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FINAL RECORD OF DECISION FOR OPERABLE UNIT 10 (OU 10) SITE 25 FORMER TRANSFORMER STORAGE YARD NAS CECIL FIELD FL

9/29/2004

TETRA TECH NUS INC

Record Of Decision
Operable Unit 10, Site 25
Former Transformer Storage Yard

Naval Air Station
Cecil Field
Jacksonville, Florida

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

Contract Task Order 0078

September 2004

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RECORD OF DECISION
OPERABLE UNIT 10, SITE 25
FORMER TRANSFORMER STORAGE YARD

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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This document that describes the Record of Decision for Operable Unit 10, Site 25, Former Transformer Storage Yard at 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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LIST OF ACRONYMS AND ABBREVIATIONS

ABB-ES	ABB Environmental Services, Inc.
AOI	Area of Interest
ARAR	Applicable or Relevant and Appropriate Requirement
BCT	BRAC Closure Team
bgs	Below ground surface
BHC	Benzene hexachloride
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
CCI	CH2M Hill Constructors, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of concern
CSF	Cancer Slope Factor (USEPA's)
DPT	Direct push technology
EE	Envirodyne Engineers
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FFA	Federal Facility Agreement
FS	Feasibility Study
GAC	Granular activated carbon
GCTL	Groundwater Cleanup Target Levels (FDEP's)
G&M	Geraghty & Miller
HLA	Harding Lawson Associates
HRC®	Hydrogen release compound
HSWA	Hazardous and Solid Waste Amendments
IAS	Initial Assessment Study
IBDS	Inorganic Background Data Set
IR	Installation Restoration
IRA	Interim Removal Action
KAG	Kerosene Analyte Group (FDEP's)
LUCs	Land use control
MCLs	Maximum Contaminant Levels (USEPA's)
MOA	Memorandum of Agreement
µg/L	Microgram(s) per liter
µg/kg	Microgram(s) per kilogram

NAS	Naval Air Station
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NFA	No further action
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPW	Net present worth
O&M	Operation and maintenance
ORC	Oxygen release compound
OSHA	Occupational Safety and Health Act
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCOC	Potential chemical of concern
PID	Photoionization detector
ppm	Part(s) per million
PRE	Preliminary Risk Evaluation
PRG	Preliminary Remedial Action Goal
PSC	Potential Source of Contamination
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose (USEPA's)
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SCTL	Soil Cleanup Target Level (FDEP's)
SDWA	Safe Drinking Water Act
SMCL	Secondary Maximum Contaminant Level (USEPA's)
SOUTHDIVNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SPECAP	Specific capacity
SVOC	Semivolatile organic compound
TAL	Target Analyte List
TBC	To Be Considered (criterion)
TCL	Target Compound List
TRPH	Total recoverable petroleum hydrocarbons

TSD	Treatment, storage, disposal (facility)
TtNUS	Tetra Tech NUS, Inc.
UCL	Upper confidence limit
USCS	United Soil Classification System
U.S. EPA	United States Environmental Protection Agency
UST	Underground storage tank
VOC	Volatile organic compound

1.0 DECLARATION OF THE RECORD OF DECISION

1.1 SITE NAME AND LOCATION

Operable Unit (OU) 10, Site 25 consists of the soil and groundwater at the Former Transformer Storage Yard at the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida [United States Environmental Protection Agency (U.S. EPA) ID FL5 170 022 474]. Site 25 is located in the north-central portion of the former Main Base.

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedy for OU 10, Site 25 at the former NAS Cecil Field. The selected remedial actions were chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 Code of Federal Regulations (CFR) §300]. This decision document was prepared in accordance with U.S. EPA decision document guidance (U.S. EPA, 1999). This decision is based on the Administrative Record for the site. The United States Department of the Navy (Navy) and U.S. EPA Region 4 issue this ROD (jointly). The Florida Department of Environmental Protection (FDEP) concurs with the selected remedy.

1.3 ASSESSMENT OF THE SITE

The response actions selected in this ROD are necessary to protect the public health, welfare, or the environment from actual or threatened releases of hazardous substances into the environment or of pollutants or contaminants from this site that may present an imminent and substantial endangerment to public health or welfare.

1.4 DESCRIPTION OF THE SELECTED REMEDY

OU 10, Site 25 is part of a comprehensive environmental investigation and cleanup currently being performed at the former NAS Cecil Field under the CERCLA program. This ROD addresses only OU 10, Site 25. The selected remedy eliminates unacceptable exposure to benzene hexachloride (BHC) in the groundwater. The selected remedy for OU 10, Site 25 includes no further action (NFA) for soil. The selected remedy also includes monitored natural attenuation for groundwater and land use controls (LUCs) that will prohibit the future extraction or consumption of groundwater from taking place at this location. The selected remedy was chosen based upon evaluation of site conditions, site-related risks,

future land use, applicable or relevant and appropriate requirements (ARARs), and Remedial Action Objectives (RAOs).

The major components of the selected remedy are as follows:

- No Further Action for soil.

- LUCs, including institutional controls such as deed restrictions, will be implemented to restrict the future uses of the surficial aquifer groundwater until the levels of contamination in the groundwater meet the State of Florida's Groundwater Cleanup Target Levels (GCTLs).

- Long-term groundwater monitoring will be performed by collecting and analyzing groundwater samples to verify that no unacceptable contaminant migration is occurring and to evaluate reductions in contaminant concentrations through dilution and naturally occurring processes such as biodegradation, dispersion, advection, and adsorption.

- Site conditions will be reviewed at the end of 5 years. If natural attenuation and LUCs are shown to be insufficient to meet the cleanup goals and RAOs as predicted by modeling, another remedial approach will be evaluated and may be implemented.

The Navy shall prepare in accordance with U.S. EPA Guidance and submit to the U.S. EPA and FDEP a Remedial Design as well as all other post-ROD documents as specified in the Federal Facility Agreement (FFA) dated October 23, 1990.

1.5 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, is cost effective, and complies with federal and State requirements that are legally applicable or relevant and appropriate to the remedial action. The nature of the selected remedy for OU 10, Site 25 is such that ARARs will be met through natural attenuation for groundwater. The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner at this site. Of those alternatives that are protective of human health and the environment and comply with ARARs, the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment. Although the selected remedy does not provide for treatment as a principal element, reduction of groundwater contaminant concentrations are expected over time due to biodegradation, dispersion, advection, and adsorption processes and dilution. Because this remedy would result in groundwater with contaminant concentrations greater than health-based levels

remaining on site for an estimated 5 years, a site review will be conducted at the end of that time period to verify that the cleanup goals and RAOs have been met.

1.6 DATA CERTIFICATION CHECKLIST

The information required to be included in the ROD is summarized on Table 1-1. These data are presented in Section 2.0: Decision Summary of this ROD. Additional information, if required, can be found in the Administrative Record for OU 10, Site 25.

1.7 SIGNATURE AND SUPPORT AGENCY ACCEPTANCE OF REMEDY

Jeffrey G. Meyers, P.E., CHMM
Base Realignment and Closure
Environmental Coordinator

09 July 2004
Date

Winston A. Smith
Director
Waste Management Division
U.S. EPA Region 4

9-29-04
Date

TABLE 1-1

DATA CERTIFICATION CHECKLIST
OU 10, SITE 25 RECORD OF DECISION
NAS CECIL FIELD – JACKSONVILLE, FLORIDA

Information	ROD Reference
Chemicals of Concern (COCs) and their concentrations	Section 2.5.2, Pages 2-8 to 2-11, Tables 2-1 & 2-2, Figure 2-4
Baseline risk represented by the COCs	Section 2.6, Page 2-11
Cleanup Goals established for the COCs	Section 2.7, Pages 2-11 and 2-12
Disposition of source materials constituting principal threat	Section 2.2.2, 6th bullet, Page 2-4
Current and reasonably anticipated future land and groundwater use scenarios used in the Baseline Risk Assessment (BRA) and Record of Decision (ROD)	Section 2.5.3, Page 2-11, Section 2.10.2, Component 3; Pages 2-15 and 2-16
Potential land and groundwater uses available at the site as a result of the selected remedy	Section 2.10.4, Pages 2-17 and 2-18
Estimated capital, operating and maintenance (O&M), and net present worth (NPW) costs of selected remedy and timeframe over which these costs are projected	Section 2.10.3, Page 2-17 Appendix B
Key factors that lead to the selection of the remedy	Section 2.10.1, Page 2-15

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

OU 10, Site 25 is situated within the boundaries of the former NAS Cecil Field (U.S. EPA ID FL5 170 022 474) which is located 14 miles southwest of Jacksonville, Florida, as shown on Figure 2-1. The majority of Cecil Field is located within Duval County, and the southernmost part of the Facility is located in Clay County. NAS Cecil Field was established in 1941 and provided facilities, services, and material support for the operation and maintenance of naval weapons, aircraft, and other units of the operation forces as designated by the Chief of Naval Operations. Since the closure of NAS Cecil Field in September 1999, most of the Facility has been transferred to the Jacksonville Port Authority (now Jacksonville Airport Authority) and the City of Jacksonville. According to the City's reuse plan, Cecil Field will have multiple uses but will be used primarily for aviation-related activities.

The name of Site 25 has been changed over the course of the investigations. For the BRAC investigation, the site was designated as AOI 25. After it was determined that soil contamination was present over a large area, the area was redesignated Potential Source of Contamination (PSC) 25 in January 1999. After the presence of groundwater contamination was confirmed, the area was designated as Installation Restoration (IR) Site 25 in February 2000.

As shown on Figure 2-2, Site 25, the Former Transformer Storage Yard, is located in the Transportation and Fuel Management Compound/Public Works Maintenance Area, north of Cecil Pines Street (formerly 9th Street) and east of New World Avenue (formerly “D” Avenue). The site itself is to the north of Building 81. As shown on Figure 2-3, the site included Buildings 101 and 247 as well as oil/water separators 80-OW1, 80-OW2, and 80-OW4. These buildings and oil/water separators have been demolished or dismantled and removed from the site.

The site is primarily unpaved and covers about 0.6 acre. Building 100 formed the northern border of the site. Access roads around former Building 81 form the east and south borders. The fence between the Transportation and Fuel Management Compound and Public Works Maintenance Contractor Area forms the western border. Former Oil/Water Separators 80-OW1 and 80-OW2 were located west of the fence. In addition, the unpaved strip between the Transportation and Fuel Management Compound and Public Works Maintenance Contractor Area is included in the site [Harding Lawson Associates (HLA), 1999b].

The site’s unpaved area was used to store several hundred transformers and other pieces of electrical equipment. Some of the transformers were reported to have contained PCBs. The transformers and equipment are no longer present and were removed in the early 1990s. Building 247 was a metal shed

constructed in 1956 and originally used for the storage of pesticides. Pesticide storage in Building 247 ceased in 1975, and the building's last use was the storage of fluorescent lights. Building 101 was constructed in 1975 and served as an office and an insecticide storage area for the pest control subcontractor. Although Building 101 had a mixing area, the area was reportedly never used for mixing pesticides [ABB Environmental Services (ABB-ES), 1994]. All the Site 25 buildings have been demolished and removed.

Three oil/water separators were included as part of OU 10, Site 25. Former Oil/Water Separator 80-OW1 was a portable unit located on a concrete pad on the west side of the fence. Former Oil/Water Separator 80-OW2 was an underground unit located on the west side of the fence and serviced the automotive and repair shop at Building 80 (HLA, 1999a). Former Oil/Water Separator 80-OW4 was located within Site 25 and appears to have been connected to the discharge of the containment area on the western side of the fence (HLA, 1999c). All the Site 25 oil/water separators have been dismantled and removed.

