PB99-963105
EPA541-R99-022
1999

# EPA Superfund
# Record of Decision Amendment:

## Cecil Field Naval Air Station OU 7
## Jacksonville, FL
## 5/12/1999

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAY 12 1999

**CERTIFIED MAIL**
**RETURN RECEIPT REQUESTED**

4WD-FFB

Commanding Officer
Attn: Scott Glass
BRAC Environmental Coordinator
DON, Southern Division
Naval Facilities Engineering Command
Mail Code 18B12
P.O. Box 190010
North Charleston, South Carolina 20419-9010

Subject: Naval Air Station Cecil Field, Jacksonville, Florida
Record of Decision for Operable Unit 7 (Site 16)

Dear Mr. Glass:

The U.S. Environmental Protection Agency (EPA) has reviewed the Amended Record of Decision (ROD) for Operable Unit 7 (Site 16) and concurs with the selected remedies for the remedial actions. These remedies are supported by the previously completed Remedial Investigation, Feasibility Study, Technical Memorandum for Surface Soil Remediation, and the Baseline Risk Assessment. The selected remedies include institutional controls on future groundwater usage and long term groundwater monitoring .

On April 21, 1998, the EPA Region 4 Federal Facilities Branch issued a policy on "Assuring Land Use Controls at Federal Facilities." The policy deals with land use controls for properties which are not imminently being transferred to a non-federal entity. However, until Site 16 is transferred by deed to a non-federal entity, EPA believes that our April 21, 1998, policy on land use controls should apply. Therefore, we are concurring on the ROD Amendmnet with the condition that a Land Use Control Assurance Plan (LUCAP) be developed.

Thus, EPA's concurrence with the Amended Record of Decision (ROD) for OU 7 (Site 16) is conditioned on the express understanding that the Navy is committed to entering a Memorandum of Agreement (MOA) with EPA Region 4 and the Florida Department of Environmental protection (FDEP) that complies with the April 1998 policy mentioned above within 90-days of receipt of this letter. This MOA will serve as the LUCAP for NAS Cecil Field. Once the LUCAP is in place, the NAS Cecil Field BRAC Cleanup Team (BCT) will be expected to develop specific provisions for land use controls as part of the resulting Land Use Control Implementation Plan for Site 16, that will prohibit unrestricted property reuse until cleanup goals are met.

EPA appreciates the coordination efforts of the Navy and the level of effort that was put forth in the documents leading to this decision. EPA looks forward to continuing the excellent working relationship with NAS Cecil Field and Southern Division Naval Facilities Engineering Command as we move toward a final cleanup of the NPL site. Should you have any questions, or if EPA can be of any further assistance, please contact Ms. Deborah Vaughn-Wright, of my staff, at the letterhead address or at (404) 562-8539.

Sincerely,

Jon D. Johnston, acting

Richard D. Green
Director
Waste Management Division

cc: Mr. James Crane, FL DEP
Mr. Eric Nuzie, FL DEP
Mr. Michael Deliz, FL DEP
Mr. Mark Davidson, SOUTHDIV
Ms. Allison Abernathy, FFRO/OSWE
David Levenstein, FFEO/OECA
Sherri Fields, EAD

Amended Record of Decision Briefing Summary
Mayl 1999

Naval Air Station Cecil Field, Jacksonville, FL
Site 16, Aircraft Intermediate Maintenance Department
(SCAP OU #7)

**Participants:**

Deborah A. Vaughn-Wright, RPM, FFB
Earl Bozeman, Chief, DOD Remedial Section, FFB
Jon Johnston, Chief, FFB

**Operable Unit Background:**

Site 16, consists of a groundwater plume stemming from operations at the Aircraft Intermediate Maintenance Department seepage pit and associated areas. It is located in the industrial area of the main base, approximately 1,600 feet west of the north-south runways.

An IROD was approved in March 1994 for remediation of the source area seepage pit and associated soils. The interim remedial action was completed in September 1994.

The original ROD was approved in September 1996, and called for groundwater extraction, pretreatment, and discharge to a wastewater treatment plant; as well as enhanced bioremediation for the downgradient portion of the plume. This ROD is being amended for several reasons:

1. The water treatment plant will be closing with base closure;
2. Monitoring has shown that enhanced bioremediation will not be necessary due to natural conditions;
3. Storm sewer system serves as a conduit for groundwater to surface water pathway. Portions of the storm water system needed to be replaced; and
4. Data from pilot study indicates that air sparging may be more efficient and cost-effective than extraction.

| | Site 16, Aircraft Intermediate Maintenance Department |
|---|---|
| Type Unit | Seepage Pit and Groundwater Plume |
| Size | Groundwater Plume 1280 ft x 320 ft x 70 ft. depth. |
| Waste Type Disposed | grease, rust, scale, solvents and paint wastes |
| Waste Quantity | Unknown |

| | |
|---|---|
| **Period of Operation** | **1959 to 1980** |
| **Impacted Media** | **Soil (removed in 1994)**<br>**Groundwater** |
| **Risk/Media** | **Groundwater: Potential residential land use**<br>**ELCR 3E-03**<br>**HI 50** |
| **Primary Risk Drivers** | **Groundwater: ELCR: 1,1,DCE**<br>**HI: 1,1,-DCE, 1,2-DCE, TCE, antimony, and thallium** |
| **Preferred Remedy/ RAOs** | **Groundwater: Air Sparging in source area**<br>**Monitored Natural Attenuation downgradient**<br><br>**Groundwater to Surface water: Replace storm sewer**<br><br>**Institutional Controls: Limit exposure to groundwater** |
| **ARARs** | **Complies with ARARs and is Cost Effective** |
| **Concurrence** | **FL DEP is a partner on the BCT and is in full concurrence of the selected alternatives**<br><br>**The RAB has been briefed on the alternatives selected and are in concurrence. No public comments were received on the Proposed Plan** |
| **RCRA/CERCLA Integration** | **CERCLA remedy will be incorporated into the EPA RCRA HSWA provision via a permit modification.** |
| **Costs** | **Air Sparging: $1,140,000**<br>**MNA: $ 252,000**<br>Sewer Repair: $ 106,000<br><br>Total: $ 1,498,000 |

029915/P

# AMENDED RECORD OF DECISION OPERABLE UNIT 7, SITE 16 FOR

# NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA

## COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 051

APRIL 1999

PREPARED UNDER THE SUPERVISION OF:

MARK SPERANZA, P.E.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMITTAL BY:

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

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## FIGURES

# ACRONYM LIST

| | |
|---|---|
| A | Aroclor |
| ABB-ES | ABB Environmental Services, Inc. |
| AC | Alpha Chlordane |
| Ag | Silver |
| AIMD | Aircraft Intermediate Maintenance Department |
| Al | Aluminum |
| ARAR | Applicable or Relevant and Appropriate Requirements |
| AS | Air sparging |
| As | Arsenic |
| Ba | Barium |
| bgs | below ground surface |
| BIS | Bis(2-ethylhexyl)phthalate |
| BRA | Baseline Risk Assessment |
| BRAC | Base Realignment and Closure |
| Ca | Calcium |
| Cd | Cadmium |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| Co | Cobalt |
| COC | Chemical of Concern |
| COPC | Chemical of Potential Concern |
| Cu | Copper |
| DCA | Dichloroethane |
| DCE | Dichloroethene |
| DDE | 4,4-Dichlorodiphenyldichlorethene |
| Die | Diethylphthalate |
| DON | Department of the Navy |
| EBS | Environmental Baseline Survey |
| EE | Envirodyne Engineers |
| ELCR | Excess Lifetime Cancer Risk |
| ES | Endosulfan Sulfate |
| FDEP | Florida Department of Environmental Protection |
| Fe | Iron |
| FFA | Federal Facility Agreement |

| | |
|---|---|
| FS | Feasibility Study |
| GAC | Granular activated carbon |
| GC | Gamma Chlordane |
| gpm | Gallons Per Minute |
| G&M | Geraghty & Miller |
| HE | Heptaclor epoxide |
| Hg | Mercury |
| HHRA | Human Health Risk Assessment |
| HI | Hazard Index |
| HLA | Harding Lawson Associates |
| HQ | Hazard Quotient |
| IAS | Initial Assessment Study |
| IRA | Interim Remedial Action |
| IZS | Intermediate Zone Surficial Aquifer |
| LUCIPs | Land Use Control Implementation Plans |
| LZS | Lower Zone Surficial Aquifer |
| MC | Methylene Chloride |
| 2-MNAPH | 2-Methylnaphthalene |
| Mg | Magnesium |
| Mgd | Million gallons per day |
| mg/kg | milligram per kilogram |
| Mn | Manganese |
| Na | Sodium |
| NAPH | Naphthalene |
| NAS | Naval Air Station |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| Ni | Nickel |
| NPL | National Priority List |
| OU | Operable Unit |
| PAH | Polycyclic aromatic hydrocarbon |
| Pb | Lead |
| PCB | Polychlorinated biphenyl |
| Phl | Phenol |
| RAB | Restoration Advisory Board |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |

| | |
|---|---|
| RFI | RCRA Facility Investigation |
| RI | Remedial Investigation |
| ROD | Record of Decision |
| SARA | Superfund Amendments and Reauthorization Act |
| Sb | Antimony |
| SVOC | Semivolatile organic compound |
| TCA | Trichloroethane |
| TCE | Trichloroethene |
| Tl | Thallium |
| Tol | Tolune |
| TRPH | Total recoverable petroleum hydrocarbon |
| TtNUS | Tetra Tech NUS, Inc. |
| µg/kg | microgram per kilogram |
| µg/L | microgram per liter |
| U.S. EPA | U.S. Environmental Protection Agency |
| UST | Underground Storage Tank |
| UZH | Upper Zone of the Hawthorn Group |
| UZS | Upper Zone Surficial Aquifer |
| V | Vanadium |
| VE | Vapor Extraction |
| VOC | Volatile organic compound |
| Zn | Zinc |

# 1.0 DECLARATION OF THE AMENDED RECORD OF DECISION

## 1.1 SITE NAME AND LOCATION

Operable Unit (OU) 7 is located in the industrial area of the main base of Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. OU 7 consists of Site 16, Aircraft Intermediate Maintenance Department (AIMD) Seepage Pit and associated contaminated areas. OU 7, Site 16 is located at the intersection of Jet Road and 6th Street, approximately 1,600 feet west of the north-south runways.

## 1.2 STATEMENT OF BASIS AND PURPOSE

This document is an amendment of the Record of Decision (ROD) originally published in July 1996 (ABB Environmental Services [ABB-ES], 1996c). The original ROD for this site was submitted by the Department of the Navy (DON) on July 31, 1996 and accepted by the state of Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection Agency (U.S. EPA) Region 4 as the selected remedy for groundwater at OU 7, Site 16. The remedy presented in the original ROD was groundwater extraction, pretreatment, and discharge to a wastewater treatment plant; and groundwater treatment with enhanced bioremediation; institutional controls; and five-year reviews. Due to the closing of the base in 1999, the wastewater treatment plant would no longer be available as part of the remedy. Also, after further evaluation and a pilot-study, alternative remedies were determined to be more cost effective and protective of human health and the environment. Therefore, an amendment to the original ROD is required to document this fundamental change.

This amended ROD presents a revised selected remedial action for OU 7, Site 16 at NAS Cecil Field. The revised remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (CERCLA § 117), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations § 300.435(c)(2)(ii)).

The U.S. EPA and the State of Florida concur with the revised selected remedy.

## 1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this amended ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. Unacceptable human health risks would exist if groundwater from the surficial aquifer at OU 7, Site 16 is used as a potable water source.

## 1.4 DESCRIPTION OF THE SELECTED REMEDY

This amended ROD presents the final remedy for OU 7, Site 16. Final RODs have been approved for OU 1; OU 2, Site 17; OU 3; OU 4; OU 5, Site 14; OU 6 and OU 8. An amended ROD is expected to be prepared for OU 2, Site 5 due to changes in conditions at the site and cleanup objectives. A Remedial Investigation (RI), a Baseline Risk Assessment (BRA), and a Feasibility Study (FS) has been completed for OU 5, Site 15 and a Proposed Plan and subsequent ROD is pending A RI and FS is currently being conducted for OU 9, Sites 36 and 37.

The remedy selected for OU 7, Site 16 in the original ROD included groundwater treatment and monitoring, and the implementation of site controls.

The major components of the originally selected remedy were as follows:

- Extraction, pre-treatment, and discharge to an existing wastewater treatment facility of the groundwater from the area with the highest contaminant concentration, referred to as the source area.
- In-situ treatment of the less contaminated downgradient groundwater with chemically-enhanced aerobic bioremediation.
- Monitoring of in-situ and treated groundwater quality to determine the decrease of contaminants concentrations in the aquifer and verify the performance of the pre-treatment system.
- Implementation of institutional controls, including deed restrictions, to limit the use of contaminated groundwater until natural processes reduce contaminant concentrations to acceptable levels.
- Review of site conditions and groundwater monitoring data every 5 years will verify the effectiveness of the remedy for the protection of human health and the environment.

In the revised selected remedy, the first two of the above components are replaced, one new component is added, and the last three components (i.e., monitoring, institutional controls, and 5-year reviews) remain unchanged.

The first two replacement components are as follows:

- In-situ air sparging (AS), vapor extraction (VE), and treatment of extracted vapor to volatilize, remove, and capture contaminants from the groundwater in the source area.

- Natural attenuation of the groundwater in the downgradient area to remove contaminants through natural processes, including anaerobic bioremediation.

The new additional component is as follows:

- Repair of a damaged section of the storm sewer to prevent cross-contamination of runoff and surface water through infiltration of contaminated groundwater into the storm sewer system.

