U	430	U
BIS(2-CHLOROETHOXY)METHANE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
BIS(2-CHLOROETHYL)ETHER	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
BIS(2-ETHYLHEXYL)PHTHALATE	37,000	U	380	U	360	U	140	J	110	J	400	U	72	J
BUTYL BENZYL PHTHALATE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S032		90S033		90S034		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Sample	90S3201		90S3301		90S03401		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		11/5/91		11/5/91		11/5/91		11/5/91	
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														
CARBAZOLE														
CHRYSENE	37,000	U	380	U	360	U	81	J	81	J	400	U	430	U
DIBENZO(A,H)ANTHRACENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
DIBENZOFURAN	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
DIETHYL PHTHALATE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
DIMETHYL PHTHALATE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
DI-N-BUTYL PHTHALATE							80	J	82	J	400	U	430	U
DI-N-OCTYL PHTHALATE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
FLUORANTHENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
FLUORENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
HEXACHLOROBENZENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
HEXACHLOROBUTADIENE	1	U	1	U	1	U	460	U	470	U	400	U	430	U
HEXACHLOROCYCLOPENTADIENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
HEXACHLOROETHANE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
INDENO(1,2,3-CD)PYRENE	37,000	U	380	U	360	U	460	U	55	J	400	U	430	U
ISOPHORONE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
NAPHTHALENE	1	U	1	U	1	U	460	U	470	U	400	U	430	U
NITROBENZENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
N-NITROSO-DI-N-PROPYLAMINE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
N-NITROSODIPHENYLAMINE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
PENTACHLOROPHENOL	26		23	U	22	U	100	J	2,300	U	2,000	U	2,100	U
PHENANTHRENE	37,000	U	380	U	360	U	460	U	470	U	400	U	430	U
PHENOL	370,000	U	380	U	360	U	460	U	470	U	400	U	430	U
PYRENE	37,000	U	380	U	360	U	100	J	64	J	400	U	430	U
PYRIDINE	370,000	U	380	U	360	U								

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-006		CEF-P21-SS-011		CEF-P21-SS-013		CEF-P21-SS-013	
Sample	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-006-01		CEF-P21-SS-011-01		CEF-P21-SS-013		CEF-P21-SS-013-D	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/5/91		11/5/91		11/5/91		4/29/99		4/29/99		4/29/99		4/29/99	
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	460	U	400	U	460	U	170	U	170	U	180	U	180	U
1,2-DICHLOROBENZENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
1,2-DIPHENYLHYDRAZINE	460	U	400	U	460	U								
1,3-DICHLOROBENZENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
1,3-DINITROBENZENE														
1,4-DICHLOROBENZENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
1-METHYLNAPHTHALENE														
2,2'-OXYBIS(1-CHLOROPROPANE)	460	U	400	U	460	U	170	U	170	U	180	U	180	U
2,4,5-TRICHLOROPHENOL	2,300	U	2,000	U	2,200	U	170	U	170	U	180	U	180	U
2,4,6-TRICHLOROPHENOL	460	U	400	U	460	U	170	U	170	U	180	U	180	U
2,4-DICHLOROPHENOL	460	U	400	U	460	U	160	U	160	U	160	U	160	U
2,4-DIMETHYLPHENOL	460	U	400	U	460	U	340	U	350	U	350	U	350	U
2,4-DINITROPHENOL	2,300	U	2,000	U	2,200	U	860	U	870	U	880	U	880	U
2,4-DINITROTOLUENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
2,6-DINITROTOLUENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
2-CHLORONAPHTHALENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
2-CHLOROPHENOL	460	U	400	U	460	U	170	U	170	U	180	U	180	U
2-METHYLNAPHTHALENE	460	UJ	400	U	460	UJ	170	U	170	U	180	U	180	U
2-METHYLPHENOL	460	U	400	U	460	U	170	U	170	U	180	U	180	U
2-NITROANILINE	2,300	U	2,000	U	2,200	U	170	U	170	U	180	U	180	U
2-NITROPHENOL	460	U	400	U	460	U	170	U	170	U	180	U	180	U
3&4-METHYLPHENOL														
3,3'-DICHLOROBENZIDINE	930	U	810	U	920	U	340	U	350	U	350	U	350	U
3-NITROANILINE	2,300	U	2,000	UJ	2,200	U	170	U	170	U	180	U	180	U
4,6-DINITRO-2-METHYLPHENOL	2,300	U	2,000	U	2,200	U	340	U	350	U	350	U	350	U
4-BROMOPHENYL PHENYL ETHER	460	U	400	U	460	U	170	U	170	U	180	U	180	U
4-CHLORO-3-METHYLPHENOL	460	U	400	U	460	U	340	U	350	U	350	U	350	U
4-CHLOROANILINE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
4-CHLOROPHENYL PHENYL ETHER	460	U	400	U	460	U	170	U	170	U	180	U	180	U
4-METHYLPHENOL	460	U	400	U	460	U	170	U	170	U	180	U	180	U
4-NITROANILINE	2,300	U	2,000	UJ	2,200	U	170	U	170	U	180	U	180	U
4-NITROPHENOL	2,300	U	2,000	U	2,200	U	860	U	870	U	880	U	880	U
ACENAPHTHENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
ACENAPHTHYLENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
ANTHRACENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
BENZO(A)ANTHRACENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
BENZO(A)PYRENE	460	U	82	J	86	J	86	U	87	U	88	U	88	U
BENZO(B)FLUORANTHENE	460	U	98	J	120	J	170	U	170	U	180	U	180	U
BENZO(G,H,I)PERYLENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
BENZO(K)FLUORANTHENE	460	U	95	J	59	J	170	U	170	U	180	U	180	U
BENZOIC ACID	2,300	U	2,000	U	2,200	U								
BENZYL ALCOHOL	460	U	400	U	460	U								
BIS(2-CHLOROETHOXY)METHANE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
BIS(2-CHLOROETHYL)ETHER	460	U	400	U	460	U	170	U	170	U	180	U	180	U
BIS(2-ETHYLHEXYL)PHTHALATE	83	J	160	J	460	U	170	U	170	U	180	U	180	U
BUTYL BENZYL PHTHALATE	460	U	400	U	460	U	170	U	170	U	180	U	180	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-006		CEF-P21-SS-011		CEF-P21-SS-013		CEF-P21-SS-013	
Sample	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-006-01		CEF-P21-SS-011-01		CEF-P21-SS-013		CEF-P21-SS-013-D	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/5/91		11/5/91		11/5/91		4/29/99		4/29/99		4/29/99		4/29/99	
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														
CARBAZOLE							170	U	170	U	180	U	180	U
CHRYSENE	460	U	400	U	68	J	170	U	170	U	180	U	180	U
DIBENZO(A,H)ANTHRACENE	460	U	400	U	460	U	86	U	87	U	88	U	88	U
DIBENZOFURAN	460	U	400	U	460	U	170	U	170	U	180	U	180	U
DIETHYL PHTHALATE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
DIMETHYL PHTHALATE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
DI-N-BUTYL PHTHALATE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
DI-N-OCTYL PHTHALATE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
FLUORANTHENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
FLUORENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
HEXACHLOROBENZENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
HEXACHLOROBUTADIENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
HEXACHLOROCYCLOPENTADIENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
HEXACHLOROETHANE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
INDENO(1,2,3-CD)PYRENE	460	U	400	U	63	J	170	U	170	U	180	U	180	U
ISOPHORONE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
NAPHTHALENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
NITROBENZENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
N-NITROSO-DI-N-PROPYLAMINE	460	U	400	U	460	U	62	U	63	U	64	U	64	U
N-NITROSODIPHENYLAMINE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
PENTACHLOROPHENOL	2,300	U	2,000	U	2,200	U	860	U	870	U	880	U	880	U
PHENANTHRENE	460	U	400	U	460	U	170	U	170	U	180	U	180	U
PHENOL	460	U	400	U	460	U	170	U	170	U	180	U	180	U
PYRENE	460	U	400	U	91	J	170	U	170	U	180	U	180	U
PYRIDINE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-016	
Sample	CEF-P21-SS-016-01	
Depth of Range (ft)	(0-1)	
Sample Date	4/29/99	
Matrix	Soil	
Units	UG/KG	
Semivolatile Organic Compounds		
1,2,4-TRICHLOROBENZENE	710	U
1,2-DICHLOROBENZENE	710	U
1,2-DIPHENYLHYDRAZINE		
1,3-DICHLOROBENZENE	710	U
1,3-DINITROBENZENE		
1,4-DICHLOROBENZENE	710	U
1-METHYLNAPHTHALENE		
2,2'-OXYBIS(1-CHLOROPROPANE)	710	U
2,4,5-TRICHLOROPHENOL	710	U
2,4,6-TRICHLOROPHENOL	710	U
2,4-DICHLOROPHENOL	640	U
2,4-DIMETHYLPHENOL	1,400	U
2,4-DINITROPHENOL	3,600	U
2,4-DINITROTOLUENE	710	U
2,6-DINITROTOLUENE	710	U
2-CHLORONAPHTHALENE	710	U
2-CHLOROPHENOL	710	U
2-METHYLNAPHTHALENE	710	U
2-METHYLPHENOL	710	U
2-NITROANILINE	710	U
2-NITROPHENOL	710	U
3&4-METHYLPHENOL		
3,3'-DICHLOROBENZIDINE	1,400	U
3-NITROANILINE	710	U
4,6-DINITRO-2-METHYLPHENOL	1,400	U
4-BROMOPHENYL PHENYL ETHER	710	U
4-CHLORO-3-METHYLPHENOL	1,400	U
4-CHLOROANILINE	710	U
4-CHLOROPHENYL PHENYL ETHER	710	U
4-METHYLPHENOL	710	U
4-NITROANILINE	710	U
4-NITROPHENOL	3,600	U
ACENAPHTHENE	710	U
ACENAPHTHYLENE	710	U
ANTHRACENE	710	U
BENZO(A)ANTHRACENE	710	U
BENZO(A)PYRENE	360	U
BENZO(B)FLUORANTHENE	710	U
BENZO(G,H,I)PERYLENE	710	U
BENZO(K)FLUORANTHENE	710	U
BENZOIC ACID		
BENZYL ALCOHOL		
BIS(2-CHLOROETHOXY)METHANE	710	U
BIS(2-CHLOROETHYL)ETHER	710	U
BIS(2-ETHYLHEXYL)PHTHALATE	710	U
BUTYL BENZYL PHTHALATE	710	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-016	
Sample	CEF-P21-SS-016-01	
Depth of Range (ft)	(0-1)	
Sample Date	4/29/99	
Matrix	Soil	
Units	UG/KG	
Semivolatile Organic Compounds		
CARBAZOLE	710	U
CHRYSENE	710	U
DIBENZO(A,H)ANTHRACENE	360	U
DIBENZOFURAN	710	U
DIETHYL PHTHALATE	710	U
DIMETHYL PHTHALATE	710	U
DI-N-BUTYL PHTHALATE	710	U
DI-N-OCTYL PHTHALATE	710	U
FLUORANTHENE	710	U
FLUORENE	710	U
HEXACHLOROBENZENE	710	U
HEXACHLOROBUTADIENE	710	U
HEXACHLOROCYCLOPENTADIENE	710	U
HEXACHLOROETHANE	710	U
INDENO(1,2,3-CD)PYRENE	710	U
ISOPHORONE	710	U
NAPHTHALENE	710	U
NITROBENZENE	710	U
N-NITROSO-DI-N-PROPYLAMINE	260	U
N-NITROSODIPHENYLAMINE	710	U
PENTACHLOROPHENOL	3,600	U
PHENANTHRENE	710	U
PHENOL	710	U
PYRENE	710	U
PYRIDINE		

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S021		90S022		90S023		90S024		90S025		90S031	
Sample	90S02001		90S02101		90S02201		90S02301		90S02401		90S02501		90S03101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	61		4.4	U	37	U	10		4.1	U	3.6	U	87	
2,4'-DDD														
4,4'-DDE	62		4.4	U	37	U	23		4.1	U	3.6	U	46	
4,4'-DDT	16		4.4	U	37	U	9.5		4.1	U	3.6	U	1,200	
ALDRIN	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
ALPHA-BHC	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	9.2	
ALPHA-CHLORDANE	400		200		4,400		110		60		4		18	
AROCLOR-1016														
AROCLOR-1221	41	U	44	U	370	U	40	U	41	U	36	U	36	U
AROCLOR-1232	41	U	44	U	370	U	40	U	41	U	36	U	36	U
AROCLOR-1242														
AROCLOR-1248	41	U	44	U	370	U	40	U	41	U	36	U	36	U
AROCLOR-1254	41	U	44	U	370	U	40	U	41	U	36	U	36	U
AROCLOR-1260	41	U	44	U	370	U	40	U	41	U	36	U	36	U
AZINPHOS METHYL	42	U	45	U	37	U	40	U	42	U	36	U	36	U
BETA-BHC	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	120	
BOLSTAR	42	U	45	U	37	U	40	U	42	U	36	U	36	U
CHLORDANE	3,000		1,600		36,000		840		510		46		140	
CHLORPYRIFOS	42	U	45	U	37	U	40	U	42	U	36	U	36	U
COUMAPHOS	42	U	45	U	37	U	40	U	42	U	36	U	36	U
DELTA-BHC	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.7	
DEMETON	42	U	45	U	37	U	40	U	42	U	36	U	36	U
DIAZINON	42	U	45	U	37	U	44		42	U	36	U	36	U
DICHLORVOS	42	U	45	U	37	U	40	U	42	U	36	U	36	U
DIELDRIN	8		15		200		11		8.5		3.6	U	6.8	
DIMETHOATE	41	U	44	U	37	U	40	U	41	U	36	U	36	U
DISULFOTON	42	U	45	U	37	U	87		42	U	36	U	36	U
ENDOSULFAN I	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
ENDOSULFAN II	4.1		4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
ENDOSULFAN SULFATE	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
ENDRIN	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
ENDRIN ALDEHYDE	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
ENDRIN KETONE	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
EPN	42	U	45	U	37	U	40	U	42	U	36	U	36	U
ETHION	42	U	45	U	37	U	40	U	42	U	36	U	36	U
ETHOPROP	42	U	45	U	37	U	40	U	42	U	36	U	36	U
ETHYL PARATHION	41	U	44	U	37	U	40	U	41	U	36	U	36	U
FENSULFOTHION	42	U	45	U	37	U	40	U	42	U	36	U	36	U
FENTHION	42	U	45	U	37	U	40	U	42	U	36	U	36	U
GAMMA-BHC (LINDANE)	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	110	
GAMMA-CHLORDANE	390		190		5,300		100		51		3.6	U	15	
HEPTACHLOR	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
HEPTACHLOR EPOXIDE	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
ISODRIN	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
MALATHION	42	U	45	U	37	U	40	U	42	U	36	U	36	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S021		90S022		90S023		90S024		90S025		90S031	
Sample	90S02001		90S02101		90S02201		90S02301		90S02401		90S02501		90S03101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MERPHOS	42	U	45	U	37	U	40	U	42	U	36	U	36	U
METHOXYCHLOR	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
METHYL PARATHION														
MEVINPHOS	42	U	45	U	37	U	40	U	42	U	36	U	36	U
MIREX	4.1	U	4.4	U	37	U	4	U	4.1	U	3.6	U	3.6	U
MONOCROTOPHOS	42	U	45	U	37	U	40	U	42	U	36	U	36	U
NALED	42	U	45	U	37	U	40	U	42	U	36	U	36	U
PHORATE	42	U	45	U	37	U	40	U	42	U	36	U	36	U
RONNEL	42	U	45	U	37	U	40	U	42	U	36	U	36	U
STIROFOS	42	U	45	U	37	U	40	U	42	U	36	U	36	U
SULFOTEPP	42	U	45	U	37	U	40	U	42	U	36	U	36	U
TEPP	42	U	45	U	37	U	40	U	42	U	36	U	36	U
TOKUTHION	42	U	45	U	37	U	40	U	42	U	36	U	36	U
TOXAPHENE	82	U	89	U	740	U	100		82	U	72	U	72	U
TRICHLORONATE	42	U	45	U	37	U	40	U	42	U	36	U	36	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S032		90S033		90S034		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Sample	90S3201		90S3301		90S03401		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		11/5/91		11/5/91		11/5/91		11/5/91	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	1,400,000		45		76		110	U	23	U	49	U	53	U
2,4'-DDD							NR		NR		NR		NR	
4,4'-DDE	370,000	U	14		3.6		30	J	7	J	5.2	J	6.5	J
4,4'-DDT	140,000		7.4		13		110	U	9.7	J	49	U	53	U
ALDRIN	370,000	U	3.8	U	3.6	U	56	U	11	U	24	U	26	U
ALPHA-BHC	370,000	U	3.8	U	3.6	U	56	U	11	U	24	U	26	U
ALPHA-CHLORDANE	370,000	U	23		41		530	J	110	U	58	J	29	J
AROCLOR-1016							560	U	110	U	240	U	260	U
AROCLOR-1221	370,000	U	38	U	36	U	560	U	110	U	240	U	260	U
AROCLOR-1232	370,000	U	38	U	36	U	560	U	110	U	240	U	260	U
AROCLOR-1242							560	U	110	U	240	U	260	U
AROCLOR-1248	370,000	U	38	U	36	U	560	U	110	U	240	U	260	U
AROCLOR-1254	370,000	U	38	U	36	U	1,100	U	230	U	490	U	530	U
AROCLOR-1260	370,000	U	64		36	U	1,100	U	230	U	490	U	530	U
AZINPHOS METHYL	37	U	39	U	36	U								
BETA-BHC	370,000	U	3.8	U	3.6	U	56	U	11	U	24	U	26	U
BOLSTAR	37	U	39	U	36	U								
CHLORDANE	370,000	U	190		410		860				82		41	
CHLORPYRIFOS	37	U	39	U	36	U								
COUMAPHOS	37	U	39	U	36	U								
DELTA-BHC	370,000	U	3.8	U	3.6	U	56	U	11	U	24	U	26	U
DEMETON	37	U	39	U	36	U								
DIAZINON	37	U	39	U	36	U								
DICHLORVOS	37	U	39	U	36	U								
DIELDRIN	370,000	U	3.8	U	3.6	U	7.3	J	23	U	49	U	53	U
DIMETHOATE	37	U	39	U	36	U								
DISULFOTON	37	U	39	U	36	U								
ENDOSULFAN I	370,000	U	3.8	U	3.6	U	56	U	11	U	24	U	26	U
ENDOSULFAN II	370,000	U	3.8	U	3.6	U	110	U	23	U	49	U	53	U
ENDOSULFAN SULFATE	370,000	U	3.8	U	3.6	U	110	U	23	U	49	U	53	U
ENDRIN	370,000	U	3.8	U	3.6	U	110	U	23	U	49	U	53	U
ENDRIN ALDEHYDE	370,000	U	3.8	U	3.6	U								
ENDRIN KETONE	370,000	U	3.8	U	3.6	U	110	U	23	U	49	U	53	U
EPN	37	U	39	U	36	U								
ETHION	37	U	39	U	36	U								
ETHOPROP	37	U	39	U	36	U								
ETHYL PARATHION	37	U	39	U	36	U								
FENSULFOTHION	37	U	39	U	36	U								
FENTHION	37	U	39	U	36	U								
GAMMA-BHC (LINDANE)	370,000	U	3.8	U	3.6	U	56	U	11	U	24	U	26	U
GAMMA-CHLORDANE	370,000	U	20		52		330	J	110	U	24	J	12	J
HEPTACHLOR	370,000	U	3.8	U	3.6	U	56	U	11	U	24	U	26	U
HEPTACHLOR EPOXIDE	370,000	U	3.8	U	3.6	U	58	J	11	U	24	U	26	U
ISODRIN	370,000	U	3.8	U	3.6	U								
MALATHION	37	U	39	U	36	U								

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S032		90S033		90S034		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Sample	90S3201		90S3301		90S03401		BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		11/5/91		11/5/91		11/5/91		11/5/91	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MERPHOS	37	U	39	U	36	U								
METHOXYCHLOR	370,000	U	3.8	U	3.6	U	560	U	110	U	240	U	260	U
METHYL PARATHION														
MEVINPHOS	37	U	39	U	36	U								
MIREX	370,000	U	3.8	U	3.6	U								
MONOCROTOPHOS	37	U	39	U	36	U								
NALED	37	U	39	U	36	U								
PHORATE	37	U	39	U	36	U								
RONNEL	37	U	39	U	36	U								
STIROFOS	37	U	39	U	36	U								
SULFOTEPP	37	U	39	U	36	U								
TEPP	37	U	39	U	36	U								
TOKUTHION	37	U	39	U	36	U								
TOXAPHENE	8,700,000		410		650		1,100	U	230	U	490	U	530	U
TRICHLORONATE	37	U	39	U	36	U								