A paved roadway and abandoned wash rack are in the west part of the site. A storm sewer catch basin is located on the roadway (HLA, 1999b).

Soil contaminated with PCBs, PAHs, TRPH, and pesticides was delineated, excavated, and disposed offsite as part of an IRA [TtNUS, 2001a and CH2M Hill Constructors, Inc. (CCI), 2001]. These areas of soil excavation are illustrated on Figure 2-3. Groundwater contaminated with BHC isomers and aluminum was also identified in earlier studies, and this contamination is the principal subject of this ROD.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The first environmental studies for the investigation of waste handling and/or disposal sites at NAS Cecil Field were conducted between 1983 [Geraghty and Miller (G&M), 1983] and 1985 (G&M, 1985). These studies were followed in 1985 by an Initial Assessment Study (IAS) [Envirodyne Engineers (EE), 1985]. A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was completed in 1988 (HLA, 1988).

NAS Cecil Field was placed on the National Priorities List (NPL) by the U.S. EPA in December 1989. A Federal Facility Agreement (FFA) for NAS Cecil Field was signed by the FDEP, U.S. EPA, and the Navy in 1990. Following the listing of NAS Cecil Field on the NPL and the signing of the FFA, remedial response activities at the Facility have been completed under CERCLA authority. OU 10 is one of 12 operable units that have been identified. A Hazardous and Solid Waste Amendments (HSWA) permit was issued on October 13, 1996. The HSWA permit was renewed on August 25, 2000 and is still in effect.

2.2.1 Site 25 History

The buildings in the immediate area of Site 25 have always been associated with the Public Works Center (ABB-ES, 1994). Former Building 81, the main building in the area, was built in 1953. Former Building 100 was constructed in 1961, Former Building 247 was constructed in 1956, and Former Building 101 was constructed in 1975. The age of the former oil/water separators was unknown. The age, duration of use, and operational details of the former wash rack are also not known. Activities at Site 25 have included the storage of pesticides and old transformers (ABB-ES, 1994).

2.2.2 Previous Investigations

The following investigations and studies have been conducted in and around Site 25:

- February 1997 – Phase II Investigation of Transportation and Fuel Management Compound and Public Works Maintenance Contractor Area was initiated. Eight surface soil samples were collected in AOI 25 and analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides and PCBs, and Target Analyte List (TAL) inorganic chemicals. One well was installed at AOI 25 and two others were installed nearby. The groundwater samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganic chemicals (HLA, 1999b).

- December 1998 – Phase II Investigation of Transportation and Fuel Management Compound and Public Works Maintenance Contractor Area was continued to delineate contaminated areas. Five surface soil samples were collected in AOI 25 and analyzed for TCL pesticides and PCBs. No groundwater samples were collected (HLA, 1999b).

- March 1997 and February 1999 – Confirmatory sampling investigation of Oil/Water Separator 80-OW2 was performed. Four soil borings for headspace analysis were advanced. One soil sample and one groundwater sample were analyzed for the FDEP Kerosene Analytical Group (KAG) parameters (HLA, 1999a).

- January 1999 through May 1999 – Confirmatory Sampling Investigation of Oil/Water Separator 80-OW4 was performed. Eleven soil borings were advanced to collect soil samples for headspace analysis. Five soil samples were analyzed for FDEP Used Oil parameters and one groundwater sample was analyzed for FDEP KAG parameters (HLA, 1999c).

- February 1999 – Confirmatory sampling investigation of Oil/Water Separator 80-OW1 was performed. One soil boring for headspace analysis was advanced. One soil sample was analyzed for FDEP Used Oil parameters.

- June 1999 through August 2000 – Investigation of PSC 25/Site 25. A total of 79 soil samples were collected in 10 phases to delineate soil contamination. One new monitoring well was installed, and two rounds of groundwater samples were collected from that well and another existing well. The analyses for each phase were progressively narrowed to the contaminants detected at concentrations of concern in previous phases. Typically, samples were analyzed for pesticides, PCBs, TRPH, and PAHs. Samples were collected to delineate contamination associated with AOI 25, 80-OW1, 80-OW2, and 80-OW4.

- June 2000 – A bench-scale treatability study was performed to verify the effectiveness of in-situ/ex-situ enhanced oxidation processes for the removal of BHC from groundwater at Site 25. Samples of groundwater were collected from well CEF-P25-01S and submitted to technology vendors for the testing of enhanced oxidation with Fenton's Reagent (Geo-Cleanse) and potassium permanganate (Carus). These tests were not successful as neither reagent was able to reduce detected concentrations of BHC to less than FDEP criteria.

- April 2001 - An Action Memorandum was prepared to discuss the results of the soil investigations, identify the need for a removal action, and delineate the area of soil to be removed (TtNUS, 2001a). As decided by the BCT (BCT, 2000), the Site 25 soil were to be remediated for residential land use and protection of groundwater. A total of approximately 1,235 cubic yards (1,852 tons) of contaminated soil were delineated for excavation and disposal. Excavation of these sols ensured that exposure concentrations, represented by the 95-percent upper confidence level (UCL) of detected concentrations, are less than FDEP Soil Cleanup Target Levels (SCTLs) for direct residential exposure or leachability to groundwater.

- April 23 to May 25, 2001 - An Interim Removal Action (IRA) was performed in accordance with the Action Memorandum (TtNUS, 2001a). Approximately 5,234 tons of contaminated soil (5,136 tons non-hazardous and 98 tons hazardous) were excavated and disposed off site (CCI, 2001). The quantity of excavated soil significantly exceeded the estimate of the Action Memorandum because of the discovery and removal of additional soil contamination during the IRA. Areas of excavation are illustrated on Figure 2-3.

- April 2000 through October 2001 – Site 25 Remedial Investigation (RI). Samples were collected from two existing monitoring wells to further delineate BHC and aluminum contamination in groundwater

(TtNUS, 2001b). One round of samples was collected from well CEF-P25-01S, where elevated BHC concentrations had previously been detected, and analyzed for TCL pesticides and PCBs. One round of samples was collected from well CEF-80-03S, where elevated aluminum concentrations had previously been detected, and analyzed for aluminum. In addition, specific capacity (SPECAP) tests were performed on two other existing monitoring wells (CEF-81-2S, CEF-81-8S) to estimate hydraulic conductivity and transmissivity in the shallow zone of the surficial aquifer.

- October 2001 - Site 25 Feasibility Study (FS). Based on the results of previous investigations, groundwater chemicals of concern (COCs) were identified and Cleanup Goals established. Groundwater remedial technologies were screened and remedial alternatives were assembled, analyzed, and compared (TtNUS, 2001c).

- May 2003 - A Proposed Plan (TtNUS, 2003) was prepared based on the findings of the FS. This Proposed Plan recommended NFA for the Site 25 soil and proposed monitored natural attenuation and LUCs for the Site 25 groundwater. The Proposed Plan also presented a rationale for the selection of this proposed remedy.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public notices of the availability of the Proposed Plan (TtNUS, 2003) were placed in the Metro section of the *Florida Times-Union* on July 1, 2003. A 30-day comment period was held from July 1 through July 30, 2003. The results of the RI (TtNUS, 2001a) and Preliminary Risk Evaluation (PRE), the remedial alternatives of the FS (TtNUS, 2001b), and the preferred alternative of the Proposed Plan (TtNUS, 2003) were also presented and discussed at a Restoration Advisory Board (RAB) meeting held on July 17, 2001, during which comments were solicited from the community. Public comments and the responses to these comments are presented in the Responsiveness Summary provided in Appendix A.

Documents pertaining to OU 10, Site 25 are available to the public at the Information Repository located at Building 907, 13357 Lake Newman Street, Cecil Commerce Center, Jacksonville, Florida 32252 [Telephone (904) 573-0336]. This ROD will become part of the Administrative Record File [NCP §300.825(a)(2)].

2.4 SCOPE AND ROLE OF OPERABLE UNIT

The environmental concerns at NAS Cecil Field are complex. As a result, work at the 24 sites in the IR Program has been organized into 12 OUs. More than 200 other areas are undergoing evaluation in the BRAC and Petroleum Programs.

This ROD is the final action for OU 10, Site 25. Final RODs have been approved for OU 1 through OU 4; OU 5, Site 14; OU 6 through OU 8; OU 9, Sites 36/37; OU 11, Site 45; and OU 12, Sites 42 44 and Old Golf Course. An RI, Baseline Risk assessment (BRA), and FS have also been prepared for OU 5, Site 15 but the FS is currently being re-evaluated. RI and FS reports were finalized for OU 9, Sites 57 and 58 in August and October 2002, respectively. RI and FS reports were finalized for OU 10, Site 21 in October 2001 and September 2002, respectively. An interim action has been completed for OU 12, Site 32. Decision documents are forthcoming for OU 10, Site 21 and OU 12, Site 32.

Investigations at OU 10, Site 25 indicated the presence of groundwater contamination from past operating practices. This contamination could pose an unacceptable human health risk if the groundwater was used as a potable water source.

The following Remedial Action Objective (RAO) was established for groundwater at OU 10, Site 25:

- Prevent ingestion of groundwater with alpha- and beta-BHC concentrations greater than their respective cleanup goals of 0.006 microgram per liter (µg/L) and 0.02 µg/L, which are the FDEP Groundwater Cleanup Target Levels (GCTLs).

- Reduce concentrations of alpha- and beta-BHC in groundwater to less than FDEP GCTLs.

It is expected that the remedy documented in this ROD will achieve this RAO.

2.5 SUMMARY OF SITE CHARACTERISTICS

Contaminant sources, detected concentrations, fate and transport, contaminated media, and geologic and hydrogeologic conditions of OU 10, Site 25 are discussed in Sections 4.0, 5.0, and 6.0 of the OU 10, Site 25 RI Report (TtNUS, 2001b). These site characteristics are summarized in the following paragraphs.

2.5.1 Geology and Hydrogeology

Shallow soil to a depth of 4 feet below ground surface (bgs) at Site 25 was composed of approximately 80 percent fine sand and approximately 20 percent silt and clay, with a United Soil Classification System (USCS) classification of SM. Specific gravity of the soil ranged from 2.58 to 2.70, and porosity ranged from 38.8 to 43.2 percent.

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.

Depth to groundwater at Site 25, as measured in April 2000, ranged from approximately 5.5 to 7 feet bgs. The surficial aquifer system in which the wells are installed is approximately 90 to 100 feet thick at NAS Cecil Field, although wells at Site 25 monitor only the shallow zone to a depth of 15 feet bgs.

The pattern of groundwater flow is consistent with the presence of a groundwater divide at Cecil Field in the Site 25 area. At the site, the direction of flow is toward the southeast, but about 300 feet to the west, the groundwater flow direction is toward the southwest. The groundwater gradient is approximately 0.0009.

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, feet/day

K_h is horizontal hydraulic conductivity, feet/day

i is hydraulic gradient, dimensionless

n_e is effective porosity, dimensionless (assumed at 0.15 for fine sands)

Because the contamination is limited to the shallow zone of the surficial aquifer, groundwater velocity was evaluated only in that zone. The K_h value used was the average of the values derived from the SPECAP test data for wells CEF-81-2S and CEF-81-8S.

K_h = 7.65 feet/day
i = 0.0009
n_e = 0.15.

The resulting V_h is 0.046 feet/day or 17 feet/year.

2.5.2 Nature and Extent of Contamination

2.5.2.1 Soil

PAHs, PCBs, pesticides, and TRPH were detected at concentrations in excess of FDEP SCTLs for residential exposure. The BCT reviewed analytical results, and a decision was made to delineate the extent of contaminated soil. A statistical evaluation was conducted to determine the areas requiring

removal to achieve a site-wide 95-percent UCL less than residential SCTLs. Additional site background information may be obtained through reference to the Action Memorandum (TtNUS, 2001a).