## 1.5 STATUTORY DETERMINATIONS

The selected amended 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 7, Site 16 is such that applicable or relevant and appropriate requirements (ARARs) will be met in the long-term when residual concentrations of contaminants in the groundwater are reduced through natural attenuation. The remedy utilizes permanent solutions and satisfies the statutory preferences for remedies that employ treatment to reduce toxicity, mobility, or volume as a principal element. Because this remedy would result in hazardous substances remaining onsite above health-based levels, a review will be conducted within 5 years of the commencement of remedial actions to ensure that the remedy continues to provide adequate protection of human health.

## 1.6 SIGNATURE AND SUPPORT AGENCY ACCEPTANCE OF REMEDY

Scott A. Glass (signature) — 4/6/99

Scott A. Glass, P.E.
Base Realignment and Closure
Environmental Coordinator

Date

# 2.0 AMENDED DECISION SUMMARY

## 2.1 SITE NAME, LOCATION, AND DESCRIPTION

NAS Cecil Field is located 14 miles southwest of Jacksonville, Florida. The majority of Cecil Field is located within Duval County; the southernmost part of the facility is located in Clay County (Figure 2-1). NAS Cecil Field was established in 1941 and provides 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. NAS Cecil Field is scheduled for closure in 1999. Much of the facility will be transferred to the Jacksonville Port Authority and City of Jacksonville. Per the reuse plan, the facility will have multiple uses, but will be used primarily for aviation-related activities.

OU 7, Site 16 is located in the south-central portion of NAS Cecil Field north of Building 313 (Figures 2-1 and 2-2). The site includes the former AIMD seepage pit and associated bead separator, holding tank, and pipelines from Building 313, as well as adjacent areas to the east and southeast of Building 313 that have been affected by activities at the site.

OU 7, Site 16 is vegetated with grass that is mowed regularly. The general area adjacent to the site is relatively flat and is covered with asphalt and concrete. The immediate area is criss-crossed with several utilities, including a water line, an overhead steam line, a fire water main, a sanitary sewer main, and both active and abandoned storm sewers. There are no inlets to the storm sewer system in the immediate vicinity of OU 7, Site 16 (ABB-ES, 1992). During site visits, the ground surface exhibited no evidence (staining or absence of vegetation) of adverse effects from previous waste handling activities at the site.

Surface water flow from OU 7, Site 16 is typically toward the adjacent paved roads and parking lots. To the east, an unlined grass drainage swale may receive some runoff and carry it toward a catch basin. The runoff from the paved roads and parking lots in the vicinity of OU 7, Site 16 flows to the storm sewer system (Harding Lawson Associates [HLA], 1988).

The storm sewer system collects surface water runoff in catch basins and transports it through underground piping that discharges into drainage ditches leading to the wetlands on the east side of the north-south runways and eventually to Sal Taylor Creek, farther to the east. Most of the storm sewer trunk (main) lines intersect the water table as do some of the smaller tributary lines.

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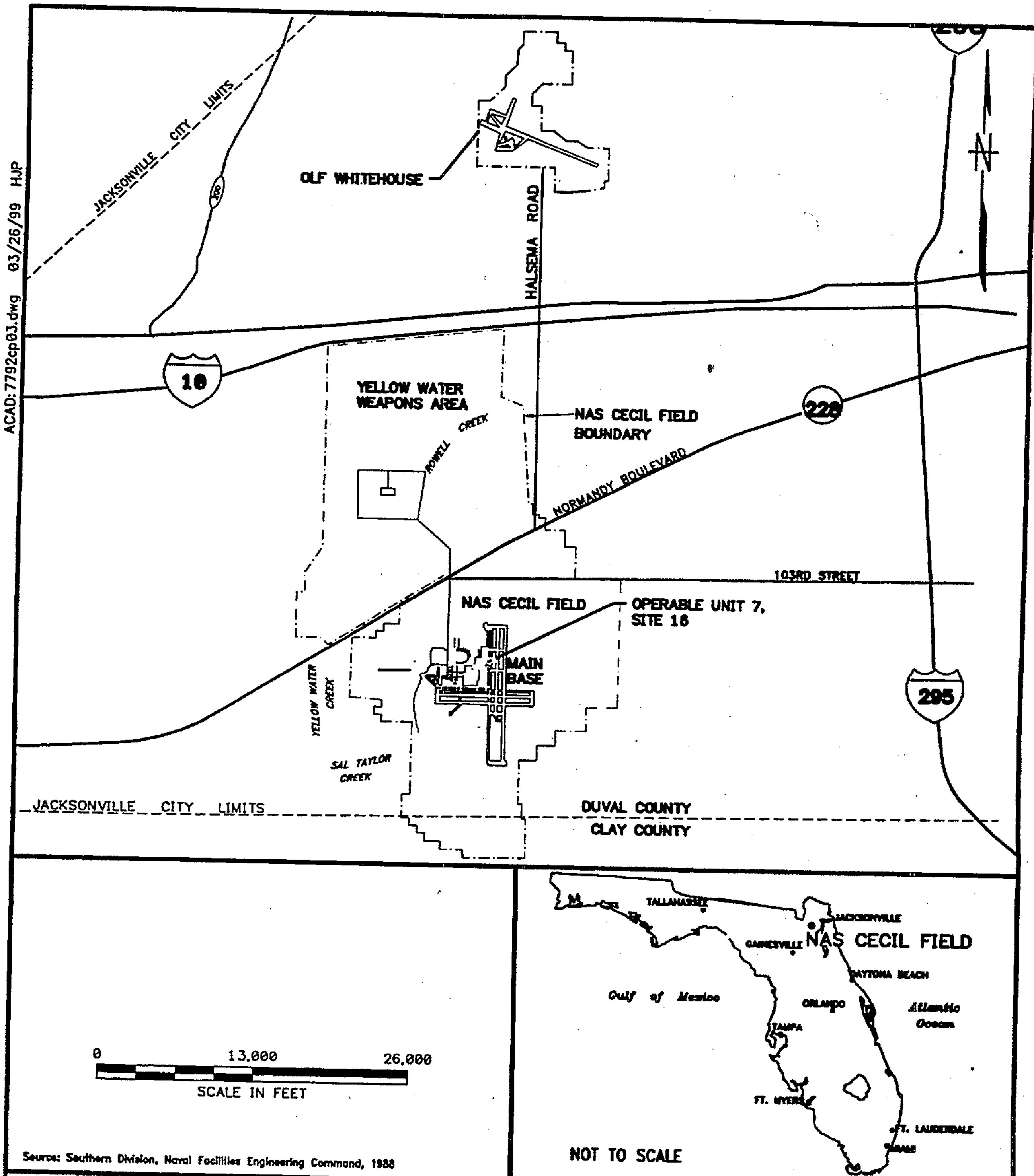


| | | | |
|---|---|---|---|
| DRAWN BY HJP DATE 10/26/98 | | GENERAL LOCATION MAP<br>AMENDED RECORD OF DECISION<br>OPERABLE UNIT 7, SITE 16<br>NAVAL AIR STATION CECIL FIELD<br>JACKSONVILLE, FLORIDA | CONTRACT NO. 7792 |
| CHECKED BY DATE | | | APPROVED BY DATE |
| COST/SCHED-AREA | | | APPROVED BY DATE |
| SCALE AS NOTED | | | DRAWING NO. FIGURE 2-1 REV. 0 |

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

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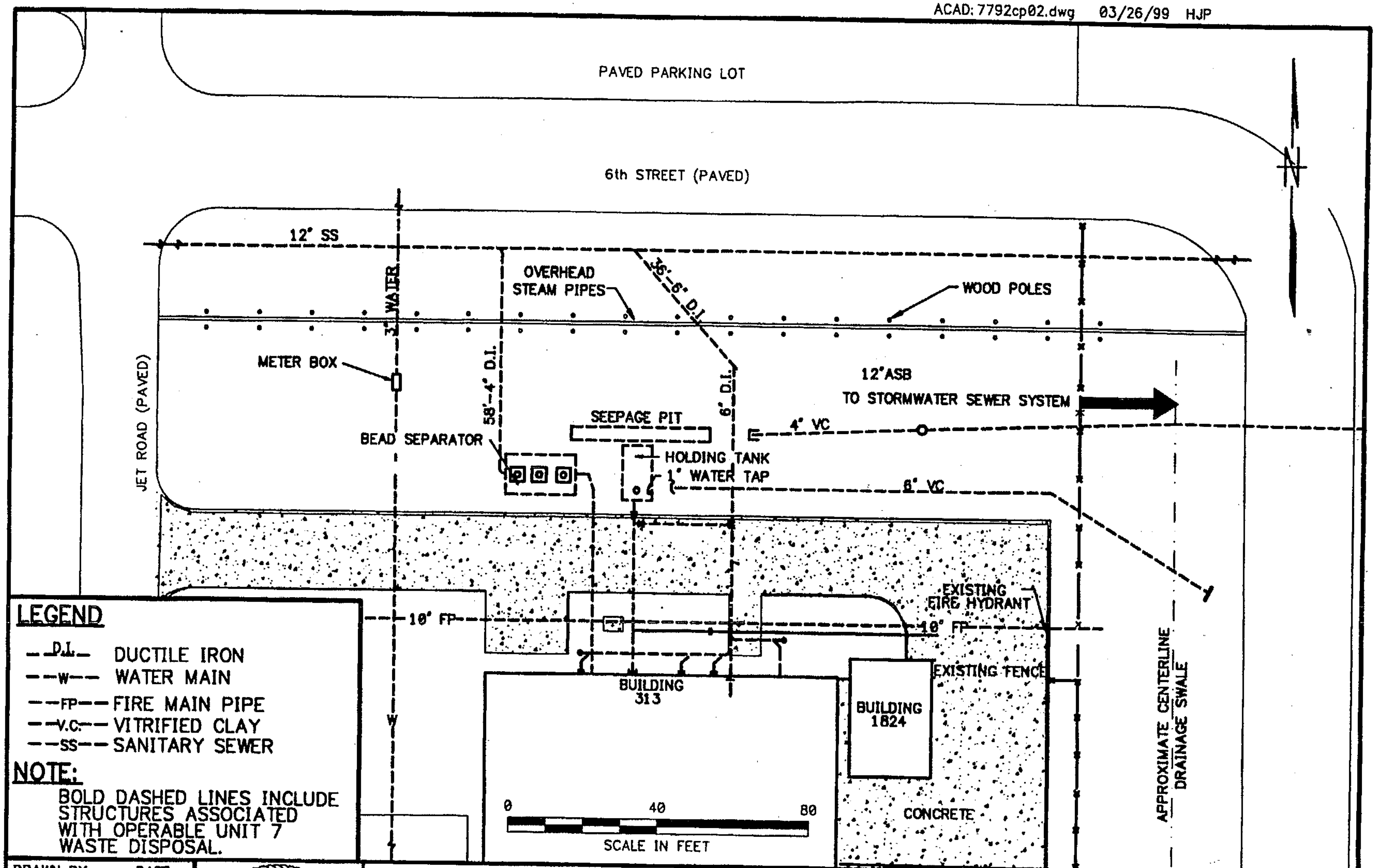


| DRAWN BY / DATE | HISTORICAL SITE LAYOUT | CONTRACT NO. |
|---|---|---|
| HJP 10/26/98 | AMENDED RECORD OF DECISION | 7792 |
| CHECKED BY / DATE | OPERABLE UNIT 7, SITE 16 | APPROVED BY / DATE |
| COST/SCHED-AREA | NAVAL AIR STATION CECIL FIELD | APPROVED BY / DATE |
| SCALE AS NOTED | JACKSONVILLE, FLORIDA | DRAWING NO. FIGURE 2-2 REV. 0 |

FORM CADD NO. SDIV_AH.DWG - REV 0 - 1/20/98

## 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 was 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). The RFI acted on the recommendations of the IAS. OU 7, Site 16 was included in the IAS and the RFI.

NAS Cecil Field was placed on the National Priorities List (NPL) by the U.S. EPA and the Office of Management and Budget in December 1989. A Federal Facility Agreement (FFA) for NAS Cecil Field was signed by the FDEP (formerly the Florida Department of Environmental Regulation), U.S. EPA, and the DON 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 7, Site 16 is one of nine operable units that were identified from 20 sites as needing further investigation.

The site-specific history for OU 7, Site 16 is presented below.

From 1959 to 1980, OU 7, Site 16 was used to dispose of greases, rusts, scale, and paint wastes from the cleaning of machines and engine parts as well as waste glass beads and blasting grit from the airframes blasting shop. Most wastes were discharged to a 4,100-gallon underground concrete holding tank located north of Building 313 and from there to an adjacent pit which allowed seepage of the waste directly into the subsurface soil and groundwater. In the late 1960s, the seepage pit was modified to allow discharge to the storm sewer system.

Use of the seepage pit was discontinued in 1980 and connecting pipes were removed or plugged. A bead separator was installed and its discharge was connected to the sanitary sewer system. During that period, the holding tank was used as a RCRA permitted facility for the 90-day storage of hazardous wastes. In 1989, the system was abandoned. All piping connections between Building 313 and the bead separator and holding tank were removed and plugged and the contents of the holding tank were removed for offsite treatment and disposal. The tank itself remained in place.

In March 1993, a modification to the RCRA permit of the holding tank stipulated that this tank must be closed. In May 1994, the holding tank, seepage pit, and glass bead separator were excavated and removed from the site as part of an Interim Remedial Action (IRA). Associated piping was removed or plugged with grout, and 1,500 cubic yards of surrounding contaminated soil was excavated and disposed of offsite.

Following the IRA, an RI was conducted to evaluate residual site contamination and associated risks (ABB-ES, 1995b). Samples of surface and subsurface soil, and groundwater were collected and analyzed. Results of these analyses were used to determine human health and ecological risks. The BRA determined that there were no unacceptable ecological risks at OU 7, Site 16 but that groundwater contained chlorinated volatile organic compounds (VOCs) which would result in significant human health risk if the groundwater was to be used as a source of drinking water (ABB-ES, 1996a). A FS was performed to define Remedial Action Objectives (RAOs) and evaluate a range of clean-up alternatives to meet these objectives (ABB-ES, August 1995c).