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-001		CEF-P21-SS-002		CEF-P21-SS-003		CEF-P21-SS-003	
Sample	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-001-01		CEF-P21-SS-002-01		CEF-P21-SS-003-01		CEF-P21-SS-003-D-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/5/91		11/5/91		11/5/91		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	110	U	650	J	4.7	J	15	U	36	U	490	U	230	U
2,4'-DDD	NR		290	J	NR									
4,4'-DDE	110	U	2,000	U	8.1	J	15	U	36	U	490	U	230	U
4,4'-DDT	110	U	2,000	U	12	J	15	U	36	U	490	U	230	U
ALDRIN	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
ALPHA-BHC	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
ALPHA-CHLORDANE	72	J	680	J	110	U	31		254		1,860	J	1,090	J
AROCLOR-1016	560	U	9,800	U	110	U								
AROCLOR-1221	560	U	9,800	U	110	U								
AROCLOR-1232	560	U	9,800	U	110	U								
AROCLOR-1242	560	U	9,800	U	110	U								
AROCLOR-1248	560	U	9,800	U	110	U								
AROCLOR-1254	1,100	U	20,000	U	220	U								
AROCLOR-1260	1,100	U	20,000	U	220	U								
AZINPHOS METHYL							1,800	U	1,400	U	1,800	U	1,900	U
BETA-BHC	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
BOLSTAR							390	U	300	U	400	U	400	U
CHLORDANE	108		1,340				60		468		3,660		2,090	
CHLORPYRIFOS							420	U	320	U	430	U	440	U
COUMAPHOS							2,100	U	1,600	U	2,200	U	2,200	U
DELTA-BHC	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
DEMETON							400	U	310	U	410	U	420	U
DIAZINON							800	U	620	U	830	U	840	U
DICHLORVOS							360	U	280	U	370	U	380	UJ
DIELDRIN	110	U	2,000	U	22	U	7.4	U	18	U	250	U	110	U
DIMETHOATE							160	U	120	U	160	U	170	U
DISULFOTON							500	U	390	U	520	U	530	U
ENDOSULFAN I	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
ENDOSULFAN II	110	U	2,000	U	22	U	15	U	36	U	490	U	230	U
ENDOSULFAN SULFATE	110	U	2,000	U	22	U	15	U	36	U	490	U	230	U
ENDRIN	110	U	2,000	U	22	U	15	U	36	U	490	U	230	U
ENDRIN ALDEHYDE							15	U	36	U	490	U	230	U
ENDRIN KETONE	110	U	2,000	U	22	U	15	U	36	U	490	U	230	U
EPN							180	U	140	U	190	U	190	U
ETHION														
ETHOPROP							710	U	550	U	740	U	750	U
ETHYL PARATHION							190	U	150	U	200	U	200	U
FENSULFOTHION							1,600	U	1,300	U	1,700	U	1,700	U
FENTHION							290	U	220	U	300	U	300	U
GAMMA-BHC (LINDANE)	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
GAMMA-CHLORDANE	36	J	660	J	110	U	29		214		1,800	J	1,000	J
HEPTACHLOR	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
HEPTACHLOR EPOXIDE	56	U	980	U	11	U	7.4	U	18	U	250	U	110	U
ISODRIN														
MALATHION							340	U	260	U	350	U	350	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-001		CEF-P21-SS-002		CEF-P21-SS-003		CEF-P21-SS-003	
Sample	BOR-A-5-1		BOR-A-6-1		BOR-A-7-1		CEF-P21-SS-001-01		CEF-P21-SS-002-01		CEF-P21-SS-003-01		CEF-P21-SS-003-D-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/5/91		11/5/91		11/5/91		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MERPHOS							630	U	490	U	650	U	660	U
METHOXYCHLOR	560	U	9,800	U	110	U	30	U	72	U	990	U	460	U
METHYL PARATHION							76	U	580	U	78	U	79	U
MEVINPHOS							630	U	490	U	650	U	660	U
MIREX														
MONOCROTOPHOS														
NALED							1,300	U	980	U	1,300	U	1,300	U
PHORATE							460	U	360	U	480	U	480	U
RONNEL							460	U	360	U	480	U	480	U
STIROFOS							2,400	U	1,800	U	2,500	U	2,500	U
SULFOTEPP							310	U	240	U	320	U	320	U
TEPP							2,100	U	1,600	U	2,200	U	2,200	U
TOKUTHION							670	U	520	U	700	U	700	U
TOXAPHENE	1,100	U	20,000	U	220	U	740	U	1,800	U	25,000	U	11,000	U
TRICHLORONATE							400	U	310	U	410	U	420	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-004		CEF-P21-SS-005		CEF-P21-SS-006		CEF-P21-SS-007		CEF-P21-SS-008		CEF-P21-SS-009		CEF-P21-SS-010	
Sample	CEF-P21-SS-004-01		CEF-P21-SS-005-01		CEF-P21-SS-006-01		CEF-P21-SS-007-01		CEF-P21-SS-008-01		CEF-P21-SS-009-01		CEF-P21-SS-010-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	24,100		7.6	U	1,400	U	170	U	740	U	38	U	36	U
2,4'-DDD														
4,4'-DDE	39,000	U	7.6	U	1,400	U	317		740	U	38	U	36	U
4,4'-DDT	152,000		7.6	U	1,400	U	389		740	U	28.7	J	36	U
ALDRIN	19,000	U	3.8	U	690	U	86	U	370	U	19	U	18	U
ALPHA-BHC	19,000	U	3.8	U	690	U	86	U	370	U	19	U	18	U
ALPHA-CHLORDANE	39,000	U	9.1		5,580		618		3,620		103		29.2	J
AROCLOR-1016					17,000	U								
AROCLOR-1221					17,000	U								
AROCLOR-1232					17,000	U								
AROCLOR-1242					17,000	U								
AROCLOR-1248					17,000	U								
AROCLOR-1254					17,000	U								
AROCLOR-1260					17,000	U								
AZINPHOS METHYL	1,400	U	1,500	U	1,600	U	1,500	U	1,500	U	1,700	U	1,700	U
BETA-BHC	19,000	U	3.8	U	690	U	86	U	370	U	19	U	18	U
BOLSTAR	300	U	320	U	350	U	330	U	330	U	360	U	370	U
CHLORDANE			16.3		10,950		1,252		7,620		179.4		45.9	
CHLORPYRIFOS	320	U	350	U	380	U	360	U	350	U	390	U	400	U
COUMAPHOS	1,600	U	1,800	U	1,900	U	1,800	U	1,800	U	2,000	U	2,000	U
DELTA-BHC	19,000	U	3.8	U	690	U	86	U	370	U	19	U	18	U
DEMETON	310	U	340	U	360	U	340	U	340	U	370	U	380	U
DIAZINON	620	U	670	U	730	U	680	U	680	U	750	U	760	U
DICHLORVOS	280	U	300	U	330	U	300	U	300	U	330	U	340	U
DIELDRIN	19,000	U	3.8	U	690	U	86	U	370	U	207		18	U
DIMETHOATE	120	U	130	U	150	U	140	U	140	U	150	U	150	U
DISULFOTON	390	U	420	U	460	U	430	U	430	U	470	U	480	U
ENDOSULFAN I	19,000	U	3.8	U	690	U	86	U	370	U	19	U	18	U
ENDOSULFAN II	39,000	U	7.6	U	1,400	U	170	U	740	U	38	U	36	U
ENDOSULFAN SULFATE	39,000	U	7.6	U	1,400	U	170	U	740	U	38	U	36	U
ENDRIN	39,000	U	7.6	U	1,400	U	170	U	740	U	38	U	36	U
ENDRIN ALDEHYDE	39,000	U	7.6	U	1,400	U	170	U	740	U	38	U	36	U
ENDRIN KETONE	39,000	U	7.6	U	1,400	U	170	U	740	U	38	U	36	U
EPN	140	U	160	U	170	U	160	U	160	U	170	U	180	U
ETHION														
ETHOPROP	560	U	600	U	650	U	610	U	610	U	670	U	680	U
ETHYL PARATHION	150	U	160	U	170	U	160	U	160	U	180	U	180	U
FENSULFOTHION	1,300	U	1,400	U	1,500	U	1,400	U	1,400	U	1,500	U	1,600	U
FENTHION	220	U	240	U	260	U	250	U	250	U	270	U	280	U
GAMMA-BHC (LINDANE)	19,000	U	3.8	U	690	U	86	U	370	U	19	U	18	U
GAMMA-CHLORDANE	39,000	U	7.2	J	5,370		634		4,000		76.4		16.7	J
HEPTACHLOR	19,000	U	3.8	U	690	U	86	U	370	U	19	U	18	U
HEPTACHLOR EPOXIDE	19,000	U	3.8	U	690	U	86	U	370	U	17	J	18	U
ISODRIN														
MALATHION	260	U	280	U	310	U	290	U	290	U	310	U	320	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-004		CEF-P21-SS-005		CEF-P21-SS-006		CEF-P21-SS-007		CEF-P21-SS-008		CEF-P21-SS-009		CEF-P21-SS-010	
Sample	CEF-P21-SS-004-01		CEF-P21-SS-005-01		CEF-P21-SS-006-01		CEF-P21-SS-007-01		CEF-P21-SS-008-01		CEF-P21-SS-009-01		CEF-P21-SS-010-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MERPHOS	490	U	530	U	580	U	540	U	540	U	590	U	600	U
METHOXYCHLOR	77,000	U	15	U	2,800	U	340	U	1,500	U	76	U	72	U
METHYL PARATHION	59	U	64	U	69	U	64	U	64	U	71	U	72	U
MEVINPHOS	490	U	530	U	580	U	540	U	540	U	590	U	600	U
MIREX														
MONOCROTOPHOS														
NALED	980	U	1,100	U	1,200	U	1,100	U	1,100	U	1,200	U	1,200	U
PHORATE	360	U	390	U	420	U	390	U	390	U	430	U	440	U
RONNEL	360	U	390	U	420	U	390	U	390	U	430	U	440	U
STIROFOS	1,900	U	2,000	U	2,200	U	2,000	U	2,000	U	2,200	U	2,300	U
SULFOTEPP	240	U	260	U	280	U	260	U	260	U	290	U	290	U
TEPP	1,600	U	1,800	U	1,900	U	1,800	U	1,800	U	2,000	U	2,000	U
TOKUTHION	520	U	570	U	620	U	570	U	570	U	630	U	640	U
TOXAPHENE	368,000		380	U	69,000	U	8,600	U	37,000	U	1,500	J	1,800	U
TRICHLORONATE	310	U	340	U	360	U	340	U	340	U	370	U	380	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-011		CEF-P21-SS-012		CEF-P21-SS-013		CEF-P21-SS-013		CEF-P21-SS-014		CEF-P21-SS-015		CEF-P21-SS-016	
Sample	CEF-P21-SS-011-01		CEF-P21-SS-012-01		CEF-P21-SS-013		CEF-P21-SS-013-D		CEF-P21-SS-014-01		CEF-P21-SS-015-01		CEF-P21-SS-016-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	70	U	8,800	U	71	U	71	U	3.5	U	17	U	278	J
2,4'-DDD														
4,4'-DDE	70	U	8,800	U	71	U	71	U	9.8		17	U	578	
4,4'-DDT	70	U	8,800	U	71	U	71	U	7.1		17	U	1,640	
ALDRIN	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
ALPHA-BHC	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
ALPHA-CHLORDANE	243		54,000		95.1		88.6		8.9		58.7		360	U
AROCLOR-1016	170	U			710	U	710	U					1,800	U
AROCLOR-1221	170	U			710	U	710	U					1,800	U
AROCLOR-1232	170	U			710	U	710	U					1,800	U
AROCLOR-1242	170	U			710	U	710	U					1,800	U
AROCLOR-1248	170	U			710	U	710	U					1,800	U
AROCLOR-1254	170	U			1,360	J	776	J					1,800	U
AROCLOR-1260	170	U			710	U	710	U					1,800	U
AZINPHOS METHYL	1,700	U	1,500	U	1,300	U	1,300	U	1,500	U	1,500	U	1,400	U
BETA-BHC	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
BOLSTAR	360	U	320	U	290	U	290	U	330	U	320	U	290	U
CHLORDANE	505		108,200		178.7		160.2		15.5		116.8			
CHLORPYRIFOS	390	U	350	U	310	U	310	U	360	U	350	U	320	U
COUMAPHOS	2,000	U	1,800	U	1,600	U	1,600	U	1,800	U	1,800	U	1,600	U
DELTA-BHC	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
DEMETON	380	U	330	U	300	U	300	U	340	U	330	U	300	U
DIAZINON	750	U	670	U	600	U	600	U	680	U	660	U	610	U
DICHLORVOS	340	UJ	300	UJ	270	UJ	270	UJ	300	UJ	300	UJ	270	UJ
DIELDRIN	35	U	4,400	U	301		266		8.4		8.7	U	180	U
DIMETHOATE	150	U	130	U	120	U	120	U	140	U	130	U	120	U
DISULFOTON	470	U	420	U	380	U	380	U	430	U	420	U	380	U
ENDOSULFAN I	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
ENDOSULFAN II	70	U	8,800	U	71	U	71	U	3.5	U	17	U	360	U
ENDOSULFAN SULFATE	70	U	8,800	U	71	U	71	U	3.5	U	17	U	360	U
ENDRIN	70	U	8,800	U	71	U	71	U	3.5	U	17	U	360	U
ENDRIN ALDEHYDE	70	U	8,800	U	71	U	71	U	3.5	U	17	U	360	U
ENDRIN KETONE	70	U	8,800	U	71	U	71	U	3.5	U	17	U	360	U
EPN	170	U	150	U	140	U	140	U	160	U	150	U	140	U
ETHION														
ETHOPROP	670	U	600	U	540	U	540	U	610	U	600	U	540	U
ETHYL PARATHION	180	U	160	U	140	U	140	U	160	U	160	U	140	U
FENSULFOTHION	1,500	U	1,400	U	1,200	U	1,200	U	1,400	U	1,400	U	1,200	U
FENTHION	270	U	240	U	220	U	220	U	250	U	240	U	220	U
GAMMA-BHC (LINDANE)	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
GAMMA-CHLORDANE	262		54,200		83.6		71.6		6.6		58.1		360	U
HEPTACHLOR	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
HEPTACHLOR EPOXIDE	35	U	4,400	U	35	U	35	U	1.7	U	8.7	U	180	U
ISODRIN														
MALATHION	320	U	280	U	250	U	250	U	290	U	280	U	260	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-011		CEF-P21-SS-012		CEF-P21-SS-013		CEF-P21-SS-013		CEF-P21-SS-014		CEF-P21-SS-015		CEF-P21-SS-016	
Sample	CEF-P21-SS-011-01		CEF-P21-SS-012-01		CEF-P21-SS-013		CEF-P21-SS-013-D		CEF-P21-SS-014-01		CEF-P21-SS-015-01		CEF-P21-SS-016-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MERPHOS	590	U	530	U	470	U	470	U	540	U	520	U	480	U
METHOXYCHLOR	140	U	18,000	U	140	U	140	U	7	U	35	U	710	U
METHYL PARATHION	71	U	63	U	57	U	57	U	64	U	63	U	57	U
MEVINPHOS	590	U	530	U	470	U	470	U	540	U	520	U	480	U
MIREX														
MONOCROTOPHOS														
NALED	1,200	U	1,000	U	950	U	950	U	1,100	U	1,000	U	960	U
PHORATE	430	U	390	U	350	U	350	U	390	U	380	U	350	U
RONNEL	430	U	390	U	350	U	350	U	390	U	380	U	350	U
STIROFOS	2,200	U	2,000	U	1,800	U	1,800	U	2,000	U	2,000	U	1,800	U
SULFOTEPP	290	U	260	U	230	U	230	U	260	U	260	U	230	U
TEPP	2,000	U	1,800	U	1,600	U	1,600	U	1,800	U	1,800	U	1,600	U
TOKUTHION	630	U	560	U	500	U	500	U	570	U	560	U	510	U
TOXAPHENE	3,500	U	440,000	U	2,500	J	1,700	J	170	U	870	U	18,000	U
TRICHLORONATE	380	U	330	U	300	U	300	U	340	U	330	U	300	U

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-017		CEF-P21-SS-103		CEF-P21-SS-104		CEF-P21-SS-105		CEF-P21-SS-105		CEF-P21-SS-106		CEF-P21-SS-110	
Sample	CEF-P21-SS-017-01		CEF-P21-SS-103-01		CEF-P21-SS-104-01		CEF-P21-SS-105-01		CEF-P21-SS-105-01-D		CEF-P21-SS-106-01		CEF-P21-SS-110-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	3.7	U	200	U	200	U	18	U	18	U	34	U	45.9	J
2,4'-DDD														
4,4'-DDE	3.7	U	200	U	200	U	18	U	18	U	34	U	73	U
4,4'-DDT	2.8	J	200	U	200	U	18	U	18	U	34	U	311	
ALDRIN	1.8	U	99	U	98	U	9	U	8.8	U	17	U	36	U
ALPHA-BHC	1.8	U	99	U	98	U	9	U	8.8	U	17	U	36	U
ALPHA-CHLORDANE	4.3		615		590		22.2		31.7		34	U	144	
AROCLOR-1016			2,000	U	2,000	U	140	U	180	U	34	U	730	U
AROCLOR-1221			2,000	U	2,000	U	140	U	180	U	34	U	730	U
AROCLOR-1232			2,000	U	2,000	U	140	U	180	U	34	U	730	U
AROCLOR-1242			2,000	U	2,000	U	140	U	180	U	34	U	730	U
AROCLOR-1248			2,000	U	2,000	U	140	U	180	U	34	U	730	U
AROCLOR-1254			7,900	U	7,900	U	360	U	700	U	140	U	730	U
AROCLOR-1260			7,900	U	7,900	U	360	U	700	U	140	U	730	U
AZINPHOS METHYL	1,800	U												
BETA-BHC	1.8	U	99	U	98	U	9	U	8.8	U	17	U	36	U
BOLSTAR	390	U												
CHLORDANE	8.7		1,131		1,094		37.5		53.4				211	
CHLORPYRIFOS	420	U												
COUMAPHOS	2,100	U												
DELTA-BHC	1.8	U	99	U	98	U	9	U	8.8	U	17	U	36	U
DEMETON	410	U												
DIAZINON	810	U												
DICHLORVOS	360	UJ												
DIELDRIN	1.8	U	2,790		1,420		504		696		17	U	36	U
DIMETHOATE	160	U												
DISULFOTON	510	U												
ENDOSULFAN I	1.8	U	99	U	98	U	9	U	8.8	U	17	U	36	U
ENDOSULFAN II	3.7	U	200	U	200	U	18	U	18	U	34	U	73	U
ENDOSULFAN SULFATE	3.7	U	200	U	200	U	18	U	18	U	34	U	73	U
ENDRIN	3.7	U	200	U	200	U	18	U	18	U	34	U	73	U
ENDRIN ALDEHYDE	3.7	U	200	U	200	U	18	U	18	U	34	U	73	U
ENDRIN KETONE	3.7	U	200	U	200	U	18	U	18	U	34	U	73	U
EPN	190	U												
ETHION														
ETHOPROP	730	U												
ETHYL PARATHION	190	U												
FENSULFOTHION	1,700	U												
FENTHION	300	U												
GAMMA-BHC (LINDANE)	1.8	U	99	U	98	U	9	U	8.8	U	17	U	36	U
GAMMA-CHLORDANE	4.4		516		504		15.3	J	21.7		34	U	67	J
HEPTACHLOR	1.8	U	99	U	98	U	9	U	8.8	U	17	U	36	U
HEPTACHLOR EPOXIDE	1.8	U	70.3	J	98	U	9	U	8.8	U	17	U	36	U
ISODRIN														
MALATHION	340	U												

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-017		CEF-P21-SS-103		CEF-P21-SS-104		CEF-P21-SS-105		CEF-P21-SS-105		CEF-P21-SS-106		CEF-P21-SS-110	
Sample	CEF-P21-SS-017-01		CEF-P21-SS-103-01		CEF-P21-SS-104-01		CEF-P21-SS-105-01		CEF-P21-SS-105-01-D		CEF-P21-SS-106-01		CEF-P21-SS-110-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MERPHOS	640	U												
METHOXYCHLOR	7.4	U	400	U	390	U	36	U	35	U	69	U	150	U
METHYL PARATHION	77	U												
MEVINPHOS	640	U												
MIREX														
MONOCROTOPHOS														
NALED	1,300	U												
PHORATE	470	U												
RONNEL	470	U												
STIROFOS	2,400	U												
SULFOTEPP	310	U												
TEPP	2,100	U												
TOKUTHION	680	U												
TOXAPHENE	180	U	7,530	J	9,890		776	J	950		1,700	U	3,600	U
TRICHLORONATE	410	U												

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-110		CEF-P21-SS-111		CEF-P21-SS-111	
Sample	CEF-P21-SS-110-02		CEF-P21-SS-111-01		CEF-P21-SS-111-01-D	
Depth of Range (ft)	(1-2)		(0-1)		(0-1)	
Sample Date	6/10/99		6/10/99		6/10/99	
Matrix	Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG	
Pesticides/PCBs						
4,4'-DDD	3.8		14	U	14	U
2,4'-DDD						
4,4'-DDE	18	U	14	U	14	U
4,4'-DDT	15.7		14	U	14	U
ALDRIN	8.9	U	7	U	6.9	U
ALPHA-BHC	8.9	U	7	U	6.9	U
ALPHA-CHLORDANE	11.6		14	U	14	U
AROCLOR-1016	36	U	35	U	34	U
AROCLOR-1221	36	U	35	U	34	U
AROCLOR-1232	36	U	35	U	34	U
AROCLOR-1242	36	U	35	U	34	U
AROCLOR-1248	36	U	35	U	34	U
AROCLOR-1254	180	U	35	U	34	U
AROCLOR-1260	180	U	35	U	34	U
AZINPHOS METHYL						
BETA-BHC	8.9	U	7	U	6.9	U
BOLSTAR						
CHLORDANE	19.1					
CHLORPYRIFOS						
COUMAPHOS						
DELTA-BHC	8.9	U	7	U	6.9	U
DEMETON						
DIAZINON						
DICHLORVOS						
DIELDRIN	8.9	U	7	U	6.9	U
DIMETHOATE						
DISULFOTON						
ENDOSULFAN I	8.9	U	7	U	6.9	U
ENDOSULFAN II	18	U	14	U	14	U
ENDOSULFAN SULFATE	18	U	14	U	14	U
ENDRIN	18	U	14	U	14	U
ENDRIN ALDEHYDE	18	U	14	U	14	U
ENDRIN KETONE	18	U	14	U	14	U
EPN						
ETHION						
ETHOPROP						
ETHYL PARATHION						
FENSULFOTHION						
FENTHION						
GAMMA-BHC (LINDANE)	8.9	U	7	U	6.9	U
GAMMA-CHLORDANE	7.5		14	U	14	U
HEPTACHLOR	8.9	U	7	U	6.9	U
HEPTACHLOR EPOXIDE	8.9	U	7	U	6.9	U
ISODRIN						
MALATHION						

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-110		CEF-P21-SS-111		CEF-P21-SS-111	
Sample	CEF-P21-SS-110-02		CEF-P21-SS-111-01		CEF-P21-SS-111-01-D	
Depth of Range (ft)	(1-2)		(0-1)		(0-1)	
Sample Date	6/10/99		6/10/99		6/10/99	
Matrix	Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG	
Pesticides/PCBs						
MERPHOS						
METHOXYCHLOR	36	U	28	U	28	U
METHYL PARATHION						
MEVINPHOS						
MIREX						
MONOCROTOPHOS						
NALED						
PHORATE						
RONNEL						
STIROFOS						
SULFOTEPP						
TEPP						
TOKUTHION						
TOXAPHENE	890	U	700	U	690	U
TRICHLORONATE						

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S020		90S020		90S023		90S023		90S023		90S023	
Sample	CEF-P21-SS-805-02		CEF-P21-SU-913-03		CEF-P21-SU-914-04		CEF-P21-SS-804-02		CEF-P21-SU-911-03		CEF-P21-SU-911-03-AVG		CEF-P21-SU-911-03-D	
Depth of Range (ft)	(1-2)		(2-3)		(3-4)		(1-2)		(2-3)		(2-3)		(2-3)	
Sample Date	6/17/00		7/13/00		7/13/00		6/17/00		7/13/00		7/13/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	80	U	314	J	81	U	2,000	U	1,900	U	1,900	U	1,900	U
4,4'-DDE	72.3	J	389	J	23.9	J	2,000	U	612	J	596	J	580	J
4,4'-DDT	80	U	1,000	U	81	U	2,000	U	1,900	U	1,900	U	1,900	U
ALDRIN	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
ALPHA-BHC	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
ALPHA-CHLORDANE	525		3,100		323		11,000		8,980		9,060		9,140	
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL	100	U					100	U						
BETA-BHC	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
BOLSTAR	100	U					100	U						
CHLORDANE														
CHLORPYRIFOS	100	U					100	U						
COUMAPHOS	100	U					100	U						
DELTA-BHC	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
DEMETON														
DEMETON	100	U					100	U						
DIAZINON	100	U					100	U						
DICHLORVOS	100	U					100	U						
DIELDRIN	17.3	J	500	U	41	U	1,000	U	970	U	965	U	960	U
DIMETHOATE	200	U					200	U						
DISULFOTON	100	U					100	U						
ENDOSULFAN I	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
ENDOSULFAN II	80	U	1,000	U	81	U	2,000	U	1,900	U	1,900	U	1,900	U
ENDOSULFAN SULFATE	80	U	1,000	U	81	U	2,000	U	1,900	U	1,900	U	1,900	U
ENDRIN	80	U	1,000	U	81	U	2,000	U	1,900	U	1,900	U	1,900	U
ENDRIN ALDEHYDE	80	U	1,000	U	81	U	2,000	U	1,900	U	1,900	U	1,900	U
ENDRIN KETONE	80	U	1,000	U	81	U	2,000	U	1,900	U	1,900	U	1,900	U
EPN	100	U					100	U						
ETHOPROP	100	U					100	U						
ETHYL PARATHION	100	U					100	U						
FENSULFOTHION	200	U					200	U						
FENTHION	100	U					100	U						
GAMMA-BHC (LINDANE)	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
GAMMA-CHLORDANE	442		3,600		366		13,100		9,470		9,565		9,660	
HEPTACHLOR	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
HEPTACHLOR EPOXIDE	40	U	500	U	41	U	1,000	U	970	U	965	U	960	U
MALATHION	100	U					100	U						
MERPHOS	100	U					100	U						
METHOXYCHLOR	160	U	2,000	U	160	U	4,000	U	3,900	U	3,900	U	3,900	U
METHYL PARATHION	100	U					100	U						

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S020		90S020		90S023		90S023		90S023		90S023	
Sample	CEF-P21-SS-805-02		CEF-P21-SU-913-03		CEF-P21-SU-914-04		CEF-P21-SS-804-02		CEF-P21-SU-911-03		CEF-P21-SU-911-03-AVG		CEF-P21-SU-911-03-D	
Depth of Range (ft)	(1-2)		(2-3)		(3-4)		(1-2)		(2-3)		(2-3)		(2-3)	
Sample Date	6/17/00		7/13/00		7/13/00		6/17/00		7/13/00		7/13/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS	200	U					200	U						
MONOCROTOPHOS	1,000	U					1,000	U						
NALED	1,000	U					1,000	U						
PHORATE	100	U					100	U						
RONNEL	100	U					100	U						
STIROFOS	100	U					100	U						
SULFOTEPP	100	U					100	U						
TEPP	1,000	U					1,000	U						
TOKUTHION	100	U					100	U						
TOXAPHENE	4,000	U	50,000	U	4,100	U	100,000	U	97,000	U	96,500	U	96,000	U
TRICHLORONATE	100	U					100	U						