During the removal action conducted from April 23 to May 25, 2001 (CCI, 2001), approximately 5,234 tons of contaminated soil were excavated and disposed off site. The 95-percent UCLs of the residual concentrations of PAHs, PCBs, pesticides, and TRPH in the soil are equal to or less than FDEP SCTLs for residential exposure (TtNUS, 2001a).

2.5.2.2 Former Oil/Water Separators

Former Oil/Water Separator 80-OW1

One soil sample was collected at a depth of 5 to 6 feet bgs and analyzed for VOCs, PAHs (U.S. EPA Method 8310), TRPH, arsenic, cadmium, chromium, and lead. The detected concentrations of all compounds and metals were either less than analytical detection limits or less than the FDEP SCTLs for residential exposure and leachability to groundwater. Analytical detection limits were less than the FDEP SCTLs.

The laboratory reported a methylene chloride concentration of 23.3 milligrams per kilograms (µg/kg) (the leachability criteria is 20 µg/kg), but noted that the compound was a suspected laboratory contaminant. Methylene chloride was not detected in other samples in the vicinity of PSC 25, and only two other organic compounds were detected in the 80-OW1 soil sample. Therefore, the methylene chloride is likely to be a laboratory contaminant, and no additional sampling was proposed.

Because the laboratory results were less than FDEP criteria, no additional delineation was required. No other contaminants were detected at concentrations greater than FDEP criteria, or greater than the NAS Cecil Field site-specific Inorganic background Data Set (IBDS) values (HLA, 1998). Therefore, NFA is required for former Oil/Water Separator 80-OW1.

Former Oil/Water Separator 80-OW2

One soil sample was collected at former Oil/Water Separator 80-OW2, next to the location of the highest photoionization detector (PID) reading [360 parts per million (ppm)] measured during the Confirmatory Sampling Investigation (HLA, 1999c). This sample was analyzed for PAHs using U.S. EPA Method 8310.

Analytical results for this soil sample were all below detection limits, and these detection limits were less than FDEP SCTLs for residential exposure and leachability to groundwater.

No other contaminants were detected at concentrations greater than FDEP criteria or greater than the NAS Cecil Field site-specific IBDS values. Therefore, NFA is required for former Oil/Water Separator 80-OW2.

Former Oil/Water Separator 80-OW4

Soil samples previously collected as part of the Confirmatory Sample Report investigation had concentrations of PAHs and TRPH greater than FDEP SCTLs (HLA, 1999c). However, the delineation was not complete, so additional samples in the vicinity of former Oil/Water Separator 80-OW4 were collected during the investigation of PSC 25. Samples were collected at depth to complete the delineation of the PAH contamination detected during previous investigations.

The additional sampling showed that PAH contamination at concentrations greater than FDEP SCTLs extended to the top of the water table, about 6 feet bgs. PAH and TRPH contamination extended 5 feet to the north, 15 feet to the east, 60 feet to the south, and 10 feet to the west of former Oil/Water Separator 80-OW4. This contamination was considered in the evaluation of the contamination at Site 25 and was accounted for in the soil excavation plan (TtNUS, 2001a; CCI, 2001). The IRA was carried out such that no contamination associated with former Oil/Water Separator 80-OW4 remains. Therefore, NFA is required for former Oil/Water Separator 80-OW4.

2.5.2.3 Groundwater

Tables 2-1 and 2-2 provide summaries of the positive detections in groundwater for the pre-RI and RI sampling events, respectively.

As shown on Table 2-1, a total of five chemicals, including alpha-, beta-, and gamma-BHC, aluminum, and manganese, were detected during the pre-RI sampling events at concentrations in excess of either FDEP GCTLs (FDEP, 1999a) or NAS Cecil-Field site-specific IBDS values (HLA, 1998). The maximum detected concentration was 0.12 µg/L for both alpha- and beta-BHC (well CEF-P25-01S), 0.43 µg/L for gamma-BHC (well CEF-P25-01S), 36,400 µg/L for aluminum (well CEF-080-03S), and 160 µg/L for manganese (well CEF-081-08S). Because exceedances of manganese were only slight and did not result in unacceptable risks, only BHC and aluminum contamination were identified as potential chemicals of concern (PCOCs) and further investigated during the RI.

As shown on Table 2-2, alpha- and beta-BHC were detected at concentrations greater than their FDEP GCTLs in the samples collected from monitoring well CEF-P25-01S during the RI. Alpha-BHC was detected at an estimated concentration of 0.58 µg/L and beta-BHC was detected at a concentration of

0.74 µg/L. The GCTLs for these two BHC isomers are 0.006 and 0.02 µg/L, respectively. Therefore, alpha- and beta-BHC were retained as COCs for the Site 25 groundwater.

During the RI, aluminum was detected at a total concentration of 287 µg/L in the sample collected from monitoring well CEF-080-03S in which it had previously detected at 36,400 µg/L. This detection is in excess of the FDEP GCTL of 200 µg/L but well below its NAS Cecil Field site-specific IBDS value of 13,100 µg/L. Also, the dissolved aluminum concentration measured in the filtered sample from well CEF-080-03S was 99 µg/L, which is below the GCTL and suggests that detected aluminum concentrations are primarily associated with suspended solids. Therefore, aluminum was not retained as a COC for the Site 25 groundwater.

The Site 25 groundwater contaminant plume, as defined by the GCTLs for alpha- and beta-BHC, is less than 100 feet across and is illustrated on Figure 2-4. The contaminants appear to be limited to the shallow zone of the surficial aquifer, i.e., no deeper than approximately 15 feet bgs. Because of the low concentrations and low mobility of the COCs and based on observations of groundwater contaminant plumes at other NAS Cecil Field sites, the installation of deeper wells to delineate vertical extent of contamination was determined to be unnecessary by the BCT. For the same reasons, it is unlikely that the BHC plume would expand and that COCs would migrate to adversely affect human health and the environment.

Accordingly, it was conservatively assumed that the groundwater contaminant plume where alpha- and beta-BHC concentrations exceed 0.006 µg/L and 0.02 µg/L, respectively, extends over a circular area approximately 100 feet in diameter centered on monitoring well CEF-P25-01S. The areal extent of the contaminant plume is estimated at approximately 7,854 square feet. Based on a water table depth of 5 feet bgs and porosity of 0.25 typical at NAS Cecil Field and using the assumed plume depth of 15 feet bgs, the total BHC plume volume is estimated at approximately 19,635 cubic feet or 147,000 gallons.

The source of the BHC in the groundwater appears to be from the soil in the unsaturated zone. BHC isomers were not detected in soil samples, but their presence could have been masked by other contaminants. The origin of the BHC is probably related to activities at the former pesticide storage building, Building 247, which is located about 20 feet from well CEF-P25-01S.

2.5.3 Current and Potential Future Site Uses

Site 25 is located within the industrial park and office complex portion of the Jacksonville Economic Development Commission (JEDC) Parcel. Site 25 is currently not being used. Existing buildings and structures have been demolished and removed for future use of the site as part of an industrial park and

office complex as provided for in the JEDC Reuse Plan. Current site conditions support both industrial and residential usage, assuming no exposure to contaminated groundwater is allowed.

2.6 SUMMARY OF SITE RISKS

2.6.1 Human Health Risk Assessment

Because of the soil IRA, exposure to soil no longer represents a human health risk. The 95-percent UCL of the concentrations detected in the soil remaining at the site is less than FDEP SCTLs for direct residential exposure. Soils with contaminant concentrations in excess of FDEP SCTLs for leachability to groundwater were removed during the 2001 IRA.

The PRE performed as part of the RI (TtNUS, 2001b) indicated that exposure to Site 25 groundwater could potentially result in adverse human health effects. Concentrations of alpha- and beta-BHC greater than FDEP GCTLs were detected in groundwater, reflecting carcinogenic risks from groundwater consumption of greater than FDEP's target risk range of 1×10^{-6}. Risks from consumption of groundwater were within U.S. EPA's risk range of 1×10^{-4} to 1×10^{-6}.

The PRE is a screening-level evaluation of potential risks from site constituents to human receptors at the site. The risks calculated in a PRE are derived by a comparison of exposure concentrations to GCTLs or PRGs. These GCTLs and PRGs are derived using default exposure assumptions established by FDEP and U.S. EPA, respectively. Because there are no deviations between the Navy and the regulatory agencies regarding those exposure assumptions or pathways defined by the regulatory agencies for groundwater exposures, this approach was used to streamline the evaluation of risk.

2.6.2 Ecological Risk Assessment

The ecological risk assessment performed as part of the RI established that Site 25 consisted primarily of buildings and parking lots that provide an ecological habitat of marginal quality and of little use to terrestrial wildlife (TtNUS, 2001b). The developed nature of the site renders exposure to soil by terrestrial receptors insignificant. Therefore, the soil exposure pathway is negligible and soil contaminants were not considered in the ecological risk assessment.

2.7 CLEANUP GOALS

The COCs identified for the Site 25 groundwater are alpha- and beta-BHC.

A cleanup goal is the target concentration to which a COC must be reduced within a particular medium of concern to achieve one or more of the established RAOs. Cleanup goals are established to ensure that COC concentration levels left on site are protective of human and ecological receptors.

For Site 25, groundwater cleanup goals were determined for alpha- and beta-BHC based on the following criteria:

- Protection of human health from exposure to contaminants in groundwater
- Restore the aquifer to meet the U.S. EPA Maximum Contaminated Levels (MCLs) and FDEP GCTLs
- Comply with ARARs and To-Be-Considered criteria (TBCs) to the extent practicable

Cleanup goals for groundwater at Site 25 are 0.006 µg/L for alpha-BHC and 0.02 µg/L for beta-BHC which are the respective FDEP GCTLs for these two chemicals.

2.8 DESCRIPTION OF REMEDIAL ALTERNATIVES

This section provides a narrative of each alternative evaluated for remediation of groundwater at OU 10, Site 25. For further information on the remedial alternatives, refer to the FS (TtNUS, 2001c) and the Proposed Plan (TtNUS, 2003). Summaries of the treatment alternatives evaluated in the FS are described in the following sections. The remedy selected for this ROD is presented in Section 2.10. As part of the FS (TtNUS, 2001c), each of the following alternatives was evaluated for compliance with related ARARs, and Section 2.0 of the FS presents a complete list of these ARARs. It should be noted that the ARARs presented in Section 2.11 and Tables 2-5 through 2-10 of this ROD are specific to the selected remedy.

Four remedial alternatives were analyzed for OU 10, Site 25 groundwater. This ROD has selected Alternative 2: Natural Attenuation, LUCs, and Groundwater Monitoring to address the COCs in groundwater. The alternatives evaluated, as described in the FS and summarized in Table 2-4, are as follows:

- Alternative 1: No Action
- Alternative 2: Natural Attenuation, LUCs, and Monitoring
- Alternative 3: In-Situ Enhanced Biodegradation, LUCs, and Monitoring
- Alternative 4: Extraction, On-Site Treatment, Surface Discharge, LUCs, and Monitoring

2.8.1 Alternative 1: No Action

Evaluation of the No Action alternative is required by law to provide a baseline for comparison with other alternatives. Under this alternative, no remedial activities would occur to remove groundwater contamination, and no controls would be implemented to prevent exposure by human receptors. Although BHC would attenuate naturally, no periodic monitoring would be performed to evaluate the effectiveness of the No Action alternative in meeting cleanup goals and preventing the potential downgradient migration of BHC.

This alternative would not protect human health because risks from direct exposure to contaminated groundwater would continue to exist. This alternative would not achieve the RAO or comply with ARARs. There would be no reduction of contaminant mobility, and reduction in toxicity and volume would occur only through long-term natural attenuation and would not be monitored. Because no remedial action would take place, this alternative would not result in any immediate risks to on-site receptors or the surrounding community and would be very easy to implement. There would be no cost associated with this alternative.