A Proposed Plan was prepared to identify the preferred clean-up alternative for OU 7, Site 16 (ABB-ES, 1996b). A public meeting was held at NAS Cecil Field on March 21, 1996 to present this Proposed Plan and to respond to public comments. The Proposed Plan and other documents related to the environmental evaluation of OU 7, Site 16 (RI, BRA, FS) were made available for public review and comments for a 30-day period from March 21 to April 22, 1996. Based on the resolution of the comments received at the public meeting and during the comment period, a ROD (July 1996) was issued which selected alternative MM6 as the clean-up alternative for OU 7, Site 16 (ABB-ES, 1996c).

Subsequent to the publication of the ROD, certain site conditions changed. In particular, it was determined that, as a result of base closure, the NAS Cecil Field wastewater treatment plant was not likely to be available to receive the pre-treated source area groundwater as specified by the selected remedy. Through pilot-scale testing, it was also determined that air sparging and vapor extraction (AS/VE) would achieve clean-up goals in the source area quicker and more cost-effectively than the extraction and pre-treatment (pump and treat) system which had been previously selected. Finally, results from additional investigations established that natural attenuation had excellent potential for the remediation of the OU 7, Site 16 groundwater and that contaminated groundwater was infiltrating a section of the storm sewer system, resulting in discharge of contaminated runoff to the drainage ditch east of the runways. All of these factors have led to the preparation of a Revised Proposed Plan (Tetra Tech NUS [TtNUS], 1999) and of this amended ROD.

## 2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The results of the RI and BRA and the remedial alternatives identified in the FS were presented on June 8, 1995 to the NAS Cecil Field Restoration Advisory Board (RAB) which is comprised of community members and representatives from the Navy, State, and Federal regulatory agencies.

Public notice of the availability of the Proposed Plan was placed in the Metro section of the Florida Times Union on March 10 and 15, 1996. This local edition targets the communities closest to NAS Cecil Field.

A public meeting was held on March 21, 1996 to present the results of the RI and the BRA, the remedial alternatives of the FS, and the preferred alternative identified in the Proposed Plan. Comments received during this meeting were presented in the responsiveness summary appended to the July 1996 ROD. A 30-day comment period was held from March 21 through April 22, 1996. No comments were received during this public comment period.

The Revised Proposed Plan was presented on January 19, 1999 to the NAS Cecil Field RAB.

Public notice of the availability of the Revised Proposed Plan was placed in the Metro section of the Florida Times Union on January 17, 1999. A 30-day comment period was held from January 19 to February 18, 1999. No comments were received during this period.

Documents pertaining to OU 7, Site 16 are available to the public at the Information Repository, located at the Charles D. Webb Wesonnett Branch of the Jacksonville Library, 6887 103rd Street, Jacksonville, Florida. This ROD amendment 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 20 sites has been organized into nine installation restoration OUs. More than 100 other areas are undergoing evaluation in the Base Realignment and Closure (BRAC) and Underground Storage Tank (UST) petroleum programs.

Final RODs have been approved for OU 1; OU 2, Site 17; OU 3; OU 4; OU 5, Site 14; OU 6 and OU 8. An amended ROD is expected to be prepared for OU 2, Site 5 due to changes in conditions at the site and cleanup objectives. A RI, a BRA and a FS has been completed for OU 5, Site 15 and a Proposed Plan and subsequent ROD is pending. A RI and FS is currently being conducted for OU 9, Sites 36 and 37.

Assessment of environmental data collected from OU 7, Site 16, the subject of this amended ROD, indicates groundwater contamination could pose an unacceptable human health risk if the groundwater was used as a potable water source. Future discharge of groundwater to Sal Taylor Creek could potentially cause adverse effects on aquatic organisms. The purpose of this remedial action is to monitor and remediate the groundwater contamination that poses human health and ecological risks. Ingestion of groundwater from the surficial aquifer poses an excess lifetime cancer risk (ELCR) that exceeds the State of Florida threshold of 1 in 1,000,000 or 1E-06.

The following RAO was established for OU 7, Site 16:

- Prevent exposure to groundwater that contains chlorinated VOCs at concentrations that are greater than the State of Florida Groundwater Cleanup Target Levels which includes the State and Federal drinking water standards and that cause unacceptable risk to human health.

The remedial action documented in this amended ROD will achieve this RAO.

## 2.5 SUMMARY OF SITE CHARACTERISTICS

### 2.5.1 Geology

Subsurface geologic materials recovered during drilling operations at OU 7, Site 16 indicate that the site is underlain by approximately 90 feet of Holocene to Pliocene age fine-grained silty sand. This sand is typically brown to gray throughout and varies in shade from light to dark. Layers of clayey sand, sandy clay, and clay, ranging in thickness from less than one inch to 6 inches, are encountered throughout this lithologic strata. Beneath the sand is a layer of clay containing 40 to 50 percent of dolomite fragments. This clay is underlain by dolomite. The dolomite is typically gray, microcrystalline, moderately well cemented, moderately hard to soft, and contains mineral replacement of shell material.

The dolomite is of the Miocene (between 6 and 24 million years old) age Hawthorn Group. Locally, the uppermost layers of this Hawthorn Group include a continuous carbonate-rich unit of dolomite, a limestone or marble rich in magnesium carbonate, and/or shell hash. Historically, this unit has been called the "rock aquifer" or "secondary artesian aquifer." For this document, this unit is simply considered to be a water-producing zone of the intermediate aquifer system.

### 2.5.2 Hydrogeology

At NAS Cecil Field, there are three water-bearing systems: the surficial aquifer, the intermediate aquifer, and the Floridan aquifer systems. The groundwater in these three aquifers is classified as potable, Class G-II (Florida Legislature, 1990). Each system is separated from the next by an aquitard or less permeable unit. At OU 7, Site 16 only the surficial aquifer and the top of the intermediate aquifer were investigated.

#### 2.5.2.1 Surficial Aquifer System

The surficial aquifer consists of three zones: shallow (UZS), intermediate (IZS), and deep (LZS). The surficial aquifer is unconfined and composed of undifferentiated fine-grained sand with some clayey sand and clay. These sediments extend to approximately 100 feet below ground surface (bgs) and are underlain by a layer of clay with dolomite fragments. The water table in the surficial aquifer typically occurs between 5 and 10 feet bgs. Groundwater flow in the surficial aquifer is generally to the southeast, towards the wetlands and drainage ditch east of the runways, at an average rate of 21 feet per year. At this rate, contaminants from OU 7, Site 16 would have migrated approximately 735 feet downgradient over the 35 years since wastes were initially released. A general upward gradient is observed from the intermediate aquifer system to the surficial aquifer system at OU 7, Site 16 based on the groundwater elevations. This upward gradient is pronounced before reaching the west side of the runways, beginning approximately 400 feet downgradient of OU 7, Site 16.

Upgradient of OU 7, Site 16, the geochemistry of the surficial aquifer is indicative of recharge by rainfall, but downgradient, where the upward gradient is present, the geochemistry is increasingly bicarbonate-rich with depth, to the point of resembling the geochemistry of the intermediate aquifer. This change in geochemistry, along with the upward gradient in the surficial aquifer and widespread upward vertical potential between the intermediate and surficial aquifers, indicate that groundwater is flowing from the intermediate aquifer to the surficial aquifer. It is unclear if this upward migration is due to increased hydraulic conductivity or gaps in the clayey layer.

Water obtained from the surficial aquifer is primarily used for lawn irrigation and domestic purposes, including heat exchange units in heating and air conditioning systems. The yield of the wells is typically between 30 and 100 gallons per minute (gpm). Water use estimates for the surficial aquifer are approximately 10 to 25 million gallons per day (mgd) for the City of Jacksonville (Jacksonville Area Planning Board, 1980). The surficial aquifer level and flow directions have been altered over time because of increased water use and pumping rates.

### 2.5.2.2 Intermediate Aquifer System

The intermediate aquifer consists of one zone, the Upper Zone of the Hawthorn Group, (UZH). At the OU 7, Site 16 source area, the intermediate aquifer is encountered at approximately 105 feet bgs. In addition to its clay-rich sediments, the Hawthorn Group includes near its top a locally continuous carbonate-rich unit of dolomite with significant secondary porosity. This carbonate-rich unit forms the historical "rock aquifer" or "secondary artesian aquifer," a water-bearing unit widely used in the region as a private drinking water source. In the NAS Cecil Field area, this unit is approximately 20 to 25 feet thick. The top of this unit is irregular and may represent an erosional unconformity. The groundwater flow in the intermediate aquifer at OU 7, Site 16 is to the south-southeast, toward the wetlands east of the runways, at an average rate of approximately 131 feet per year.

The quality of the water from the intermediate aquifer is hard to very hard and has moderate dissolved solids levels. The iron content is variable and some areas contain hydrogen sulfide (G&M, 1985). At least 50,000 homes in the Jacksonville area obtain water from private wells in the intermediate aquifer. The Florida Department of Health and Rehabilitation Services estimates that there are approximately 75 private wells located within a 2-mile radius of NAS Cecil Field, and they reportedly produce from within the intermediate aquifer.

### 2.5.3 Contaminant Sources

At OU 7, Site 16, the primary source of contamination was the liquid waste generated during the machine and engine parts cleaning process conducted within Building 313. From 1959 to 1980, these wastes were discharged to a holding tank, seepage pit, and bead separator. Based on the nature of the operations occurring within Building 313 at that time, waste components that were disposed may have included trichloroethene (TCE), methylene chloride, cresol, phenol, oil, and sodium cyanide (HLA, 1988).

The seepage pit drained directly to the underlying soil and groundwater. The addition of wastewater to the seepage pit and eventually to the groundwater would be expected to create a localized groundwater mound. The contaminants would most likely have migrated horizontally and vertically within the influence of this mound. When the discharge operations ceased, the mounding would have subsided, leaving contaminants in the vadose zone soil.

After initial spreading of contaminants caused by the mounding, the contaminants would continue to migrate from the site with the natural flow of groundwater. Contaminants remaining within the initial mound area (in soil both above and below the water table) could serve as a continuing source of groundwater contamination.

#### 2.5.3.1 Surface Soil

The results of the confirmatory surface soil sampling program performed after the 1994 IRA indicated the presence of VOCs, including TCE and its transformation product 1,2-dichloroethene (1,2-DCE), semivolatile organic compounds (SVOCs), including polynuclear aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenyls (PCBs), and inorganics. None of the detections of inorganics exceeded the NAS Cecil Field site-specific background concentrations referred to as the NAS Cecil Field Inorganic Background Data Set. All compounds were randomly detected in surface soil and are not believed to have been introduced by the subsurface discharge from the seepage pit, but rather as a result of the IRA excavation activities.

Summaries of organics and inorganics detections in surface soil are shown on Figures 2-3 and 2-4, respectively.

The BRA (ABB-ES, 1996a) determined that the compounds detected in surface soil do not pose an unacceptable risk to human receptors. Ecological risk was not assessed for surface soil due to the industrial setting of OU 7, Site 16.

#### 2.5.3.2 Subsurface Soil

The results of the confirmatory subsurface soil sampling program conducted after the 1994 IRA indicated the presence of VOCs, SVOCs, pesticides, PCBs, and inorganics. The VOCs and SVOCs appear to be related to past discharge as they were detected at the highest concentrations near the former seepage pit area. Pesticides and PCBs were detected at locations that had a more sporadic distribution across the site. The VOCs detected included TCE, 1,2-DCE and three common laboratory solvents, methylene chloride, 2-butanone, and acetone. The SVOCs detected included PAHs, phthalates, and phenol. None of the inorganics detections exceeded the NAS Cecil Field Inorganic Background Data Set.

A summary of organics detections in subsurface soil is shown on Figure 2-5.

The BRA (ABB-ES, 1996a) determined that the compounds detected in the subsurface soil do not pose an unacceptable risk to human receptors. Ecological risk was not assessed due to the industrial setting of OU 7, Site 16.