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S023		90S024		90S024		BOR-A-1-1		CEF-P21-SS-004		CEF-P21-SS-004		CEF-P21-SS-004	
Sample	CEF-P21-SU-912-04		CEF-P21-SS-801-02		CEF-P21-SU-802-03		CEF-P21-SS-803-03		CEF-P21-SS-316-02		CEF-P21-SS-602-01		CEF-P21-SU-402-03	
Depth of Range (ft)	(3-4)		(1-2)		(2-3)		(2-3)		(1-2)		(0-1)		(2-3)	
Sample Date	7/13/00		6/17/00		6/17/00		6/17/00		9/10/99		2/2/00		10/22/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	20	U	1.5	J	3.6	UJ	88	U	830	U	1,350		4.2	U
4,4'-DDE	7.8	J	6.6		3.6	UJ	88	U	830	U	1,900	U	4.2	U
4,4'-DDT	20	U	1.7	J	36	UJ	88	U	5,740		8,150		6.5	
ALDRIN	9.8	U	2	U	1.8	UJ	44	U	420	U	190	U	2.1	U
ALPHA-BHC	9.8	U	2	U	1.8	UJ	44	U	420	U	190	U	2.1	U
ALPHA-CHLORDANE	90.9		6.9		3.6	UJ	88	U	830	U	1,220		4.2	U
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL														
BETA-BHC	9.8	U	2	U	1.8	UJ	44	U	420	U	190	U	2.1	U
BOLSTAR														
CHLORDANE											2,380			
CHLORPYRIFOS														
COUMAPHOS														
DELTA-BHC	9.8	U	2	U	1.8	UJ	44	U	420	U	190	U	2.1	U
DEMETON														
DEMETON														
DIAZINON														
DICHLORVOS														
DIELDRIN	9.8	U	2	U	1.8	UJ	44	U	420	U	970	U	2.1	U
DIMETHOATE														
DISULFOTON														
ENDOSULFAN I	9.8	U	2	U	1.8	UJ	44	U	420	U	970	U	2.1	U
ENDOSULFAN II	20	U	4	U	3.6	UJ	88	U	830	U	1,900	U	4.2	U
ENDOSULFAN SULFATE	20	U	4	U	3.6	UJ	88	U	830	U	1,900	U	4.2	U
ENDRIN	20	U	4	U	3.6	UJ	88	U	830	U	1,900	U	4.2	U
ENDRIN ALDEHYDE	20	U	4	U	3.6	UJ	88	U	830	U	1,900	U	4.2	U
ENDRIN KETONE	20	U	4	U	36	UJ	88	U	830	U	1,900	U	4.2	U
EPN														
ETHOPROP														
ETHYL PARATHION														
FENSULFOTHION														
FENTHION														
GAMMA-BHC (LINDANE)	9.8	U	2	U	1.8	UJ	44	U	420	U	190	U	2.1	U
GAMMA-CHLORDANE	83.6		5.6		3.6	UJ	88	U	830	U	1,160		4.2	U
HEPTACHLOR	9.8	U	2	U	18	UJ	44	U	420	U	190	U	2.1	U
HEPTACHLOR EPOXIDE	9.8	U	2	U	1.8	UJ	44	U	420	U	190	U	2.1	U
MALATHION														
MERPHOS														
METHOXYCHLOR	39	U	7.9	U	71	UJ	180	U	1,700	U	3,900	U	8.3	U
METHYL PARATHION														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S023		90S024		90S024		BOR-A-1-1		CEF-P21-SS-004		CEF-P21-SS-004		CEF-P21-SS-004	
Sample	CEF-P21-SU-912-04		CEF-P21-SS-801-02		CEF-P21-SU-802-03		CEF-P21-SS-803-03		CEF-P21-SS-316-02		CEF-P21-SS-602-01		CEF-P21-SU-402-03	
Depth of Range (ft)	(3-4)		(1-2)		(2-3)		(2-3)		(1-2)		(0-1)		(2-3)	
Sample Date	7/13/00		6/17/00		6/17/00		6/17/00		9/10/99		2/2/00		10/22/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS														
MONOCROTOPHOS														
NALED														
PHORATE														
RONNEL														
STIROFOS														
SULFOTEPP														
TEPP														
TOKUTHION														
TOXAPHENE	980	U	200	U	180	UJ	4,400	U	3,620	J	27,600	J	210	U
TRICHLORONATE														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-006		CEF-P21-SS-012		CEF-P21-SS-012		CEF-P21-SS-012		CEF-P21-SS-012		CEF-P21-SS-103		CEF-P21-SS-111	
Sample	CEF-P21-SS-317-02		CEF-P21-SS-318-02		CEF-P21-SS-819-02		CEF-P21-SS-819-02-AVG		CEF-P21-SS-819-02-D		CEF-P21-SS-601-01		CEF-P21-SS-111-02	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(1-2)		(1-2)		(0-1)		(1-2)	
Sample Date	9/10/99		9/13/99		6/17/00		6/17/00		6/17/00		2/2/00		6/10/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	4.2	U	8.4	U	37.1	J	37.1	J	160	U			48.5	
4,4'-DDE	4.2	U	8.4	U	112	J	95.75	J	79.5	J			108	
4,4'-DDT	4.2	U	8.4	U	58	J	58	J	160	U			33.7	
ALDRIN	2.1	U	4.2	U	68	U	75	U	82	U			9	U
ALPHA-BHC	2.1	U	4.2	U	68	U	75	U	82	U			9	U
ALPHA-CHLORDANE	4.2	U	33		506		572.5		639				18	U
AROCLOR-1016													36	U
AROCLOR-1221													36	U
AROCLOR-1232													36	U
AROCLOR-1242													36	U
AROCLOR-1248													36	U
AROCLOR-1254													140	U
AROCLOR-1260													36	U
AZINPHOS METHYL							100	U	100	U				
BETA-BHC	2.1	U	4.2	U	68	U	75	U	82	U			9	U
BOLSTAR							100	U	100	U				
CHLORDANE			67											
CHLORPYRIFOS							100	U	100	U				
COUMAPHOS							100	U	100	U				
DELTA-BHC	2.1	U	4.2	U	68	U	75	U	82	U			9	U
DEMETON									100	U				
DEMETON							100	U						
DIAZINON							100	U	100	U				
DICHLORVOS							100	U	100	U				
DIELDRIN	2.1	U	4.2	U	68	U	28.5	J	28.5	J	2,540		9	U
DIMETHOATE							200	U	200	U				
DISULFOTON							100	U	100	U				
ENDOSULFAN I	2.1	U	4.2	U	68	U	75	U	82	U			9	U
ENDOSULFAN II	4.2	U	8.4	U	140	U	150	U	160	U			18	U
ENDOSULFAN SULFATE	4.2	U	8.4	U	140	U	150	U	160	U			18	U
ENDRIN	4.2	U	8.4	U	140	U	150	U	160	U			18	U
ENDRIN ALDEHYDE	4.2	U	8.4	U	140	U	150	U	160	U			18	U
ENDRIN KETONE	4.2	U	8.4	U	140	U	150	U	160	U			18	U
EPN							100	U	100	U				
ETHOPROP							100	U	100	U				
ETHYL PARATHION							100	U	100	U				
FENSULFOTHION							200	U	200	U				
FENTHION							100	U	100	U				
GAMMA-BHC (LINDANE)	2.1	U	4.2	U	68	U	75	U	82	U			9	U
GAMMA-CHLORDANE	4.2	U	34		506		546		586				18	U
HEPTACHLOR	2.1	U	4.2	U	68	U	75	U	82	U			9	U
HEPTACHLOR EPOXIDE	2.1	U	4.2	U	68	U	75	U	82	U			9	U
MALATHION							100	U	100	U				
MERPHOS							100	U	100	U				
METHOXYCHLOR	8.4	U	17	U	270	U	300	U	330	U			36	U
METHYL PARATHION							100	U	100	U				

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-006		CEF-P21-SS-012		CEF-P21-SS-012		CEF-P21-SS-012		CEF-P21-SS-012		CEF-P21-SS-103		CEF-P21-SS-111	
Sample	CEF-P21-SS-317-02		CEF-P21-SS-318-02		CEF-P21-SS-819-02		CEF-P21-SS-819-02-AVG		CEF-P21-SS-819-02-D		CEF-P21-SS-601-01		CEF-P21-SS-111-02	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(1-2)		(1-2)		(0-1)		(1-2)	
Sample Date	9/10/99		9/13/99		6/17/00		6/17/00		6/17/00		2/2/00		6/10/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS							200	U	200	U				
MONOCROTOPHOS							1,000	U	1,000	U				
NALED							1,000	U	1,000	U				
PHORATE							100	U	100	U				
RONNEL							100	U	100	U				
STIROFOS							100	U	100	U				
SULFOTEPP							100	U	100	U				
TEPP							1,000	U	1,000	U				
TOKUTHION							100	U	100	U				
TOXAPHENE	210	U	420	U	6,800	U	7,500	U	8,200	U			900	U
TRICHLORONATE							100	U	100	U				

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-302		CEF-P21-SS-303	
Sample	CEF-P21-SS-301-01		CEF-P21-SS-301-01-D		CEF-P21-SU-818-03		CEF-P21-SU-917-04		CEF-P21-SU-918-05		CEF-P21-SS-302-01		CEF-P21-SS-303-01	
Depth of Range (ft)	(0-1)		(0-1)		(2-3)		(3-4)		(4-5)		(0-1)		(0-1)	
Sample Date	9/10/99		9/10/99		6/17/00		8/8/00		8/8/00		9/10/99		9/10/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	8,000	U	9,100	U	1,900	UJ	2,100	U	34	U	4	U	17	U
4,4'-DDE	8,000	U	9,100	U	437	J	2,100	U	34	U	2.3	J	22	
4,4'-DDT	8,000	U	9,100	U	1,900	UJ	2,100	U	34	U	11		14	
ALDRIN	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
ALPHA-BHC	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
ALPHA-CHLORDANE	36,000		44,800		7,270	J	6,010		126		4	U	14	
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL														
BETA-BHC	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
BOLSTAR														
CHLORDANE	76,000		94,500				48,300		1,010				21.4	
CHLORPYRIFOS														
COUMAPHOS														
DELTA-BHC	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
DEMETON														
DEMETON														
DIAZINON														
DICHLORVOS														
DIELDRIN	4,000	U	4,600	U	960	UJ	1,000	U	17	U	1.8	J	10	
DIMETHOATE														
DISULFOTON														
ENDOSULFAN I	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
ENDOSULFAN II	8,000	U	9,100	U	1,900	UJ	2,100	U	34	U	4	U	17	U
ENDOSULFAN SULFATE	8,000	U	9,100	U	1,900	UJ	2,100	U	34	U	4	U	17	U
ENDRIN	8,000	U	9,100	U	1,900	UJ	2,100	U	34	U	4	U	17	U
ENDRIN ALDEHYDE	8,000	U	9,100	U	1,900	UJ	2,100	U	34	U	4	U	17	U
ENDRIN KETONE	8,000	U	9,100	U	1,900	UJ	2,100	U	34	U	4	U	17	U
EPN														
ETHOPROP														
ETHYL PARATHION														
FENSULFOTHION														
FENTHION														
GAMMA-BHC (LINDANE)	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
GAMMA-CHLORDANE	40,000		49,700		7,600	J	6,620		134		4	U	7.4	
HEPTACHLOR	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
HEPTACHLOR EPOXIDE	4,000	U	4,600	U	960	UJ	1,000	U	17	U	2	U	8.6	U
MALATHION														
MERPHOS														
METHOXYCHLOR	16,000	U	18,000	U	3,800	UJ	4,100	U	68	U	8	U	35	U
METHYL PARATHION														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-302		CEF-P21-SS-303	
Sample	CEF-P21-SS-301-01		CEF-P21-SS-301-01-D		CEF-P21-SU-818-03		CEF-P21-SU-917-04		CEF-P21-SU-918-05		CEF-P21-SS-302-01		CEF-P21-SS-303-01	
Depth of Range (ft)	(0-1)		(0-1)		(2-3)		(3-4)		(4-5)		(0-1)		(0-1)	
Sample Date	9/10/99		9/10/99		6/17/00		8/8/00		8/8/00		9/10/99		9/10/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS														
MONOCROTOPHOS														
NALED														
PHORATE														
RONNEL														
STIROFOS														
SULFOTEPP														
TEPP														
TOKUTHION														
TOXAPHENE	400,000	U	460,000	U	96,000	UJ	100,000	U	1,700	U	200	U	860	U
TRICHLORONATE														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-303		CEF-P21-SS-501		CEF-P21-SS-502		CEF-P21-SS-503		CEF-P21-SS-503		CEF-P21-SS-503		CEF-P21-SS-506	
Sample	CEF-P21-SS-814-02		CEF-P21-SS-501-01		CEF-P21-SS-502-01		CEF-P21-SS-503-01		CEF-P21-SS-503-01-AVG		CEF-P21-SS-503-01-D		CEF-P21-SS-506-01	
Depth of Range (ft)	(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	6/17/00		1/24/00		1/24/00		1/24/00		1/24/00		1/24/00		1/24/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	35	U	45	U	4.2	U	4	U	4	U	4	U	37	U
4,4'-DDE	35	U	45	U	2	J	2.8	J	3.3	J	3.8	J	20.2	J
4,4'-DDT	35	U	45	U	4.2	U	2.5	J	2.8	J	3.1	J	37	U
ALDRIN	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
ALPHA-BHC	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
ALPHA-CHLORDANE	235		282		18.4		4.4		4.85		5.3		224	
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL														
BETA-BHC	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
BOLSTAR														
CHLORDANE			543		30.5		6.8		7.7		8.6		458	
CHLORPYRIFOS														
COUMAPHOS														
DELTA-BHC	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
DEMETON														
DEMETON														
DIAZINON														
DICHLORVOS														
DIELDRIN	17	U	22	U	2.1	U	2	U	1.3	J	1.3	J	19	U
DIMETHOATE														
DISULFOTON														
ENDOSULFAN I	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
ENDOSULFAN II	35	U	45	U	4.2	U	4	U	4	U	4	U	37	U
ENDOSULFAN SULFATE	35	U	45	U	4.2	U	4	U	4	U	4	U	37	U
ENDRIN	35	U	45	U	4.2	U	4	U	4	U	4	U	37	U
ENDRIN ALDEHYDE	35	U	45	U	4.2	U	4	U	4	U	4	U	37	U
ENDRIN KETONE	35	U	45	U	4.2	U	4	U	4	U	4	U	37	U
EPN														
ETHOPROP														
ETHYL PARATHION														
FENSULFOTHION														
FENTHION														
GAMMA-BHC (LINDANE)	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
GAMMA-CHLORDANE	177		261		12.1		2.4	J	2.85	J	3.3	J	234	
HEPTACHLOR	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
HEPTACHLOR EPOXIDE	17	U	22	U	2.1	U	2	U	2	U	2	U	19	U
MALATHION														
MERPHOS														
METHOXYCHLOR	70	U	90	U	8.4	U	8	U	7.95	U	7.9	U	75	U
METHYL PARATHION														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-303		CEF-P21-SS-501		CEF-P21-SS-502		CEF-P21-SS-503		CEF-P21-SS-503		CEF-P21-SS-503		CEF-P21-SS-506	
Sample	CEF-P21-SS-814-02		CEF-P21-SS-501-01		CEF-P21-SS-502-01		CEF-P21-SS-503-01		CEF-P21-SS-503-01-AVG		CEF-P21-SS-503-01-D		CEF-P21-SS-506-01	
Depth of Range (ft)	(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	6/17/00		1/24/00		1/24/00		1/24/00		1/24/00		1/24/00		1/24/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS														
MONOCROTOPHOS														
NALED														
PHORATE														
RONNEL														
STIROFOS														
SULFOTEPP														
TEPP														
TOKUTHION														
TOXAPHENE	1,700	U	2,200	U	210	U	200	U	200	U	200	U	1,900	U
TRICHLORONATE														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-509		CEF-P21-SS-702		CEF-P21-SS-702		CEF-P21-SS-806		CEF-P21-SS-806		CEF-P21-SS-806		CEF-P21-SS-806	
Sample	CEF-P21-SS-509-01		CEF-P21-SS-702-01		CEF-P21-SS-702-01-D		CEF-P21-SS-806-02		CEF-P21-SS-806-02-AVG		CEF-P21-SS-806-02-D		CEF-P21-SU-915-03	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(1-2)		(1-2)		(1-2)		(2-3)	
Sample Date	1/24/00		2/15/00		2/15/00		6/17/00		6/17/00		6/17/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	460	U	7.4	U	3.6	U	20	U	2,260	U	4,500	U	38	U
4,4'-DDE	790		8.6		5.5		20	U	2,260	U	4,500	U	10.6	J
4,4'-DDT	547		11.2		6.9		20	U	2,260	U	4,500	U	38	U
ALDRIN	230	U	3.7	U	1.8	U	9.8	U	1,105	U	2,200	U	19	U
ALPHA-BHC	230	U	3.7	U	1.8	U	9.8	U	1,105	U	2,200	U	19	U
ALPHA-CHLORDANE	1,890		43.2	J	21.9	J	117	J	13,309	J	26,500	J	123	
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL							100	U	100	U	100	U		
BETA-BHC	230	U	3.7	U	1.8	U	9.8	U	1,105	U	2,200	U	19	U
BOLSTAR							100	U	100	U	100	U		
CHLORDANE	3,860		87.9		41.5									
CHLORPYRIFOS							100	U	100	U	100	U		
COUMAPHOS							100	U	100	U	100	U		
DELTA-BHC	230	U	3.7	U	1.8	U	9.8	U	1,105	U	2,200	U	19	U
DEMETON														
DEMETON							100	U						
DIAZINON							100	U	100	U	100	U		
DICHLORVOS							100	U	100	U	100	U		
DIELDRIN	230	U	3.7	U	1.8	U	12.9	J	12.9	J	2,200	UJ	8.2	J
DIMETHOATE							200	U	200	U	200	U		
DISULFOTON							100	U	100	U	100	U		
ENDOSULFAN I	230	U	3.7	U	1.8	U	9.8	U	1,105	U	2,200	U	19	U
ENDOSULFAN II	460	U	7.4	U	3.6	U	20	U	2,260	U	4,500	U	38	U
ENDOSULFAN SULFATE	460	U	7.4	U	3.6	U	20	U	2,260	U	4,500	U	38	U
ENDRIN	460	U	7.4	U	3.6	U	20	U	2,260	U	4,500	U	38	U
ENDRIN ALDEHYDE	460	U	7.4	U	3.6	U	20	U	2,260	U	4,500	U	38	U
ENDRIN KETONE	460	U	7.4	U	3.6	U	20	U	2,260	U	4,500	U	38	U
EPN							100	U	100	U	100	U		
ETHOPROP							100	U	100	U	100	U		
ETHYL PARATHION							100	U	100	U	100	U		
FENSULFOTHION							200	U	200	U	200	U		
FENTHION							100	U	100	U	100	U		
GAMMA-BHC (LINDANE)	230	U	3.7	U	1.8	U	9.8	U	1,105	U	2,200	U	19	U
GAMMA-CHLORDANE	1,970		44.7	J	19.6	J	86.3	J	15,343	J	30,600	J	119	
HEPTACHLOR	230	U	3.7	U	1.8	U	9.8	U	1,105	U	2,200	U	19	U
HEPTACHLOR EPOXIDE	230	U	1.8	J	0.83	J	9.8	U	1,105	U	2,200	U	15	J
MALATHION							100	U	100	U	100	U		
MERPHOS							100	U	100	U	100	U		
METHOXYCHLOR	930	U	15	U	7.3	U	39	U	4,520	U	9,000	U	77	U
METHYL PARATHION							100	U	100	U	100	U		

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-509		CEF-P21-SS-702		CEF-P21-SS-702		CEF-P21-SS-806		CEF-P21-SS-806		CEF-P21-SS-806		CEF-P21-SS-806	
Sample	CEF-P21-SS-509-01		CEF-P21-SS-702-01		CEF-P21-SS-702-01-D		CEF-P21-SS-806-02		CEF-P21-SS-806-02-AVG		CEF-P21-SS-806-02-D		CEF-P21-SU-915-03	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(1-2)		(1-2)		(1-2)		(2-3)	
Sample Date	1/24/00		2/15/00		2/15/00		6/17/00		6/17/00		6/17/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS							200	U	200	U	200	U		
MONOCROTOPHOS							1,000	U	1,000	U	1,000	U		
NALED							1,000	U	1,000	U	1,000	U		
PHORATE							100	U	100	U	100	U		
RONNEL							100	U	100	U	100	U		
STIROFOS							100	U	100	U	100	U		
SULFOTEPP							100	U	100	U	100	U		
TEPP							1,000	U	1,000	U	1,000	U		
TOKUTHION							100	U	100	U	100	U		
TOXAPHENE	23,000	U	370	U	180	U	980	U	110,490	U	220,000	U	1,900	U
TRICHLORONATE							100	U	100	U	100	U		

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-806		CEF-P21-SS-807		CEF-P21-SS-809		CEF-P21-SS-811		CEF-P21-SS-812		CEF-P21-SS-813		CEF-P21-SS-813	
Sample	CEF-P21-SU-916-04		CEF-P21-SS-807-02		CEF-P21-SS-809-02		CEF-P21-SS-811-01		CEF-P21-SS-812-01		CEF-P21-SS-813-01		CEF-P21-SS-901-02	
Depth of Range (ft)	(3-4)		(1-2)		(1-2)		(0-1)		(0-1)		(0-1)		(1-2)	
Sample Date	7/13/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	41	U	3.5	U	24.8	J	24.3	J	3.5	U	113	J	3.8	U
4,4'-DDE	13.1	J	3.5	U	95	U	120		3.5	U	516		4.3	J
4,4'-DDT	41	U	3.5	U	433		222		3.5	U	189	J	4.2	J
ALDRIN	20	U	1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
ALPHA-BHC	20	U	1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
ALPHA-CHLORDANE	109		3.5	U	95	U	210		1.9	J	1,000		1.1	J
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL			100	U										
BETA-BHC	20	U	1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
BOLSTAR			100	U										
CHLORDANE														
CHLORPYRIFOS			100	U										
COUMAPHOS			100	U										
DELTA-BHC	20	U	1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
DEMETON														
DEMETON			100	U										
DIAZINON			100	U										
DICHLORVOS			100	U										
DIELDRIN	7.9	J	1.7	U	48	U	27.3	J	1.8	U	2,680		1.9	U
DIMETHOATE			200	U										
DISULFOTON			100	U										
ENDOSULFAN I	20	U	1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
ENDOSULFAN II	41	U	3.5	U	95	U	68	U	3.5	U	360	U	3.8	U
ENDOSULFAN SULFATE	41	U	3.5	U	95	U	68	U	3.5	U	360	U	3.8	U
ENDRIN	41	U	3.5	U	95	U	68	U	3.5	U	360	U	3.8	U
ENDRIN ALDEHYDE	41	U	3.5	U	95	U	68	U	3.5	U	360	U	3.8	U
ENDRIN KETONE	41	U	3.5	U	95	U	68	U	3.5	U	360	U	3.8	U
EPN			100	U										
ETHOPROP			100	U										
ETHYL PARATHION			100	U										
FENSULFOTHION			200	U										
FENTHION			100	U										
GAMMA-BHC (LINDANE)	20	U	1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
GAMMA-CHLORDANE	90.2		3.5	U	95	U	222		1.5	J	1,100		1.4	J
HEPTACHLOR	20	U	1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
HEPTACHLOR EPOXIDE	44.8		1.7	U	48	U	34	U	1.8	U	180	U	1.9	U
MALATHION			100	U										
MERPHOS			100	U										
METHOXYCHLOR	82	U	6.9	U	190	U	140	U	7	U	720	U	7.7	U
METHYL PARATHION			100	U										

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-806		CEF-P21-SS-807		CEF-P21-SS-809		CEF-P21-SS-811		CEF-P21-SS-812		CEF-P21-SS-813		CEF-P21-SS-813	
Sample	CEF-P21-SU-916-04		CEF-P21-SS-807-02		CEF-P21-SS-809-02		CEF-P21-SS-811-01		CEF-P21-SS-812-01		CEF-P21-SS-813-01		CEF-P21-SS-901-02	
Depth of Range (ft)	(3-4)		(1-2)		(1-2)		(0-1)		(0-1)		(0-1)		(1-2)	
Sample Date	7/13/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS			200	U										
MONOCROTOPHOS			1,000	U										
NALED			1,000	U										
PHORATE			100	U										
RONNEL			100	U										
STIROFOS			100	U										
SULFOTEPP			100	U										
TEPP			1,000	U										
TOKUTHION			100	U										
TOXAPHENE	2,000	U	170	U	4,800	U	3,400	U	180	U	18,000	U	190	U
TRICHLORONATE			100	U										