2.8.2 Alternative 2: Natural Attenuation, LUCs, and Groundwater Monitoring

Natural processes such as dispersion, advection, adsorption, dilution, and biological degradation would eventually reduce the groundwater concentrations of BHC to cleanup goals. A long-term groundwater monitoring program would be implemented to evaluate the decrease in BHC groundwater concentrations as a result of naturally occurring processes. Groundwater monitoring would also be used to evaluate the potential downgradient migration of BHC. LUCs would consist of preventing the use of groundwater until cleanup goals have been met. Regular site inspections would be conducted to verify the continued application of LUCs. A site review would be performed every 5 years to confirm the adequacy of the remedy, as predicted through modeling.

This alternative would protect human health because it would reduce the risk from direct exposure to contaminated groundwater. This alternative would achieve the RAO, and groundwater monitoring would establish compliance with ARARs through natural attenuation. There would be no reduction of contaminant toxicity, mobility, or volume through active treatment, but contaminant toxicity and volume would be reduced through long-term natural attenuation. There would be minimal short-term risks associated with the performance of groundwater monitoring activities that would be addressed through appropriate health and safety procedures. Based upon modeling results, the cleanup goals would be attained within 16 months for beta-BHC and 32 months for alpha-BHC. The activities for this alternative would be easy to implement. The 5-year net present worth (NPW) cost of this alternative would be approximately $89,000.

2.8.3 Alternative 3: In-Situ Enhanced Biodegradation, LUCs, and Groundwater Monitoring

This alternative would consist of enhancing the naturally occurring anaerobic biodegradation of BHC in groundwater with the application of a hydrogen release compound (HRC) such as lactic acid by direct push technology (DPT). Prior to this application, a treatability study would be performed to verify the effectiveness of the HRC and determine whether an oxygen release compound (ORC) such as magnesium peroxide might also have to be applied to complete the aerobic biodegradation of BHC metabolites. LUCs and groundwater monitoring would be the same as for Alternative 2.

Alternative 3 would protect human health because it would actively remove BHC from groundwater and reduce the risk from direct exposure to contaminated groundwater. This alternative would achieve the RAO, and groundwater monitoring would establish compliance with ARARs through treatment and natural attenuation. There would be a significant reduction of contaminant toxicity, mobility, or volume through treatment, and an estimated 0.0006 pound of BHC would be irreversibly and permanently removed from the groundwater. There would be minimal risks associated with the DPT application of HRC and performance of groundwater monitoring activities. These risks would be addressed through appropriate health and safety procedures. Based upon anticipated effectiveness of the HRC application, the cleanup goals would be attained within 36 months or less. The activities for this alternative would be easy to implement. The 5-year NPW cost of this alternative would be approximately $578,000.

2.8.4 Alternative 4: Extraction, On-Site Treatment, Surface Water Discharge, LUCs, and Groundwater Monitoring

This alternative would consist of extracting the contaminated groundwater through two new extraction wells pumping at a combined rate of 15 gallons per minute. The extracted groundwater would be treated by liquid-phase granular activated carbon (GAC) adsorption to remove dissolved BHC prior to discharge to surface water. LUCs and groundwater monitoring would be the same as for Alternatives 2 and 3.

This alternative would protect human health because it would actively remove BHC from groundwater and reduce the risk from direct exposure to contaminated groundwater. This alternative would achieve the RAO, and groundwater monitoring would establish compliance with ARARs through treatment. There would be a significant reduction of contaminant toxicity, mobility, or volume through treatment, and an estimated 0.0006 pound of BHC would be irreversibly and permanently removed from the groundwater. There would be minimal risks associated with operation of the groundwater extraction and treatment system and performance of groundwater monitoring activities. These risks would be addressed through appropriate health and safety procedures. Based upon modeling results, the cleanup goals would be

attained within 25 months. The activities for this alternative would be easy to implement. The 5-year NPW cost of this alternative would be approximately $702,000.

2.9 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section evaluates and compares each of the remedial alternatives with respect to the nine criteria outlined in Section 300.430(e) of the NCP. These criteria are categorized as threshold, primary balancing, or modifying and are further explained in Table 2-3. A detailed analysis was performed for each alternative using the nine evaluation criteria to select a site remedy, and Table 2-4 presents a summary comparison of these analyses.

2.10 SELECTED REMEDY

2.10.1 Summary of Rationale For Remedy Selection

Based on the conclusions of the RI (TtNUS, 2001b), there are no longer any unacceptable risks associated with exposure to Site 25 soil.

The goals of the selected groundwater remedy are to protect human health and the environment by eliminating, reducing, or controlling hazard posed by the site and to meet ARARs. Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and U.S. EPA, FDEP, and public comments, Alternative 2 was selected to address the contaminants in the groundwater at OU 10, Site 25.

This remedy was selected based on discussions held by the BCT (BCT, 2001). This remedy was selected for the following reasons: (1) It is considered to be adequately protective of human health and the environment at a much more reasonable cost than active treatment, (2) The groundwater contaminant plume is small and stable and confined to the shallow zone of the surficial aquifer with no evidence of ongoing migration, (3) FDEP GCTLs are exceeded, (4) Detected COCs could cause adverse environmental impact, and (5) incremental cancer risk levels from exposure to contaminated groundwater are greater than the threshold of 1.0E-06.

2.10.2 Remedy Description

The remedy is illustrated on Figure 2-5 and consists of five major components: (1) NFA for soil, (2) natural attenuation of groundwater contamination, (3) LUCs, (4) groundwater monitoring, and (5) contingency remedy.

Component 1: NFA for Soil

Component 2: Natural Attenuation of Groundwater Contamination

Natural attenuation would rely on naturally occurring processes within the aquifer to reduce concentrations of BHC. Dispersion and dilution through aquifer movement, adsorption on soil particles, and biodegradation would mainly be responsible for this reduction. Aquifer conditions would be regularly monitored to make sure that concentrations are being adequately reduced through natural processes.

Component 3: LUCs

Groundwater contamination remains at Site 25 at concentrations that preclude unrestricted reuse; therefore, the remedy includes LUCs to prevent unacceptable risk. These LUCs will be implemented to prohibit usage of the surficial aquifer beneath the site and thereby preclude unacceptable risks from exposure to contaminated groundwater. The boundaries of OU 10, Site 25 and the area to be covered by the groundwater LUCs are shown in Figure 2-7. The following are the LUC performance objectives for OU 10, Site 25, and these objectives will also be incorporated into the deed and other LUC mechanisms:

- Prohibit the consumption of groundwater that exceeds federal MCLs or FDEP GCTLs.

- Prohibit all use of the groundwater from the surficial aquifer underlying the site (including, but not limited to, dewatering, irrigation, heating/cooling purposes, and other industrial processes) without prior written approval from the Navy, U.S. EPA, and FDEP.

- Maintain the integrity of any existing or future monitoring or remediation system(s).

The LUCs shall be implemented and maintained for as long as they are required to prevent unacceptable exposure to contaminated groundwater or to preserve the integrity of the remedy. The Navy or any subsequent owners shall not modify, delete, or terminate any LUC without U.S. EPA and FDEP concurrence. The LUCs shall be maintained until the concentrations of BHC in the groundwater beneath Site 25 have been reduced to levels that allow for unlimited exposure.

The Navy is responsible for implementing, inspecting, reporting, and enforcing the LUCs described in this ROD in accordance with the approved LUC Remedial Design. Although the Navy retains ultimate responsibility for the performance of these obligations, the Navy may later arrange by contract or otherwise, for another party(ies) to carry them out. Should any LUC remedy fail, the Navy will ensure that appropriate actions are taken to reestablish the remedy's protectiveness and may initiate legal action to

either compel action by a third party(ies) and/or to recover the Navy's costs for remedying any discovered LUC violation(s).

The LUC Remedial Design will be prepared as the LUC component of the Remedial Design. Within 90 days of ROD signature, the Navy shall prepare and submit to U.S. EPA and FDEP for review and approval, a LUC Remedial Design that shall contain implementation and maintenance actions, including periodic inspections. The Navy will implement, maintain, monitor, and enforce the LUCs according to the Remedial Design.

Component 4: Groundwater Monitoring

Groundwater monitoring will consist of the periodic collection and analysis of groundwater samples to verify that BHC is not migrating past selected compliance wells. Monitoring will also be used to assess natural attenuation of BHC.

Monitoring will consist of collecting samples from five existing monitoring wells and analyzing them for BHC. Sampling frequency will be quarterly for the first year, semi-annual for the next 2 years, and annual thereafter, until the cleanup goals are met. As agreed by the Navy, U.S. EPA, and FDEP, if the results of two consecutive sampling events indicate that the BHC cleanup goals have been met, the site will be considered as remediated for BHC in groundwater.

Component 5: Contingency Remedy

Site conditions will be reviewed at the end of 5 years. If the results of this review show that (1) the implemented LUCs have failed to prevent unacceptable risks from exposure to groundwater contamination; (2) contaminated groundwater has migrated to an unacceptable degree as determined by sentinel well sampling results; or (3) the BHC contamination in groundwater is not attenuating as expected, then additional remedial measures would need to be evaluated and possibly implemented. Potential contingency remedial measures could include in-situ enhanced bioremediation or extraction, on-site treatment, and surface discharge of contaminated groundwater.

2.10.3 Summary of Estimated Remedy Costs

The estimated capital, operation and maintenance (O&M), and NPW costs of the selected remedy are as follows:

- Capital Cost: $5,000
- 5-year NPW of O&M Costs: $84,000

- 5-year NPW Cost: $89,000

The above cost figures have been rounded to the nearest $1,000 to reflect the preliminary nature of the estimates. A detailed breakdown of the above estimates is provided in Appendix B.

2.10.4 Expected Outcomes of the Selected Remedy

The expected outcomes of the selected remedy may be summarized as follows:

- Immediately upon implementation of the remedy, Site 25 will be environmentally safe for its intended use as part of an industrial park and office complex or for any other purpose including industrial, commercial, or residential use.

- Within 32 months after implementation of the remedy, or possibly sooner as may be determined through monitoring, the groundwater cleanup goals will be attained and the surficial aquifer will become available for unrestricted use.

- LUCs will be required to prevent use of the surficial aquifer at Site 25. These controls will be required for as long as groundwater BHC concentrations preclude unrestricted reuse.

- Site 25 is currently not in use. In the future, Site 25 is planned to be part of an industrial park and office complex. It is anticipated that the reuse of NAS Cecil Field, including Site 25, will be beneficial to the Jacksonville area and expand the tax base of Duval County.

2.11 STATUTORY DETERMINATIONS

Under CERCLA §121 and the NCP, the selected remedy must be protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The following sections discuss how the selected remedy meets these statutory requirements.

2.11.1 Protection of Human Health and the Environment

The selected remedy, Alternative 2, will protect human health and the environment. LUCs will prohibit use of groundwater from the surficial aquifer beneath the site. The PRE indicates that exposure to groundwater associated with Site 25 results in incremental cancer risks that fall within U.S. EPA's target risk range of 1.0E-04 to 1.0E-06 and hazard indices of less than 1.0. The concentrations of alpha- and

beta-BHC in groundwater are less than U.S. EPA's tap water criteria, but exceed the FDEP GCTLs. Although this results in a hazard index of less than 1.0, the exceedance of the GCTL still triggers the need for monitoring.

2.11.2 Compliance with ARARs

The selected remedy, Alternative 2, will comply with all ARARs. The ARARs that the selected remedy complies with are presented below and in more detail in Table 2-5 through Table 2-10. There are no Location-Specific ARARs.