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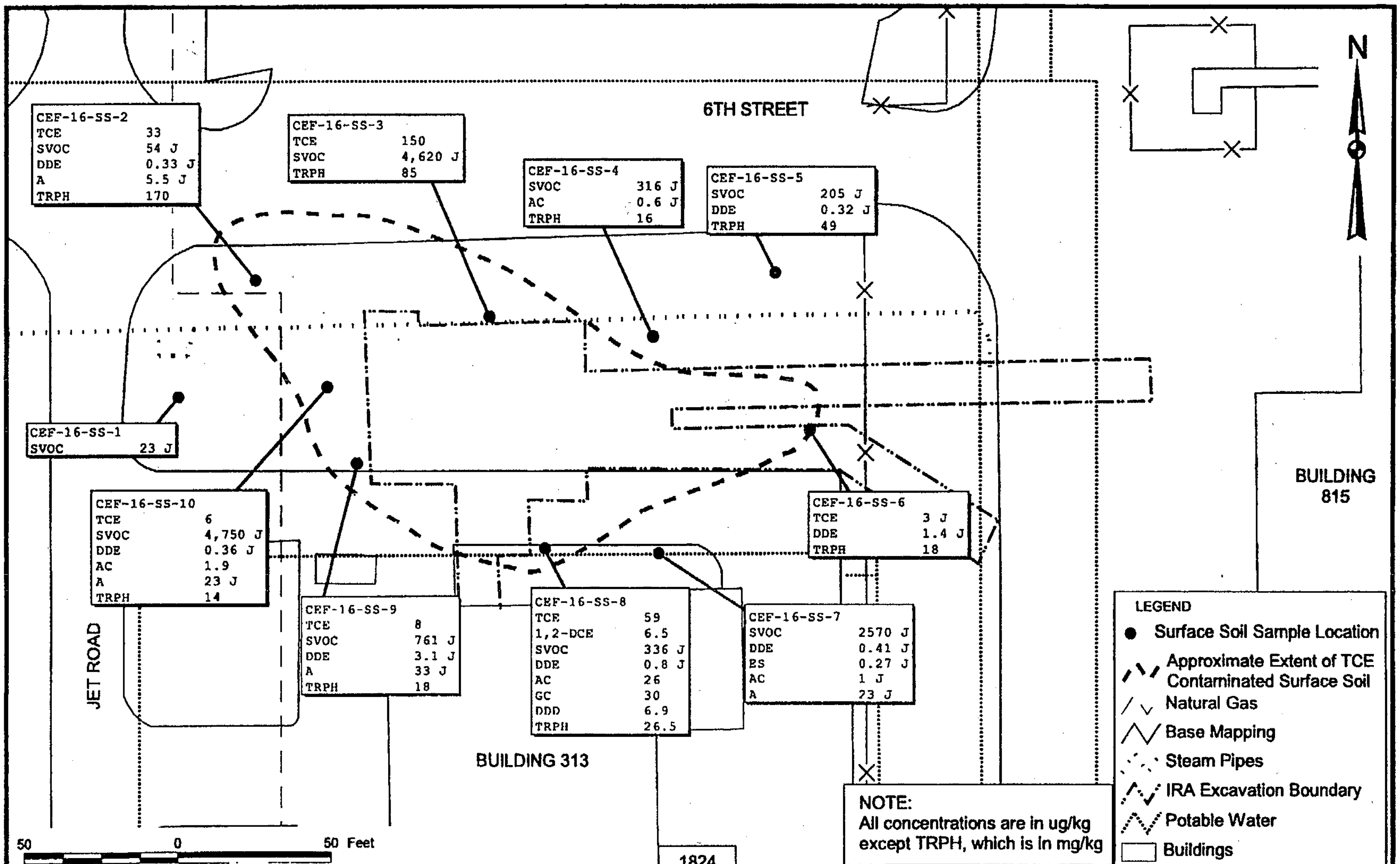


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ORGANICS DETECTED IN SURFACE SOIL
AMENDED RECORD OF DECISION
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

| CONTRACT NUMBER 7792 | |
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P:\GIS\CECIL\SITE16_ABBTAG.APR 25-MAR-99 CPG LAYOUT FIG 2-3 ORGANICS

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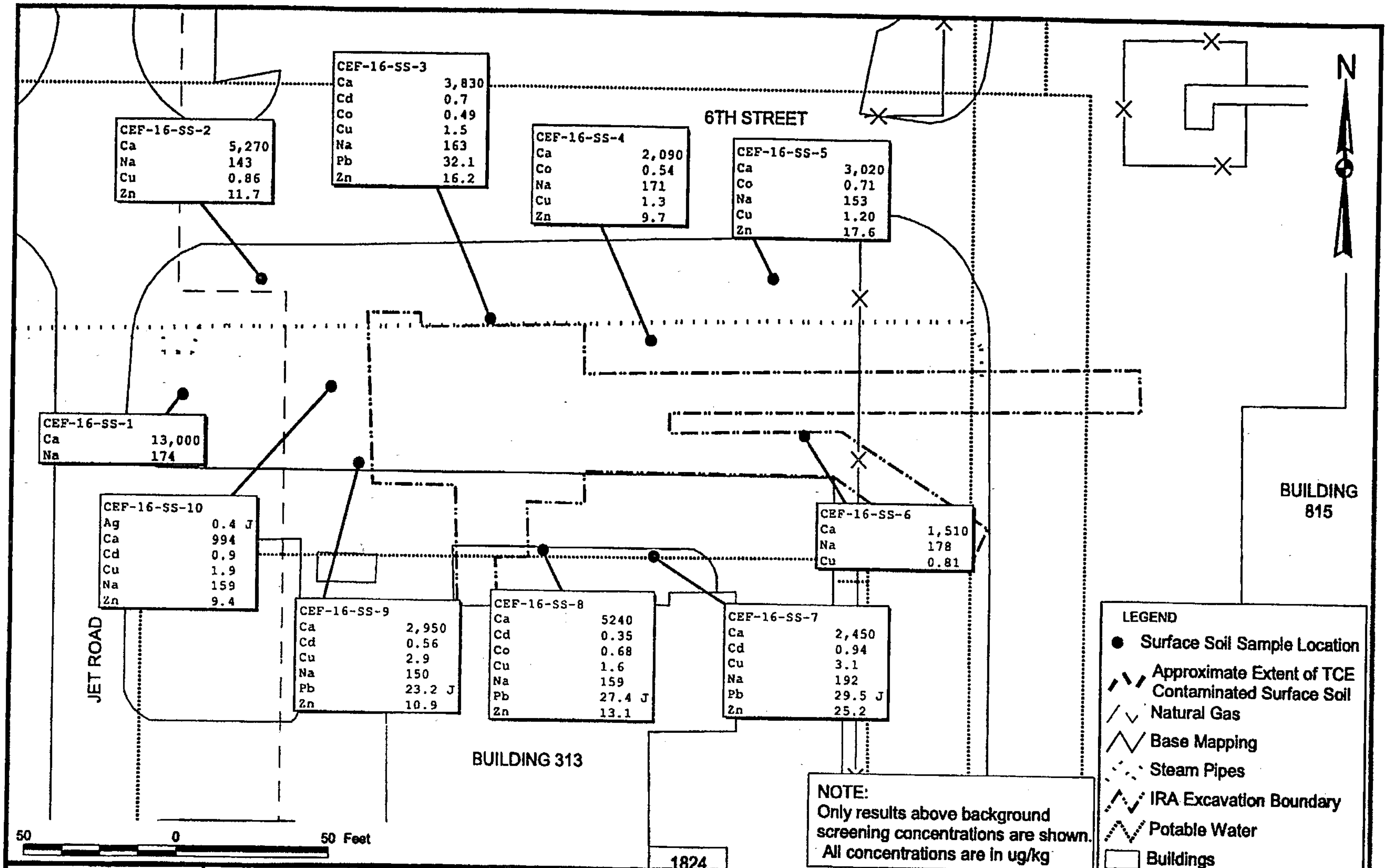


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INORGANICS DETECTED IN SURFACE SOIL
AMENDED RECORD OF DECISION
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

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P:\GIS\CECIL\SITE16_ABBTAG.APR 25-MAR-99 CPG LAYOUT FIG 2-4 INORGANICS

2-13 + 2-14

#### 2.5.3.3 Surficial Aquifer Groundwater

VOCs, SVOCs, and inorganics were detected in the surficial aquifer groundwater at OU 7, Site 16. Detected VOCs included TCE, 1,1-DCE, 1,2-DCE, and 1,1,1-trichloroethane (1,1,1-TCA). Detected SVOCs included PAHs, phthalates, and phenol. Detected inorganics included aluminum, cadmium, cobalt, lead, sodium, and vanadium. All of these compounds appear to be associated with past discharge practices. The leading edge of this contamination has migrated downgradient approximately 1,000 feet in a southeasterly direction from the former location of the seepage pit.

Summaries of organics and inorganics detections in groundwater are shown on Figures 2-6 and 2-7, respectively.

The BRA (ABB-ES, 1996a) determined that three of the VOCs detected in the surficial aquifer groundwater and associated with the contaminant source including TCE, 1,1-DCE, and 1,2-DCE, would pose an unacceptable risk to human receptors if the surficial aquifer was used as a source of drinking water. The BRA also determined that none of the organic compounds detected in the surficial aquifer groundwater currently pose an unacceptable risk to ecological receptors and that only one contaminant, bis(2-ethylhexyl)phthalate, would pose an unacceptable future risk to aquatic receptors when contaminated groundwater discharges to the wetlands east of the runways.

The BRA determined none of the inorganics detected in the surficial aquifer groundwater pose an unacceptable risk to human receptors and that only three inorganics (aluminum, iron, and zinc) would pose an unacceptable future risk to aquatic receptors when contaminated groundwater discharges to the wetlands east of the runways. Two inorganic parameters (iron and manganese) exceeded the NAS Cecil Field Inorganic Background Data Set.

#### 2.5.3.4 Intermediate Aquifer Groundwater

No TCE or other VOCs were detected in the intermediate aquifer groundwater. SVOCs and inorganics were detected in the intermediate aquifer groundwater. These detections are not believed to be associated with OU 7, Site 16 because the previously mentioned upward gradient from the intermediate to the surficial aquifer would prevent the downward migration of contaminants.

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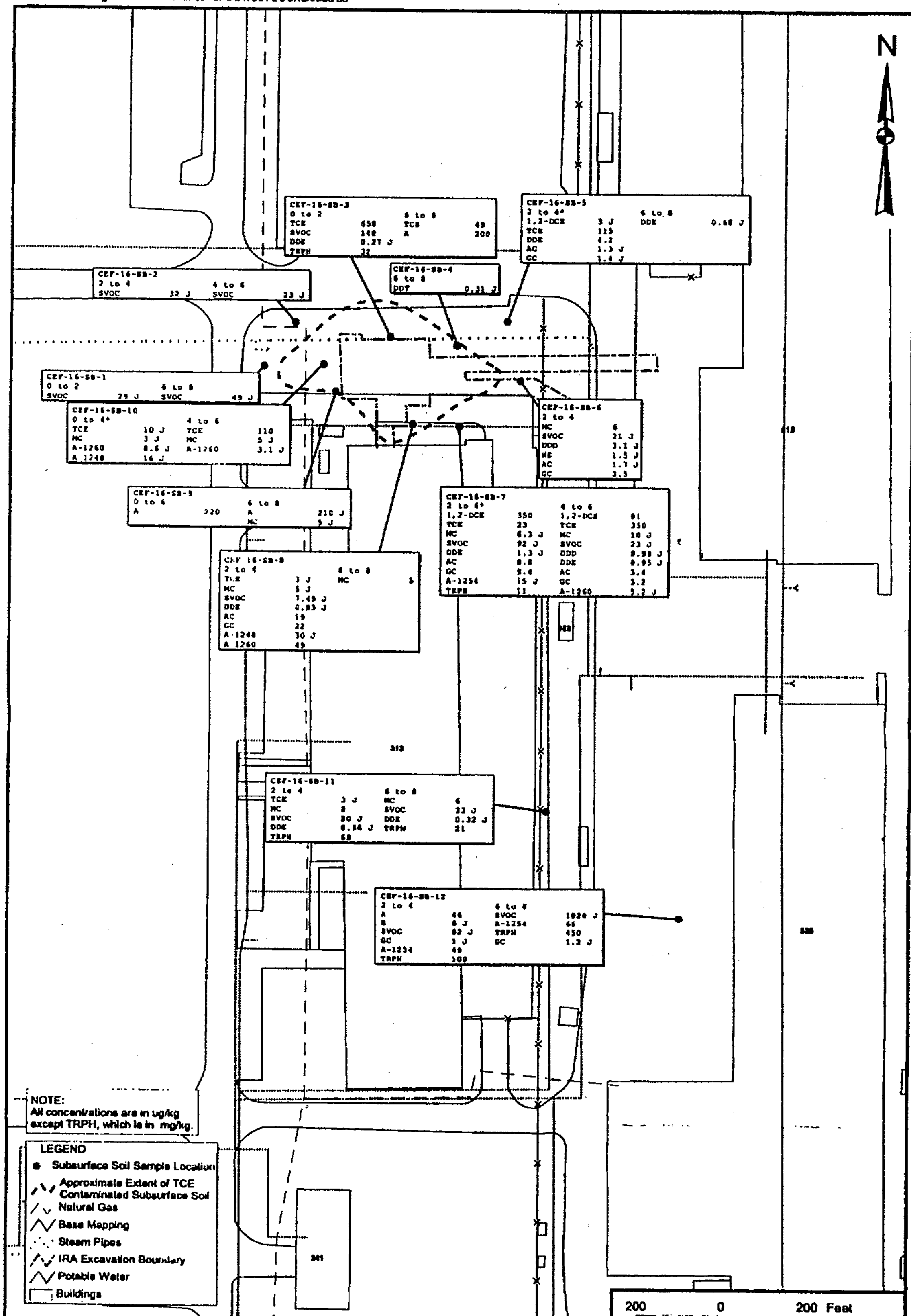


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ORGANICS DETECTED IN SUBSURFACE SOIL
AMENDED RECORD OF DECISION
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