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-813		CEF-P21-SS-813		CEF-P21-SS-813		CEF-P21-SS-813		CEF-P21-SS-815		CEF-P21-SS-816		CEF-P21-SS-817	
Sample	CEF-P21-SS-901-02-AVG		CEF-P21-SS-901-02-D		CEF-P21-SU-902-03		CEF-P21-SU-903-04		CEF-P21-SS-815-01		CEF-P21-SS-816-01		CEF-P21-SS-817-02	
Depth of Range (ft)	(1-2)		(1-2)		(2-3)		(3-4)		(0-1)		(0-1)		(1-2)	
Sample Date	7/13/00		7/13/00		7/13/00		7/13/00		6/17/00		6/17/00		6/17/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	3.9	U	3.9	U	3.9	U	3.9	U	12.1	J	4.8	J	1,800	U
4,4'-DDE	13.2	J	13.2	J	12.4		3.9	U	31		1.4	J	1,800	U
4,4'-DDT	12.8	J	12.8	J	12		3.9	U	104	J	9.5	J	1,800	U
ALDRIN	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
ALPHA-BHC	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
ALPHA-CHLORDANE	3.6	J	3.6	J	2.7	J	3.9	U	17.7		10	J	6,960	J
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL														
BETA-BHC	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
BOLSTAR														
CHLORDANE														
CHLORPYRIFOS														
COUMAPHOS														
DELTA-BHC	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
DEMETON														
DEMETON														
DIAZINON														
DICHLORVOS														
DIELDRIN	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
DIMETHOATE														
DISULFOTON														
ENDOSULFAN I	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
ENDOSULFAN II	3.9	U	3.9	U	3.9	U	3.9	U	14	U	34	U	1,800	U
ENDOSULFAN SULFATE	3.9	U	3.9	U	3.9	U	3.9	U	14	U	34	U	1,800	U
ENDRIN	3.9	U	3.9	U	3.9	U	3.9	U	14	U	34	U	1,800	U
ENDRIN ALDEHYDE	3.9	U	3.9	U	3.9	U	3.9	U	14	U	34	U	1,800	U
ENDRIN KETONE	3.9	U	3.9	U	3.9	U	3.9	U	14	U	34	U	1,800	U
EPN														
ETHOPROP														
ETHYL PARATHION														
FENSULFOTHION														
FENTHION														
GAMMA-BHC (LINDANE)	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
GAMMA-CHLORDANE	3.6	J	3.6	J	2.8	J	3.9	U	11	J	5.1	J	7,360	J
HEPTACHLOR	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
HEPTACHLOR EPOXIDE	1.9	U	1.9	U	2	U	2	U	6.8	U	17	U	880	U
MALATHION														
MERPHOS														
METHOXYCHLOR	7.7	U	7.7	U	7.9	U	7.8	U	27	U	68	U	3,500	U
METHYL PARATHION														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-813		CEF-P21-SS-813		CEF-P21-SS-813		CEF-P21-SS-813		CEF-P21-SS-815		CEF-P21-SS-816		CEF-P21-SS-817	
Sample	CEF-P21-SS-901-02-AVG		CEF-P21-SS-901-02-D		CEF-P21-SU-902-03		CEF-P21-SU-903-04		CEF-P21-SS-815-01		CEF-P21-SS-816-01		CEF-P21-SS-817-02	
Depth of Range (ft)	(1-2)		(1-2)		(2-3)		(3-4)		(0-1)		(0-1)		(1-2)	
Sample Date	7/13/00		7/13/00		7/13/00		7/13/00		6/17/00		6/17/00		6/17/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS														
MONOCROTOPHOS														
NALED														
PHORATE														
RONNEL														
STIROFOS														
SULFOTEPP														
TEPP														
TOKUTHION														
TOXAPHENE	190	U	190	U	200	U	200	U	680	U	1,700	U	88,000	U
TRICHLORONATE														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-817		CEF-P21-SS-817		CEF-P21-SS-820		CEF-P21-SS-822		CEF-P21-SS-831		CEF-P21-SS-904		CEF-P21-SS-904	
Sample	CEF-P21-SS-817-02-AVG		CEF-P21-SS-817-02-D		CEF-P21-SS-820-02		CEF-P21-SS-822-02		CEF-P21-SS-831-01		CEF-P21-SS-904-01		CEF-P21-SU-908-02	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(1-2)		(0-1)		(0-1)		(1-2)	
Sample Date	6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		7/13/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
4,4'-DDD	985	U	170	U	3.5	U	3.5	U	34	U	300	U	15	U
4,4'-DDE	133	J	133	J	3.5	U	3.5	U	15	J	83.9	J	3.4	J
4,4'-DDT	985	U	170	U	3.5	U	3.5	U	16.3	J	300	U	15	U
ALDRIN	483	U	86	U	1.7	U	1.7	U	17	U	150	U	7.6	U
ALPHA-BHC	483	U	86	U	1.7	U	1.7	U	17	U	150	U	7.6	U
ALPHA-CHLORDANE	3,782	J	603	J	3.5	U	2.4	J	190		1,190		49.4	
AROCLOR-1016														
AROCLOR-1221														
AROCLOR-1232														
AROCLOR-1242														
AROCLOR-1248														
AROCLOR-1254														
AROCLOR-1260														
AZINPHOS METHYL														
BETA-BHC	483	U	86	U	1.7	U	1.7	U	17	U	150	U	7.6	U
BOLSTAR														
CHLORDANE														
CHLORPYRIFOS														
COUMAPHOS														
DELTA-BHC	483	U	86	U	1.7	U	1.7	U	17	U	150	U	7.6	U
DEMETON														
DEMETON														
DIAZINON														
DICHLORVOS														
DIELDRIN	483	U	86	U	1.7	U	1.7	U	14.9	J	150	U	7.6	U
DIMETHOATE														
DISULFOTON														
ENDOSULFAN I	483	U	86	U	1.7	U	1.7	U	17	U	150	U	7.6	U
ENDOSULFAN II	985	U	170	U	3.5	U	3.5	U	34	U	300	U	15	U
ENDOSULFAN SULFATE	985	U	170	U	3.5	U	3.5	U	34	U	300	U	15	U
ENDRIN	985	U	170	U	3.5	U	3.5	U	34	U	300	U	15	U
ENDRIN ALDEHYDE	985	U	170	U	3.5	U	3.5	U	34	U	300	U	15	U
ENDRIN KETONE	985	U	170	U	3.5	U	3.5	U	34	U	300	U	15	U
EPN														
ETHOPROP														
ETHYL PARATHION														
FENSULFOTHION														
FENTHION														
GAMMA-BHC (LINDANE)	483	U	86	U	0.81	J	1.7	U	17	U	150	U	7.6	U
GAMMA-CHLORDANE	3,998	J	635	J	3.5	U	2	J	211		1,270		53.5	
HEPTACHLOR	483	U	86	U	1.7	U	1.7	U	17	U	150	U	7.6	U
HEPTACHLOR EPOXIDE	483	U	86	U	1.7	U	1.7	U	17	U	150	U	7.6	U
MALATHION														
MERPHOS														
METHOXYCHLOR	1,920	U	340	U	6.9	U	6.9	U	68	U	590	U	30	U
METHYL PARATHION														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-817		CEF-P21-SS-817		CEF-P21-SS-820		CEF-P21-SS-822		CEF-P21-SS-831		CEF-P21-SS-904		CEF-P21-SS-904	
Sample	CEF-P21-SS-817-02-AVG		CEF-P21-SS-817-02-D		CEF-P21-SS-820-02		CEF-P21-SS-822-02		CEF-P21-SS-831-01		CEF-P21-SS-904-01		CEF-P21-SU-908-02	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(1-2)		(0-1)		(0-1)		(1-2)	
Sample Date	6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		7/13/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs														
MEVINPHOS														
MONOCROTOPHOS														
NALED														
PHORATE														
RONNEL														
STIROFOS														
SULFOTEPP														
TEPP														
TOKUTHION														
TOXAPHENE	48,300	U	8,600	U	170	U	170	U	1,700	U	15,000	U	760	U
TRICHLORONATE														

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-904		CEF-P21-SS-904		CEF-P21-SS-905		CEF-P21-SS-906		CEF-P21-SS-907	
Sample	CEF-P21-SU-909-03		CEF-P21-SU-910-04		CEF-P21-SS-905-01		CEF-P21-SS-906-01		CEF-P21-SS-907-01	
Depth of Range (ft)	(2-3)		(3-4)		(0-1)		(0-1)		(0-1)	
Sample Date	7/13/00		7/13/00		7/13/00		7/13/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs										
4,4'-DDD	20	U	16	U	3.6	U	7.8	U	3.8	U
4,4'-DDE	5.3	J	16	U	3.6	U	7.8	U	3.8	U
4,4'-DDT	20	U	16	U	3.6	U	7.8	U	3.8	U
ALDRIN	9.8	U	8	U	1.8	U	3.9	U	1.9	U
ALPHA-BHC	9.8	U	8	U	1.8	U	3.9	U	1.9	U
ALPHA-CHLORDANE	89.8		47.9		7.6		23.8		3.8	U
AROCLOR-1016										
AROCLOR-1221										
AROCLOR-1232										
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
AZINPHOS METHYL										
BETA-BHC	9.8	U	8	U	1.8	U	3.9	U	1.9	U
BOLSTAR										
CHLORDANE										
CHLORPYRIFOS										
COUMAPHOS										
DELTA-BHC	9.8	U	8	U	1.8	U	3.9	U	1.9	U
DEMETON										
DEMETON										
DIAZINON										
DICHLORVOS										
DIELDRIN	9.8	U	8	U	0.85	J	3.9	U	1.9	U
DIMETHOATE										
DISULFOTON										
ENDOSULFAN I	9.8	U	8	U	1.8	U	3.9	U	1.9	U
ENDOSULFAN II	20	U	16	U	3.6	U	7.8	U	3.8	U
ENDOSULFAN SULFATE	20	U	16	U	3.6	U	7.8	U	3.8	U
ENDRIN	20	U	16	U	3.6	U	7.8	U	3.8	U
ENDRIN ALDEHYDE	20	U	16	U	3.6	U	7.8	U	3.8	U
ENDRIN KETONE	20	U	16	U	3.6	U	7.8	U	3.8	U
EPN										
ETHOPROP										
ETHYL PARATHION										
FENSULFOTHION										
FENTHION										
GAMMA-BHC (LINDANE)	9.8	U	8	U	1.8	U	3.9	U	1.9	U
GAMMA-CHLORDANE	96		52		11.2		28		3.8	U
HEPTACHLOR	9.8	U	8	U	1.8	U	3.9	U	1.9	U
HEPTACHLOR EPOXIDE	9.8	U	8	U	1.8	U	3.9	U	1.9	U
MALATHION										
MERPHOS										
METHOXYCHLOR	39	U	32	U	7.2	U	16	U	7.6	U
METHYL PARATHION										

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-904		CEF-P21-SS-904		CEF-P21-SS-905		CEF-P21-SS-906		CEF-P21-SS-907	
Sample	CEF-P21-SU-909-03		CEF-P21-SU-910-04		CEF-P21-SS-905-01		CEF-P21-SS-906-01		CEF-P21-SS-907-01	
Depth of Range (ft)	(2-3)		(3-4)		(0-1)		(0-1)		(0-1)	
Sample Date	7/13/00		7/13/00		7/13/00		7/13/00		7/13/00	
Matrix	Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs										
MEVINPHOS										
MONOCROTOPHOS										
NALED										
PHORATE										
RONNEL										
STIROFOS										
SULFOTEPP										
TEPP										
TOKUTHION										
TOXAPHENE	980	U	800	U	180	U	390	U	190	U
TRICHLORONATE										

SOIL SAMPLE RESULTS
HERBICIDES
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020	90S021	90S022	90S023	90S024	90S025	90S031	90S034	90S032
Sample	90S02001	90S02101	90S02201	90S02301	90S02401	90S02501	90S03101	90S03401	90S3201
Depth of Range (ft)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)
Sample Date	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98	12/12/98
Matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO
Units	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Herbicides									
2,4,5-T	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
2,4,5-TP (SILVEX)	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	80
2,4-D	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	47
2,4-DB	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
3,5-DCBA	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	38
4-NITROPHENOL	25 U	27 U	22 U	400 U	4100 U	22 U	22 U	360 U	390
ACIFLUORFEN, SODIUM	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
BENTAZON	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
CHLORAMBEN	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	220 U
DACTHAL	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
DALAPON	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
DICAMBA	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
DICHLOROPROP	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	220 U
DINOSEB	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U
MCPA	1200 U	1400 U	1100 U	1200 U	620 U	1100 U	1100 U	1100 U	47000
MCPP	1200 U	1400 U	1100 U	1200 U	620 U	1100 U	1100 U	1100 U	33000
PENTACHLOROPHENOL	25 U	27 U	22 U	24 U	4100 U	22 U	22 U	22 U	26
PICLORAM	25 U	27 U	22 U	24 U	12 U	22 U	22 U	22 U	22 U

SOIL SAMPLE RESULTS
HERBICIDES
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S033	CEF-P21-SS-001	CEF-P21-SS-002	CEF-P21-SS-003	CEF-P21-SS-003	CEF-P21-SS-004	CEF-P21-SS-005
Sample	90S3301	CEF-P21-SS-001-01	CEF-P21-SS-002-01	CEF-P21-SS-003-01	CEF-P21-SS-003-D-01	CEF-P21-SS-004-01	CEF-P21-SS-005-01
Depth of Range (ft)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)
Sample Date	12/12/98	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99
Matrix	SO	SO	SO	SO	SO	SO	SO
Units	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Herbicides							
2,4,5-T	23 U	14 U	11 U	14 U	14 U	12 U	13 U
2,4,5-TP (SILVEX)	23 U	14 U	11 U	14 U	14 U	12 U	13 U
2,4-D	23 U	100 U	80 U	100 U	100 U	83 U	90 U
2,4-DB	23 U	140 U	110 U	140 U	140 U	120 U	130 U
3,5-DCBA	23 U						
4-NITROPHENOL	380 U	280 U	230 U	290 U	290 U	240 U	260 U
ACIFLUORFEN, SODIUM	23 U						
BENTAZON	23 U						
CHLORAMBEN	23 U						
DACTHAL	460						
DALAPON	23 U	280 U	230 U	290 U	290 U	240 U	260 U
DICAMBA	23 U	28 U	23 U	29 U	29 U	24 U	26 U
DICHLOROPROP	23 U	71 U	57 U	72 U	72 U	59 U	64 U
DINOSEB	23 U	28 U	23 U	29 U	29 U	24 U	26 U
MCPA	1200 U	5700 U	4600 U	5800 U	5700 U	4700 U	5100 U
MCPP	1200 U	7100 U	5700 U	7200 U	7200 U	5900 U	6400 U
PENTACHLOROPHENOL	23 U	14 U	11 U	14 U	14 U	12 U	13 U
PICLORAM	23 U						

SOIL SAMPLE RESULTS
HERBICIDES
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-006	CEF-P21-SS-007	CEF-P21-SS-008	CEF-P21-SS-009	CEF-P21-SS-010	CEF-P21-SS-011	CEF-P21-SS-012
Sample	CEF-P21-SS-006-01	CEF-P21-SS-007-01	CEF-P21-SS-008-01	CEF-P21-SS-009-01	CEF-P21-SS-010-01	CEF-P21-SS-011-01	CEF-P21-SS-012-01
Depth of Range (ft)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)
Sample Date	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99
Matrix	SO	SO	SO	SO	SO	SO	SO
Units	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Herbicides							
2,4,5-T	12 U	12 U	13 U	13 U	14 U	13 U	12 U
2,4,5-TP (SILVEX)	12 U	12 U	13 U	13 U	14 U	13 U	12 U
2,4-D	88 U	85 U	93 U	93 U	95 U	91 U	86 U
2,4-DB	120 U	120 U	130 U	130 U	140 U	130 U	120 U
3,5-DCBA							
4-NITROPHENOL	250 U	240 U	270 U	270 U	270 U	260 U	250 U
ACIFLUORFEN, SODIUM							
BENTAZON							
CHLORAMBEN							
DACTHAL							
DALAPON	250 U	240 U	270 U	270 U	270 U	260 U	250 U
DICAMBA	25 U	24 U	27 U	27 U	27 U	26 U	25 U
DICHLOROPROP	63 U	60 U	67 U	67 U	68 U	65 U	62 U
DINOSEB	25 U	24 U	27 U	27 U	27 U	26 U	25 U
MCPA	500 U	4800 U	5300 U	5300 U	5400 U	5200 U	4900 U
MCPP	6300 U	6000 U	6700 U	6700 U	6800 U	6500 U	6200 U
PENTACHLOROPHENOL	12 U	12 U	13 U	13 U	14 U	13 U	12 U
PICLORAM							

SOIL SAMPLE RESULTS
HERBICIDES
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-013	CEF-P21-SS-013	CEF-P21-SS-014	CEF-P21-SS-015	CEF-P21-SS-016	CEF-P21-SS-017	BOR-A-1-1
Sample	CEF-P21-SS-013	CEF-P21-SS-013-D	CEF-P21-SS-014-01	CEF-P21-SS-015-01	CEF-P21-SS-016-01	CEF-P21-SS-017-01	CEF-P21-SS-803-03
Depth of Range (ft)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(2-3)
Sample Date	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	04/29/99	06/17/00
Matrix	SO	SO	SO	SO	SO	SO	SO
Units	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Herbicides							
2,4,5-T	12 U	12 U	13 U	12 U	10 U	21 U	3.5 U
2,4,5-TP (SILVEX)	12 U	12 U	13 U	12 U	10 U	21 U	3.5 U
2,4-D	84 U	84 U	91 U	83 U	74 U	140 U	18 U
2,4-DB	120 U	120 U	130 U	120 U	100 U	210 U	
3,5-DCBA							
4-NITROPHENOL	240 U	240 U	260 U	240 U	210 U	420 U	
ACIFLUORFEN, SODIUM							
BENTAZON							
CHLORAMBEN							
DACTHAL							
DALAPON	240 U	240 U	260 U	240 U	210 U	420 U	
DICAMBA	24 U	24 U	26 U	24 U	21 U	42 U	
DICHLOROPROP	60 U	60 U	65 U	60 U	52 U	100 U	
DINOSEB	24 U	24 U	26 U	24 U	21 U	42 U	
MCPA	4800 U	4800 U	5200 U	4800 U	4200 U	8300 U	
MCPP	6000 U	6000 U	6500 U	6000 U	5200 U	10000 U	
PENTACHLOROPHENOL	12 U	12 U	13 U	12 U	10 U	21 U	
PICLORAM							

SOIL SAMPLE RESULTS
HERBICIDES
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-817	CEF-P21-SS-817	CEF-P21-SS-012	CEF-P21-SS-820	CEF-P21-SS-822	CEF-P21-SS-301
Sample	CEF-P21-SS-817-02	CEF-P21-SS-817-02-D	CEF-P21-SS-819-02	CEF-P21-SS-820-02	CEF-P21-SS-822-02	CEF-P21-SU-818-03
Depth of Range (ft)	(1-2)	(1-2)	(1-2)	(1-2)	(1-2)	(2-3)
Sample Date	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00	06/17/00
Matrix	SO	SO	SO	SO	SO	SO
Units	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Herbicides						
2,4,5-T	3.5 U	3.4 U	3.4 U	3.5 U	3.5 U	3.8 UJ
2,4,5-TP (SILVEX)	3.5 U	3.4 U	3.4 U	3.5 U	3.5 U	3.8 UJ
2,4-D	18 U	17 U	17 U	17 U	17 U	19 UJ
2,4-DB						
3,5-DCBA						
4-NITROPHENOL						
ACIFLUORFEN, SODIUM						
BENTAZON						
CHLORAMBEN						
DACTHAL						
DALAPON						
DICAMBA						
DICHLOROPROP						
DINOSEB						
MCPA						
MCPP						
PENTACHLOROPHENOL						
PICLORAM						

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90B00201		90S001		90S002		90S003		90S005		90S006		90S007	
Sample	90B00201		90S00101		90S00201		90S00301		90S00501		90S00601		90S00701	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		8/28/98		8/28/98		8/28/98		8/28/98		8/28/98		8/28/98	
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														
ARSENIC	1.8	J	1.2	J	47		16		2.2		1.6	J	0.9	J
ALUMINUM														
ANTIMONY														
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM														
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S010		90S011		90S012		90S013		90S014		90S014		90S015	
Sample	90S01001		90S01101		90S01201		90S01301		90S01401		90S01402		90S01501	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)	
Sample Date	8/28/98		8/28/98		8/28/98		8/28/98		12/12/98		12/12/98		12/12/98	
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														
ARSENIC	7.4		3.5		5.4		0.9	J	15		62		1	J
ALUMINUM														
ANTIMONY														
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM														
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S015		90S016		90S016		90S017		90S017		90S018		90S018	
Sample	90S01502		90S01601		90S01602		90S01701		90S01702		90S01801		90S01802	
Depth of Range (ft)	(1-2)		(0-1)		(1-2)		(0-1)		(1-2)		(0-1)		(1-2)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
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														
ARSENIC	7.3		0.9	J	0.6	U	0.5	U	0.6	U	0.9	J	0.8	J
ALUMINUM														
ANTIMONY														
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM														
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S019		90S019		90S020		90S021		90S022		90S023		90S024	
Sample	90S01901		90S01902		90S02001		90S02101		90S02201		90S02301		90S02401	
Depth of Range (ft)	(0-1)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
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														
ARSENIC	0.5	U	0.7	J	5.6		3.2		4.3		1.1	J	69	
ALUMINUM					3,500		2,200		1,100		1,200		2,400	
ANTIMONY					2	U	3	U	2	U	2	U	2	U
BARIUM					25	U	27	U	22	U	24	U	25	U
BERYLLIUM					1	U	1	U	1	U	1	U	1	U
CADMIUM					1	U	1	U	1.6		1	U	2.8	
CALCIUM					7,500		13,000		100,000		6,400		8,600	
CHROMIUM					8.6		20		9.9		5.5		30	
COBALT					6	U	7	U	6	U	6	U	6	U
COPPER					9.6		19		15		8		14	
CYANIDE														
IRON					960		1,300		930		520		5,100	
LEAD					12		20		12		6.1		66	
MAGNESIUM					200		400		13,000		170		150	
MANGANESE					24		55		58		16		40	
MERCURY					0.09		0.088		3.5		0.14		0.14	
NICKEL					6	U	7	U	6	U	6	U	6.9	
POTASSIUM					95		99		67		52		58	
SELENIUM					2	U	3	U	2	U	2	U	2	U
SILVER					2	U	3	U	2	U	2	U	2	U
SODIUM					31	U	34	U	28	U	30	U	31	U
THALLIUM					1	U	1	U	1	U	1	U	1	U
VANADIUM					2.2		3		3.7		1		3.1	
ZINC					36		78		27		24		910	

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S025		90S026		90S027		90S031		90S032		90S033		90S034	
Sample	90S02501		90S02601		90S02701		90S03101		90S3201		90S3301		90S03401	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
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														
ARSENIC	1.3	J	9.3		1.8	J	0.5	U	30		2.2		3	J
ALUMINUM	890						300		760		480		240	
ANTIMONY	2	U					2	U	2	U	2	U	2	U
BARIUM	22	U					22	U	22	U	23	U	22	U
BERYLLIUM	1	U					1	U	1	U	1	U	1	U
CADMIUM	1	U					1	U	1	U	1	U	1	U
CALCIUM	27	U					1,600		17,000		29	U	2,300	
CHROMIUM	3.6						1	U	3.9		1.7		1.3	
COBALT	5	U					5	U	6	U	6	U	5	U
COPPER	5	U					5	U	6	U	6	U	5	U
CYANIDE														
IRON	400						100		470		440		150	
LEAD	7						1.4		18		10		4	
MAGNESIUM	470						27	U	130		190		27	U
MANGANESE	12						1.5		18		7.8		6	
MERCURY	0.074						0.01	U	0.027		0.016	J	0.036	
NICKEL	5	U					5	U	6	U	6	U	5	U
POTASSIUM	27	U					27	U	28	U	29	U	27	U
SELENIUM	2	U					2	U	2	U	2	U	4	U
SILVER	2	U					2	U	2	U	2	U	2	U
SODIUM	27	U					27	U	28	U	29	U	27	U
THALLIUM	1	U					1	U	1	U	1	U	2	U
VANADIUM	1	U					1	U	1	U	1	U	1	U
ZINC	52						5	U	24		21		11	

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1		BOR-A-5-1		BOR-A-6-1		BOR-A-7-1	
Sample	BOR-A-1-1		BOR-A-2-1		BOR-A-3-1		BOR-A-4-1		BOR-A-5-1		BOR-A-6-1		BOR-A-7-1	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/5/91		11/5/91		11/5/91		11/5/91		11/5/91		11/5/91		11/5/91	
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														
ARSENIC	2	J	0.36	J	0.44	J	0.94	J	3		46.9		0.39	J
ALUMINUM	3,370		2,530		2,700		2,260		5,170		4,270		3,110	
ANTIMONY	11.3	UJ	11	UJ	9.7	UJ	10.2	UJ	10.8	UJ	9.3	UJ	11.1	UJ
BARIUM	10	J	15.1	J	6.4	J	8.4	J	11.1	J	64	J	14.2	J
BERYLLIUM	0.03	UJ	0.029	UJ	0.025	UJ	0.027	U	0.028	UJ	0.024	UJ	0.029	UJ
CADMIUM	4.5	J	0.44	UJ	0.39	UJ	0.41	UJ	0.43	UJ	0.37	UJ	0.45	UJ
CALCIUM	5,840		10,400		1,400		1,280		4,720		110,000		9,180	
CHROMIUM	7.6		4.3		4.8		4.8		8.7		19		5.7	
COBALT	1.4	U	1.4	U	1.2	U	1.3	U	1.7	J	1.2	U	1.4	U
COPPER	10.8	J	5.3	J	3.6	J	5.3	J	8.3	J	9.4	J	74.4	J
CYANIDE	0.51	U	0.5	U	1	J	0.46	U	0.48	U	1.9	J	0.51	U
IRON	1,860	J	798	J	1,060	J	639	J	1,090	J	2,470	J	776	J
LEAD	22.5		9.7		4.9		47.4		22.8		19.4		11.8	
MAGNESIUM	221	J	268	J	111	J	74.9	J	340	J	17,500		290	J
MANGANESE	19.9		18.7		3.3	J	3.9		30		317		12	
MERCURY	0.76		0.1	U	0.15		0.89		0.38		0.093	U	0.1	U
NICKEL	2	UJ	3	J	2.4	J	2	J	3.4	J	3	J	70.7	J
POTASSIUM	49.9	U	48.6	U	42.7	U	44.9	U	109	J	389	J	49.1	U
SELENIUM	0.5	J	0.5	J	0.6	J	0.37	J	0.34	J	0.3	J	0.38	J
SILVER	0.65	U	0.64	U	0.56	U	0.99	J	0.62	U	0.54	U	0.64	U
SODIUM	308	UJ	309	UJ	270	UJ	296	UJ	324	UJ	296	UJ	352	UJ
THALLIUM	0.4	U	0.39	U	0.34	U	0.36	U	0.38	U	0.33	U	0.39	U
VANADIUM	2.1	J	1.8	J	3.3	J	1.6	J	3.3	J	15.5		2.9	J
ZINC	43.6	J	14.1	J	7.4	UJ	27.6	J	26.6	J	47.2	J	27.7	J

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-001		CEF-P21-SS-002		CEF-P21-SS-003		CEF-P21-SS-003		CEF-P21-SS-004		CEF-P21-SS-005		CEF-P21-SS-006	
Sample	CEF-P21-SS-001-01		CEF-P21-SS-002-01		CEF-P21-SS-003-01		CEF-P21-SS-003-D-01		CEF-P21-SS-004-01		CEF-P21-SS-005-01		CEF-P21-SS-006-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
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														
ARSENIC	1.1	U	1.1	U	2.7		3		4.7		1.9		22.2	
ALUMINUM													1,860	
ANTIMONY													0.34	U
BARIUM													10.6	
BERYLLIUM													0.14	U
CADMIUM													2.4	
CALCIUM													20,700	
CHROMIUM													7.6	
COBALT													0.24	U
COPPER													12.5	
CYANIDE														
IRON													670	
LEAD													17.3	
MAGNESIUM													517	
MANGANESE													11.5	
MERCURY													0.1	
NICKEL													1.1	
POTASSIUM													67.4	
SELENIUM													0.43	U
SILVER													0.36	
SODIUM													294	
THALLIUM													0.42	U
VANADIUM	3.4		3.4		2.4		2.5		4.3		2.9		2.6	
ZINC													20.9	