The Chemical- and Action-Specific ARARs include the following:

- Safe Drinking Water Act (SWDA) Maximum Contaminant Levels (MCLs) (40 CFR Part 141), This is a Chemical-Specific ARAR that specifies acceptable concentration levels in groundwater that serves as a potential drinking water aquifer.

- Groundwater Classes, Standards, and Exemptions [Florida Administrative Code (FAC) Chapter 62 520]. This is a Chemical-Specific ARAR that designates the groundwater of the State into five classes and establishes minimum "free from" criteria (i.e., what contaminants are prohibited from being present in a particular class of aquifer).

- Occupational Safety and Health Act (OSHA), General Industry Standards (29 CFR Part 1910). This is an Action-Specific ARAR that requires the establishment of programs to assure worker health and safety at hazardous waste sites.

- OSHA Occupational Safety and Health Regulations (29 CFR Part 1910, Subpart Z). This is an Action-Specific ARAR that establishes permissible exposure limits for workplace exposure to specific chemicals.

- OSHA Recordkeeping, Reporting, and Related Regulations (29 CFR Part 1904). This is an Action-Specific ARAR that dictates recordkeeping and reporting requirement for remedial activities.

- OSHA, Health and Safety Standards (29 CFR Part 1926). This is an Action-Specific ARAR that specifies the type of safety training, equipment, and procedures to be used during remediation.

- Florida Water Well Permitting and Construction Requirement - March 1992. This is an Action-Specific ARAR that establishes minimum standard for location, construction, repair, and abandonment of water wells.

- Florida Rules on Hazardous Waste Warning Signs - July 1991. This is an Action-Specific ARAR that requires appropriate warning signs for public protection at NPL and FDEP hazardous waste sites.

- Drinking Water Criteria (FAC Chapter 62-550). This Chemical-Specific ARAR provides primary and secondary drinking water quality criteria.

2.11.3 Other Criteria, Advisories, or Guidance To Be Considered for This Remedial Action

In implementing the selected remedy, the Navy, U.S. EPA and the FDEP have agreed to consider a number of non-binding criteria that are TBCs. These include:

- SDWA Regulations, National Secondary Drinking Water Standards (SMCLs), (40 CFR 143). This Chemical-Specific TBC establishes welfare-based standards for public water systems.

- Cancer Slope Factors (CSF) (Integrated Risk Information System). This Chemical-Specific TBC provides guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.

- Reference Dose (RfD) Factors (Integrated Risk Information System). This Chemical-Specific TBC provides guidance values used to evaluate the potential noncarcinogenic hazard caused by exposure to contaminants.

- Contaminant Cleanup Target Levels Rule (FAC Chapter 62-777). This Chemical-Specific TBC provides values for soil, groundwater, and surface water cleanup.

- U.S. EPA Monitored Natural Attenuation Guidance. This provides guidance on evaluation of monitored natural attenuation.

2.11.4 Cost-Effectiveness

The selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if it costs are proportional to its overall effectiveness." [NCP §300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., both

were protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money spent.

The estimated 5 year NPW cost of the selected remedy is $89,000.

2.11.5 Utilization of Permanent Solutions and Alternative Treatment Technologies

The Navy and U.S. EPA, in consultation with FDEP, have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at Site 25. Of those alternatives that are protective of human health and the environment and comply with ARARs, the Navy and U.S. EPA, in consultation with FDEP, have determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principle element and bias against off-site treatment and disposal and considering State and community acceptance.

2.11.6 Preference for Treatment as a Principal Element

Although the selected remedy does not meet the statutory preference for treatment as a principal element, reduction of groundwater contaminant concentrations are expected over time due to such naturally occurring processes as biological degradation, dispersion, advection, and adsorption.

2.11.7 Five-Year Review Requirement

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

2.12 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU 10, Site 25 (TtNUS, 2003) was released for public comment on July 1, 2003. The Proposed Plan identified NFA for soil and Alternative 2, Natural Attenuation, LUCs, and Groundwater Monitoring, as the preferred groundwater alternative. The public was invited to comment during a 30-day period extending from July 1 to July 30, 2003. No changes to the proposed remedy, as originally identified in the Proposed Plan, have been made as a result of public comments.

TABLE 2-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDDWATER
PRE-RI SAMPLING
SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	CEF-081-03S	CEF-080-03S	CEF-080-03S	CEF-080-13S	CEF-081-06S	CEF-081-06S	CEF-081-07S
	Feb-97	Feb-97	Feb-97	May-99	Jun-98	Jun-98	Jun-98
Volatile Organic Compounds (ug/L)							
1,1-Dichloroethane	10 U	10 U	10 U	1 U	**1.7**	**1.4**	1 U
1,1-Dichloroethene	10 U	10 U	10 U	1 U	**1**	**1.1**	1 U
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	10 U	**4 J**	**5 J**	1 U	1 U	NA	1 U
cis-1,2-Dichloroethene	NA	NA	NA	1 U	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA	NA	**3.1**	**3**	1 U
Ethylbenzene	10 U	10 U	10 U	1 U	1 U	NA	1 U
Trichloroethene	10 U	10 U	10 U	1 U	**2.4**	**2**	1 U
Semivolatile Organic Compounds (ug/L)							
1,3-Dichlorobenzene	10 U	**3 J**	**4 J**	NA	1 U	NA	1 U
1,4-Dichlorobenzene	10 U	**3 J**	**4 J**	NA	1 U	NA	1 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	1 U	NA	1 U
bis(2-Ethylhexyl) phthalate	10 U	10 U	**1 J**	NA	NA	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/L)							
Heptachlor Epoxide	0.05 U	0.05 U	**0.013 J**	NA	NA	NA	NA
alpha-BHC	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
beta-BHC	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
delta-BHC	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
Inorganics (ug/L)							
Aluminum	**415**	**36400**	**224**	NA	NA	NA	NA
Arsenic	2 U	2 U	2 U	10 U	NA	NA	NA
Barium	**11.4 J**	**45.4 J**	**18.8 J**	100 U	NA	NA	NA
Calcium	**7480**	**87500**	**83100**	NA	NA	NA	NA
Chromium	1 U	**26.1**	1 U	10 U	NA	NA	NA
Cobalt	1 U	**2.6 J**	1 U	NA	NA	NA	NA
Copper	1 U	**5.4 J**	1 U	NA	NA	NA	NA
Cyanide	**1.8 J**	1.2 U	1.2 U	NA	NA	NA	NA
Iron	**48.9 J**	**4590**	**51.4 J**	NA	NA	NA	NA
Lead	1 U	**13.9**	1 U	**6 J**	NA	NA	NA
Magnesium	**1340 J**	**5250**	**4140 J**	NA	NA	NA	NA
Manganese	**36**	**28.3**	**3.5 J**	NA	NA	NA	NA
Nickel	2 U	**10.8 J**	2 U	NA	NA	NA	NA
Potassium	**266 J**	**2460 J**	**1500 J**	NA	NA	NA	NA
Selenium	4 U	**6.4**	4 U	10 U	NA	NA	NA
Sodium	**1800 J**	**18300**	**16800**	NA	NA	NA	NA
Thallium	**3.3 J**	3 U	3 U	NA	NA	NA	NA
Vanadium	**2.5 J**	**30 J**	**4.9 J**	NA	NA	NA	NA
Zinc	**7.3 J**	**18.6 J**	**2.1 J**	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/L)							
TRPH	NA	NA	NA	NA	NA	NA	NA

TABLE 2-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDDWATER
PRE-RI SAMPLING
SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	CEF-081-08S	CEF-P25-01S	CEF-P25-01S	CEF-080-03S	FDEP GCTL	NAS Cecil Field IBDS Value
	Nov-98	Jul-99	Jul-99	Mar-97		
Volatile Organic Compounds (ug/L)						
1,1-Dichloroethane	1 U	NA	NA	1 U	70	NC
1,1-Dichloroethene	1 U	NA	NA	1 U	7	NC
1,2,4-Trichlorobenzene	10 U	NA	NA	NA	70	NC
Chlorobenzene	1 U	NA	NA	**1.7**	100	NC
cis-1,2-Dichloroethene	NA	NA	NA	**1.9**	70	NC
Dichlorodifluoromethane	NA	NA	NA	1 U	1400	NC
Ethylbenzene	1 U	NA	NA	**1.6**	700	NC
Trichloroethene	1 U	NA	NA	1 U	3	NC
Semivolatile Organic Compounds (ug/L)						
1,3-Dichlorobenzene	10 U	NA	NA	10 U	10	NC
1,4-Dichlorobenzene	10 U	NA	NA	10 U	75	NC
2-Methylnaphthalene	10 U	NA	NA	**4.1**	20	NC
bis(2-Ethylhexyl) phthalate	NA	NA	NA	10 U	6	NC
Pesticides/Polychlorinated Biphenyls (ug/L)						
Heptachlor Epoxide	0.05 U	0.05 U	0.05 U	NA	0.2	NC
alpha-BHC	0.05 U	**0.12**	**0.12**	NA	6	NC
beta-BHC	0.05 U	**0.12**	**0.12**	NA	20	NC
delta-BHC	NA	**0.057**	**0.059**	NA	2100	NC
gamma-BHC (Lindane)	0.05 U	**0.43**	**0.42**	NA	0.2	NC
Inorganics (ug/L)						
Aluminum	0.05 U	NA	NA	NA	200	13100
Arsenic	10 U	NA	NA	**13.1**	50	7.1
Barium	100 U	NA	NA	NA	2000	88.2
Calcium	**28000**	NA	NA	NA	NC	81100
Chromium	10 U	NA	NA	50 U	100	18
Cobalt	50 U	NA	NA	NA	420	12.8
Copper	50 U	NA	NA	NA	1000	12.5
Cyanide		NA	NA	NA	200	22
Iron	**7400**	NA	NA	NA	300	7760
Lead	5 U	NA	NA	5 U	15	5.35
Magnesium	**5600**	NA	NA	NA	NC	10000
Manganese	**160**	NA	NA	NA	50	150
Nickel	10 U	NA	NA	NA	100	24.5
Potassium	500 U	NA	NA	NA	NC	4330
Selenium	10 U	NA	NA	NA	50	7
Sodium	**4500**	NA	NA	NA	160000	16500
Thallium	4 U	NA	NA	NA	2	13.3
Vanadium	10 U	NA	NA	NA	49	20.2
Zinc	0.1 U	NA	NA	NA	5000	76.8
Petroleum Hydrocarbons (mg/L)						
TRPH	NA	NA	NA	**1.5**	5	NC

NA = Not analyzed.
NC = No criterion.
U = Not detected at indicated detection limit.
J - Estimated concentration.
Bolded values exceed detection limit.
Shaded values exceed FDEP GCTL or IBDS value.
FDEP GCTL = Florida Department of Environmental Protection Groundwater Cleanup Target Level (FDEP, 1999).
IBDS = NAS Cecil Field site-specific Inorganic Background Data Set (HLA, 1998).

TABLE 2-2

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER
REMEDIAL INVESTIGATION SAMPLING
SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Parameter	CEF-080-03S	CEF-P25-01S		FDEP GCTLs	U.S. EPA MCLs	NAS Cecil Field IBDS Value
		Apr-00				
	Oct-00	Sample	Duplicate			
Pesticides/Polychlorinated Biphenyls (µg/L)						
alpha-BHC	NA	**0.058 J**	**0.06**	0.006	NC	NC
beta-BHC	NA	**0.074**	**0.069**	0.02	NC	NC
delta-BHC	NA	0.06 U	0.055 U	2.1	NC	NC
gamma-BHC (Lindane)	NA	**0.16**	**0.16**	0.2	0.2	NC
Heptachlor Epoxide	NA	0.06 U	0.055 U	0.2	0.2	NC
Inorganics (µg/L)						
Aluminum, Total	**287**	NA	NA	200	50 - 200(1)	13,100
Aluminum, Filtered	99 U	NA	NA	200(1)	300(1)	13,100(2)

Bolded values exceed detection limits.
Shaded results exceed of FDEP GCTL or NAS Cecil Field IDBS.