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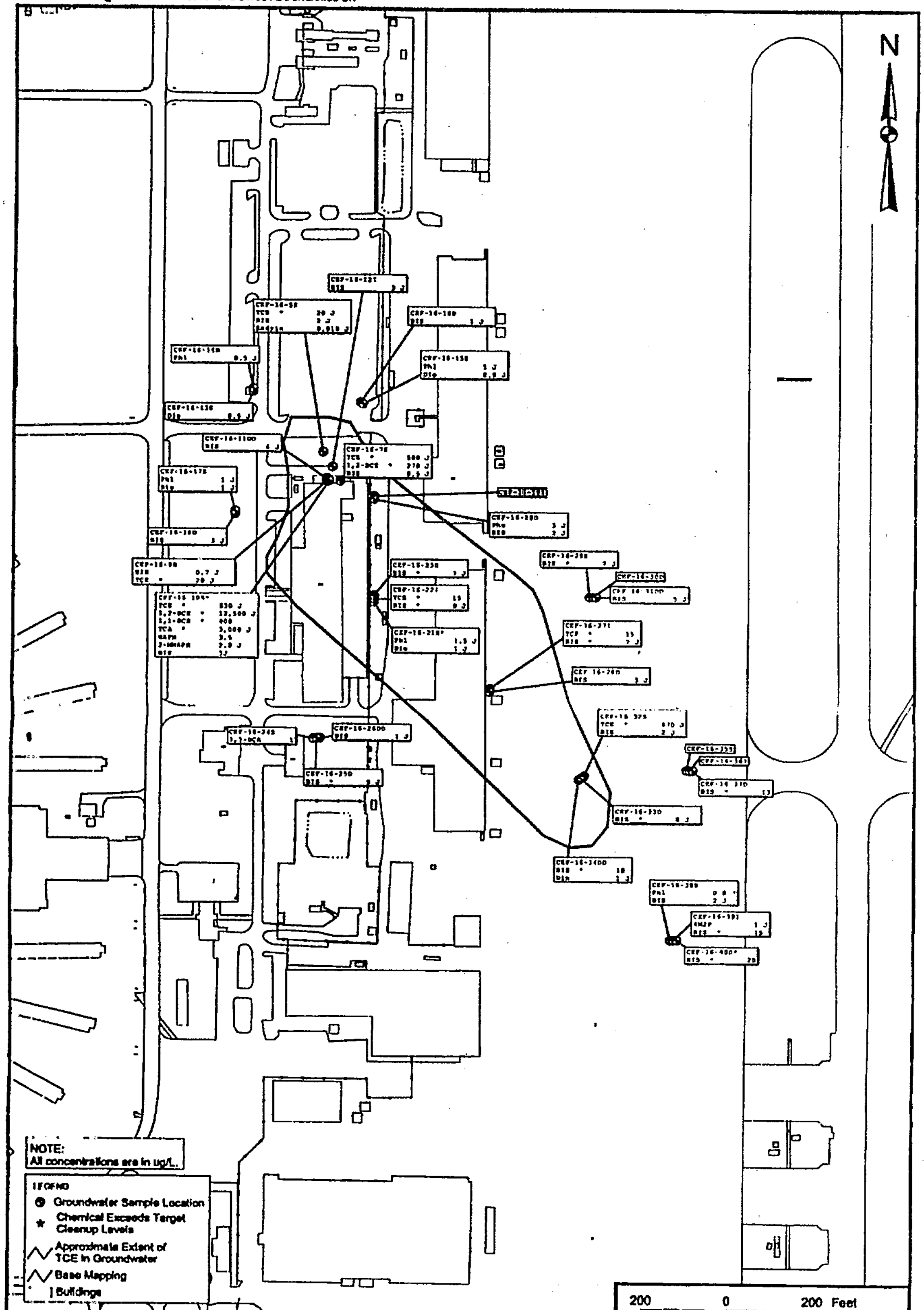


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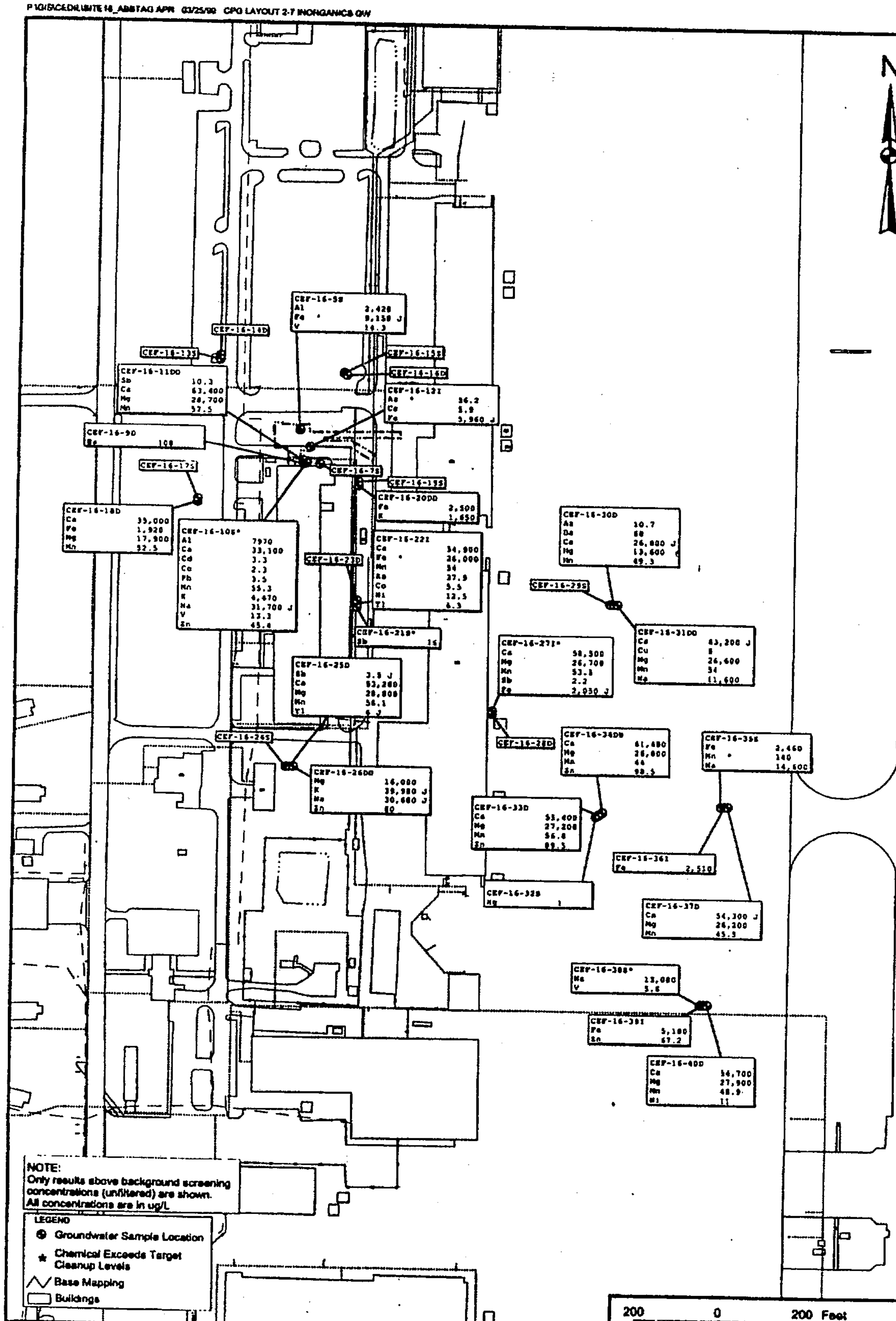


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INORGANICS DETECTED IN GROUNDWATER
AMENDED RECORD OF DECISION
OPERABLE UNIT 7, SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

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2-21 & 2-22

The BRA determined none of the SVOCs and inorganics detected in the intermediate aquifer groundwater pose as unacceptable risk to human health receptors. However, risks associated with potential worst-case future exposures to the SVOCs and inorganics are possible for aquatic receptors in the wetlands. The iron concentrations detected in the intermediate aquifer groundwater exceeded the NAS Cecil Field Inorganic Background Data Set.

#### 2.5.3.5 Surface Water and Sediment

Surface water and sediment samples were collected from the ditches east of the north-south runways, which receive drainage from the runways and the developed areas west of these, including OU 7, Site16. VOCs, SVOCs, and inorganics were detected in these samples.

Summaries of organics and inorganics detections in surface water and sediment are shown on Figures 2-8 and 2-9, respectively.

TCE and 1,2-DCE detected in surface water at location STC-SW3 appear to be associated with OU 7, Site 16 as a result of infiltration of contaminated groundwater into the storm sewer system. The storm sewer line that discharges at that location runs north-south along the west side of Building 313 and then eastward under the north-south runways to the drainage ditch. That eastward run intersects with the contaminated groundwater plume which extends southeasterly from OU 7, Site 16 and, since the invert elevation of the sewer line is below the water table, contaminated groundwater infiltrates into the sewer line through joints and cracks.

The BRA (ABB-ES, 1996a) determined that, of all the compounds detected in surface water and sediment, the only unacceptable risk to aquatic receptors is that associated with the elevated concentrations of total recoverable petroleum hydrocarbons (TRPHs) detected in sediment. Because the ditches receive stormwater drainage from the runways and much of the developed areas west of these, the presence of these elevated concentrations of TRPHs in the ditch sediment is not believed to be specifically related to OU 7, Site16.

## 2.6 SUMMARY OF SITE RISKS

The BRA (ABB-ES, 1996a) provides the basis for taking action and indicates the exposure pathways to be addressed by the remedial action. It serves as the baseline indicating what risk could exist if no action is taken at the site. This section of the amended ROD summarizes the results of the BRA conducted for OU 7, Site 16. Detailed information on identification of chemicals of concern (COCs), exposure assessment, This was intentionally left blank.

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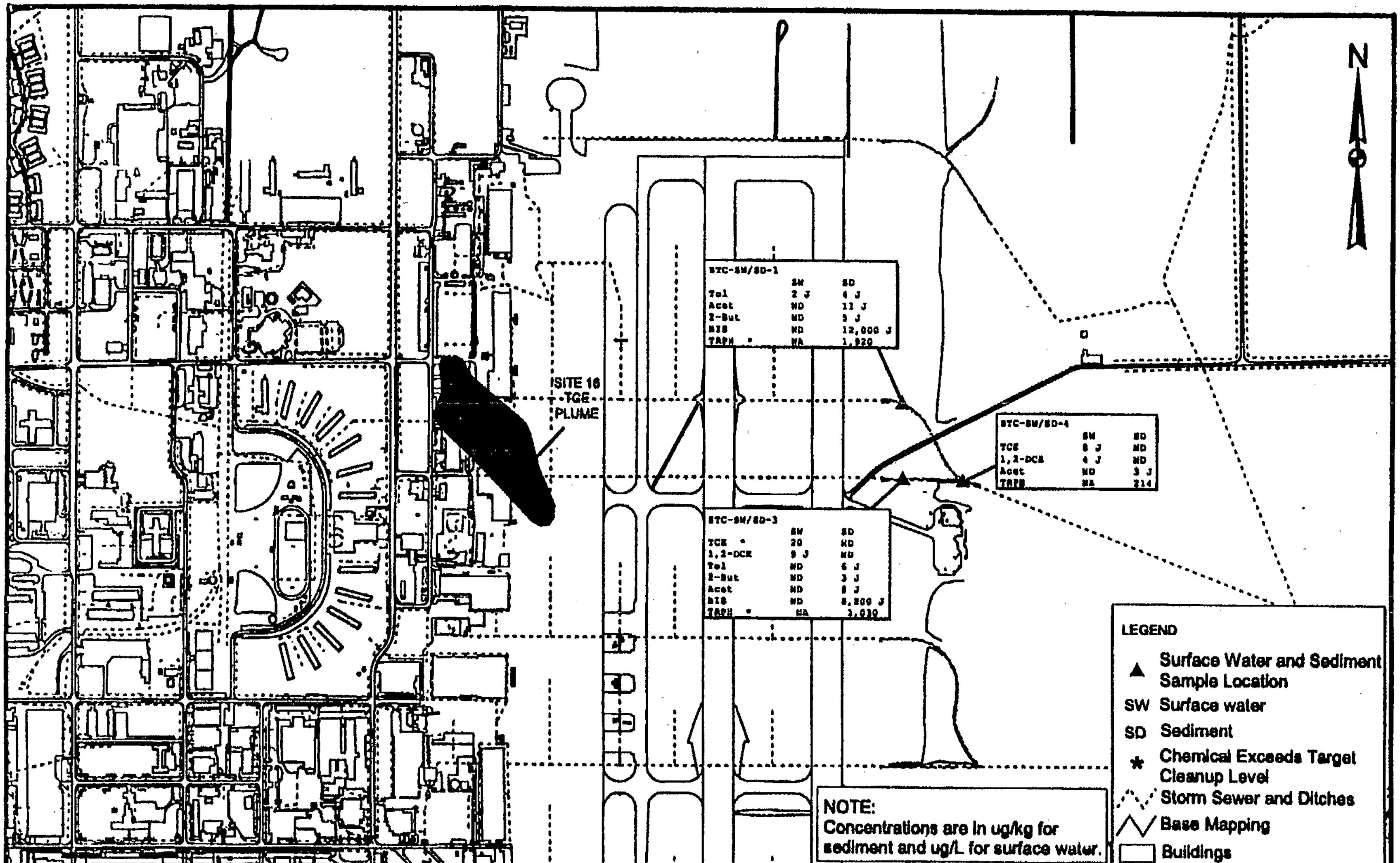