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-007		CEF-P21-SS-008		CEF-P21-SS-009		CEF-P21-SS-010		CEF-P21-SS-011		CEF-P21-SS-012		CEF-P21-SS-013	
Sample	CEF-P21-SS-007-01		CEF-P21-SS-008-01		CEF-P21-SS-009-01		CEF-P21-SS-010-01		CEF-P21-SS-011-01		CEF-P21-SS-012-01		CEF-P21-SS-013	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
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														
ARSENIC	12		8.5		4.4		17.9		3.1		3.9		6.2	
ALUMINUM									1,050				2,090	
ANTIMONY									0.35	U			0.35	U
BARIUM									11.1				11.5	
BERYLLIUM									0.17	U			0.17	U
CADMIUM									0.5	U			0.77	
CALCIUM									13,300				1,500	
CHROMIUM									3.2				15.9	
COBALT									0.22	U			0.3	U
COPPER									4.9				8.8	
CYANIDE														
IRON									438				592	
LEAD									7.1				9.7	
MAGNESIUM									129				124	
MANGANESE									5.2				17.6	
MERCURY									0.06				0.04	
NICKEL									0.75				1.6	
POTASSIUM									39.9				41.8	
SELENIUM									0.32	U			0.53	U
SILVER									0.69				0.44	
SODIUM									317				322	
THALLIUM									0.43	U			0.43	U
VANADIUM	4.1		4.3		1.7		1.7		1.5		2.6		2.1	
ZINC									13.6				12.5	

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-013		CEF-P21-SS-014		CEF-P21-SS-016		CEF-P21-SS-017		CEF-P21-SS-018		CEF-P21-SS-019		CEF-P21-SS-020	
Sample	CEF-P21-SS-013-D		CEF-P21-SS-014-01		CEF-P21-SS-016-01		CEF-P21-SS-017-01		CEF-P21-SS-018-01		CEF-P21-SS-019-01		CEF-P21-SS-020-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
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														
ARSENIC	5.7		2.5		10.2		10.9		3.2		1.8		0.62	U
ALUMINUM	2,070				1,150									
ANTIMONY	0.35	U			0.78	U								
BARIUM	10.5				17.7									
BERYLLIUM	0.23	U			0.22	U								
CADMIUM	0.47	U			2									
CALCIUM	1,500				28,600									
CHROMIUM	13.3				15.5									
COBALT	0.15	U			0.67	U								
COPPER	7.5				13.4									
CYANIDE														
IRON	496				6,250									
LEAD	9.2				80.4									
MAGNESIUM	115				552									
MANGANESE	12.8				106									
MERCURY	0.11				0.04									
NICKEL	0.88				2.8									
POTASSIUM	34.6				51.3									
SELENIUM	0.5	U			0.55	U								
SILVER	0.16				0.32									
SODIUM	299				371									
THALLIUM	0.44	U			0.44	U								
VANADIUM	1.9		1.4		3.5		3.5							
ZINC	9.2				142									

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-021		CEF-P21-SS-101		CEF-P21-SS-102		CEF-P21-SS-103		CEF-P21-SS-104		CEF-P21-SS-105		CEF-P21-SS-105	
Sample	CEF-P21-SS-021-01		CEF-P21-SS-101-01		CEF-P21-SS-102-01		CEF-P21-SS-103-01		CEF-P21-SS-104-01		CEF-P21-SS-105-01		CEF-P21-SS-105-01-D	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99	
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														
ARSENIC	0.46	U	2.8		2.4	U	15.4		9.9		1.6	U	1.8	U
ALUMINUM														
ANTIMONY														
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM														
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-106		CEF-P21-SS-107		CEF-P21-SS-108		CEF-P21-SS-109		CEF-P21-SS-110		CEF-P21-SS-110		CEF-P21-SS-111	
Sample	CEF-P21-SS-106-01		CEF-P21-SS-107-01		CEF-P21-SS-108-01		CEF-P21-SS-109-01		CEF-P21-SS-110-01		CEF-P21-SS-110-02		CEF-P21-SS-111-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)	
Sample Date	6/10/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99	
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														
ARSENIC	1.7	U	0.36	U	3		4.8		2.7		0.37	U	0.54	U
ALUMINUM														
ANTIMONY														
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM														
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-111		SD-A-3		SD-A-3	
Sample	CEF-P21-SS-111-01-D		90B00101		90S00401	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)	
Sample Date	6/10/99		12/12/98		8/28/98	
Matrix	Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG	
Inorganic Compounds						
ARSENIC	0.52	U	11		21	
ALUMINUM						
ANTIMONY						
BARIUM						
BERYLLIUM						
CADMIUM						
CALCIUM						
CHROMIUM						
COBALT						
COPPER						
CYANIDE						
IRON						
LEAD						
MAGNESIUM						
MANGANESE						
MERCURY						
NICKEL						
POTASSIUM						
SELENIUM						
SILVER						
SODIUM						
THALLIUM						
VANADIUM						
ZINC						

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S023		90S024		90S024		CEF-P21-SS-006		CEF-P21-SS-012		CEF-P21-SS-012	
Sample	CEF-P21-SS-805-02		CEF-P21-SS-804-02		CEF-P21-SS-801-02		CEF-P21-SU-802-03		CEF-P21-SU-403-03		CEF-P21-SS-819-02		CEF-P21-SS-819-02-AVG	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(2-3)		(2-3)		(1-2)		(1-2)	
Sample Date	6/17/00		6/17/00		6/17/00		6/17/00		10/22/99		6/17/00		6/17/00	
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														
ARSENIC					19.9	J	1.7		0.95	U	2.7	J	2.7	J
MERCURY	0.11	J	0.63	J									0.56	J
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-012		CEF-P21-SS-111		CEF-P21-SS-112		CEF-P21-SS-113		CEF-P21-SS-114		CEF-P21-SS-114		CEF-P21-SS-114	
Sample	CEF-P21-SS-819-02-D		CEF-P21-SS-111-02		CEF-P21-SS-112-01		CEF-P21-SS-113-01		CEF-P21-SS-114-02		CEF-P21-SS-114-03		CEF-P21-SS-212-04	
Depth of Range (ft)	(1-2)		(1-2)		(0-1)		(0-1)		(1-2)		(2-3)		(3-4)	
Sample Date	6/17/00		6/10/99		6/10/99		6/10/99		6/10/99		6/10/99		7/12/99	
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														
ARSENIC			0.37	U	19.6		2.5		2.1	U	60.9		39	
MERCURY	0.56	J												
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-115		CEF-P21-SS-115		CEF-P21-SS-115		CEF-P21-SS-116		CEF-P21-SS-116		CEF-P21-SS-116		CEF-P21-SS-116	
Sample	CEF-P21-SS-115-02		CEF-P21-SS-115-03		CEF-P21-SS-213-04		CEF-P21-SS-116-02		CEF-P21-SS-116-03		CEF-P21-SS-214-03		CEF-P21-SS-214-03-D	
Depth of Range (ft)	(1-2)		(2-3)		(3-4)		(1-2)		(2-3)		(2-3)		(2-3)	
Sample Date	6/10/99		6/10/99		7/12/99		6/10/99		6/10/99		7/12/99		7/13/99	
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														
ARSENIC	15.7		4		65.8		131		136		10.5		12.8	
MERCURY														
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-116		CEF-P21-SS-208		CEF-P21-SS-209		CEF-P21-SS-210		CEF-P21-SS-211		CEF-P21-SS-215		CEF-P21-SS-216	
Sample	CEF-P21-SS-603-03		CEF-P21-SS-208-01		CEF-P21-SS-209-01		CEF-P21-SS-210-01		CEF-P21-SS-211-01		CEF-P21-SS-215-01		CEF-P21-SS-216-01	
Depth of Range (ft)	(2-3)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	2/2/00		7/12/99		7/12/99		7/12/99		7/12/99		7/12/99		7/12/99	
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														
ARSENIC	5.3		1.6	U	6.2		19.1		1.6	U	9.6		1.7	U
MERCURY														
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-217		CEF-P21-SS-217		CEF-P21-SS-218		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301		CEF-P21-SS-301	
Sample	CEF-P21-SS-217-01		CEF-P21-SS-217-01-D		CEF-P21-SS-218-02		CEF-P21-SS-301-01		CEF-P21-SS-301-01-D		CEF-P21-SU-818-03		CEF-P21-SU-917-04	
Depth of Range (ft)	(0-1)		(0-1)		(1-2)		(0-1)		(0-1)		(2-3)		(3-4)	
Sample Date	7/12/99		7/13/99		7/13/99		9/10/99		9/10/99		6/17/00		8/8/00	
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														
ARSENIC	1.7	U	2.2	U	1.5		36.1		26.7		19.9		10.8	
MERCURY														
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-301		CEF-P21-SS-302		CEF-P21-SS-303		CEF-P21-SS-304		CEF-P21-SS-305		CEF-P21-SS-305		CEF-P21-SS-305	
Sample	CEF-P21-SU-918-05		CEF-P21-SS-302-01		CEF-P21-SS-303-01		CEF-P21-SS-304-01		CEF-P21-SS-305-01		CEF-P21-SS-919-02		CEF-P21-SS-919-02-AVG	
Depth of Range (ft)	(4-5)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(1-2)	
Sample Date	8/8/00		9/10/99		9/10/99		9/10/99		9/10/99		8/18/00		8/18/00	
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														
ARSENIC	6.8		0.99	U	0.89	U	3.8	U	93.6		57.2		55.95	
MERCURY														
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-305		CEF-P21-SS-305		CEF-P21-SS-305		CEF-P21-SS-306		CEF-P21-SS-307		CEF-P21-SS-308		CEF-P21-SS-311	
Sample	CEF-P21-SS-919-02-D		CEF-P21-SU-920-03		CEF-P21-SU-921-04		CEF-P21-SS-306-01		CEF-P21-SS-307-01		CEF-P21-SS-308-01		CEF-P21-SU-311-5.5	
Depth of Range (ft)	(1-2)		(2-3)		(3-4)		(0-1)		(0-1)		(0-1)		(4.5-5.5)	
Sample Date	8/18/00		8/18/00		8/18/00		9/10/99		9/13/99		9/13/99		9/13/99	
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														
ARSENIC	54.7		62.6		29.5		1.9	U	4		3.9	U	1.5	U
MERCURY														
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-311		CEF-P21-SS-312		CEF-P21-SS-313		CEF-P21-SS-314		CEF-P21-SS-315		CEF-P21-SS-401		CEF-P21-SS-404	
Sample	CEF-P21-SU-311-5.5-D		CEF-P21-SU-312-06		CEF-P21-SU-313-07		CEF-P21-SU-314-07		CEF-P21-SS-315-07		CEF-P21-SS-401-01		CEF-P21-SU-404-03	
Depth of Range (ft)	(4.5-5.5)		(5-6)		(6-7)		(6-7)		(6-7)		(0-1)		(2-3)	
Sample Date	9/13/99		9/13/99		9/13/99		9/13/99		9/10/99		10/22/99		10/22/99	
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														
ARSENIC	1.6	U	0.42	U	0.4	U	0.46	U	0.53	U	1.9	U	0.42	U
MERCURY														
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-404		CEF-P21-SS-503		CEF-P21-SS-503		CEF-P21-SS-503		CEF-P21-SS-504		CEF-P21-SS-505		CEF-P21-SS-507	
Sample	CEF-P21-SU-404-03-D		CEF-P21-SS-503-01		CEF-P21-SS-503-01-AVG		CEF-P21-SS-503-01-D		CEF-P21-SS-504-01		CEF-P21-SS-505-01		CEF-P21-SS-507-01	
Depth of Range (ft)	(2-3)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	10/22/99		1/24/00		1/24/00		1/24/00		1/24/00		1/24/00		1/25/00	
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														
ARSENIC	0.87	U	19.3		17.55		15.8		1.2		1.6			
MERCURY														
VANADIUM													1.2	

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-508		CEF-P21-SS-701		CEF-P21-SS-806		CEF-P21-SS-806		CEF-P21-SS-806		CEF-P21-SS-807		CEF-P21-SS-817	
Sample	CEF-P21-SS-508-01		CEF-P21-SS-701-01		CEF-P21-SS-806-02		CEF-P21-SS-806-02-AVG		CEF-P21-SS-806-02-D		CEF-P21-SS-807-02		CEF-P21-SS-817-02	
Depth of Range (ft)	(0-1)		(0-1)		(1-2)		(1-2)		(1-2)		(1-2)		(1-2)	
Sample Date	1/24/00		2/15/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00	
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														
ARSENIC			3.6										18.1	J
MERCURY					0.4	J	2.9	J	5.4	J	0.02	U		
VANADIUM	1.3													

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-817		CEF-P21-SS-817		CEF-P21-SS-820		CEF-P21-SS-822		CEF-P21-SS-823		CEF-P21-SS-825		CEF-P21-SS-827	
Sample	CEF-P21-SS-817-02-AVG		CEF-P21-SS-817-02-D		CEF-P21-SS-820-02		CEF-P21-SS-822-02		CEF-P21-SS-823-02		CEF-P21-SS-825-02		CEF-P21-SS-827-02	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(1-2)		(1-2)		(1-2)		(1-2)	
Sample Date	6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00	
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														
ARSENIC	10.95	J	3.8	J	2.3	J	0.37	U	0.47	J	0.87	J	0.4	U
MERCURY														
VANADIUM														

SOIL SAMPLE RESULTS
METALS
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-829		CEF-P21-SS-922		CEF-P21-SS-922		CEF-P21-SS-922	
Sample	CEF-P21-SU-829-03		CEF-P21-SS-922-02		CEF-P21-SU-923-03		CEF-P21-SU-924-04	
Depth of Range (ft)	(2-3)		(1-2)		(2-3)		(3-4)	
Sample Date	6/17/00		8/18/00		8/18/00		8/18/00	
Matrix	Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds								
ARSENIC	0.4	J	39		65.4		4.8	
MERCURY								
VANADIUM								

SOIL SAMPLE RESULTS
TRPH AND CYANIDE
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S020		90S021		90S022		90S023		90S024		90S025		90S031	
Sample	90S02001		90S02101		90S02201		90S02301		90S02401		90S02501		90S03101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98		12/12/98	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Miscellaneous														
CYANIDE														
TRPH	62		76		680		100		1,900		37		25	

SOIL SAMPLE RESULTS
TRPH AND CYANIDE
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	90S032		90S033		90S034		CEF-P21-SS-001		CEF-P21-SS-002		CEF-P21-SS-003		CEF-P21-SS-003	
Sample	90S3201		90S3301		90S03401		CEF-P21-SS-001-01		CEF-P21-SS-002-01		CEF-P21-SS-003-01		CEF-P21-SS-003-D-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	12/12/98		12/12/98		12/12/98		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Miscellaneous														
CYANIDE														
TRPH	3,600		130		120		140		150		152	J	110	UJ

SOIL SAMPLE RESULTS
TRPH AND CYANIDE
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-004		CEF-P21-SS-005		CEF-P21-SS-006		CEF-P21-SS-007		CEF-P21-SS-008		CEF-P21-SS-009		CEF-P21-SS-010	
Sample	CEF-P21-SS-004-01		CEF-P21-SS-005-01		CEF-P21-SS-006-01		CEF-P21-SS-007-01		CEF-P21-SS-008-01		CEF-P21-SS-009-01		CEF-P21-SS-010-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Miscellaneous														
CYANIDE					0.52	U								
TRPH	286		109		90.2		153		93.2		95	U	97.8	

SOIL SAMPLE RESULTS
TRPH AND CYANIDE
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-011		CEF-P21-SS-012		CEF-P21-SS-013		CEF-P21-SS-013		CEF-P21-SS-014		CEF-P21-SS-015		CEF-P21-SS-016	
Sample	CEF-P21-SS-011-01		CEF-P21-SS-012-01		CEF-P21-SS-013		CEF-P21-SS-013-D		CEF-P21-SS-014-01		CEF-P21-SS-015-01		CEF-P21-SS-016-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99		4/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Miscellaneous														
CYANIDE	0.52	U			0.53	U	0.53	U					0.54	U
TRPH	87	U	381		80.4	J	88	UJ	87	U	87	U	198	

SOIL SAMPLE RESULTS
TRPH AND CYANIDE
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-017		90S024		90S024		90S023		90S020		CEF-P21-SS-806		CEF-P21-SS-806	
Sample	CEF-P21-SS-017-01		CEF-P21-SS-801-02		CEF-P21-SU-802-03		CEF-P21-SS-804-02		CEF-P21-SS-805-02		CEF-P21-SS-806-02		CEF-P21-SS-806-02-AVG	
Depth of Range (ft)	(0-1)		(1-2)		(2-3)		(1-2)		(1-2)		(1-2)		(1-2)	
Sample Date	4/29/99		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Miscellaneous														
CYANIDE														
TRPH	125		10.8		12	J	83.9		131		292		246	

SOIL SAMPLE RESULTS
TRPH AND CYANIDE
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-806		CEF-P21-SS-807		CEF-P21-SS-817		CEF-P21-SS-817		CEF-P21-SS-817		CEF-P21-SS-301		CEF-P21-SS-012	
Sample	CEF-P21-SS-806-02-D		CEF-P21-SS-807-02		CEF-P21-SS-817-02		CEF-P21-SS-817-02-AVG		CEF-P21-SS-817-02-D		CEF-P21-SU-818-03		CEF-P21-SS-819-02	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(1-2)		(1-2)		(2-3)		(1-2)	
Sample Date	6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00		6/17/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Miscellaneous														
CYANIDE														
TRPH	200		14.2		69.3	J	120.65	J	172	J	99.5	J	185	

SOIL SAMPLE RESULTS
TRPH AND CYANIDE
SITE 21
NAVAL AIR STATION CECIL FIELD

Location	CEF-P21-SS-012		CEF-P21-SS-012		CEF-P21-SS-820		CEF-P21-SS-822	
Sample	CEF-P21-SS-819-02-AVG		CEF-P21-SS-819-02-D		CEF-P21-SS-820-02		CEF-P21-SS-822-02	
Depth of Range (ft)	(1-2)		(1-2)		(1-2)		(1-2)	
Sample Date	6/17/00		6/17/00		6/17/00		6/17/00	
Matrix	Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG	
Miscellaneous								
CYANIDE								
TRPH	150.5		116		8.6	U	8.7	U

APPENDIX E

DATA VALIDATION SUMMARIES

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-05-0-049

TO: **MARK SPERANZA** **DATE: MAY 26, 2000**

FROM: **JUSTIN ORBICH** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PEST**
CTO 078 – NAS CECIL FIELD
SDG F6348

SAMPLES: 2/Aqueous

CEF-P21-GW-07S CEF-P21-GW-DU09

OVERVIEW

The sample set for CTO 078, SDG F6348 Naval Air Station (NAS) Cecil Field; Florida consists of two (2) aqueous environmental sample. The samples were analyzed for Target Compound List (TCL) pesticide organic compounds. One (1) field duplicate pair (CEF-P21-GW-07S/CEF-P21-GW-DU09) were included within this SDG.

The samples were collected by Tetra Tech, NUS on April 24th, 2000 and analyzed by Accutest Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW 846 Method 8081A analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
* • Initial/continuing calibrations
* • Laboratory method/field quality control blank results
* • Field Duplicate Precision
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified analytical results are presented in Appendix A.

PESTICIDE FRACTION

It should be noted that Dieldrin was extracted and analyzed using a modification to the analytical procedure SW-846 3510C and 8081A in order to provide a reporting limit of 0.001 ug/L.

MEMO TO: **MARK SPERANZA**
DATE: **MAY 26, 2000 – PAGE 2**

EXECUTIVE SUMMARY

Laboratory performance: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October, 1999), and the NFESC guidelines "Navy Installation Restoration Program Laboratory Quality Assurance Guide" (February, 1996). The text of this report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Justin Orbich

Chemist/Data Validator
Tetra Tech, NUS

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech, NUS

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

DATA QUALIFIER DEFINITIONS:

U - Value is a nondetected result as reported by the laboratory and should not be considered present.

J - Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.

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%

APPENDIX A

Qualified Analytical Results

CTO078-NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6348

SAMPLE NUMBER:	CEF-P21-GW-07S			CEF-P21-GW-DU09								
SAMPLE DATE:	04/24/00			04/24/00			/ /			/ /		
LABORATORY ID:	F6348-1			F6348-2								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:				CEF-P21-GW-07S								
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
PESTICIDES/PCBs												
4,4'-DDD	0.1	U		0.11	U							
4,4'-DDE	0.1	U		0.11	U							
4,4'-DDT	0.1	U		0.11	U							
ALDRIN	0.05	U		0.055	U							
ALPHA-BHC	0.05	U		0.055	U							
ALPHA-CHLORDANE	0.1	U		0.11	U							
BETA-BHC	0.05	U		0.055	U							
DELTA-BHC	0.05	U		0.055	U							
DIELDRIN	0.001	U		0.0011	U							
ENDOSULFAN I	0.05	U		0.055	U							
ENDOSULFAN II	0.1	U		0.11	U							
ENDOSULFAN SULFATE	0.1	U		0.11	U							
ENDRIN	0.1	U		0.11	U							
ENDRIN ALDEHYDE	0.1	U		0.11	U							
ENDRIN KETONE	0.1	U		0.11	U							
GAMMA-BHC (LINDANE)	0.05	U		0.055	U							
GAMMA-CHLORDANE	0.1	U		0.11	U							
HEPTACHLOR	0.05	U		0.055	U							
HEPTACHLOR EPOXIDE	0.05	U		0.055	U							
METHOXYCHLOR	0.2	U		0.22	U							
TOXAPHENE	2.5	U		2.8	U							

APPENDIX B

Results as Reported by the Laboratory

Report of Analysis

Client Sample ID:	CEF-P21-GW-07S		
Lab Sample ID:	F6348-1	**Date Sampled:**	04/24/00
Matrix:	AQ - Ground Water	**Date Received:**	04/25/00
Method:	SW846 3510C/8081A	**Percent Solids:**	n/a
Project:	NAS Cecil Field-PSC 21		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST04489.D	1	05/01/00	SKW	04/28/00	OP1494	GST167
Run #2							

Pesticide TCL List

CAS No.	Compound	Result	RL	Units	Q
309-00-2	Aldrin	ND	0.050	ug/l	
319-84-6	alpha-BHC	ND	0.050	ug/l	
319-85-7	beta-BHC	ND	0.050	ug/l	
319-86-8	delta-BHC	ND	0.050	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.050	ug/l	
5103-71-9	alpha-Chlordane	ND	0.10	ug/l	
5103-74-2	gamma-Chlordane	ND	0.10	ug/l	
72-54-8	4,4'-DDD	ND	0.10	ug/l	
72-55-9	4,4'-DDE	ND	0.10	ug/l	
50-29-3	4,4'-DDT	ND	0.10	ug/l	
72-20-8	Endrin	ND	0.10	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.10	ug/l	
7421-93-4	Endrin aldehyde	ND	0.10	ug/l	
53494-70-5	Endrin ketone	ND	0.10	ug/l	
959-98-8	Endosulfan-I	ND	0.050	ug/l	
33213-65-9	Endosulfan-II	ND	0.10	ug/l	
76-44-8	Heptachlor	ND	0.050	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.050	ug/l	
72-43-5	Methoxychlor	ND	0.20	ug/l	
8001-35-2	Toxaphene	ND	2.5	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	89%		50-128%
2051-24-3	Decachlorobiphenyl	50%		11-157%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P21-GW-07S		
Lab Sample ID:	F6348-1A	**Date Sampled:**	04/24/00
Matrix:	AQ - Ground Water	**Date Received:**	04/25/00
Method:	SW846 3510C/8081A	**Percent Solids:**	n/a
Project:	NAS Cecil Field-PSC 21		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST04526.D	1	05/03/00	SKW	05/01/00	OP1506	GST169
Run #2							

Pesticide TCL List

CAS No.	Compound	Result	RL	Units	Q
60-57-1	Dieldrin	ND	0.0010	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	70%		50-128%
2051-24-3	Decachlorobiphenyl	65%		11-157%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P21-GW-DU09		
Lab Sample ID:	F6348-2	**Date Sampled:**	04/24/00
Matrix:	AQ - Ground Water	**Date Received:**	04/25/00
Method:	SW846 3510C/8081A	**Percent Solids:**	n/a
Project:	NAS Cecil Field-PSC 21		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST04490.D	1	05/01/00	SKW	04/28/00	OP1494	GST167
Run #2							

Pesticide TCL List

CAS No.	Compound	Result	RL	Units	Q
309-00-2	Aldrin	ND	0.055	ug/l	
319-84-6	alpha-BHC	ND	0.055	ug/l	
319-85-7	beta-BHC	ND	0.055	ug/l	
319-86-8	delta-BHC	ND	0.055	ug/l	
58-89-9	gamma-BHC (Lindane)	ND	0.055	ug/l	
5103-71-9	alpha-Chlordane	ND	0.11	ug/l	
5103-74-2	gamma-Chlordane	ND	0.11	ug/l	
72-54-8	4,4'-DDD	ND	0.11	ug/l	
72-55-9	4,4'-DDE	ND	0.11	ug/l	
50-29-3	4,4'-DDT	ND	0.11	ug/l	
72-20-8	Endrin	ND	0.11	ug/l	
1031-07-8	Endosulfan sulfate	ND	0.11	ug/l	
7421-93-4	Endrin aldehyde	ND	0.11	ug/l	
53494-70-5	Endrin ketone	ND	0.11	ug/l	
959-98-8	Endosulfan-I	ND	0.055	ug/l	
33213-65-9	Endosulfan-II	ND	0.11	ug/l	
76-44-8	Heptachlor	ND	0.055	ug/l	
1024-57-3	Heptachlor epoxide	ND	0.055	ug/l	
72-43-5	Methoxychlor	ND	0.22	ug/l	
8001-35-2	Toxaphene	ND	2.8	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	92%		50-128%
2051-24-3	Decachlorobiphenyl	58%		11-157%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P21-GW-DU09		
Lab Sample ID:	F6348-2A	**Date Sampled:**	04/24/00
Matrix:	AQ - Ground Water	**Date Received:**	04/25/00
Method:	SW846 3510C/8081A	**Percent Solids:**	n/a
Project:	NAS Cecil Field-PSC 21		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	ST04527.D	1	05/03/00	SKW	05/01/00	OP1506	GST169
Run #2							

Pesticide TCL List

CAS No.	Compound	Result	RL	Units	Q
60-57-1	Dieldrin	ND	0.0011	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	71%		50-128%
2051-24-3	Decachlorobiphenyl	59%		11-157%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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:

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
SOIL DATA
Accutest, NJ
SDG: F5993

SAMPLE NUMBER:	CEF-P21-SS-TOC-01			
SAMPLE DATE:	03/03/00	/ /	/ /	/ /
LABORATORY ID:	F5993-1			
QC_TYPE:	NORMAL			
% SOLIDS:	83.3 %	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)	8430											

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P21-SS-TOC-01		
Lab Sample ID:	F5993-1	**Date Sampled:**	03/03/00
Matrix:	SO - Soil	**Date Received:**	03/04/00
		Percent Solids:	83.3
Project:	NAS Cecil Field-PSC 21		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed By		Method
Solids, Percent	83.3		%	1	03/08/00	ANJ	EPA 160.3 M
Total Organic Carbon	8430	1200	mg/kg	1	03/10/00	ANJ	CORP ENG 81 M

RL = Reporting Limit

APPENDIX F

GEOTECHNICAL SAMPLE ANALYSES

UNIVERSAL
ENGINEERING SCIENCES
Consultants in: Geotechnical Engineering • Threshold Environmental Sciences • Construction Materials Testing

Project No.: 10132-002-02

Date Typed: May 3, 2000

Field and Laboratory Report Cover Page

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), CTP 0078, Contract No. N62467-94-D-0888

As requested, a representative of Universal Engineering Sciences, Inc. (UES) was at the referenced project to provide construction materials testing services.