FDEP Florida Department of Environmental Protection Groundwater Cleanup Target Level (FDEP,1999).
IDBS NAS Cecil Field site-specific Inorganic Background Data Set (HLA, 1998).
J Estimated concentration.
NA Not analyzed
NC No criteria
U Not detected at indicated detection limit.
U.S. EPA United States Environmental Protection Agency Maximum Contaminant Levels (MCLs) (U.S.EPA, 2000)

1 Secondary drinking water regulation
2 Criterion for total aluminum.

TABLE 2-3

EXPLANATION OF EVALUATION CRITERIA
OU 10, SITE 25 RECORD OF DECISION
NVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Criteria	Description
Threshold	**Overall Protection of Human Health and the Environment.** This criterion evaluates the degree to which each alternative eliminates, reduces, or controls threats to human health and the environment through treatment, engineering methods, or land use controls (e.g., site use restrictions). **Compliance with State and Federal Regulations.** The alternatives are evaluated for compliance with environmental protection regulations determined to be applicable or relevant and appropriate to the site conditions.
Primary Balancing	**Long-Term Effectiveness and Permanence.** The alternatives are evaluated based on their ability to maintain reliable protection of human health and the environment after implementation. **Reduction of Contaminant Toxicity, Mobility, and Volume Through Treatment**. Each alternative is evaluated based on how it reduces the harmful nature of the contaminants, their ability to move through the environment, and the amount of contamination. **Short-Term Effectiveness.** The risks that implementation of a particular remedy may pose to workers and nearby residents (e.g., whether or not contaminated dust will be produced during excavation), as well as the reduction in risks that results by controlling the contaminants, are assessed. The length of time needed to implement each alternative is also considered. **Implementability**. Both the technical feasibility and administrative ease (e.g., the amount of coordination with other government agencies needed) of a remedy, including availability of necessary goods and services, are assessed. **Cost.** The benefits of implementing a particular alternative are weighted against the cost of implementation.
Modifying	**U.S. EPA and FDEP Acceptance.** The final Feasibility Study and the Proposed Plan, which are placed in the Information Repository, represent a consensus by the Navy, U.S. EPA, and FDEP. **Community Acceptance.** The Navy assesses community acceptance of the preferred alternative by giving the public an opportunity to comment on the remedy selection process and the preferred alternative and then responds to those comments.

TABLE 2-4
SUMMARY OF COMPARATIVE EVALUATION OF ALTERNATIVES
OPERABLE UNIT 10, SITE 25
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Evaluation Criterion	Alternative 1: No Action	Alternative 2: Natural Attenuation, LUCs, and Monitoring	Alternative 3: In-Situ Enhanced Biodegradation, LUCs, and Monitoring	Alternative 4: Extraction, On-Site Treatment, Surface Discharge, LUCs, and Monitoring
Overall Protection of Human Health and Environment	Would not be protective because nothing would prevent human exposure to contaminated groundwater. Also, potential migration of BHC would remain unchecked.	Would be protective by preventing risk from exposure to contaminated groundwater through LUCs and monitoring until cleanup goals are achieved.	Would be more protective than Alternative 2 because it would provide the same protective components and also accelerate in-situ biodegradation of BHC.	Would be as protective as Alternative 3. because it would provide the same protective components as Alternative 2 and also accelerate removal of BHC through extraction and on-site treatment.
Compliance with ARARs and TBCs:				
Chemical-Specific Cleanup Criteria	Would not comply	Would comply	Would comply	Would comply
Location-Specific	Not applicable (no ARARs)	Not applicable (no ARARs)	Not applicable (no ARARs)	Not applicable (no ARARs)
Action-Specific	Not applicable	Would comply	Would comply	Would comply
Long-Term Effectiveness and Permanence	Would have very limited long-term effectiveness and permanence because no action would occur. BHC reduction or migration would remain undetected because no monitoring would occur.	Would be long-term effective and permanent. Natural attenuation would eventually reduce BHC concentrations to its cleanup goals. LUCs would effectively prevent unacceptable human health risk from exposure to contaminated groundwater. Monitoring would effectively evaluate the progress of remediation and detect potential migration of BHC.	Would be more long-term effective and permanent than Alternative 2 by significantly accelerating the removal of BHC through in-situ bioremediation. However, the effectiveness of HRC injection would have to be verified through treatability testing. The long-term effectiveness and permanence of the LUCs and monitoring would be the same as for Alternative 2.	Would be slightly more long-term effective and permanent than Alternative 3 because it would provide the same accelerated removal of BHC through extraction and on-site-treatment, which is well-proven. The long-term effectiveness and permanence of the LUCs and monitoring would be the same as for Alternatives 2 and 3.
Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment but might achieve reduction through natural processes.	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment because no treatment would occur.	Would achieve reduction of contaminant toxicity, mobility, and volume through treatment. Approximately 0.0006 pound of BHC would be irreversibly removed from groundwater.	Would achieve reduction of contaminant toxicity, mobility, and volume through treatment. Approximately 0.0006 pound of BHC would be irreversibly removed from groundwater.
Short-Term Effectiveness	Would not result in short-term risks to site workers or adversely impact the surrounding community but would also not achieve the RAO through treatment.	Would result in a slight possibility of exposing site workers as a result of monitoring activities. This risk would be reduced through compliance with appropriate site-specific health and safety procedures. There would be no risk to the surrounding community or the environment. The RAO would be achieved immediately upon implementation of LUCs and monitoring. Cleanup goals would be attained within an estimated 16 months (β-BHC) to 32 months (α-BHC).	Would result in a possibility of exposing site workers to contaminated groundwater as a result of bioremediation and monitoring activities. This risk would be reduced through compliance with appropriate site-specific health and safety procedures. There would be no risk to the surrounding community or the environment. The RAO would be achieved immediately upon implementation of LUCs and monitoring. Cleanup goals would be attained within 36 months.	Would result in a possibility of exposing site workers to contaminated groundwater as a result of extraction and treatment and monitoring activities. This risk would be reduced through compliance with appropriate site-specific health and safety procedures. There would be minimal risk to the surrounding community or the environment from offsite transportation and disposal of treatment residues. The RAO would be achieved immediately upon implementation of LUCs and monitoring.. Cleanup goals would be attained within 25 months.

TABLE 2-4
SUMMARY OF COMPARATIVE EVALUATION OF ALTERNATIVES
OPERABLE UNIT 10, SITE 25
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Evaluation Criterion	Alternative 1: No Action	Alternative 2: Natural Attenuation, LUCs, and Monitoring	Alternative 3: In-Situ Enhanced Biodegradation, LUCs, and Monitoring	Alternative 4: Extraction, On-Site Treatment, Surface Discharge, LUCs, and Monitoring
Implementability	Technical and administrative implementation would be extremely simple because there would be no action to implement.	Technical implementation of the monitoring would be simple. Administrative implementation of the LUCs would be simple.	Technical implementation of the in-situ bioremediation would be simple although it would create temporary site disruptions, and the number of qualified contractors would be limited. Technical implementation of the monitoring would be simple. Administrative implementation of the LUCs would be simple. A construction permit might be required for installation of the ORC/HRC injection points	Technical implementation of the extraction and on-site treatment would be somewhat more complex than that of the in-situ bioremediation. Installation and O&M of the limited number of extraction wells and small on-site treatment system would be simple and would not create significant site disruptions. Implementation of the surface discharge, disposal of treatment residues, and monitoring would be simple. Administrative implementation of the LUCs would be simple. A construction permit would be required, and the substantive requirements of an NPDES permit would have to be met.
Costs: Capital NPW of O&M NPW	 $0 $0 $0	 $5,000 $84,000 $89,000	 $485,000 $93,000 $578,000	 $423,000 $279,000 $702,000
State Acceptance	FDEP concurs with the selection of Alternative 2 as the Preferred Alternative			
Public Acceptance	Public acceptance of Alternative 2 as the Preferred Alternative will be determined following the public comment period			

NOTES:

ARARs	Applicable or relevant and appropriate requirements
BHC	Benzene hexachloride
HRC	Hydrogen release compound
LUC	Land use control
NPDES	National Pollutant Discharge Elimination System
NPW	Net present worth
O&M	Operation and maintenance
ORC	Oxygen release compound
RAO	Remedial Action Objective
TBC	To-Be-Considered (criterion)

TABLE 2-5

FEDERAL CHEMICAL-SPECIFIC ARARs
OU 10, SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Safe Drinking Water Act (SDWA) Regulations, Maximum Contaminant Levels (MCLs)	40 Code of Federal Regulation (CFR) Part 141	Relevant and Appropriate	Establishes enforceable standards for potable water for specific contaminants that have been determined to adversely affect human health.	Will be used as protective levels for groundwater that is a current or potential drinking water sources.
SDWA Regulations, National Secondary Drinking Water Standards (SMCLs)	40 CFR Part 143	To-Be Considered (TBC) Criterion	Establishes welfare-based standards for public water systems for specific contaminants or water characteristics that may affect the aesthetic qualities of drinking water.	Will be used as protective levels for groundwater that is a current or potential drinking water sources.
U.S. EPA Office of Drinking Water, Health Advisories		Potential TBC	Health advisories are estimates of non-carcinogenic risk due to consumption of contaminated drinking water.	These advisories will be considered for contaminants in groundwater that could be used as a potable water source.
Cancer Slope Factors (CSFs)		TBC	CSFs are guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.	CSFs were considered for the development of human health protection cleanup goals for groundwater at this site.
Reference Doses (RfDs)		TBC	RfDs are guidance values used to evaluate the potential noncarcinogenic hazard caused by exposure to contaminants.	RfDs were considered for the development of human health protection cleanup goals for groundwater at this site.

TABLE 2-6

STATE CHEMICAL-SPECIFIC ARARs
OU 10, SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Groundwater Classes, Standards and Exemptions	Florida Administrative Code (FAC) Chapter 62-520	Applicable	This rule designates the groundwater of the State into five classes and establishes minimum "free from" criteria. This rule also specifies that Classes I & II must meet the primary and secondary drinking water standards listed in Chapter 62-550.	This rule was used to establish cleanup goals for groundwater that is a potential source of drinking water.
Drinking Water Criteria	FAC Chapter 62-550	TBC	This rule provides primary and secondary drinking water quality criteria.	This rule was considered for the establishment of cleanup goals.
Contaminant Cleanup Target Levels Rule	FAC Chapter 62-777	TBC	This rule provides guidance for soil, groundwater, and surface water cleanup levels that can be developed on a site-by-site basis.	This rule was considered for the establishment of cleanup goals.