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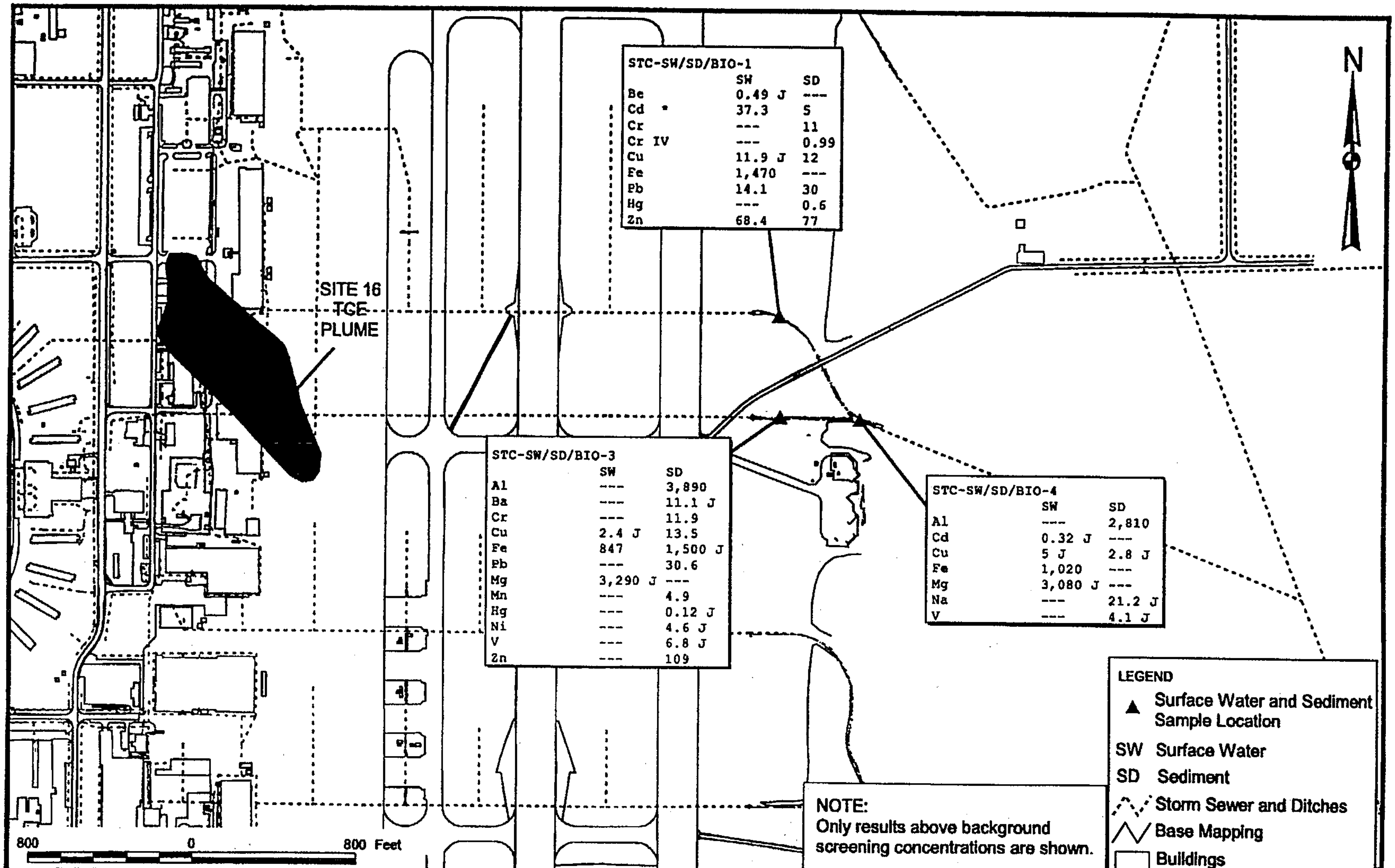


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2-27 + 2-28

toxicity assessment, and risk characterization are provided in the RI (ABB-ES, 1995b). The BRA identified unacceptable risks to both human and ecological receptors at OU 7, Site 16.

Human health threats include both a cancer risk and a noncancer hazard index (HI) in accordance with the NCP. The NCP establishes 1 in 1,000,000 (1E-06) to 1 in 10,000 (1E-04) as an "acceptable" ELCR from chemicals of potential concern (COPCs) (U.S. EPA, 1990). Fornoncarcinogenic chemicals, an HI of equal to or less than one is acceptable. The State of Florida established an acceptable ELCR as equal to or less than 1E-06 and an HI equal to or less than one.

### 2.6.1 Human Health Risk Assessment

The purpose of the Human Health Risk Assessment (HHRA) was to characterize the risks associated with possible exposure of human receptors to site-related contaminants. Potential health risks were evaluated under current and assumed future land-use scenarios for the contaminants detected in surface soil, subsurface soil, groundwater (surficial and intermediate aquifers), surface water, and sediment.

Under the current land use scenario, estimated cancer and non-cancer risks are within the acceptable range, i.e., an ELCR of between 1E-04 and 1E-06 and an HI of less than 1.0.

Under a potential future residential land use scenario, with use of the surficial aquifer as a source of potable water, the ELCR and HI resulting from ingestion of groundwater and inhalation of VOCs by a resident adult while showering would be 3E-03 and 50, respectively, both of which are above the acceptable risk range. The major contaminant contributing to the elevated ELCR is 1,1-DCE. The major contaminants contributing to the elevated HI are 1,1-DCE, 1,2-DCE, TCE, antimony, and thallium. However, the concentrations of antimony and thallium are less than the NAS Cecil Field Inorganic Background Data Set. Other cancer and non-cancer risks associated with a potential future residential scenario, including risks from exposure to surface and subsurface soil, surface water, and sediment, are all within the acceptable range.

Because the current base reuse plan indicates that OU 7, Site 16 will continue to be used for industrial purposes and because the buildings adjacent to OU 7, Site 16 are served with a potable water supply, the estimated future risks are very unlikely to occur.

A summary of human health risks for OU 7, Site 16 is presented on Table 2-1.

## TABLE 2-1

### SUMMARY OF HUMAN HEALTH RISK ASSESSMENT
### AMENDED RECORD OF DECISION
### OPERABLE UNIT 7, SITE 16
### NAVAL AIR STATION CECIL FIELD
### JACKSONVILLE, FLORIDA

| Medium | Risks Above U.S. EPA Risk Range?(1) | | Risks Above FDEP Risk Range?(4) | | Concentrations Above Florida Soil Cleanup Goals or Groundwater Cleanup Target Levels?(5) |
|---|---|---|---|---|---|
| | Current Land Use(2) | Future Land Use(3) | Current Land Use(2) | Future Land Use(3) | |
| Surface Soil | No | No | No | No | Yes(6) |
| Subsurface Soil | No | No | No | No | Yes(7) |
| Surface Water | No | No | No | No | NA |
| Sediment | No | No | No | No | NA |
| Surficial Aquifer Groundwater | NA | Yes | NA | Yes | Yes(8) |
| Intermediate Aquifer Groundwater | NA | No | NA | No | Yes(9) |

<u>NOTES</u>:

F.A.C.: Florida Administrative Code
U.S. EPA: U.S. Environmental Protection Agency
NA: not applicable

1 U.S. EPA has established an acceptable ELCR range of 1E-06 to 1E-04 (U.S. EPA, 1990) and a maximum non-carcinogen HI of 1.0.
2 Current land uses evaluated in this report include nonresidential exposures with no current use of groundwater.
3 Potential future land uses evaluated in this report include residential exposures with the use of groundwater as drinking water.
4 FDEP has established an acceptable ELCR threshold of 1E-06 and a maximum non-carcinogen HI of 1.0.
5 Florida soil cleanup goals and groundwater cleanup target levels for Chapter 62-785 F.A.C, as listed in the Florida Department of Environmental Protection (FEDP) memorandum dated April 30, 1998 (FDEP, 1998).
6 In surface soil, the maximum detected concentration of TCE exceeded the Florida soil cleanup goal for leaching to groundwater.
7 In subsurface soil, the maximum detected concentration of TCE exceeded the Florida cleanup goal for leaching to groundwater.
8 In the surficial aquifer, the maximum detected concentrations of 1,1,1-TCA, 1,1-DCE, 1,2-DCE (total), TCE, bis(2-ethylhexyl)phthalate, antimony, arsenic, iron, manganese, and thallium exceeded their respective Florida target cleanup levels. For the inorganic parameters, iron and manganese exceeded the NAS Cecil Field Inorganic Background Data Set.
9 In the intermediate aquifer, the maximum detected concentrations of bis(2-ethylhexyl)phthalate, antimony, iron, and manganese exceeded their Florida cleanup target levels. For the inorganic parameters, iron exceeded the NAS Cecil Field Inorganic Background Data Set.

### 2.6.2 Ecological Risk Assessment

Potential risks to ecological receptors were evaluated for selected contaminants detected in surface water, sediment, and groundwater at OU 7, Site 16.

Sediment toxicity results indicate that risks may be present for certain types of macroinvertebrates receptors at two of the three sampling stations within the drainage ditches east of the runways. Comparison of the adverse responses with the measurements of selected contaminants in surface water or sediment revealed that risks to aquatic receptors may be associated with elevated concentrations of TRPHs in sediment. TRPHs were not identified as contaminants associated with OU 7, Site 16 but are expected to have entered the storm sewers as a result of fuel spills or runoff from runways and parking lots. Risks were not identified for terrestrial wildlife resulting from exposures to selected contaminants in surface water and sediment within the drainage ditches. Potential risks for aquatic receptors were evaluated for exposures to selected contaminants in groundwater. The maximum concentrations of selected contaminants in unfiltered groundwater, as they are discharged to both the wetlands and Sal Taylor Creek, were estimated. The risk characterization did not identify risks for aquatic receptors in Sal Taylor Creek that could be associated with exposure to selected contaminants in groundwater. However, future risks associated with exposures to bis(2-ethylhexyl)phthalate, aluminum, iron, and zinc are possible for aquatic receptors within the wetlands. Although bis(2-ethylhexyl)phthalate and zinc pose a future risk to ecological receptors, their source cannot be hydraulically linked to the OU 7, Site 16 source area.

A summary of the ecological risk assessment for OU 7, Site 16 is presented in Table 2-2.

## 2.7 DESCRIPTION OF REMEDIAL ALTERNATIVES

### 2.7.1 Available Remedial Alternatives

Three types of general response actions were evaluated for groundwater during the FS for OU 7, Site 16:

1 Take no action: Leave the site as it is. While the no action alternative would cost the least, it would not ensure the protection of human health and the environment since it would leave a source of future contamination and would not monitor the effectiveness of natural attenuation.

2 Take limited action: Monitor the groundwater quality to evaluate contaminant reduction though natural attenuation and limit use of groundwater until clean-up levels have been met. This would ensure that site remediation goals are being achieved and that there are no adverse human health or environmental impacts from the potential spread of contamination.

## TABLE 2-2

**SUMMARY OF ECOLOGICAL RISK ASSESSMENT**
**AMENDED RECORD OF DECISION**
**OPERABLE UNIT 7, SITE 16**
**NAVAL AIR STATION CECIL FIELD**
**JACKSONVILLE, FLORIDA**

| Receptor | Estimated Risk (per Medium) | | | |
|---|---|---|---|---|
| | Surface Soil | Surface Water | Sediment | Future Groundwater Discharge |
| Terrestrial and wetland wildlife | NE | None | None | NA |
| Terrestrial and wetland plants | NE | NA | NA | NA |
| Soil invertebrates | NE | NA | NA | NA |
| Benthic macroinvertebrates | NE | None | TRPHs | BIS, Al, Fe, Zn |

NOTES:

NA: Not Applicable
NE: Not Evaluated (industrial setting, no receptors)

Al: Aluminum may pose a future risk to wetlands macroinvertebrates
BIS: bis(2-ethylhexyl)phthalate may pose a future risk to wetlands macroinvertebrates but cannot be linked to OU7
Fe: Iron may pose a future risk to wetlands macroinvertebrates
TRPHs: Total recoverable petroleum hydrocarbons may pose a future risk to drainage ditch macroinvertebrates but cannot be linked to OU7
Zn: Zinc may pose a future risk to wetlands macroinvertebrates but cannot be linked to OU7

3 Treat contamination on site: Use chemical, physical, and/or natural processes to destroy, remove, or reduce the contamination. If needed, contaminants captured by the treatment process are disposed in an offsite licensed waste disposal facility.

Remedial alternatives for surface soil and sediments were not developed in the FS.

### 2.7.2 Description of Original and Amended Groundwater Remedial Alternatives for Operable Unit 7, Site 16

The results of the BRA indicate that adverse impacts to human health and the environment are present only under the future use scenario for exposure to OU 7, Site 16 groundwater. Therefore, only remedial action alternatives related to groundwater were evaluated. This section provides a narrative of each alternative evaluated for groundwater at OU 7, Site 16. For further information on the remedial alternatives, see the FS (ABB-ES, 1995c), the original Proposed Plan (ABB-ES, 1996b) and ROD (ABB-ES, 1996c), and the Revised Proposed Plan (TtNUS, 1999)

Five groundwater remedial alternatives were evaluated in the FS, including MM-1: No Action; MM-2: Enhanced Bioremediation; MM-3: Groundwater Extraction, Treatment, and Discharge to Surface Water; MM-4: Sparging of Groundwater; and MM-5: Groundwater Extraction, Pretreatment. and Discharge to a Wastewater Treatment Plant. In addition, the original Proposed Plan presented and evaluated Alternative MM-6: Extraction, Pretreatment, and Discharge of Source Area Groundwater to Wastewater Treatment Plan and Enhanced Bioremediation of Downgradient Groundwater (a combination of MM-5 and MM-2), and the Revised Proposed Plan presented and evaluated Alternative MM-7: Natural Attenuation and Institutional Controls.

#### 2.7.2.1 No Action

Alternative MM-1: No Action

Evaluation of the No Action alternative is required by law to provide a baseline against which other alternatives may be compared. This alternative would leave the site the way it exists today. No remedial action would be taken to reduce risks to human health and the environment. Concentrations of contaminants in the groundwater might eventually be reduced to clean-up levels through natural attenuation processes but no monitoring would be performed which would quantify this reduction.

This alternative would not protect human health because future risks from direct exposure to contaminated groundwater would not be prevented. 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 short-term risks and would be very easy to implement. There would be no cost associated with this alternative.

#### 2.7.2.2 Limited Action

Alternative MM-7: Natural Attenuation with Institutional Controls

Under this alternative, natural processes such as biological degradation, dispersion, and advection would reduce the concentration of groundwater contaminants to clean-up levels. Groundwater would be regularly sampled and analyzed to monitor the decrease in contaminant concentrations. Administrative action would be taken to prevent the use of the surficial aquifer groundwater as a source of drinking water until clean-up levels have been reached. Site reviews would be conducted every 5 years to determine whether continued implementation of this alternative is appropriate.

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 achievement of long-term compliance with ARARs through natural attenuation of contaminants. There would be no reduction of contaminant mobility, but long-term natural attenuation would reduce the contaminant toxicity. There would be minimal short-term risk associated with the performance of groundwater monitoring activities, which would be addressed through appropriate health and safety procedures. This alternative would achieve compliance with clean-up levels within approximately 30 years. All of the activities for this alternative would be easy to perform but their continued implementation, especially after the site is no longer under military control, would require careful oversight. The present-worth cost of this alternative would be approximately $503,000, if applied to both the source and downgradient areas, and $252,000, if applied only to the downgradient area.