Scope of Work

Report No.	Type of Report
113577, 113575, 113572, 113571, 113569, & 113566	Report on Dry Unit Weight, Specific Gravity, Porosity, and Moisture Content, pH, Sieve Analysis

The results of the observations and or tests are summarized on the attached sheets. We hope this information is sufficient for your immediate needs. If you have any questions, please do not hesitate to contact the undersigned.

cc: Client (2)

Reviewed By,
Universal Engineering Sciences, Inc.

Fred J. Schmalzer, P.E.
Department Manager - Construction Services
STATE OF FLORIDA
Registered Professional Engineers No. 38818

Attachments (6)
dlc

3532 Maggie Blvd. • Orlando, Fl 32811 • (407) 423-0504 • Fax (407) 423-3106

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.: 113569.1
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-P21, 8 Feet

Soil Description: Light Brown Silty Sand

Date Tested: 4-20-00 **Tested By:** Lori Bass

Date Sampled: 4-6-00 **Sample No.:** CEF-P21

TEST RESULTS

Dry Unit Weight	98.3	pcf
Specific Gravity	2.73	
Porosity	.4231	
Moisture Content	22.2	%
pH	5.26	

Sieve Size	Percent Passing
¾ In.	100.0
No. 4	100.0
No. 10	100.0
No. 40	99.8
No. 60	98.8
No. 100	70.1
No. 200	15.2

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.: 113566.1
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 - P21, 6 Feet

Soil Description: Brown to Orange Clayey Sand

Date Tested: 4-20-00 **Tested By:** Lori Bass

Date Sampled: 4-6-00 **Sample No.:** CEF-P21

TEST RESULTS

Dry Unit Weight	103.1	pcf
Specific Gravity	2.64	
Porosity	.3794	
Moisture Content	22.4	%
pH	6.24	

Sieve Size	Percent Passing
¾ In.	100.0
No. 4	100.0
No. 10	100.0
No. 40	99.9
No. 60	98.9
No. 100	74.6
No. 200	26.1

cc: Client (2)

dc (WO# N/S)

APPENDIX G

ATTAINMENT OF SCTLs

PSC 21
ATTAINMENT OF SCTLS
PRE-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.7000	1.1000	36.0000	4.3000	0.8500
MAX	136.00	152,000.00	190,000.00	8,700,000.00	3,600.00	185,000.00
MEAN	11.94	3,716.93	8,761.12	112,407.38	274.91	2,352.12
t 0.95, n-1	0.25081097	0.180438502	0.231376183	0.212691392	0.221124313	0.213999526
STANDARD DEVIATION	23.42	21,875.77	31,211.86	927,330.97	663.60	19,724.24
COEFFICIENT OF VARIATION	1.96	5.89	3.56	8.25	2.41	8.39
n	128	88	55	88	35	88
UCL $_{0.95}$	12.46	4,137.71	9,734.89	133,432.73	299.72	2,802.08
Goal	3.70	13,000.00	12,000.00	3,700.00	2,500.00	300.00
remediation level	1	3.8	7	8.5	45	1.9
90B00101	11					
90B00201	1.8					
90S00101 [08/28/98]	1.2					
90S00201 [08/28/98]	47					
90S00401 [08/28/98]	21					
90S00501 [08/28/98]	2.2					
90S00601 [08/28/98]	1.6					
90S00701 [08/28/98]	0.9					
90S01001 [08/28/98]	7.4					
90S01101 [08/28/98]	3.5					
90S01201 [08/28/98]	5.4					
90S01301 [08/28/98]	0.9					
90S01401	15					
90S01402	62					
90S01501	1					
90S01502	7.3					
90S01601	0.9					
90S01602	*0.3*					
90S01701	*0.3*					
90S01702	*0.3*					
90S01801	0.9					
90S01802	0.8					
90S01901	*0.3*					
90S01902	0.7					
90S02001	5.6	16	3000	*41*	62	8
90S02101	3.2	*2.2*	1600	*45*	76	15
90S02201	4.3	*19*	36000	*370*	680	200
90S02301	1.1	9.5	840	*100*	100	11
90S02401	69	*2.1*	510	*41*	1900	8.5
90S02501	1.3	*1.8*	46	*36*	37	*1.8*
90S02601	9.3					
90S02701	1.8					
90S03101	*0.3*	1200	140	*36*	25	6.8
90S03401	3	13	410	650	120	*1.8*
90S3201	30	140000	*190000*	8700000	3600	*185000*
90S3301	2.2	7.4	190	410	130	*1.9*
BOR-A-1-1 [11/05/91]	2	*55*	860	*550*		3.7
BOR-A-2-1 [11/05/91]	0.36	9.7		*115*		*12*
BOR-A-3-1 [11/05/91]	0.44	*25*	82	*245*		*25*
BOR-A-4-1 [11/05/91]	0.94	*27*	41	*265*		*27*
BOR-A-5-1 [11/05/91]	3	*55*	108	*550*		*55*
BOR-A-6-1 [11/05/91]	46.9	*1000*	1340	*10000*		*1000*
BOR-A-7-1 [11/05/91]	0.39	12	*55*	*110*		*11*
CEF-P21-SS-001-01	*0.6*	*7.5*	60	*370*	140	*3.7*
CEF-P21-SS-002-01	*0.6*	*18*	468	*900*	150	*9*
CEF-P21-SS-003-01-AVG	2.85	*115*	2875	*5500*	103.5	*55*
CEF-P21-SS-004-01	4.7	152000	*8500*	368000	286	*9500*
CEF-P21-SS-005-01	1.9	*3.8*	16.3	*190*	109	*1.9*

PSC 21
ATTAINMENT OF SCTLS
PRE-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.7000	1.1000	36.0000	4.3000	0.8500
MAX	136.00	152,000.00	190,000.00	8,700,000.00	3,600.00	185,000.00
MEAN	11.94	3,716.93	8,761.12	112,407.38	274.91	2,352.12
t 0.95, n-1	0.25081097	0.180438502	0.231376183	0.212691392	0.221124313	0.213999526
STANDARD DEVIATION	23.42	21,875.77	31,211.86	927,330.97	663.60	19,724.24
COEFFICIENT OF VARIATION	1.96	5.89	3.56	8.25	2.41	8.39
n	128	88	55	88	35	88
UCL $_{0.95}$	12.46	4,137.71	9,734.89	133,432.73	299.72	2,802.08
Goal	**3.70**	**13,000.00**	**12,000.00**	**3,700.00**	**2,500.00**	**300.00**
remediation level	**1**	**3.8**	**7**	**8.5**	**45**	**1.9**
CEF-P21-SS-006-01	22.2	*700*	10950	*34500*	90.2	*345*
CEF-P21-SS-007-01	12	389	1252	*4300*	153	*43*
CEF-P21-SS-008-01	8.5	*370*	7620	*18500*	93.2	*185*
CEF-P21-SS-010-01	17.9	*18*	45.9	*900*	97.8	*9*
CEF-P21-SS-011-01	3.1	*35*	505	*1750*	*44*	*18*
CEF-P21-SS-012-01	3.9	*4400*	108200	*220000*	381	*2200*
CEF-P21-SS-015-01		*8.5*	116.8	*435*	*44*	*4.4*
CEF-P21-SS-016-01	10.2	1640	*180*	*9000*	198	*90*
CEF-P21-SS-017-01	10.9	2.8	8.7	*90*	125	*0.9*
CEF-P21-SS-018-01	3.2					
CEF-P21-SS-019-01	1.8					
CEF-P21-SS-020-01	*0.3*					
CEF-P21-SS-021-01	*0.2*					
CEF-P21-SS-101-01	2.8					
CEF-P21-SS-102-01	*1.2*					
CEF-P21-SS-107-01	0.2					
CEF-P21-SS-108-01	3					
CEF-P21-SS-109-01	4.8					
CEF-P21-SS-110-01	2.7	311	211	*1800*		*18*
CEF-P21-SS-110-02	*0.2*	15.7	19.1	*445*		*4.5*
CEF-P21-SS-111-01-AVG	*0.26*	*7*	*7*	*345*		*3.5*
CEF-P21-SS-111-02	*0.2*	33.7		*450*		*4.5*
CEF-P21-SS-112-01	19.6					
CEF-P21-SS-113-01	2.5					
CEF-P21-SS-114-02	*1.1*					
CEF-P21-SS-114-03	60.9					
CEF-P21-SS-115-02	15.7					
CEF-P21-SS-115-03	4					
CEF-P21-SS-116-02	131					
CEF-P21-SS-116-03	136					
CEF-P21-SS-208-01	*0.8*					
CEF-P21-SS-209-01	6.2					
CEF-P21-SS-210-01	19.1					
CEF-P21-SS-211-01	*0.8*					
CEF-P21-SS-212-04	39					
CEF-P21-SS-213-04	65.8					
CEF-P21-SS-214-03-AVG	11.65					
CEF-P21-SS-215-01	9.6					
CEF-P21-SS-216-01	*0.9*					
CEF-P21-SS-217-01-AVG	*0.9*					
CEF-P21-SS-218-02	1.5					
CEF-P21-SS-301-01-AVG	31.4	*4000*	85250	*200000*		*2000*
CEF-P21-SS-302-01	*1*	11	*2*	*100*		1.8
CEF-P21-SS-303-01	*0.5*	14	21.4	*430*		10
CEF-P21-SS-304-01	*1.9*					
CEF-P21-SS-305-01	93.6					
CEF-P21-SS-306-01	*1*					
CEF-P21-SS-307-01	4					

PSC 21
ATTAINMENT OF SCTLS
PRE-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.7000	1.1000	36.0000	4.3000	0.8500
MAX	136.00	152,000.00	190,000.00	8,700,000.00	3,600.00	185,000.00
MEAN	11.94	3,716.93	8,761.12	112,407.38	274.91	2,352.12
t 0.95, n-1	0.25081097	0.180438502	0.231376183	0.212691392	0.221124313	0.213999526
STANDARD DEVIATION	23.42	21,875.77	31,211.86	927,330.97	663.60	19,724.24
COEFFICIENT OF VARIATION	1.96	5.89	3.56	8.25	2.41	8.39
n	128	88	55	88	35	88
UCL $_{0.95}$	12.46	4,137.71	9,734.89	133,432.73	299.72	2,802.08
Goal	3.70	13,000.00	12,000.00	3,700.00	2,500.00	300.00
remediation level	1	3.8	7	8.5	45	1.9
CEF-P21-SS-308-01	*2*					
CEF-P21-SS-315-07	*0.3*					
CEF-P21-SS-316-02		5740	*210*	3620		*210*
CEF-P21-SS-317-02		*2.1*	*1.1*	*105*		*1.1*
CEF-P21-SS-318-02		*4.2*	67	*210*		*2.1*
CEF-P21-SS-401-01	*1*					
CEF-P21-SS-501-01		*23*	543	*1100*		*11*
CEF-P21-SS-502-01		*2.1*	30.5	*105*		*1.1*
CEF-P21-SS-503-01-AVG	17.55	*2.8*	*7.7*	*100*		1.3
CEF-P21-SS-504-01	1.2					
CEF-P21-SS-505-01	1.6					
CEF-P21-SS-506-01		*19*	458	*950*		*9.5*
CEF-P21-SS-509-01		547	3860	*11500*		*115*
CEF-P21-SS-602-01		8150	2380	27600		*485*
CEF-P21-SS-603-03	5.3					
CEF-P21-SS-701-01	3.6					
CEF-P21-SS-702-01-AVG		9.05	64.7	*90*		*0.9*
CEF-P21-SS-801-02	19.9	1.7		*100*	10.8	*1*
CEF-P21-SS-803-03		*44*	*44*	*2200*		*22*
CEF-P21-SS-804-02		*1000*		*50000*	83.9	*500*
CEF-P21-SS-805-02		*40*		*2000*	131	17.3
CEF-P21-SS-806-02-AVG		*10*		*490*	246	12.9
CEF-P21-SS-807-02		*1.8*	*1.8*	*85*	14.2	*0.9*
CEF-P21-SS-809-02		433	*24*	*2400*		*24*
CEF-P21-SS-811-01		222		*1700*		27.3
CEF-P21-SS-812-01		*1.8*		*90*		*0.9*
CEF-P21-SS-813-01		189		*9000*		2680
CEF-P21-SS-814-02		*18*		*850*		*9*
CEF-P21-SS-815-01		104		*340*		*3.4*
CEF-P21-SS-816-01		9.5		*850*		*9*
CEF-P21-SS-817-02-AVG	10.95	*85*		*4300*	120.65	*43*
CEF-P21-SS-819-02-AVG	2.7	58		*3400*	150.5	28.5
CEF-P21-SS-820-02	2.3	*1.8*	*1.8*	*85*	*4.3*	*0.9*
CEF-P21-SS-822-02	*0.2*	*1.8*		*85*	*4.4*	*0.9*
CEF-P21-SS-823-02	0.47					
CEF-P21-SS-825-02	0.87					
CEF-P21-SS-827-02	*0.2*					
CEF-P21-SS-831-01		16.3		*850*		14.9
CEF-P21-SS-901-02		4.2		*95*		*1*
CEF-P21-SS-904-01		*150*		*7500*		*75*
CEF-P21-SS-905-01		*1.8*		*90*		0.85
CEF-P21-SS-906-01		*3.9*		*195*		*2*
CEF-P21-SS-907-01		*1.9*	*1.9*	*95*		*1*
CEF-P21-SS-919-02-AVG	55.95					
CEF-P21-SS-922-02	39					
CEF-P21-SU-311-5.5-AVG	*0.8*					
CEF-P21-SU-312-06	*0.2*					
CEF-P21-SU-313-07	*0.2*					

PSC 21
ATTAINMENT OF SCTLS
PRE-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.7000	1.1000	36.0000	4.3000	0.8500
MAX	136.00	152,000.00	190,000.00	8,700,000.00	3,600.00	185,000.00
MEAN	11.94	3,716.93	8,761.12	112,407.38	274.91	2,352.12
t 0.95, n-1	0.25081097	0.180438502	0.231376183	0.212691392	0.221124313	0.213999526
STANDARD DEVIATION	23.42	21,875.77	31,211.86	927,330.97	663.60	19,724.24
COEFFICIENT OF VARIATION	1.96	5.89	3.56	8.25	2.41	8.39
n	128	88	55	88	35	88
UCL $_{0.95}$	12.46	4,137.71	9,734.89	133,432.73	299.72	2,802.08
Goal	3.70	13,000.00	12,000.00	3,700.00	2,500.00	300.00
remediation level	1	3.8	7	8.5	45	1.9
CEF-P21-SU-314-07	*0.2*					
CEF-P21-SU-402-03		6.5	*2.1*	*105*		*1.1*
CEF-P21-SU-403-03	*0.5*					
CEF-P21-SU-404-03-AVG	*0.21*					
CEF-P21-SU-802-03	1.7	*18*	*1.8*	*90*	12	0.9
CEF-P21-SU-818-03	19.9	*950*		*48000*	99.5	480
CEF-P21-SU-829-03	0.4					
CEF-P21-SU-901-02		12.8		*95*		*1*
CEF-P21-SU-902-03		12		*100*		*1*
CEF-P21-SU-903-04		*2*	*2*	*100*		*1*
CEF-P21-SU-908-02		*8*		*380*		*3.8*
CEF-P21-SU-909-03		*10*		*490*		*4.9*
CEF-P21-SU-910-04		*8*		*400*		*4*
CEF-P21-SU-911-03-AVG		*950*		*48000*		*480*
CEF-P21-SU-912-04		*10*		*490*		*4.9*
CEF-P21-SU-913-03		*500*		*25000*		*250*
CEF-P21-SU-914-04		*42*		*2050*		*21*
CEF-P21-SU-915-03		*19*		*950*		8.2
CEF-P21-SU-916-04		*21*		*1000*		7.9
CEF-P21-SU-917-04	10.8	*1050*	12630	*50000*		*500*
CEF-P21-SU-918-05	6.8	*17*		*850*		*8.5*
CEF-P21-SU-920-03	62.6					
CEF-P21-SU-921-04	29.5					
CEF-P21-SU-923-03	65.4					
CEF-P21-SU-924-04	4.8					

Italicized values represent one-half the detection limit.

PSC 21
ATTAINMENT OF SCTLS
POST-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.8000	1.8000	8.5000	12.0000	0.8500
MAX	10.90	5,740.00	36,000.00	11,500.00	680.00	210.00
MEAN	1.59	105.16	895.80	535.02	77.90	11.96
t 0.95, n-1	0.23997083	0.167311834	0.19436814	0.199785112	0.21695635	0.204838395
STANDARD DEVIATION	1.85	625.66	4,878.45	1,611.05	110.35	33.94
COEFFICIENT OF VARIATION	1.17	5.95	5.45	3.01	1.42	2.84
n	128	88	55	88	35	88
UCL $_{0.95}$	1.63	116.32	1,023.66	569.33	81.95	12.71
Goal	3.70	13,000.00	12,000.00	3,700.00	2,500.00	300.00
remediation level	1	3.8	7	8.5	45	1.9
CEF-P21-SS-116-03	1					
CEF-P21-SS-116-02	1					
CEF-P21-SS-305-01	1					
90S02401	1	3.8	7	8.5	45	1.9
CEF-P21-SS-213-04	1					
CEF-P21-SU-923-03	1					
CEF-P21-SU-920-03	1					
90S01402	1					
CEF-P21-SS-114-03	1					
CEF-P21-SS-919-02-AVG	1					
90S00201 [08/28/98]	1					
BOR-A-6-1 [11/05/91]	1	3.8	7	8.5		1.9
CEF-P21-SS-212-04	1					
CEF-P21-SS-922-02	1					
CEF-P21-SS-301-01-AVG	1	3.8	7	8.5		1.9
90S3201	1	3.8	7	8.5	45	1.9
CEF-P21-SU-921-04	1					
CEF-P21-SS-006-01	1	3.8	7	8.5	45	1.9
90S00401 [08/28/98]	1					
CEF-P21-SS-801-02	1	3.8		8.5	45	1.9
CEF-P21-SU-818-03	1	3.8		8.5	45	1.9
CEF-P21-SS-112-01	1					
CEF-P21-SS-210-01	1					
CEF-P21-SS-010-01	1	3.8	7	8.5	45	1.9
CEF-P21-SS-503-01-AVG	1	3.8	7	8.5		1.9
CEF-P21-SS-115-02	1					
90S01401	1					
CEF-P21-SS-007-01	1	3.8	7	8.5	45	1.9
CEF-P21-SS-214-03-AVG	1					
90B00101	1					
CEF-P21-SS-817-02-AVG	1	3.8		8.5	45	1.9
CEF-P21-SS-017-01	10.9	2.8	8.7	*90*	125	*0.9*
CEF-P21-SU-917-04	1	3.8	7	8.5		1.9
CEF-P21-SS-016-01	1	3.8	7	8.5	45	1.9
CEF-P21-SS-215-01	9.6					
90S02601	9.3					
CEF-P21-SS-008-01	1	3.8	7	8.5	45	1.9
90S01001 [08/28/98]	1					
90S01502	7.3					
CEF-P21-SU-918-05	6.8	*17*		*850*		*8.5*
CEF-P21-SS-209-01	6.2					
90S02001	5.6	16	3000	*41*	62	8
90S01201 [08/28/98]	5.4					
CEF-P21-SS-603-03	5.3					
CEF-P21-SS-109-01	1					
CEF-P21-SU-924-04	1					
CEF-P21-SS-004-01	1	3.8	7	8.5	45	1.9
90S02201	4.3	*19*	36000	*370*	680	200
CEF-P21-SS-115-03	1					
CEF-P21-SS-307-01	4					

PSC 21
ATTAINMENT OF SCTLS
POST-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.8000	1.8000	8.5000	12.0000	0.8500
MAX	10.90	5,740.00	36,000.00	11,500.00	680.00	210.00
MEAN	1.59	105.16	895.80	535.02	77.90	11.96
t 0.95, n-1	0.23997083	0.167311834	0.19436814	0.199785112	0.21695635	0.204838395
STANDARD DEVIATION	1.85	625.66	4,878.45	1,611.05	110.35	33.94
COEFFICIENT OF VARIATION	1.17	5.95	5.45	3.01	1.42	2.84
n	128	88	55	88	35	88
UCL $_{0.95}$	1.63	116.32	1,023.66	569.33	81.95	12.71
Goal	3.70	13,000.00	12,000.00	3,700.00	2,500.00	300.00
remediation level	1	3.8	7	8.5	45	1.9
CEF-P21-SS-012-01	1	3.8	7	8.5	45	1.9
CEF-P21-SS-701-01	3.6					
90S01101 [08/28/98]	1					
90S02101	1	3.8	7	8.5	45	1.9
CEF-P21-SS-018-01	3.2					
CEF-P21-SS-011-01	3.1	*35*	505	*1750*	*44*	*18*
90S03401	3	13	410	650	120	*1.8*
BOR-A-5-1 [11/05/91]	3	*55*	108	*550*		*55*
CEF-P21-SS-108-01	3					
CEF-P21-SS-003-01-AVG	2.85	*115*	2875	*5500*	103.5	*55*
CEF-P21-SS-101-01	2.8					
CEF-P21-SS-110-01	2.7	311	211	*1800*		*18*
CEF-P21-SS-819-02-AVG	1	3.8		8.5	45	1.9
CEF-P21-SS-113-01	2.5					
CEF-P21-SS-820-02	1	3.8	7	8.5	45	1.9
90S00501 [08/28/98]	2.2					
90S3301	2.2	7.4	190	410	130	*1.9*
BOR-A-1-1 [11/05/91]	1	3.8	7	8.5		1.9
CEF-P21-SS-308-01	*2*					
CEF-P21-SS-005-01	1.9	*3.8*	16.3	*190*	109	*1.9*
CEF-P21-SS-304-01	*1.9*					
90B00201	1.8					
90S02701	1.8					
CEF-P21-SS-019-01	1.8					
CEF-P21-SU-802-03	1.7	*18*	*1.8*	*90*	12	0.9
90S00601 [08/28/98]	1.6					
CEF-P21-SS-505-01	1.6					
CEF-P21-SS-218-02	1.5					
90S02501	1.3	*1.8*	46	*36*	37	*1.8*
90S00101 [08/28/98]	1.2					
CEF-P21-SS-102-01	*1.2*					
CEF-P21-SS-504-01	1.2					
90S02301	1	3.8	7	8.5	45	11
CEF-P21-SS-114-02	1					
90S01501	1					
CEF-P21-SS-302-01	*1*	11	*2*	*100*		1.8
CEF-P21-SS-306-01	*1*					
CEF-P21-SS-401-01	*1*					
BOR-A-4-1 [11/05/91]	0.94	*27*	41	*265*		*27*
90S00701 [08/28/98]	0.9					
90S01301 [08/28/98]	0.9					
90S01601	0.9					
90S01801	0.9					
CEF-P21-SS-216-01	*0.9*					
CEF-P21-SS-217-01-AVG	*0.9*					
CEF-P21-SS-825-02	0.87					
90S01802	0.8					
CEF-P21-SS-208-01	*0.8*					
CEF-P21-SS-211-01	*0.8*					