TABLE 2-7

FEDERAL LOCATION-SPECIFIC ARARs
OU 10, SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken

There are no Federal Location-Specific ARARs for the selected remedy

TABLE 2-8

STATE LOCATION-SPECIFIC ARARs
OU 10, SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken

There are no State Location-Specific ARARs for the selected remedy

TABLE 2-9

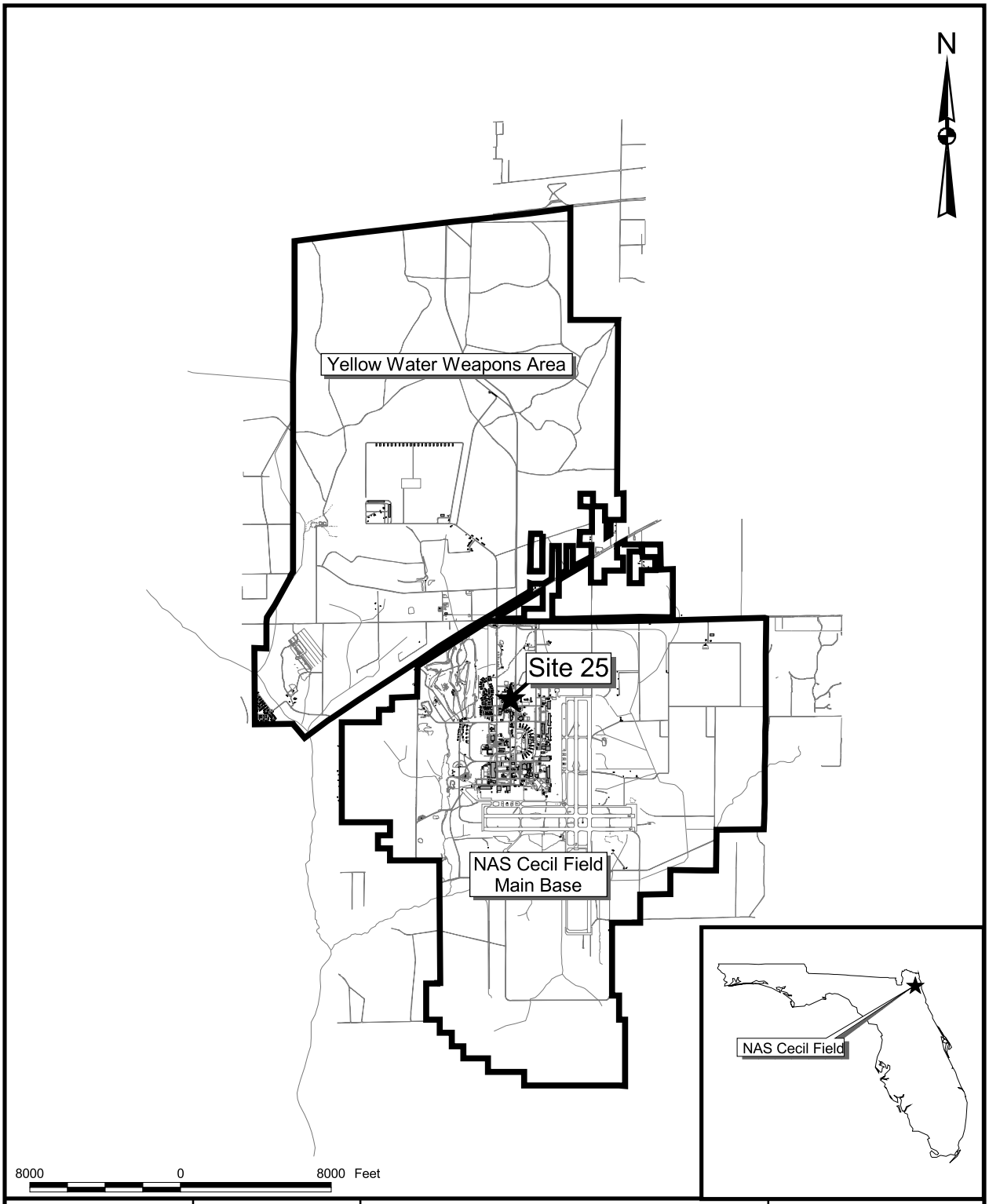
FEDERAL ACTION-SPECIFIC ARARs
OU 10, SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Occupational Safety and Health Act (OSHA) Regulations, General Industry Standards	29 Code of Federal Regulations (CFR) Part 1910	Applicable	Requires establishment of programs to assure worker health and safety at hazardous waste sites, including employee training requirements.	These regulations will apply to all monitoring activities.
OSHA Regulations, Occupational Health and Safety Regulations	29 CFR Part 1910, Subpart Z	Applicable	Establishes permissible exposure limits for workplace exposure to a specific listing of chemicals.	Standards are applicable for worker exposure to OSHA hazardous chemicals during remedial activities.
OSHA Regulations, Recordkeeping, Reporting, and Related Regulations	29 CFR Part 1904	Applicable	Provides recordkeeping and reporting requirements applicable to remedial activities.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
OSHA Regulations, Health and Safety Standards	29 CFR Part 1926	Applicable	Specifies the type of safety training, equipment, and procedures to be used during the site investigation and remediation.	All phases of the remedial response project would be executed in compliance with this regulation.
Resource Conservation and Recovery Act (RCRA) Regulations, Contingency Plan and Emergency Procedures	40 CFR 264, Subpart D	Potentially Relevant and Appropriate	Outlines requirements for emergency procedures to be followed in case of an emergency.	The administrative requirements established in this rule would be met for remedial actions involving the management of hazardous waste.

TABLE 2-10

STATE ACTION-SPECIFIC ARARs
OU 10, SITE 25 RECORD OF DECISION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Florida Water Well Permitting and Construction Requirements – March 1992	FAC Chapter 62-532	Potentially Applicable	Establishes minimum standards for the location, construction, repair, and abandonment of water wells. Permitting requirements and procedures are established.	The substantive requirements for permitting would be met if remedial actions involve the construction, repair, or abandonment of monitoring, extraction, or injection wells.
Florida Rules on Hazardous Waste Warning Signs – July 1991	FAC Chapter 62-736	Applicable	Requires warning signs at National Priorities List (NPL) and FDEP identified hazardous waste sites to inform the public of the presence of potentially harmful conditions.	This requirement will be met.



DRAWN BY MJJ	DATE 08May00	GENERAL LOCATION MAP OU 10, SITE 25 RECORD OF DECISION 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 0

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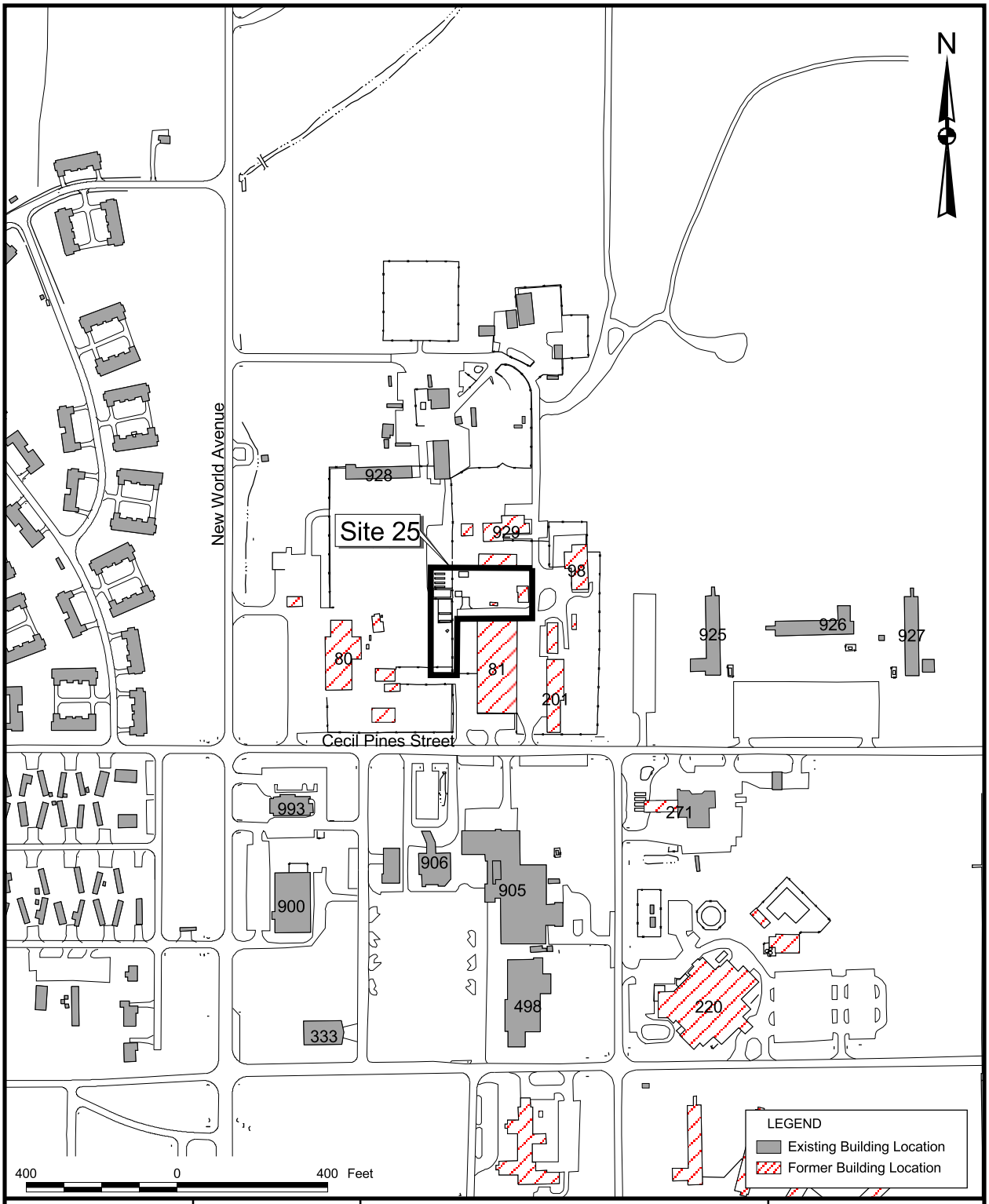
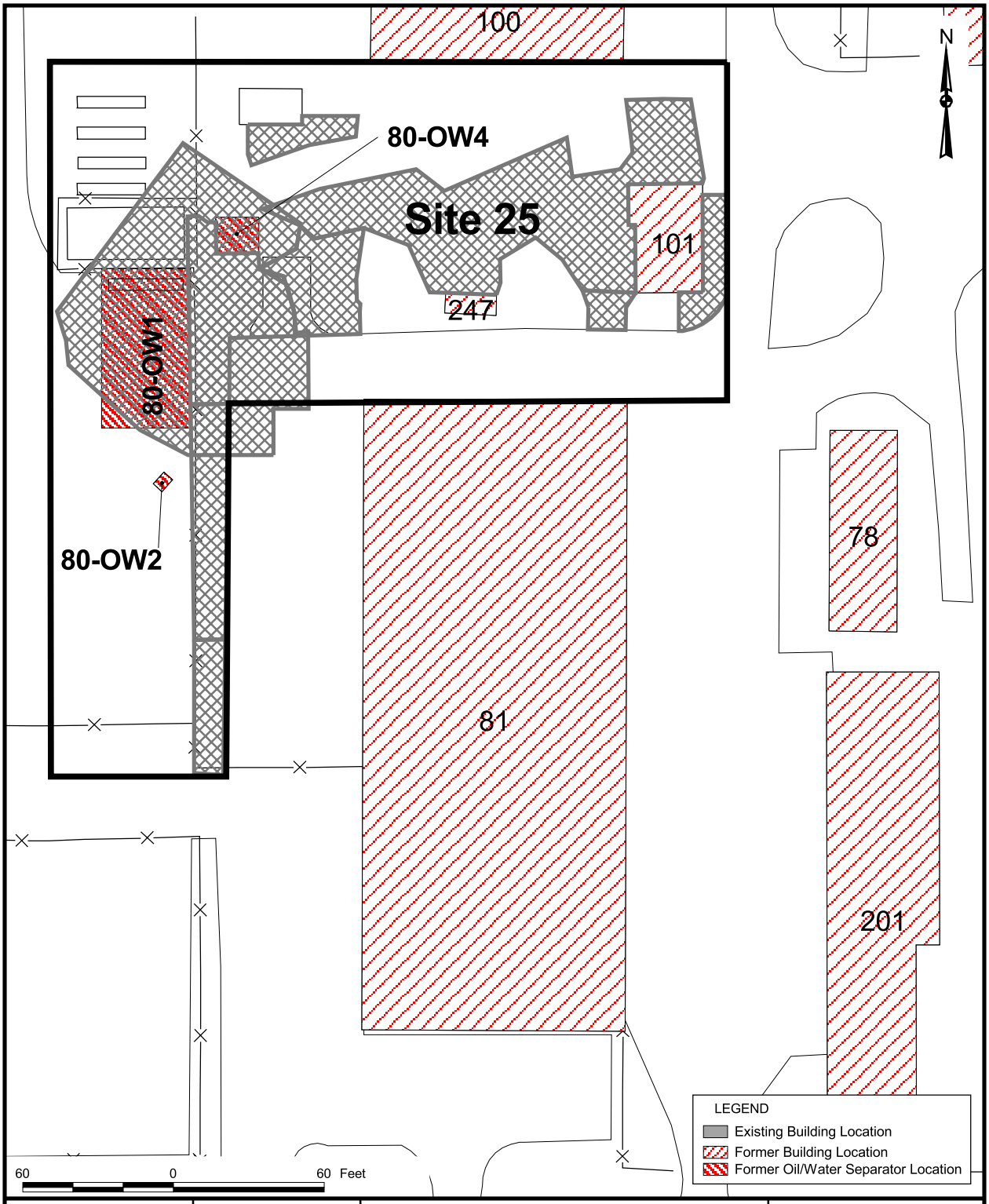