#### 2.7.2.3 Treatment

Alternative MM-2: Enhanced Bioremediation

This alternative relies on naturally-occurring microorganisms to biodegrade groundwater contaminants. This alternative would enhance the growth and activity of these naturally-occurring microorganisms by injection of nutrients, such as nitrogen and phosphorus compounds, in the surficial aquifer. Nutrients would be injected in the groundwater through nine wells, including six in the source area and three in the downgradient area. Enhanced bioremediation would break down organic contaminants until clean-up levels have been met. Groundwater would be regularly sampled and analyzed to monitor the decrease in contaminant concentrations. Administrative action would be taken to prevent the use of the surficial aquifer groundwater as a source of drinking water until clean-up levels have been reached. Site reviews would be conducted every 5 years to determine whether continued implementation of this alternative is appropriate.

This alternative would protect human health because it would biodegrade the site contaminants and prevent groundwater use until clean-up levels were met. This alternative would achieve the RAO and comply with ARARs. Significant, permanent, and irreversible reduction of contaminant mobility, toxicity, and volume would be achieved through biodegradation. Groundwater monitoring would determine the rate and effectiveness of this reduction. Minimal short-term risk would be associated with the installation and operation of the nutrient injection system and with the performance of groundwater monitoring activities. These risks would be addressed through proper engineering controls and health and safety procedures. This alternative would achieve compliance with action levels within approximately 12 years. All of the activities for this alternative would be easy to perform but their continued implementation, especially after the site is no longer under military control, would require careful oversight. The present-worth cost of this alternative would be approximately $2,256,000.

Alternative MM-3: Groundwater Extraction, Treatment, and Discharge to Surface Water

This alternative would consist of extracting the contaminated groundwater from the subsurface, treating it in a onsite facility to remove contaminants, and discharging the treated groundwater to a surface water body. Groundwater would be extracted from six wells. The extracted groundwater would be treated to break down organic contaminants through a combination of irradiation with ultra-violet (UV) light and addition of of a strong chemical oxidant, such as hydrogen peroxide. The groundwater would then be clarified to settle-out suspended material and percolated through a bed of granular activated carbon (GAC) to adsorb residual contaminants. The treated groundwater would be discharged to a nearby storm sewer inlet and conveyed by the storm sewer system to the drainage ditches east of the north-south runways and, eventually, to Sal Taylor Creek. Periodically, as a bed of Granular Activated Carbon (GAC) would become saturated with contaminants, it would be replaced with a fresh bed and taken offsite for disposal or regeneration. Treated groundwater would be regularly sampled and analyzed to verify the performance of the treatment system. Groundwater would be regularly sampled and analyzed to monitor the decrease in contaminant concentrations. Administrative action would be taken to prevent the use of the surficial aquifer groundwater as a source of drinking water until clean-up levels have been reached.

Site reviews would be conducted every 5 years to determine whether continued implementation of this alternative is appropriate.

This alternative would protect human health because it would remove contaminants from the groundwater and limit groundwater use until clean-up levels have been met. This alternative would achieve the RAO and comply with ARARs. Significant, permanent, and irreversible reductions in contaminant mobility, toxicity, and volume would occur. Groundwater monitoring would determine the rate and effectiveness of this reduction. Some short-term risks would be associated with the construction and operation of the groundwater extraction and treatment system and with the performance of groundwater monitoring activities. These risks would be addressed through engineering controls and health and safety procedures. This alternative would achieve compliance with action levels within approximately 30 years. All of the activities for this alternative would be easy to perform but their continued implementation, especially after the site is no longer under military control, would require careful oversight. The present-worth cost of this alternative would be approximately $5,732,000.

Alternative MM-4: Sparging of Groundwater

This alternative consists of forcing air into the subsurface and groundwater to remove organic contaminants through insitu volatilization. Compressed air would be injected into the groundwater through 14 wells (10 in the source area and 4 in the downgradient area). Volatilized organic contaminants would be drawn out of the subsurface by the vacuum action induced through 22 vapor extraction wells (14 in the source area and 8 in the downgradient area). The extracted vapor would be treated above ground through an onsite vapor phase GAC adsorption system which would treat the volatilized organic contaminants, and the treated vapor would be vented to the atmosphere. The saturated GAC adsorption units would be replaced as required and sent offsite for disposal or regeneration. Treated vapor would be regularly sampled and analyzed to verify the performance of the treatment system. Groundwater would be regularly sampled and analyzed to monitor the decrease in contaminant concentrations. Administrative action would be taken to prevent the use of the surficial aquifer groundwater as a source of drinking water until clean-up levels have been reached. Site reviews would be conducted every 5 years to determine whether continued implementation of this alternative is appropriate.

This alternative would protect human health because it would remove contaminants from the groundwater and limit groundwater use until clean-up levels have been met. This alternative would achieve the RAO and comply with ARARs. Significant, permanent, and irreversible reductions in contaminant mobility, toxicity, and volume would occur. Groundwater monitoring would determine the rate and effectiveness of this reduction. Some short-term risks would be associated with the construction and operation of the air sparging and vapor extraction and treatment system and with the performance of groundwater monitoring activities. These risks would be addressed through engineering controls and health and safety procedures. This alternative would achieve compliance with action levels within approximately 12 years. All of the activities for this alternative would be easy to perform but their continued implementation, especially after the site is no longer under military control, would require careful oversight. The present-worth cost of this alternative would be approximately $1,829,000, if applied to both the source and downgradient areas, and $1,140,000, if applied only to the source area.

Alternative MM-5 Groundwater Extraction, Pretreatment, and Discharge to a Wastewater Treatment Plant

This alternative is essentially a modification of Alternative MM-3, with the difference that the extracted groundwater would only be treated to the degree necessary for discharge to the NAS Cecil Field wastewater treatment plant, instead of to surface water. Groundwater would be extracted from six wells. The extracted groundwater would be pre-treated by air stripping, or other appropriate process to lower the concentration of TCE to a level appropriate for discharge to the NAS Cecil Field wastewater treatment plant. Residual TCE and other COCs would then be removed by that wastewater treatment plant. The exhaust from the air stripper would pass through a gas-phase GAC unit to adsorb the volatilized organics prior to being vented to the atmosphere. Periodically, as a GAC unit would become saturated with organics, it would be replaced with a fresh one and taken offsite for disposal or regeneration. Pretreated groundwater and GAC unit exhaust would be regularly sampled and analyzed to verify the performance of the pretreatment system. Groundwater would be regularly sampled and analyzed to monitor the decrease in contaminant concentrations. Administrative action would be taken to prevent the use of the surficial aquifer groundwater as a source of drinking water until clean-up levels have been reached. Site reviews would be conducted every 5 years to determine whether continued implementation of this alternative is appropriate.

This alternative would protect human health because it would remove contaminants from the groundwater and limit groundwater use until clean-up levels have been met. This alternative would achieve the RAO and comply with ARARs. Significant, permanent, and irreversible reductions in contaminant mobility, toxicity, and volume would occur. Groundwater monitoring would determine the rate and effectiveness of this reduction. Some short-term risks would be associated with the construction and operation of the groundwater extraction and pre-treatment system and with the performance of groundwater monitoring activities. These risks would be addressed through engineering controls and health and safety procedures. This alternative would achieve compliance with action levels within approximately 30 years. All of the activities for this alternative would be easy to perform but their continued implementation, especially after the site is no longer under military control, would require careful oversight. The present-worth cost of this alternative would be approximately $3,672,000, if applied to both the source and downgradient areas, and $1,946,000, if applied only to the source area.

Alternative MM-6: Extraction, Pretreatment, and Discharge of Source Groundwater to a Wastewater Treatment Plant and Enhanced Bioremediation of Downgradient Groundwater

This alternative is a combination of Alternative MM-5 for the source area and Alternatives MM-2 and MM-4 for the downgradient area. In the source area, groundwater would be extracted from one well, treated on site by air stripping and discharged to the NAS Cecil Field wastewater treatment plant. Exhaust from the air stripper would be treated with gas-phase GAC adsorption and vented to atmosphere. When saturated, the GAC adsorption unit would be replaced with a fresh unit and taken offsite for regeneration or disposal. In the downgradient area, air and nutrients would be injected through three wells to promote volatilization and biodegradation of contaminants. Volatilized contaminants would be drawn out of the subsurface through the vacuum action induced by eight vapor extraction wells. Extracted vapor would be treated with gas-phase GAC adsorption and vented to atmosphere. When saturated, the GAC adsorption unit would be replaced with a fresh unit and taken offsite for regeneration or disposal. Pretreated groundwater and exhaust gas from the GAC units would be regularly sampled and analyzed to verify the performance of the source pre-treatment and downgradient treatment systems. Groundwater would be regularly sampled and analyzed to monitor the decrease in contaminant concentrations. Administrative action would be taken to prevent the use of the surficial aquifer groundwater as a source of drinking water until clean-up levels have been reached. Site reviews would be conducted every 5 years to determine whether continued implementation of this alternative is appropriate.

This alternative would protect human health because it would remove contaminants from the groundwater and limit groundwater use until clean-up levels have been met. This alternative would achieve the RAO and comply with ARARs. Significant, permanent, and irreversible reductions in contaminant mobility, toxicity, and volume would occur. Groundwater monitoring would determine the rate and effectiveness of this reduction. Some short-term risks would be associated with the construction and operation of the source and downgradient systems and with the performance of groundwater monitoring activities. These risks would be addressed through engineering controls and health and safety procedures. This alternative would achieve compliance with action levels within approximately 12 to 30 years. All of the activities for this alternative would be easy to perform but their continued implementation, especially after the site is no longer under military control, would require careful oversight. The present-worth cost of this alternative would be approximately $2,916,000.

## 2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section evaluates and compares each of the 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. Table 2-3 gives an explanation of the evaluation criteria. A detailed analysis was performed on the alternatives using the nine evaluation criteria to select a site remedy, and Table 2-4 presents this comparison.

## 2.9 SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and U.S. EPA, FDEP, and public comments, a remedy was selected to address the contaminants in the groundwater at OU 7, Site 16.

The original ROD (ABB-ES, 1996c) selected Alternative MM-6 (a combination of MM-2, MM-4, and MM-5) as the preferred alternative for OU 7, Site 16 at NAS Cecil Field. This remedy would have involved extraction, pretreatment, and discharge of the source area groundwater to the NAS Cecil Field wastewater treatment plant and a combination of air and nutrient injection and vacuum extraction in the downgradient area to promote the volatilization and biodegradation of contaminants.

As discussed at the end of Section 2.2, certain site conditions have changed since the publication of the original ROD. In particular, it was determined that, as a result of base closure, the NAS Cecil Field wastewater treatment plant was not likely to be available to receive the pretreated source area originally, it groundwater as specified by the selected remedy. Originally, it was believed that even though the selected remedy was more costly, it would have been easier to install, maintain, and cause fewer disruptions of flight operations. Through pilot-scale testing it has been determined that AS/VE would probably achieve clean-up goals in the source area quicker and more cost-effectively than the extraction and pretreatment (pump and treat) system which had been previously selected. Finally, results from additional investigations established that natural attenuation had excellent potential for the remediation of the OU 7, Site 16 groundwater. Additionally it was determined that contaminated groundwater was infiltrating a section of the storm sewer system, resulting in discharge of contaminated runoff to the drainage ditch east of the runways. All of these factors led to the selection of a different remedy, as documented by this amended ROD.

The new selected remedy is a combination of Alternative MM-4: Air Sparging in the source area and Alternative MM-7: Natural Attenuation in the downgradient area. The new selected remedy also includes repair of the storm sewer system to prevent infiltration of contaminated groundwater.

## TABLE 2-3

## EXPLANATION OF EVALUATION CRITERIA
## AMENDED RECORD OF DECISION
## OPERABLE UNIT 7, SITE 16
## NAVAL 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 institutional controls (e.g., access restrictions).<br><br>**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.** The alternatives are evaluated based on their ability to maintain reliable protection of human health and the environment after implementation.<br><br>**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.<br><br>**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.<br><br>**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.<br><br>**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.<br><br>**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
## AMENDED RECORD OF DECISION
## OPERABLE UNIT 7, SITE 16
## NAVAL AIR STATION CECIL FIELD
## JACKSONVILLE, FLORIDA



| Alternatives | Threshold Criteria | | Primary Balancing Criteria | | | | |
|---|---|---|---|---|---|---|---|
| | Overall Protection of Human Health & the Environment | Compliance with ARARs & TBCs | Long-Term Effectiveness | Reduction in Contaminant Toxicity, Mobility, & Volume | Short-Term Effectiveness | Implementability | Cost (Present Worth) |
| **No Action** | | | | | | | |
| MM-1: No Action | Would not protect human health. | No ARARs. Chemical-specific TBCs would not be met. | Would not be effective long-term. | Would not reduce contaminant mobility. Natural reduction in toxicity and volume would not be monitored and would be unknown. | No short-term risks. | No action to implement. | $0 |
| **Limited Action** | | | | | | | |
| MM-7: Natural Attenuation plus Institutional Controls | Would protect human health by preventing exposure to contaminated groundwater. | No ARARs. Eventual compliance with chemical-specific TBCs would be determined by monitoring. | Would be long-term effective. | Would not reduce contaminant mobility. Would reduce contaminant toxicity and volume through natural attenuation. | Minimal and manageable short-term risks. Would require approximately 30 years to complete. | Would be easy to implement. | $503,000 (entire site) $252,000 (downgradient area only) |
| **Treatment** | | | | | | | |
| MM-2: Enhanced Bioremediation plus Institutional Controls | Would protect human health by treating contaminated groundwater and preventing exposure to it until clean-up goals have been met. | Would meet ARARs. | Would be long-term effective. | Would reduce contaminant mobility, toxicity and volume through treatment. | Minimal and manageable short-term risks. Would require approximately 12 years to complete. | Would be easy to implement. | $2,256,000 |
| MM-3: Extraction, Treatment, & Discharge to Surface Water plus Institutional Controls | Would protect human health by treating contaminated groundwater and preventing exposure to it | Would meet ARARs. | Would be long-term effective. | Would reduce contaminant mobility, toxicity and volume through treatment. | Minimal and manageable short-term risks. Would require approximately 30 | Would be relatively easy to implement. | $5,732,000 |