PSC 21
ATTAINMENT OF SCTLS
POST-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.8000	1.8000	8.5000	12.0000	0.8500
MAX	10.90	5,740.00	36,000.00	11,500.00	680.00	210.00
MEAN	1.59	105.16	895.80	535.02	77.90	11.96
t 0.95, n-1	0.23997083	0.167311834	0.19436814	0.199785112	0.21695635	0.204838395
STANDARD DEVIATION	1.85	625.66	4,878.45	1,611.05	110.35	33.94
COEFFICIENT OF VARIATION	1.17	5.95	5.45	3.01	1.42	2.84
n	128	88	55	88	35	88
UCL $_{0.95}$	1.63	116.32	1,023.66	569.33	81.95	12.71
Goal	3.70	13,000.00	12,000.00	3,700.00	2,500.00	300.00
remediation level	1	3.8	7	8.5	45	1.9
CEF-P21-SU-311-5.5-AVG	*0.8*					
90S01902	0.7					
CEF-P21-SS-001-01	*0.6*	*7.5*	60	*370*	140	*3.7*
CEF-P21-SS-002-01	*0.6*	*18*	468	*900*	150	*9*
CEF-P21-SS-303-01	1	3.8	7	8.5		1.9
CEF-P21-SU-403-03	*0.5*					
CEF-P21-SS-823-02	0.47					
BOR-A-3-1 [11/05/91]	0.44	*25*	82	*245*		*25*
CEF-P21-SU-829-03	0.4					
BOR-A-7-1 [11/05/91]	0.39	12	*55*	*110*		*11*
BOR-A-2-1 [11/05/91]	0.36	9.7		*115*		*12*
90S01602	*0.3*					
90S01701	*0.3*					
90S01702	*0.3*					
90S01901	*0.3*					
90S03101	*0.3*	1200	140	*36*	25	6.8
CEF-P21-SS-020-01	*0.3*					
CEF-P21-SS-315-07	*0.3*					
CEF-P21-SS-111-01-AVG	*0.26*	*7*	*7*	*345*		*3.5*
CEF-P21-SU-404-03-AVG	*0.21*					
CEF-P21-SS-021-01	*0.2*					
CEF-P21-SS-107-01	0.2					
CEF-P21-SS-110-02	*0.2*	15.7	19.1	*445*		*4.5*
CEF-P21-SS-111-02	*0.2*	33.7		*450*		*4.5*
CEF-P21-SS-822-02	1	3.8		8.5	45	1.9
CEF-P21-SS-827-02	*0.2*					
CEF-P21-SU-312-06	*0.2*					
CEF-P21-SU-313-07	*0.2*					
CEF-P21-SU-314-07	*0.2*					
CEF-P21-SS-015-01		*8.5*	116.8	*435*	*44*	*4.4*
CEF-P21-SS-316-02		5740	*210*	3620		*210*
CEF-P21-SS-317-02		3.8	7	8.5		1.9
CEF-P21-SS-318-02		3.8	7	8.5		1.9
CEF-P21-SS-501-01		*23*	543	*1100*		*11*
CEF-P21-SS-502-01		*2.1*	30.5	*105*		*1.1*
CEF-P21-SS-506-01		3.8	7	8.5		1.9
CEF-P21-SS-509-01		547	3860	*11500*		*115*
CEF-P21-SS-602-01		3.8	7	8.5		1.9
CEF-P21-SS-702-01-AVG		9.05	64.7	*90*		*0.9*
CEF-P21-SS-803-03		3.8	7	8.5		1.9
CEF-P21-SS-804-02		3.8		8.5	45	1.9
CEF-P21-SS-805-02		3.8		8.5	45	1.9
CEF-P21-SS-806-02-AVG		3.8		8.5	45	1.9
CEF-P21-SS-807-02		3.8	7	8.5	45	1.9
CEF-P21-SS-809-02		433	*24*	*2400*		*24*
CEF-P21-SS-811-01		3.8		8.5		1.9
CEF-P21-SS-812-01		*1.8*		*90*		*0.9*
CEF-P21-SS-813-01		3.8		8.5		1.9
CEF-P21-SS-814-02		*18*		*850*		*9*

PSC 21
ATTAINMENT OF SCTLS
POST-REMEDIATION
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

nsample	Arsenic	4,4'DDT	Chlordanes	Toxaphene	TRPH	Dieldrin
MIN	0.2000	1.8000	1.8000	8.5000	12.0000	0.8500
MAX	10.90	5,740.00	36,000.00	11,500.00	680.00	210.00
MEAN	1.59	105.16	895.80	535.02	77.90	11.96
t 0.95, n-1	0.23997083	0.167311834	0.19436814	0.199785112	0.21695635	0.204838395
STANDARD DEVIATION	1.85	625.66	4,878.45	1,611.05	110.35	33.94
COEFFICIENT OF VARIATION	1.17	5.95	5.45	3.01	1.42	2.84
n	128	88	55	88	35	88
UCL $_{0.95}$	1.63	116.32	1,023.66	569.33	81.95	12.71
Goal	**3.70**	**13,000.00**	**12,000.00**	**3,700.00**	**2,500.00**	**300.00**
remediation level	**1**	**3.8**	**7**	**8.5**	**45**	**1.9**
CEF-P21-SS-815-01		104		*340*		*3.4*
CEF-P21-SS-816-01		9.5		*850*		*9*
CEF-P21-SS-831-01		3.8		8.5		1.9
CEF-P21-SS-901-02		4.2		*95*		*1*
CEF-P21-SS-904-01		*150*		*7500*		*75*
CEF-P21-SS-905-01		*1.8*		*90*		0.85
CEF-P21-SS-906-01		*3.9*		*195*		*2*
CEF-P21-SS-907-01		*1.9*	*1.9*	*95*		*1*
CEF-P21-SU-402-03		6.5	*2.1*	*105*		*1.1*
CEF-P21-SU-901-02		12.8		*95*		*1*
CEF-P21-SU-902-03		12		*100*		*1*
CEF-P21-SU-903-04		*2*	*2*	*100*		*1*
CEF-P21-SU-908-02		*8*		*380*		*3.8*
CEF-P21-SU-909-03		*10*		*490*		*4.9*
CEF-P21-SU-910-04		*8*		*400*		*4*
CEF-P21-SU-911-03-AVG		3.8		8.5		1.9
CEF-P21-SU-912-04		3.8		8.5		1.9
CEF-P21-SU-913-03		3.8		8.5		1.9
CEF-P21-SU-914-04		3.8		8.5		1.9
CEF-P21-SU-915-03		3.8		8.5		1.9
CEF-P21-SU-916-04		3.8		8.5		1.9

Bolded samples are to be removed.
Italicized values represent one-half the detection limit.

APPENDIX H

FOOD CHAIN MODELLING

APPENDIX H
FOOD CHAIN MODELING

Contaminant exposure via the food chain was modeled as part of the refinement of contaminants of potential concern (COPCs) in order to investigate potential risks to representative receptors. Toxicity reference values (TRVs), which are contaminant doses associated with adverse effects on growth, survival, and reproduction, were obtained for comparison to doses that the receptors may receive in the environment. TRVs were preferentially selected that represent thresholds for sublethal effects based on the measurement endpoint (*i.e.*, impairment of reproduction, growth, or long-term survival). Because toxicity data for the specific receptors chosen herein were usually not available, toxicity data from laboratory species were extrapolated to receptor species. The TRVs were preferentially obtained from ORNL wildlife toxicity data (Sample et al., 1996), and are presented in Tables H-1 and H-2.

COPCs investigated via food chain modeling were those that are known to bioaccumulate and/or biomagnify. EPA (2000) was used to identify these chemicals in accordance with EPA Region IV (Simon, 2000). COPCs at Site 21 that were investigated via food chain modeling consisted of arsenic, chromium, mercury, zinc, Aroclor-1260, and organochlorine pesticides.

Representative Receptors

Representative ecological receptors used in the food chain model for Site 21 consisted of the short-tailed shrew (*Blarina carolinensis*), cotton mouse (*Peromyscus gossypinus*), red fox (*Vulpes vulpes*), American robin (*Turdus migratorius*), American woodcock (*Scolopax minor*), and red-tailed hawk (*Buteo jamaicensis*), all of which are found at NAS Cecil Field and could forage (at least occasionally) at Site 21. Information regarding these representative receptors is presented below and in Table H-3.

Short-tailed shrew

The short-tailed shrew was selected as a representative insectivorous and vermivorous (worm eating) small mammal. It can be found in forested areas, brushy areas, and near marshes. It feeds primarily on insects and invertebrates such as earthworms, snails, centipedes, and slugs, as well as small vertebrates (Burt and Grossenheider, 1980). The short-tailed shrew has a voracious appetite for its body size, and as a result, may receive high doses of contaminants relative to other small mammals. Its home range is approximately 0.5 to 2.4 acres (Cothran et al, 1991; EPA, 1993), allowing it to potentially spend all or much of its time at Site 21.

Cotton mouse

The cotton mouse was chosen as a representative herbivorous small mammal. It is frequently associated with forested areas and moist habitats along the wetland/upland interface (Burt and Grossenheider, 1980). It is common in the Southeast and feeds on grasses, sedges, seeds, fruits, grains, and bark. Since its home range is usually less than 1 acre (EPA, 1993), it could reside permanently within Site 21.

Red fox

The red fox was chosen as a representative mammalian carnivore. The red fox is common in Florida and the entire eastern United States. Its principal food items are small mammals (especially mice and voles) but it also preys on insects and birds. The red fox utilizes many habitat types, but prefers deciduous woodlands and edge areas. Home ranges vary from 50 to over 3,000 acres, but most values in the literature are within a range of 140 to 2100 acres (EPA, 1993). Thus, although the red fox is known to exist at NAS Cecil Field, Site 21 would comprise only a small portion of its home range.

American woodcock

The American woodcock was selected as a representative vermivorous/insectivorous avian species. It also consumes insects and other soil invertebrates. The species is common in Florida and the entire eastern United States. The woodcock prefers moist woodlands and thickets. Its home range varies from approximately 8 to 182 acres (EPA, 1993).

American robin

The American robin was chosen as a representative omnivorous bird. Common winter food items include seeds and fruit. Insects and invertebrates, especially earthworms, are eaten more frequently in the spring and summer. The robin is common in Florida and the entire eastern United States in a variety of habitats. During the non-breeding seasons, robins in Florida are joined by migratory individuals from the northern United States, roaming over large areas and usually forming communal roosts within 1 to 2 miles of foraging areas. The home range during breeding season is approximately 0.5 to 2.0 acres (EPA, 1993). Therefore, a robin might forage exclusively at Site 21 only during nesting.

Red-tailed hawk

The red-tailed hawk was selected as a representative avian carnivore. This hawk is common in Florida and the entire eastern United States, and it forages in a variety of habitats. The red-tailed hawk feeds primarily on small mammals but will also consume small birds, lizards, snakes, and insects (EPA, 1993). Breeding populations in Florida are non-migratory. The home range size is highly variable, depending on the available habitat. Mean home ranges varied from 150 to over 4,300 acres in several studies summarized by EPA (1993). The home range shown in Table H-3 (940-2,440 acres) represents the data from habitats most similar to those at Cecil Field (EPA, 1993). The habitat at Site 21 would comprise a minor portion of the hawk's foraging area.

Exposure Estimate And Risk Calculation

Chemicals whose maximum concentrations did not exceed EPA Region IV ecological screening values were dropped from further consideration, while those that equaled or exceeded ecological screening values were retained as ecological COPCs. The following equation was then used to estimate the ingested dose of bioaccumulative and biomagnifiable COPCs for representative wildlife species:

$$\text{PD ingestion} = [(C_{soil} * FI * SA * F) + (C_{food} * F * FA * FI)]/WR$$

where:

PD	=	predicted dose from the ingestion food items and the incidental ingestion of soil (mg/kg/day)
C_{soil}	=	concentration in soil (mg/kg)
FI	=	fractional intake (portion of home range that overlaps affected area; assumed to be 100%)
SA	=	portion of diet consisting of soil
F	=	food consumed (kg/day)
C_{food}	=	contaminant concentration in food (mg/kg)
FA	=	portion of diet consisting of prey or vegetation
WR	=	weight of receptor (kg)

Exposure parameters (e.g., body weight, ingestion rate) for the representative receptors are shown in Table H-3. Most exposure parameters were obtained from the *Wildlife Exposure Factors Handbook: Volumes I and II* (EPA, 1993). Wet weight food ingestion rates shown in Table H-3 were calculated as follows:

- shrew: 0.62 grams food/gram body weight/day (g/g bw/day) (EPA, 1993)
- cotton mouse: 8.6 g/day; calculated using rodent equation for food ingestion (g/day): $0.621 \times bw^{0.564}$ (U.S. EPA, 1993); converted to wet weight assuming 50 percent water content in food items (vegetation)
- red fox: 0.14 g/g bw/day (EPA, 1993)
- woodcock: 0.77 g/g bw/day (EPA, 1993)
- robin: 0.89 g/g bw/day (EPA, 1993)
- hawk: 0.11 g/g bw/day (EPA, 1993)

The contaminant concentration in food (C_{food} in the equation shown above) was calculated using bioaccumulation factors (BAFs) from published sources (Table H-4).

Surface soil data were used in the food chain modeling to calculate doses to the shrew, mouse, robin, woodcock, fox, and hawk as follows. Chemical concentrations in terrestrial invertebrates (food items of the shrew, robin, and woodcock) were estimated by multiplying each chemical's surface soil

concentration by its associated soil-to-invertebrate BAF. Food of the robin was assumed to consist of 60 percent vegetation and 35 percent invertebrates (Table 7-2). Chemical concentrations in vegetation (food items of the mouse and robin) were estimated by multiplying each chemical's surface soil concentration by its associated soil-to-plant BAF. The resulting estimated concentrations in invertebrates and plants were multiplied by the associated food-to-mammal BAF to derive estimated concentrations in the shrew and mouse, respectively. The estimated mammal concentrations were then used to derive an estimated dose to the hawk and fox. Initial calculations of doses used maximum detected soil concentrations and conservatively assumed that the hawk and fox preyed exclusively on shrews (since most contaminant concentrations in shrews were greater than contaminant concentrations in mice). Subsequently, average soil concentrations were also used to calculate doses to the hawk and fox. In the average concentration scenario, prey items of the hawk and fox were assumed to consist of equal amounts of shrews and mice. Incidental ingestion of surface soil was also included in the dose equations for the shrew, mouse, robin, woodcock, and fox. Incidental ingestion of surface soil is negligible for birds of prey (Sample and Suter, 1994) and therefore, was not included in the dose equations for the hawk.

A hazard quotient (HQ) is presented for each chemical assessed in the food chain model and is defined as the ratio of the modeled dose to the TRV.

TABLE H-1

TOXICITY REFERENCE VALUES (TRVs) FOR MAMMALS
SITE 21
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Chemical	Test Species	Endpoint	Study Duration	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	Reference
Pesticides/PCBs						
4,4'-DDD[a]	Rat	reproduction	2 years	0.8	4	Fitzhugh, 1948[b]
4,4'-DDE[a]	Rat	reproduction	2 years	0.8	4	Fitzhugh, 1948[b]
4,4'-DDT	Rat	reproduction	2 years	0.8	4	Fitzhugh, 1948[b]
Alpha-Chlordane[c]	Mouse	reproduction	>1 year	4.6	9.2	WHO 1984 and Keplinger et al. 1968[b]
Aroclor-1260[d]	Old field mouse	reproduction	12 months	0.068	0.68	McCoy et al. 1995[b]
Chlordane	Mouse	reproduction	>1 year	4.6	9.2	WHO 1984 and Keplinger et al. 1968[b]
Dieldrin	Rat	reproduction	>1 year	0.02	0.2	Treon and Cleveland 1955[b]
Gamma-Chlordane[c]	Mouse	reproduction	>1 year	4.6	9.2	WHO 1984 and Keplinger et al. 1968[b]
Heptachlor epoxide[e]	Mink	reproduction	181 days	0.1	1	Crum et al. 1993[b]
Toxaphene	Rat	reproduction	>1 year	8	NA	Kennedy et al. 1973[b]
Metals and Inorganics						
Arsenic	Mouse	reproduction	>1 year	0.126	1.26	Schroeder & Mitchner, 1971[b]
Chromium	Rat	body weight & food consumption	1 year	3.28	NA	MacKenzie et al. 1958[b]
Mercury	Mink	mortality, weight loss	93 days	0.015	0.025	Wobeser et al., 1976[b]
Zinc	Rat	reproduction	days 1-16 of gestation	160	320	Schlinker & Cox, 1968[b]

NA Not available
a 4,4'-DDT used as a surrogate.
b See Sample et al (1996) for full citation and details of study.
c Chlordane used as a surrogate.
d Aroclor-1254 used as a surrogate.
e Heptachlor used as a surrogate.

TABLE H-2

TOXICITY REFERENCE VALUES (TRVs) FOR BIRDS
SITE 21
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Chemical	Test Species	Endpoint	Study Duration	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	Reference
Pesticides/PCBs						
4,4'-DDD[a]	Brown pelican	reproduction	5 years	0.0028	0.028	Anderson et al., 1975[b]
4,4'-DDE[a]	Brown pelican	reproduction	5 years	0.0028	0.028	Anderson et al., 1975[b]
4,4'-DDT	Brown pelican	reproduction	5 years	0.0028	0.028	Anderson et al., 1975[b]
Alpha-Chlordane[c]	Red-winged blackbird	mortality	84 days	2.14	10.7	Stickel et al., 1983[b]
Aroclor-1260[d]	Ring-necked pheasant	reproduction	17 weeks	0.18	1.8	Dahlgren et al., 1972[b]
Chlordane	Red-winged blackbird	mortality	84 days	2.14	10.7	Stickel et al., 1983[b]
Dieldrin	Barn owl	reproduction	>2 years	0.077	NA	Mendenhall et al., 1983[b]
Gamma-Chlordane[c]	Red-winged blackbird	mortality	84 days	2.14	10.7	Stickel et al., 1983[b]
Heptachlor epoxide	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA
Metals and Inorganic Compounds						
Arsenic	Brown-headed cowbird	mortality	7 months	2.46	7.38	USFWS, 1969[b]
Chromium	Black duck	reproduction	10 months	1	5	Haseltine et al.[b]
Mercury	Mallard duck	reproduction	>1 year	0.0064	0.064	Heinz, 1979[b]
Zinc	White leghorn hens	reproduction	44 weeks	14.5	131	Stahl et al., 1990[b]

NA = Not available
a DDT used as a surrogate.
b See Sample et al., (1996) for full citation and details of study.
c Chlordane used as a surrogate.
d Aroclor-1254 used as a surrogate.

TABLE H-3

EXPOSURE PARAMETERS FOR REPRESENTATIVE ECOLOGICAL RECEPTORS
SITE 21
NAS CECIL FIELD
JACKSONVILLE, FLORIA

Receptor	Representative Group	Body Weight[1] (grams)	Water Ingestion[1] (grams/day)	Food Ingestion[1,2] (grams/day)	Assumed Diet for Exposure Assessment[1]	Home Range[1] (acres)
Short-tailed shrew (*Blarina carolinensis*)	Vermivorous and Insectivorous Mammal	9.7[3]	NA	6.0	87% invertebrates 13% soil[4]	0.96[1] to 2.4[3]
Cotton mouse (*Peromyscus gossypnius*)	Herbivorous Mammal	31[5]	NA	8.6	98% vegetation 2% soil[6]	0.05 to 0.3[6]
Red fox (*Vulpes vulpes*)	Carnivorous Mammal	3940	NA	552	97.2% prey 2.8% soil	140 to 2100
American robin (*Turdus migratorius*)	Omnivorous Bird	77	NA	69	35% invertebrates 60% vegetation 5% soil[7]	0.5 to 2.1 (nesting season)
American woodcock (*Scolopax minor*)	Vermivorous and Insectivorous Bird	134	NA	103	89.6% invertebrates 10.4% soil	8 to 182
Red-tailed hawk (*Buteo jamaicensis*)	Carnivorous Bird	957	NA	105	100% prey soil, sediment: none[7]	940 to 2440

NA = Not applicable. There is no surface water at Site 21; this assessment is based on the analyses of surface soil samples.

1 Exposure parameters are from EPA (1993) unless otherwise noted.
2 Food ingestion includes intended food items and incidentally ingested soil. For example, a shrew would be expected to consume 5.2 g invertebrates plus 0.8 g soil per day.
3 Cothran et al (1991)
4 Talmage and Walton (1993)
5 Lowery (1974)
6 Based on deer mouse (*Peromyscus maniculatus*)
7 Sample and Suter (1994)

TABLE H-4
BIOACCUMULATION FACTORS
SITE 21
NAS CECIL FIELD, JACKSONVILLE, FLORIDA

Chemical	Bioaccumulation Factor[a]					
	Terrestrial Invertebrate	Invertebrate Source	Terrestrial Plant	Plant Source	Mammal	Mammal Source
Pesticides/PCBs (mg/kg)						
4,4'-DDD	3.3	see footnote b	0.01	see footnote c	1.2	Forsyth & Peterle, 1984
4,4'-DDE	1.7	see footnote d	0.01	see footnote c	1.2	Forsyth & Peterle, 1984
4,4'-DDT	0.57	see footnote e	0.01	see footnote c	1.2	Forsyth & Peterle, 1984
Alpha-Chlordane	1.6[f]	Gish, 1970	0.0017[fg]	Travis & Arms, 1988	0.55	see footnote h
Aroclor-1260	6.667	Sample et al., 1998	0.12	see footnote i	3.8	see footnote j
Chlordane	1.6	Gish, 1970	0.0017[g]	Travis & Arms, 1988	0.55	see footnote h
Dieldrin	6.7[k]	Korschgen, 1970	0.03[l]	(Lichtenstein and Schultz, 1965)	0.1[m]	Korschgen, 1970
Gamma-chlordane	1.6[f]	Gish, 1970	0.0017[fg]	Travis & Arms, 1988	0.55	see footnote h
Heptachlor epoxide	1.0	see footnote n	0.0059	Travis & Arms, 1988	0.35	Garten & Trabalka, 1983
Toxaphene	6.7	see footnote o	0.03	see footnote o	1.2	see footnote o
Metals						
Arsenic	0.224	Sample et al., 1998	0.0375	ORNL, 1998	0.1	Eisler, 1988
Chromium	0.306	Sample et al., 1998	0.0015	Baes et al., 1984	0.28	Baes et al., 1984
Mercury	1.693	Sample et al., 1998	0.652	ORNL, 1998	0.01	USEPA, 1985a
Zinc	3.201	Sample et al., 1998	0.366	ORNL, 1998	2.1	Baes et al., 1984

a Bioaccumulation factors (BAFs) consist of concentrations in tissue/concentrations in soil for invertebrates and plants, and concentrations in tissue/concentrations in food for mammals.

b Geometric mean of 4,4'-DDD (Barker, 1958, Davis, 1968, Davis and Harrison, 1966; Cramp and Olney, 1967; Collett and Harrison, 1968; Wheatley and Hardman, 1968; Hunt and Sacho, 1969; and Gish, 1970).

c Geometric mean of 4,4'-DDT, 4,4'-DDD, and 4,4'-DDE BAFs (fresh wt/dry wt) reported for roots (carrot, potato, sugar beet), grains (corn, oats), and legumes (alfalfa) derived from USEPA (1985b) converted from dry weight to wet weight per values provided by Suter (1993).

d Geometric mean of 4,4'-DDE (Davis, 1968; Davis and Harrison, 1966; Cramp and Olney, 1967; Collett and Harrison, 1968; Hunt and Sacho, 1969; and Gish, 1970).

e Geometric mean of 4,4'-DDT (Davis, 1968; Davis and Harrison, 1966; Wheatley and Hardman, 1968; Bailey et al, 1970; Cramp and Olney, 1967; Beyer and Gish, 1980).

f Chlordane used as a surrogate.

g log (Plant Uptake Factor) = 1.588-0.578 (log Kow). Converted from dry weight to wet weight plant concentration assuming 80% water content.

h BAF calculated from data presented in Eisler, 1990

i Arithmetic mean BAF for corn, leaves, carrots, beets, surgarbeets, radishes, and soybeans (tops, roots, and whole plants) from EPA (1985c) and Webber et al. (1983).

j BAF calculated from discussion in Eisler (1986) stating that Aroclor 1254 residues in subcutaneous fat of adult minks were up to 38 times dietary levels; value converted to whole body concentrations assuming 10% lipid content.

k Average of four values for aldrin and dieldrin concentrations in soil versus concentrations in earthworms (wet weight).

l Based on nomogram of BAFs developed from aldrin and dieldrin concentrations in soil versus concentrations in crops; converted from dry weight to wet weight plant concentration assuming 70% water content.

m Based on a nomogram of BAFs developed from aldrin and dieldrin concentrations in invertebrates versus animals feeding on invertebrates.

n Geometric mean of BAFs for earthworms (Gish, 1970).

o BAFs not available. BAFs for toxaphene were conservatively assumed to be equal to the highest BAFs of other pesticides presented in this table.

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EXAMPLE CALCULATION OF HAZARD QUOTIENT
FOR THE SHREW
USING THE MAXIMUM SOIL CONCENTRATION OF AROCLOR-1260

(See Appendix H text for definitions of the terms in the following equation).

The predicted dose (PD) for all representative receptors =
$[C_{soil} * FI * SA * F) + (C_{food} * F * FA * FI)]/WR$

Concentrations of COPCs in food items of the shrew (soil invertebrates) were derived from soil data using the bioaccumulation factors for terrestrial invertebrates in Table H-4.