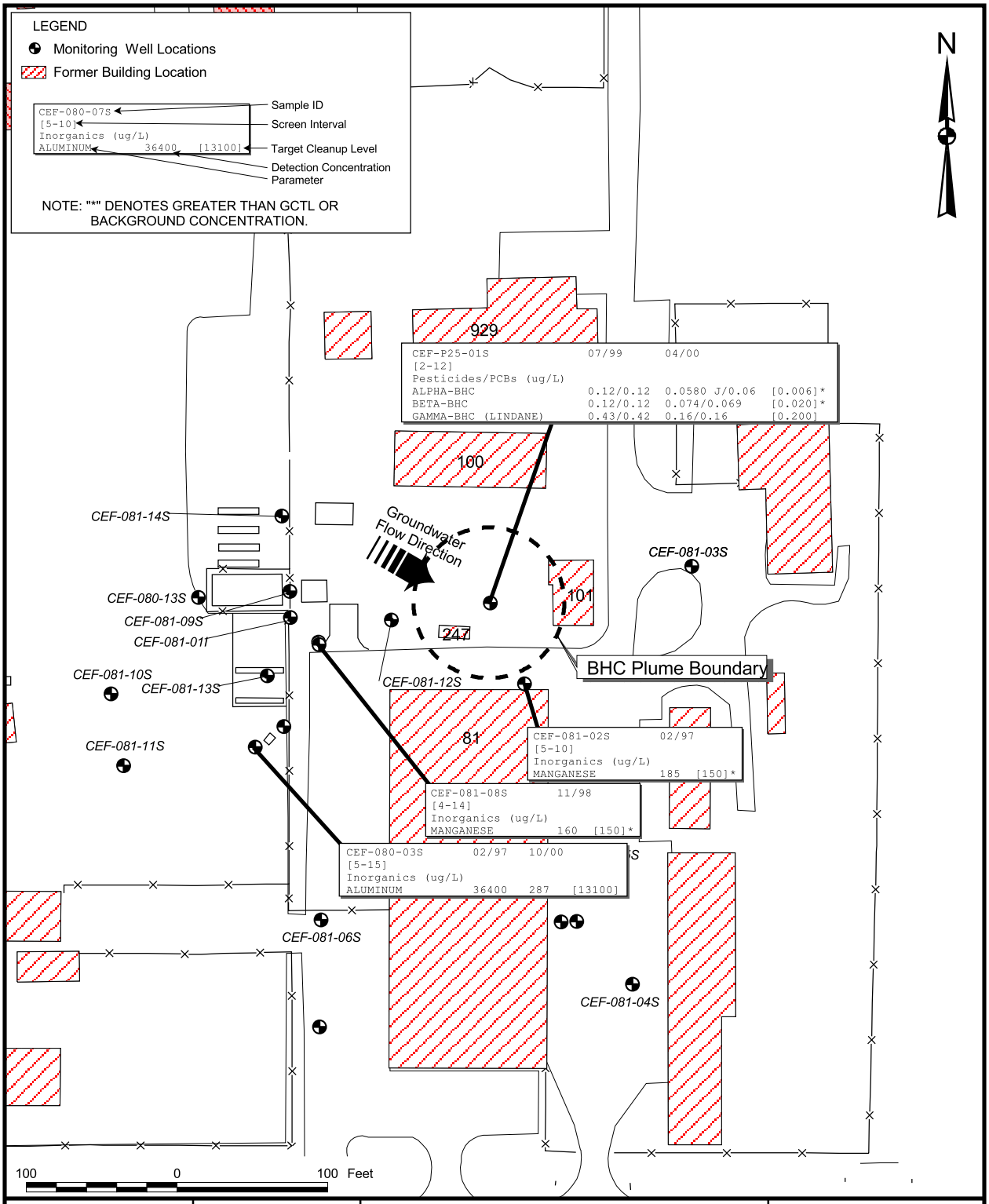
DRAWN BY MJJ	DATE 03Oct00	SITE VICINITY MAP OU 10, SITE 25 RECORD OF DECISION NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-2 / REV 0

P:\GIS\NAS_CecilField\psc25_rod.apr 30Apr03 MJJ 2-2_Site Vicinity Layout



DRAWN BY MJJ	DATE 08May00	GENERAL ARRANGEMENT OU 10, SITE 25 RECORD OF DECISION 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 2-3 / REV 0

P:\GIS\NAS_CecilField\psc25_rod.apr 30Apr03 MJJ 2-3_General Arragnement Layout



DRAWN BY MJJ	DATE 03Oct00	GROUNDWATER ANALYTICAL RESULTS OU 10, SITE 25 RECORD OF DECISION 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 2-4 / REV 0

P:\GIS\NAS_CecilField\psc25_rod.apr 30Apr03 MJJ 2-4_Groundwater Results Layout

NO FURTHER ACTION FOR SOIL, NATURAL ATTENUATION, LUCs, LONG TERM MONITORING, CONTINGENCY REMEDY

NO FURTHER ACTION REQUIRED FOR SOIL.

→

NATURAL ATTENUATION

- REDUCTION OF BHC GROUNDWATER CONCENTRATIONS THROUGH NATURALLY OCCURRING PROCESSES (BIODEGRADATION, DISPERSION, DILUTION).

→

LUCs

- PREVENT CONSUMPTION/USE OF SURFICIAL GROUNDWATER.
- MAINTAIN INTEGRITY OF EXISTING AND/OR FUTURE REMEDIATION SYTEM(S).
- PERFORM ANNUAL SITE INSPECTIONS TO VERIFY CONTINUED IMPLEMENTATION OF LUCs.

→

LONG TERM MONITORING

- COLLECT GROUNDWATER SAMPLES FROM 5 EXISTING WELLS AND ANALYZE FOR BHC:
  - QUARTERLY FOR 1 YEAR
  - SEMI-ANNUALLY FOR 2 YEARS
  - ANNUALLY FOR 2 YEARS

→

CONTINGENCY REMEDY

- PERFORM SITE REVIEW AFTER 5 YEARS.
- EVALUATE ADDITIONAL ACTIVE REMEDIAL MEASURES IF LUCs ARE NOT ADEQUATELY PROTECTIVE; UNACCEPTABLE MIGRATION OF GROUNDWATER CONTAMINATION OCCURS; AND/OR ATTENUATION PROCEEDS AT A RATE SLOWER THAN EXPECTED.

NOTES:

BHC BENZENE HEXACHLORIDE
LUCs LAND USE CONTROLS

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DM DATE 5/13/03
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

DEPARTMENT OF THE NAVY ★ SOUTHERN DIV FACILITIES ENGINEERING COMD

BLOCK FLOW DIAGRAM
SELECTED REMEDY
SITE 25 ROD
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. 0039
APPROVED BY DATE 07/10/03
APPROVED BY DATE
DRAWING NO. FIGURE 2-5
REV. 0

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APPENDIX A

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

Public notice of the availability of the Proposed Plan was placed in the Metro edition of the *Florida-Times Union* on July 1, 2003. This local edition targets the communities closest to NAS Cecil field. A 30-day public comment period was held from July 1 to July 30, 2003. Provisions for the public to request a public meeting to discuss the Revised Proposed Plan were also described in the public notice. No comments were received during the 30-day comment period.

APPENDIX B

ESTIMATED COSTS OF SELECTED REMEDY

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
SITE 25
ALTERNATIVE 2, NATURAL ATTENUATION, INSTITUTIONAL CONTROLS, AND MONITORING
CAPITAL COST

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal	Comments
1 INSTITUTIONAL CONTROLS												
1.1 Prepare Deed Restrictions	100	hours			$35.00		$0	$0	$3,500	$0	$3,500	
Subtotal							$0	$0	$3,500	$0	$3,500	
Local Area Adjustments							100.0%	123.0%	88.0%	88.0%		
Subtotal							$0	$0	$3,080	$0	$3,080	
Overhead on Labor Cost @ 30%									$924		$924	
G & A on Labor Cost @ 10%									$308		$308	
G & A on Material Cost @ 10%								$0			$0	
G & A on Subcontract Cost @ 10%							$0				$0	
Total Direct Cost							$0	$0	$4,312	$0	$4,312	
Indirects on Total Direct Cost @ 0%											$0	
Profit on Total Direct Cost @ 10%											$431	
Subtotal											$4,743	
Health & Safety Monitoring @ 0%											$0	
Total Field Cost											$4,743	
Contingency on Total Field Cost @ 0%											$0	
Engineering on Total Field Cost @ 0%											$0	
TOTAL COST											**$4,743**	

NAVAL AIR STATION CECIL FIELI
JACKSONVILLE, FLORIDA
SITE 25
ALTERNATIVE 2, NATURAL ATTENUATION, INSTITUTIONAL CONTROLS, AND MONITORIN
Annual Cos

Item	Item Cost Year 1 (1)	Item Cost Years 2 & 3 (2)	Item Cost Year 4 (3)	Item Cost Year 5	Notes
Sampling	$15,000	$7,500	$3,750		Labor, Mobilization/Demobilization, Field Supplie
Analysis/Water	$4,400	$2,200	$1,100		Analyze samples from 5 wells for pesticides including QA samples. Quarterly year 1, semi-annually years 2 - 3, and annually years 4 - 30.
Report	$16,000	$8,000	$4,000		Document sampling events and result
Site Inspection	$1,000	$1,000	$1,000		One day annual inspection to verify continued implementation c institutional controls
Site Review				$5,500	
TOTALS	$36,400	$18,700	$9,850	$5,500	

(1) Sampling would occur quarterly for the first yea
(2) Sampling would occur semi-annually for the years 2 - 3
(3) Sampling would occur annually for years 4 - 5

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
SITE 25
ALTERNATIVE 2, NATURAL ATTENUATION, INSTITUTIONAL CONTROLS, AND MONITORING
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$4,743		$4,743	1.000	$4,743
1		$36,400	$36,400	0.935	$34,034
2		$18,700	$18,700	0.873	$16,325
3		$18,700	$18,700	0.816	$15,259
4		$9,850	$9,850	0.763	$7,516
5		$15,350	$15,350	0.713	$10,945
				TOTAL PRESENT WORTH	$88,822