# TABLE 2-4
## SUMMARY OF COMPARATIVE EVALUATION OF ALTERNATIVES
## AMENDED RECORD OF DECISION
## OPERABLE UNIT 7, SITE 16
## NAVAL AIR STATION CECIL FIELD
## JACKSONVILLE, FLORIDA


| Alternatives | Threshold Criteria | | Primary Balancing Criteria | | | | |
|---|---|---|---|---|---|---|---|
| | Overall Protection of Human Health & the Environment | Compliance with ARARs & TBCs | Long-Term Effectiveness | Reduction in Contaminant Toxicity, Mobility, & Volume | Short-Term Effectiveness | Implementability | Cost (Present Worth) |
| | until clean-up goals have been met.. | | | | years to complete. | | |

| Alternatives | Threshold Criteria | | Primary Balancing Criteria | | | | |
|---|---|---|---|---|---|---|---|
| | Overall Protection of Human Health & the Environment | Compliance with ARARs & TBCs | Long-Term Effectiveness | Reduction in Contaminant Toxicity, Mobility, & Volume | Short-Term Effectiveness | Implementability | Cost (Present Worth) |
| MM-4: Air Sparging plus Institutional Controls | Would protect human health by treating contaminated groundwater and preventing exposure to it until clean-up goals have been met. | Would meet ARARs. | Would be long-term effective. | Would reduce contaminant mobility, toxicity and volume through treatment. | Minimal and manageable short-term risks. Would require approximately 12 years to complete. | Would be relatively easy to implement. | $1,829,000 (entire site) $1,140,000 (source area only) |
| MM-5: Extraction, Pre-treatment, & Discharge to Wastewater Treatment Plant plus Institutional Controls | Would protect human health by treating contaminated groundwater and preventing exposure to it until clean-up goals have been met. | Would meet ARARs. | Would be long-term effective. | Would reduce contaminant mobility, toxicity and volume through treatment. | Minimal and manageable short-term risks. Would require approximately 30 years to complete. | May be not be possible to implement because discharge to NAS Cecil Field wastewater treatment plant would not be possible following base closure. | $3,672,000 (entire site) $1,946,000 (source area only) |
| MM-6: Extraction, Pre-treatment, & Discharge of source Groundwater to Wastewater Treatment Plant plus Enhanced Bioremediation of | Would protect human health by treating contaminated groundwater and preventing exposure to it until clean-up goals have been met. | Woiuld meet ARARs. | Would be long-term effective. | Would reduce contaminant mobility, toxicity and volume through treatment. | Minimal and manageable short-term risks. Would require approximately 12 to 30 years to complete | May be not be possible to implement because discharge to NAS Cecil Field wastewater treatment plant would not be | $2,916,000 |

# TABLE 2-4
## SUMMARY OF COMPARATIVE EVALUATION OF ALTERNATIVES
## AMENDED RECORD OF DECISION
## OPERABLE UNIT 7, SITE 16
## NAVAL AIR STATION CECIL FIELD
## JACKSONVILLE, FLORIDA



| Alternatives | Threshold Criteria | | Primary Balancing Criteria | | | | |
|---|---|---|---|---|---|---|---|
| | Overall Protection of Human Health & the Environment | Compliance with ARARs & TBCs | Long-Term Effectiveness | Reduction in Contaminant Toxicity, Mobility, & Volume | Short-Term Effectiveness | Implementability | Cost (Present Worth) |
| Downgradient Groundwater plus Institutional Controls | | | | | | possible following base closure. | |
| **Selected Remedy (MM-4 & MM-7)**: Air Sparging of Source Groundwater, Natural Attenuation of Downgradient Groundwater, Institutional Controls, and Storm Sewer Repair | Would protect human health by treating contaminated groundwater and preventing exposure to it until clean-up goals have been met. | Would meet ARARs. | Would be long-term effective. | Would reduce contaminant mobility, toxicity and volume through treatment. | Minimal and manageable short-term risks. Would require approximately 12 to 30 years to complete | Would be relatively easy to implement. | $1,498,000 ($252,000 for MM-7 downgradient + $1,140,000 for MM-4 source area + $106,000 for sewer repair) |

Air Sparging of Source Area Groundwater - The VOCs (in particular TCE) that are present at concentrations that exceed cleanup goals concentrations will be reduced to the extent necessary for natural attenuation to effectively occur. These contaminants will be removed by a process of in-situ, subsurface volatilization, called air sparging, which uses clean air under pressure. Air sparging also may enhance the removal of less volatile organics by stimulating biological activity. Pilot-scale tests were performed which verified the effectiveness of this technology and determined design parameters, including expected areas of influence of air injection and vapor extraction wells and composition of extracted vapors. Results of these tests were summarized in the draft Groundwater Remedial Design report (TtNUS, 1998). The extracted vapors will be treated above ground through an onsite GAC system which will treat the volatilized organic contaminants, and the treated vapor will be vented to the atmosphere. The saturated GAC adsorption units would be replaced as required and sent offsite for disposal or regeneration. Treated vapors will be regularly sampled and analyzed to verify the performance of the treatment system. A long-term groundwater monitoring plan will be implemented to evaluate the effectiveness of air sparging and to determine the appropriate time to begin site-wide natural attenuation. The list of COCs for which groundwater will be analyzed will be periodically re-evaluated based upon monitoring results.

Natural Attenuation of Downgradient Groundwater - Concentrations of organic and inorganic contaminants exceeding groundwater cleanup goals in the treated source area and downgradient plume will be reduced through natural attenuation processes, including biodegradation, dilution and dispersion, known to be occurring at the site. Natural attenuation studies have previously been performed at the site and have shown it to be effective in reducing contaminant levels. Additional groundwater modeling will be performed during the remedial design, and a long-term monitoring plan will be implemented to further evaluate and monitor the effectiveness of natural attenuation.

Implementation of Institutional Controls – Institutional controls will be implemented at OU 7, Site 16 for the purpose of protecting human health and the environment by (1) limiting exposure to groundwater which may pose an unacceptable risk and that exceeds State and Federal drinking water standards; (2) prevent discharge of contaminated groundwater to the surface waters of the State of Florida; and (3) maintain the integrity of the remediation systems.

Institutional controls will consist of administrative measures taken to prevent exposure of human receptors to the groundwater of the surficial aquifer. Use of this groundwater will be controlled through deed restrictions and Land Use Control Implementation Plans (LUCIPs). A formal request will be made to the agency administrating the well installation permit program in Duval County to not issue permits for installation of water supply or non-potable use wells which would pump from the surficial aquifer. Regular inspections will be conducted to make sure that deed restrictions and LUCIPs are being followed.

The section of the storm sewer system intersecting with the OU 7, Site 16 contaminated groundwater plume will be restored and repaired through replacement or sleeving to prevent infiltration of contaminated groundwater.

## 2.10 STATUTORY DETERMINATIONS

The remedies selected for OU 7, Site 16 are consistent with the NCP and satisfies CERCLA § 121. The selected remedy provides protection of human health and the environment, attains ARARs, and is cost-effective. Table 2-5 lists and describes Federal and State ARARs to which the selected remedy must comply. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. The selected remedy also provides flexibility to implement additional remedial measures, if necessary, to address RAOs or unforeseen issues.

## 2.11 DOCUMENTATION OF SIGNIFICANT CHANGES

A Proposed Plan for OU 7, Site 16 (ABB-ES, 1996b) was released for public comment in March 1996. This Proposed Plan identified extraction, pre-treatment, and discharge to the NAS Cecil Field wastewater treatment plant as the preferred remedy for the source area groundwater and a combination of air and nutrient injection and vacuum extraction as the preferred remedy for the downgradient groundwater. The preferred remedy also included the application of institutional controls to limit groundwater use until clean-up goals had been reached. A public meeting was held on March 21, 1996 to discuss the Proposed Plan and the public was further invited to comment upon the preferred remedy from March 21 to April 22, 1996. No public comments were received during that period, therefore, no changes were made to the preferred remedy, as originally identified in the Proposed Plan, and it was incorporated into the ROD (ABB-ES, 1996c).

As discussed at the end of Section 2.2 and in Section 2.9, certain site conditions have significantly changed since the publication of the ROD. In particular, it was determined that, as a result of base closure, the NAS Cecil Field wastewater treatment plant was not likely to be available to receive the pretreated source area groundwater as specified by the selected remedy. Through pilot-scale testing it was also determined that air sparging and vapor extraction (AS/VE) would probably achieve clean-up goals in the source area quicker and more cost-effectively than the extraction and pretreatment (pump and treat) system which had been previously selected. Finally, results from additional investigations

TABLE 2-5

SYNOPSIS OF FEDERAL AND STATE REGULATORY REQUIREMENTS
AMENDED RECORD OF DECISION
OPERABLE UNIT 7 SITE 16
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA


| Name and Regulatory Citation | Description | Consideration in the Remedial Action Process | Type |
|---|---|---|---|
| Resource Conservation and Recovery Act (RCRA) Regulations, Identification and Listing of Hazardous Wastes (40 CFR Part 261) | Defines the listed and characteristic hazardous wastes subject to RCRA. Appendix II contains the Toxicity Characteristic Leaching Procedure. | These regulations would apply when determining whether or not a waste is hazardous, either by being listed or exhibiting a hazardous characteristic, as described in the regulations. | Chemical-Specific<br>Action-Specific |
| Endangered Species Act Regulations (50 CFR Parts 81, 225, 402) | Requires Federal agencies to take action to avoid jeopardizing the continued existence of federally listed endangered or threatened species. | If a site investigation or remedial activity potentially could affect endangered species or their habitat, these regulations would apply. | Location-Specific |
| RCRA Regulations, Land Disposal Restrictions (40 CFR Part 268) | Prohibit the land disposal of untreated hazardous wastes and provides standards for treatment of hazardous waste prior to land disposal. | Remedial actions that involve excavating hazardous soil, treating, and redepositing it require compliance with land disposal restriction (LDRs). | Action-Specific |
| Florida Hazardous Waste Rules (FAC, 62-730) | Adopts by reference sections of the Federal hazardous waste regulations and establishes minor additions to these regulations concerning the generation, storage, treatment, transportation and disposal of hazardous wastes. | These regulations would apply if waste is deemed hazardous and needed be stored, transported, or disposed. | Action-Specific |
| Safe Drinking Water Act (SDWA) Regulations, Maximum Contaminant Levels (40 CFR Part 131) | Establishes enforceable standards for potable water for specific contaminants that have been determined to adversely affect human health. | MCLs can be used as protection for groundwaters or surface waters that are current or potential drinking water sources. | Chemical-Specific |

TABLE 2-5

**SYNOPSIS OF FEDERAL AND STATE REGULATORY REQUIREMENTS**
**AMENDED RECORD OF DECISION**
**OPERABLE UNIT 7 SITE 16**
**NAVAL AIR STATION CECIL FIELD**
**JACKSONVILLE, FLORIDA**


| Name and Regulatory Citation | Description | Consideration in the Remedial Action Process | Type |
|---|---|---|---|
| Florida Groundwater Classes, Standards and Exemptions (FAC, 62-520) | Designates the groundwaters of the state into five classes and establishes minimum "free from" criteria. Rule also specifies that Classes I & II must meet the primary and secondary drinking water standards listed in Chapter 62-550. | These regulations may be used to determine cleanup levels for groundwaters that are potential sources of drinking water. | Chemical-Specific |
| Florida Soil Cleanup Standards, September 1995 | Provide guidance for soil cleanup levels that can be developed on a site-by-site basis using the calculations found in Appendix B of the guidance. | These guidelines aid in determining leachability-based cleanup goals for soils. | Chemical-Specific Guidance |
| Florida Drinking Water Standards (FAC, 62-550) | Adopts Federal primary and secondary drinking water standards. | These regulation apply to remedial activities that involve discharges to potential sources of drinking water. | Chemical-Specific |
| Florida Groundwater Guidance, Bureau of Groundwater Protection, June 1994. | Provides maximum concentration levels of contaminants for groundwater in the State of Florida. Groundwater with concentrations less than the listed values are considered "free from" contamination. | The values in this guidance should be considered when determining cleanup levels for groundwater. | Chemical-Specific Guidance |

Notes: OU = Operable Unit.
CFR = Code of Federal Regulations.
LDR = land disposal restriction.
FAC = Florida Administrative Code.
MCL = maximum contaminant level.

established that natural attenuation had excellent potential for the remediation of the OU 7, Site 16 groundwater and that contaminated groundwater was infiltrating a section of the storm sewer system, resulting in discharge of contaminated runoff to the drainage ditch east of the runways. All of these factors led to the re-evaluation of the selected remedy.

A Revised Proposed Plan (TtNUS, 1999) was released for public comments on January 19, 1999. This Revised Proposed Plan identified air sparging and vapor extraction as the preferred remedy for the source area groundwater and natural attenuation as the preferred remedy for the downgradient groundwater. The preferred remedy also included the application of institutional controls to limit groundwater use until clean-up goals had been reached. Additionally, the storm sewer that is receiving infiltration from the groundwater will be repaired. The public was invited to comment upon the Revised Proposed Plan from January 19 to February 18, 1999. No public comments were received during that period: therefore, no additional changes were made to the revised preferred remedy, beyond those identified in the Revised Proposed Plan, and this revised remedy was incorporated into this amended ROD.

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# APPENDIX A

# RESPONSIVENESS SUMMARY

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Public notice of the availability of the Revised Proposed Plan was placed in the Metro edition of the Florida Times Union on January 17, 1999. This local edition targets the communities closest to NAS Cecil Field.

A 30-day public comment period was held from January 19 to February 18, 1999. No comments were received during this period.