BAF for Aroclor-1260 = 6.667 (Table H-4)
C_{soil} for Aroclor-1260 = 64 µg/kg (Table 8-1) or 0.064 mg/kg
Therefore, C_{food} = 6.667 * 0.064 mg/kg = 0.426688 mg/kg

FI = 100 percent = 1.0
SA = 13% = 0.13 (Table H-3)
F = 0.006 kg/day (Table H-3)
C_{food} = 0.426688 mg/kg (derivation shown above)
FA = 87% = 0.87 (Table H-3)
WR = 0.0097 kg (Table H-3)

Using the above values,

$$PD = \frac{[(0.064\ mg/kg * 1.0 * 0.13 * 0.006\ kg/day) + (0.426688\ mg/kg * 0.006\ kg/day * 0.87 * 1.0)]}{0.0097\ kg}$$

PD = (0.00004992 mg/day + 0.0022273 mg/day) ÷ 0.0097 kg = 0.234766 mg/kg/day

The mammalian NOAEL for Aroclor-1260 is 0.068 mg/kg/day (Table H-1).
Thus, the HQ (based on the NOAEL) = 0.234766 mg/kg/day ÷ 0.068 mg/kg/day = 3.45.

Short-Tailed Shrew

Body Weight	0.0097000 kg		
Food Ingestion Rate	0.0060000 kg/day	% EW	0.87
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.0060000 kg/day	% SS	0.13

Mean Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs	0	0	0	0.000	#N/A	#N/A	#N/A	#N/A
4,4'-DDD	0.036632692	0	0.120887884	0.068	0.8	4	8.50E-02	1.70E-02
4,4'-DDE	0.050375	0	0.0856375	0.050	0.8	4	6.27E-02	1.25E-02
4,4'-DDT	0.059423077	0	0.033871154	0.023	0.8	4	2.88E-02	5.75E-03
Alpha-chlordane	0.217125	0	0.3474	0.204	4.6	9.2	4.44E-02	2.22E-02
Aroclor-1254	#N/A	0	#N/A	#N/A	0.068	0.68	#N/A	#N/A
Aroclor-1260	0.174225	0	1.161558075	0.639	0.068	0.68	9.40E+00	9.40E-01
Chlordane	0.5610125	0	0.89762	0.528	4.6	9.2	1.15E-01	5.74E-02
Dieldrin	0.018394231	0	0.123241348	0.068	0.02	0.2	3.39E+00	3.39E-01
Gamma-chlordane	0.212936538	0	0.340698461	0.200	4.6	9.2	4.36E-02	2.18E-02
Heptachlor epoxide	0.016093846	0	0.016093846	0.010	0.1	1	9.95E-02	9.95E-03
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	1.450807692	0	9.720411536	5.348	8	80	6.68E-01	6.68E-02
Metals	#N/A	0	0	#N/A	#N/A	#N/A	#N/A	#N/A
Arsenic	2.065588	0	0.462691712	0.415	0.126	1.26	3.29E+00	3.29E-01
Chromium (total)	4.05	0	1.2393	0.993	3.28	32.8	3.03E-01	3.03E-02
Mercury	0.207	0	0.350451	0.205	0.015	0.025	1.37E+01	8.21E+00
Zinc	21.2	0	67.8612	38.224	160	320	2.39E-01	1.19E-01

Short-Tailed Shrew

Body Weight	0.0097000 kg		
Food Ingestion Rate	0.0060000 kg/day	% EW	0.87
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.0060000 kg/day	% SS	0.13

Maximum Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs	0	0	0	0	#N/A	#N/A	#N/A	#N/A
4,4'-DDD	0.076	0	0.2508	0.14107794	0.8	4	1.76E-01	3.53E-02
4,4'-DDE	0.79	0	1.343	0.78625361	0.8	4	9.83E-01	1.97E-01
4,4'-DDT	0.547	0	0.31179	0.21177359	0.8	4	2.65E-01	5.29E-02
Alpha-chlordane	1.89	0	3.024	1.77932784	4.6	9.2	3.87E-01	1.93E-01
Aroclor-1254	#N/A	0	#N/A	#N/A	0.068	0.68	#N/A	#N/A
Aroclor-1260	0.064	0	0.426688	0.23476612	0.068	0.68	3.45E+00	3.45E-01
Chlordane	3.86	0	6.176	3.63397113	4.6	9.2	7.90E-01	3.95E-01
Dieldrin	0.0018	0	0.01206	0.00663476	0.02	0.2	3.32E-01	3.32E-02
Gamma-chlordane	1.97	0	3.152	1.8546433	4.6	9.2	4.03E-01	2.02E-01
Heptachlor epoxide	0.0013	0	0.0013	0.00080412	0.1	1	8.04E-03	8.04E-04
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	0.65	0	4.355	2.3958866	8	80	2.99E-01	2.99E-02
Metals	#N/A	0	0	#N/A	#N/A	#N/A	#N/A	#N/A
Arsenic	10.9	0	2.4416	2.19042804	0.126	1.26	1.74E+01	1.74E+00
Chromium (total)	8.7	0	2.6622	2.13223546	3.28	32.8	6.50E-01	6.50E-02
Mercury	0.89	0	1.50677	0.88242674	0.015	0.025	5.88E+01	3.53E+01
Zinc	52	0	166.452	93.7566433	160	320	5.86E-01	2.93E-01

Cotton Mouse

Body Weight	0.0310000 kg		
Food Ingestion Rate	0.0086000 kg/day	% Veg	0.98
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.0086000 kg/day	% SS	0.02

Mean Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Vegetation Concentration (mg/kg)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs	0	0	0	0	0.00E+00	#N/A	#N/A	#N/A	#N/A
4,4'-DDD	0.036632692	0	0.000366327	0.120887884	3.03E-04	0.8	4	3.79E-04	7.57E-05
4,4'-DDE	0.050375	0	0.00050375	0.0856375	4.16E-04	0.8	4	5.21E-04	1.04E-04
4,4'-DDT	0.059423077	0	0.000594231	0.033871154	4.91E-04	0.8	4	6.14E-04	1.23E-04
Alpha-chlordane	0.217125	0	0.000369113	0.3474	1.31E-03	4.6	9.2	2.84E-04	1.42E-04
Aroclor-1254	#N/A	0	#N/A	#N/A	#N/A	0.068	0.68	#N/A	#N/A
Aroclor-1260	0.174225	0	0.020907	1.161558075	6.65E-03	0.068	0.68	9.78E-02	9.78E-03
Chlordane	0.5610125	0	0.000953721	0.89762	3.37E-03	4.6	9.2	7.33E-04	3.67E-04
Dieldrin	0.018394231	0	0.000551827	0.123241348	2.52E-04	0.02	0.2	1.26E-02	1.26E-03
Gamma-chlordane	0.212936538	0	0.000361992	0.340698461	1.28E-03	4.6	9.2	2.78E-04	1.39E-04
Heptachlor epoxide	0.016093846	0	9.49537E-05	0.016093846	1.15E-04	0.1	1	1.15E-03	1.15E-04
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	1.450807692	0	0.043524231	9.720411536	1.99E-02	8	80	2.49E-03	2.49E-04
Metals	#N/A	0	0	0	#N/A	#N/A	#N/A	#N/A	#N/A
Arsenic	2.065588	0	0.7745955	0.462691712	2.22E-01	0.126	1.26	1.76E+00	1.76E-01
Chromium (total)	4.05	0	0.006075	1.2393	2.41E-02	3.28	32.8	7.35E-03	7.35E-04
Mercury	0.207	0	0.134964	0.350451	3.78E-02	0.015	0.025	2.52E+00	1.51E+00
Zinc	21.2	0	7.7592	67.8612	2.23E+00	160	320	1.39E-02	6.96E-03

Cotton Mouse

Body Weight	0.0310000 kg		
Food Ingestion Rate	0.0086000 kg/day	% Veg	0.98
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.0086000 kg/day	% SS	0.02

Maximum Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Vegetation Concentration (mg/kg)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs	0	0	0	0	0.00E+00	#N/A	#N/A	#N/A	#N/A
4,4'-DDD	0.076	0	0.00076	0.2508	6.28E-04	0.8	4	7.85E-04	1.57E-04
4,4'-DDE	0.79	0	0.0079	1.343	6.53E-03	0.8	4	8.16E-03	1.63E-03
4,4'-DDT	0.547	0	0.00547	0.31179	4.52E-03	0.8	4	5.65E-03	1.13E-03
Alpha-chlordane	1.89	0	0.003213	3.024	1.14E-02	4.6	9.2	2.47E-03	1.23E-03
Aroclor-1254	#N/A	0	#N/A	#N/A	#N/A	0.068	0.68	#N/A	#N/A
Aroclor-1260	0.064	0	0.00768	0.426688	2.44E-03	0.068	0.68	3.59E-02	3.59E-03
Chlordane	3.86	0	0.006562	6.176	2.32E-02	4.6	9.2	5.04E-03	2.52E-03
Dieldrin	0.0018	0	0.000054	0.01206	2.47E-05	0.02	0.2	1.23E-03	1.23E-04
Gamma-chlordane	1.97	0	0.003349	3.152	1.18E-02	4.6	9.2	2.57E-03	1.29E-03
Heptachlor epoxide	0.0013	0	0.00000767	0.0013	9.30E-06	0.1	1	9.30E-05	9.30E-06
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	0.65	0	0.0195	4.355	8.91E-03	8	80	1.11E-03	1.11E-04
Metals	#N/A	0	0	0	#N/A	#N/A	#N/A	#N/A	#N/A
Arsenic	10.9	0	4.0875	2.4416	1.17E+00	0.126	1.26	9.30E+00	9.30E-01
Chromium (total)	8.7	0	0.01305	2.6622	5.18E-02	3.28	32.8	1.58E-02	1.58E-03
Mercury	0.89	0	0.58028	1.50677	1.63E-01	0.015	0.025	1.08E+01	6.51E+00
Zinc	52	0	19.032	166.452	5.46E+00	160	320	3.41E-02	1.71E-02

American Robin

Body Weight	0.0770000 kg		
Food Ingestion Rate	0.0690000 kg/day	% Veg	0.6
Water Ingestion Rate	0.0000000 L/day	% EW	0.35
Soil Ingestion Rate	0.0690000 kg/day	% SS	0.05

Mean Concentrations

COPC	Soil Concentration	Vegetation Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.036632692	0.000366327	0.120887884	0.040	0.0028	0.028	1.42E+01	1.42E+00
4,4'-DDE	0.050375	0.00050375	0.0856375	0.029	0.0028	0.028	1.05E+01	1.05E+00
4,4'-DDT	0.059423077	0.000594231	0.033871154	0.014	0.0028	0.028	4.86E+00	4.86E-01
Alpha-chlordane	0.217125	0.000369113	0.3474	0.119	2.14	10.7	5.56E-02	1.11E-02
Aroclor-1254	#N/A	#N/A	#N/A	#N/A	0.18	1.8	#N/A	#N/A
Aroclor-1260	0.174225	0.020907	1.161558075	0.383	0.18	1.8	2.13E+00	2.13E-01
Chlordane	0.5610125	0.000953721	0.89762	0.307	2.14	10.7	1.44E-01	2.87E-02
Dieldrin	0.018394231	0.000551827	0.123241348	0.040	0.077	0.77	5.17E-01	5.17E-02
Gamma-chlordane	0.212936538	0.000361992	0.340698461	0.117	2.14	10.7	5.45E-02	1.09E-02
Heptachlor epoxide	0.016093846	9.49537E-05	0.016093846	0.006	0	0	#DIV/0!	#DIV/0!
Total chlordane	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	1.450807692	0.043524231	9.720411536	3.137	0	0	#DIV/0!	#DIV/0!
Metals								
Arsenic	2.065588	0.7745955	0.462691712	0.654	2.46	7.38	2.66E-01	8.86E-02
Chromium (total)	4.05	0.006075	1.2393	0.573	1	5	5.73E-01	1.15E-01
Mercury	0.207	0.134964	0.350451	0.192	0.0064	0.064	3.00E+01	3.00E+00
Zinc	21.2	7.7592	67.8612	26.405	14.5	131	1.82E+00	2.02E-01

American Robin

Body Weight	0.0770000 kg		
Food Ingestion Rate	0.0690000 kg/day	% Veg	0.6
Water Ingestion Rate	0.0000000 L/day	% EW	0.35
Soil Ingestion Rate	0.0690000 kg/day	% SS	0.05

Maximum Concentrations

COPC	Soil Concentration (mg/kg)	Vegetation Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.076	0.00076	0.2508	0.08247382	0.0028	0.028	2.95E+01	2.95E+00
4,4'-DDE	0.79	0.0079	1.343	0.46085727	0.0028	0.028	1.65E+02	1.65E+01
4,4'-DDT	0.547	0.00547	0.31179	0.12523814	0.0028	0.028	4.47E+01	4.47E+00
Alpha-chlordane	1.89	0.003213	3.024	1.03484569	2.14	10.7	4.84E-01	9.67E-02
Aroclor-1254	#N/A	#N/A	#N/A	#N/A	0.18	1.8	#N/A	#N/A
Aroclor-1260	0.064	0.00768	0.426688	0.14082165	0.18	1.8	7.82E-01	7.82E-02
Chlordane	3.86	0.006562	6.176	2.11349437	2.14	10.7	9.88E-01	1.98E-01
Dieldrin	0.0018	0.000054	0.01206	0.00389214	0.077	0.77	5.05E-02	5.05E-03
Gamma-chlordane	1.97	0.003349	3.152	1.07864868	2.14	10.7	5.04E-01	1.01E-01
Heptachlor epoxide	0.0013	0.00000767	0.0013	0.0004701	0	0	#DIV/0!	#DIV/0!
Total chlordane	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	0.65	0.0195	4.355	1.40549416	0	0	#DIV/0!	#DIV/0!
Metals								
Arsenic	10.9	4.0875	2.4416	3.45184597	2.46	7.38	1.40E+00	4.68E-01
Chromium (total)	8.7	0.01305	2.6622	1.23178442	1	5	1.23E+00	2.46E-01
Mercury	0.89	0.58028	1.50677	0.82444919	0.0064	0.064	1.29E+02	1.29E+01
Zinc	52	19.032	166.452	64.7680597	14.5	131	4.47E+00	4.94E-01

American Woodcock

Body Weight	0.1340000 kg		
Food Ingestion Rate	0.1030000 kg/day	% EW	0.896
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.1030000 kg/day	% soil	0.104

Mean Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Earthworm Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.036632692	0	0.120887884	0.0861859	0.0028	0.028	3.08E+01	3.08E+00
4,4'-DDE	0.050375	0	0.0856375	0.06300694	0.0028	0.028	2.25E+01	2.25E+00
4,4'-DDT	0.059423077	0	0.033871154	0.02807792	0.0028	0.028	1.00E+01	1.00E+00
Alpha-chlordane	0.217125	0	0.3474	0.25661712	2.14	10.7	1.20E-01	2.40E-02
Aroclor-1254	#N/A	0	#N/A	#N/A	0.18	1.8	#N/A	#N/A
Aroclor-1260	0.174225	0	1.161558075	0.81391172	0.18	1.8	4.52E+00	4.52E-01
Chlordane	0.5610125	0	0.89762	0.66305314	2.14	10.7	3.10E-01	6.20E-02
Dieldrin	0.018394231	0	0.123241348	0.08634878	0.077	0.77	1.12E+00	1.12E-01
Gamma-chlordane	0.212936538	0	0.340698461	0.25166683	2.14	10.7	1.18E-01	2.35E-02
Heptachlor epoxide	0.016093846	0	0.016093846	0.01237064	0	0	#DIV/0!	#DIV/0!
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	1.450807692	0	9.720411536	6.81058501	0	0	#DIV/0!	#DIV/0!
Metals								
Arsenic	2.065588	0	0.462691712	0.4837871	2.46	7.38	1.97E-01	6.56E-02
Chromium (total)	4.05	0	1.2393	1.17728447	1	5	1.18E+00	2.35E-01
Mercury	0.207	0	0.350451	0.257909	0.0064	0.064	4.03E+01	4.03E+00
Zinc	21.2	0	67.8612	48.4318569	14.5	131	3.34E+00	3.70E-01

American Woodcock

Body Weight	0.1340000 kg		
Food Ingestion Rate	0.1030000 kg/day	% EW	0.896
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.1030000 kg/day	% soil	0.104

Maximum Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Earthworm Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.076	0	0.2508	0.17880554	0.0028	0.028	6.39E+01	6.39E+00
4,4'-DDE	0.79	0	1.343	0.98809899	0.0028	0.028	3.53E+02	3.53E+01
4,4'-DDT	0.547	0	0.31179	0.25846224	0.0028	0.028	9.23E+01	9.23E+00
Alpha-chlordane	1.89	0	3.024	2.23376561	2.14	10.7	1.04E+00	2.09E-01
Aroclor-1254	#N/A	0	#N/A	#N/A	0.18	1.8	#N/A	#N/A
Aroclor-1260	0.064	0	0.426688	0.29898321	0.18	1.8	1.66E+00	1.66E-01
Chlordane	3.86	0	6.176	4.56208215	2.14	10.7	2.13E+00	4.26E-01
Dieldrin	0.0018	0	0.01206	0.00844981	0.077	0.77	1.10E-01	1.10E-02
Gamma-chlordane	1.97	0	3.152	2.32831654	2.14	10.7	1.09E+00	2.18E-01
Heptachlor epoxide	0.0013	0	0.0013	0.00099925	0	0	#DIV/0!	#DIV/0!
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	0.65	0	4.355	3.05132119	0	0	#DIV/0!	#DIV/0!
Metals								
Arsenic	10.9	0	2.4416	2.55291926	2.46	7.38	1.04E+00	3.46E-01
Chromium (total)	8.7	0	2.6622	2.52898144	1	5	2.53E+00	5.06E-01
Mercury	0.89	0	1.50677	1.1088841	0.0064	0.064	1.73E+02	1.73E+01
Zinc	52	0	166.452	118.795121	14.5	131	8.19E+00	9.07E-01

Red Fox

Body Weight	3.9400000 kg		
Food Ingestion Rate	0.5520000 kg/day	% prey	0.972
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.5520000 kg/day	% soil	0.028

Mean Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.036632692	0	0.072752526	1.01E-02	0.8	4	1.26E-02	2.51E-03
4,4'-DDE	0.050375	0	0.05168475	7.24E-03	0.8	4	9.04E-03	1.81E-03
4,4'-DDT	0.059423077	0	0.020679231	3.05E-03	0.8	4	3.81E-03	7.62E-04
Alpha-chlordane	0.217125	0	0.095636506	1.39E-02	4.6	9.2	3.02E-03	1.51E-03
Aroclor-1254	#N/A	0	#N/A	#N/A	0.068	0.68	#N/A	#N/A
Aroclor-1260	0.174225	0	2.246683643	3.07E-01	0.068	0.68	4.51E+00	4.51E-01
Chlordane	0.5610125	0	0.247107773	3.59E-02	4.6	9.2	7.79E-03	3.90E-03
Dieldrin	0.018394231	0	0.006189659	9.15E-04	0.02	0.2	4.58E-02	4.58E-03
Gamma-chlordane	0.212936538	0	0.093791625	1.36E-02	4.6	9.2	2.96E-03	1.48E-03
Heptachlor epoxide	0.016093846	0	0.00283304	4.49E-04	0.1	1	4.49E-03	4.49E-04
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	1.450807692	0	5.85836146	8.03E-01	8	80	1.00E-01	1.00E-02
Metals								
Arsenic	2.065588	0	0.061864361	1.65E-02	0.126	1.26	1.31E-01	1.31E-02
Chromium (total)	4.05	0	0.1743525	3.96E-02	3.28	32.8	1.21E-02	1.21E-03
Mercury	0.207	0	0.002427075	1.14E-03	0.015	0.025	7.62E-02	4.57E-02
Zinc	21.2	0	79.40142	1.09E+01	160	320	6.81E-02	3.40E-02

Red Fox

Body Weight	3.9400000 kg		
Food Ingestion Rate	0.5520000 kg/day	% prey	0.972
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.5520000 kg/day	% soil	0.028

Maximum Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.076	0	0.30096	0.04128247	0.8	4	5.16E-02	1.03E-02
4,4'-DDE	0.79	0	1.6116	0.22256461	0.8	4	2.78E-01	5.56E-02
4,4'-DDT	0.547	0	0.374148	0.05309678	0.8	4	6.64E-02	1.33E-02
Alpha-chlordane	1.89	0	1.6632	0.23390655	4.6	9.2	5.08E-02	2.54E-02
Aroclor-1254	#N/A	0	#N/A	#N/A	0.068	0.68	#N/A	#N/A
Aroclor-1260	0.064	0	1.6214144	0.22105313	0.068	0.68	3.25E+00	3.25E-01
Chlordane	3.86	0	3.3968	0.47771391	4.6	9.2	1.04E-01	5.19E-02
Dieldrin	0.0018	0	0.001206	0.00017129	0.02	0.2	8.56E-03	8.56E-04
Gamma-chlordane	1.97	0	1.7336	0.24380736	4.6	9.2	5.30E-02	2.65E-02
Heptachlor epoxide	0.0013	0	0.000455	6.7061E-05	0.1	1	6.71E-04	6.71E-05
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	0.65	0	5.226	0.71421963	8	80	8.93E-02	8.93E-03
Metals								
Arsenic	10.9	0	0.24416	0.07600837	2.46	7.38	3.09E-02	1.03E-02
Chromium (total)	8.7	0	0.745416	0.1356385	1	5	1.36E-01	2.71E-02
Mercury	0.89	0	0.0150677	0.00554323	0.0064	0.064	8.66E-01	8.66E-02
Zinc	52	0	349.5492	47.8051365	14.5	131	3.30E+00	3.65E-01

Red-Tailed Hawk

Body Weight	0.9570000 kg		
Food Ingestion Rate	0.1050000 kg/day	% prey	1.00E+00
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.0000000 kg/day		

Mean Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.036632692	**0**	0.072752526	7.98E-03	0.0028	0.028	2.85E+00	2.85E-01
4,4'-DDE	0.050375	**0**	0.05168475	5.67E-03	0.0028	0.028	2.03E+00	2.03E-01
4,4'-DDT	0.059423077	**0**	0.020679231	2.27E-03	0.0028	0.028	8.10E-01	8.10E-02
Alpha-chlordane	0.217125	**0**	0.095636506	1.05E-02	2.14	10.7	4.90E-03	9.81E-04
Aroclor-1254	#N/A	**0**	#N/A	#N/A	0.18	1.8	#N/A	#N/A
Aroclor-1260	0.174225	0	2.246683643	2.47E-01	0.18	1.8	1.37E+00	1.37E-01
Chlordane	0.5610125	0	0.247107773	2.71E-02	2.14	10.7	1.27E-02	2.53E-03
Dieldrin	0.018394231	0	0.006189659	6.79E-04	0.077	0.77	8.82E-03	8.82E-04
Gamma-chlordane	0.212936538	0	0.093791625	1.03E-02	2.14	10.7	4.81E-03	9.62E-04
Heptachlor epoxide	0.016093846	0	0.00283304	3.11E-04	0	0	#DIV/0!	#DIV/0!
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	1.450807692	0	5.85836146	6.43E-01	0	0	#DIV/0!	#DIV/0!
Metals								
Arsenic	2.065588	0	0.061864361	6.79E-03	2.46	7.38	2.76E-03	9.20E-04
Chromium (total)	4.05	0	0.1743525	1.91E-02	1	5	1.91E-02	3.83E-03
Mercury	0.207	0	0.002427075	2.66E-04	0.0064	0.064	4.16E-02	4.16E-03
Zinc	21.2	0	79.40142	8.71E+00	14.5	131	6.01E-01	6.65E-02

Red-Tailed Hawk

Body Weight	0.9570000 kg		
Food Ingestion Rate	0.1050000 kg/day	% prey	1
Water Ingestion Rate	0.0000000 L/day		
Soil Ingestion Rate	0.0000000 kg/day		

Maximum Concentrations

COPC	Soil Concentration (mg/kg)	Water Concentration (mg/L)	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Pesticides/PCBs								
4,4'-DDD	0.076	0	0.30096	0.03302069	0.0028	0.028	1.18E+01	1.18E+00
4,4'-DDE	0.79	0	1.6116	0.17682132	0.0028	0.028	6.32E+01	6.32E+00
4,4'-DDT	0.547	0	0.374148	0.04105072	0.0028	0.028	1.47E+01	1.47E+00
Alpha-chlordane	1.89	0	1.6632	0.18248276	2.14	10.7	8.53E-02	1.71E-02
Aroclor-1254	#N/A	0	#N/A	#N/A	0.18	1.8	#N/A	#N/A
Aroclor-1260	0.064	0	1.6214144	0.17789813	0.18	1.8	9.88E-01	9.88E-02
Chlordane	3.86	0	3.3968	0.37268966	2.14	10.7	1.74E-01	3.48E-02
Dieldrin	0.0018	0	0.001206	0.00013232	0.077	0.77	1.72E-03	1.72E-04
Gamma-chlordane	1.97	0	1.7336	0.1902069	2.14	10.7	8.89E-02	1.78E-02
Heptachlor epoxide	0.0013	0	0.000455	4.9922E-05	0	0	#DIV/0!	#DIV/0!
Total chlordane	#N/A	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Toxaphene	0.65	0	5.226	0.57338558	0	0	#DIV/0!	#DIV/0!
Metals								
Arsenic	10.9	0	0.24416	0.02678871	2.46	7.38	1.09E-02	3.63E-03
Chromium (total)	8.7	0	0.745416	0.08178545	1	5	8.18E-02	1.64E-02
Mercury	0.89	0	0.0150677	0.0016532	0.0064	0.064	2.58E-01	2.58E-02
Zinc	52	0	349.5492	38.3517931	14.5	131	2.64E+00	2.93E-01