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NAS WHITING FIELD  
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FINAL RECORD OF DECISION FOR SITE 18 NAS WHITING FIELD FL  
9/22/2006  
TETRA TECH NUS

# Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888



Rev. 3  
09/22/06

## Record of Decision for OU 17, Site 18, Crash Crew Training Area B Surface and Subsurface Soil

Naval Air Station Whiting Field  
Milton, Florida  
USEPA ID No. FL2170023244

Contract Task Order 0369

September 2006



Southeast

2155 Eagle Drive

North Charleston, South Carolina 29406

**RECORD OF DECISION  
FOR  
OPERABLE UNIT 17 - SITE 18, CRASH CREW TRAINING AREA B  
SURFACE AND SUBSURFACE SOIL**

**NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA  
USEPA ID No. FL2170023244**

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

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

**Submitted by:  
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**CONTRACT NO. N62467-94-D-0888  
CONTRACT TASK ORDER 0369**

**SEPTEMBER 2006**

**PREPARED UNDER THE SUPERVISION OF:**

  
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### CERTIFICATION OF TECHNICAL DATA CONFORMITY

The Contractor, Tetra Tech NUS, Inc., hereby certifies, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-94-D-0888 are complete, accurate, and comply with all requirements of this contract. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice.

DATE: 30 September 2006

A handwritten signature in black ink, which appears to read "Michael O. Jaynes".

NAME AND TITLE OF CERTIFYING OFFICIAL: Michael O. Jaynes, P.E.  
Task Technical Lead

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## ACRONYMS

AFFF	aqueous film-forming foam
ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CGs	cleanup goals
COC	Constituent of Concern
COPC	Constituent of Potential Concern
cPAH	carcinogenic polynuclear aromatic hydrocarbons
ECs	Engineering Controls
ELCR	excess lifetime cancer risk
ERA	Ecological Risk Assessment
EE	Envirodyne Engineers, Inc.
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FS	Feasibility Study
FSA	Feasibility Study Addendum
ft	feet/foot
G&M	Geraghty & Miller, Inc.
HHRA	Human Health Risk Assessment
HI	Hazard Index
HLA	Harding Lawson and Associates
IAS	Initial Assessment Study
ILCR	Incremental Life-Time Cancer Risk
IR	Installation Restoration
IRA	Interim Removal Action
LUCs	Land Use Controls
LUCIP	Land Use Controls Implementation Plan
mg/kg	milligrams per kilograms
NA	No Action
NACIP	Navy Assessment and Control of Installation Pollutants
NAS	Naval Air Station
Navy	United States Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NPW	net present worth
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbons
PRGs	Preliminary Remediation Goals
RA	Remedial Action
RAOs	Remedial Action Objectives
RD	Remedial Design
RfD	reference dose
RI	Remedial Investigation
ROD	Record of Decision

## ACRONYMS (Continued)

SARA	Superfund Amendments and Reauthorization Act
SCTLs	Soil Cleanup Target Levels
SERA	Screening Ecological Risk Assessment
SVOCs	Semi Volatile Organic Compounds
TBC	to be considered
TRPH	Total Recoverable Petroleum Hydrocarbons
TtNUS	Tetra Tech, NUS, Inc.
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

## **1.0 DECLARATION OF THE RECORD OF DECISION**

### **1.1 SITE NAME AND LOCATION**

Naval Air Station (NAS) Whiting Field is located approximately 5.5 miles north of the city of Milton, Florida in Santa Rosa County, about 25 miles northeast of Pensacola. Operable Unit (OU) 17 - Site 18, Crash Crew Training Area B, is located along the northwestern boundary of the facility near the North Air Field taxiway, at NAS Whiting Field. The approximate location of Site 18 is shown on Figure 1-1.

### **1.2 STATEMENT OF BASIS AND PURPOSE**

This decision document presents the selected remedy for Site 18 as Engineering Controls (ECs) and Land Use Controls (LUCs) for surface and subsurface soils. Groundwater at NAS Whiting Field has been identified as a separate site (Site 40, Basewide Groundwater) and will be addressed in a future decision document. There is no surface water or sediment present at Site 18. The selected action was chosen by the United States Navy (Navy) and the United States Environmental Protection Agency (USEPA) in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Information supporting the selection of this action is contained in the Administrative Record for this site. The NAS Whiting Field Information Repository, including the Administrative Record, is located at the West Florida Regional Library, Milton Branch, 805 Alabama Street, Milton, Florida 32570, (850) 623-5565.

The Florida Department of Environmental Protection (FDEP) concurs with the selected remedy.

### **1.3 ASSESSMENT OF THE SITE**

The Remedial Investigation (RI) Report for Site 18 [Harding Lawson and Associates (HLA), 1999] identified seven volatile organic compounds (VOCs), 15 semi-volatile organic compounds (SVOCs) including several carcinogenic polynuclear aromatic hydrocarbons (cPAHs), 22 inorganic compounds, and total recoverable petroleum hydrocarbon (TRPH) compounds in surface soil and four VOCs, eight SVOCs, one pesticide, 19 inorganic compounds, TRPH, and cyanide in subsurface soil at Site 18. Four constituents, cPAHs, barium, copper, and TRPH, were identified as constituents of concern (COCs) in soil in the revised human health risk assessment (HHRA) included in the *Risk Assessment Re-evaluation for*

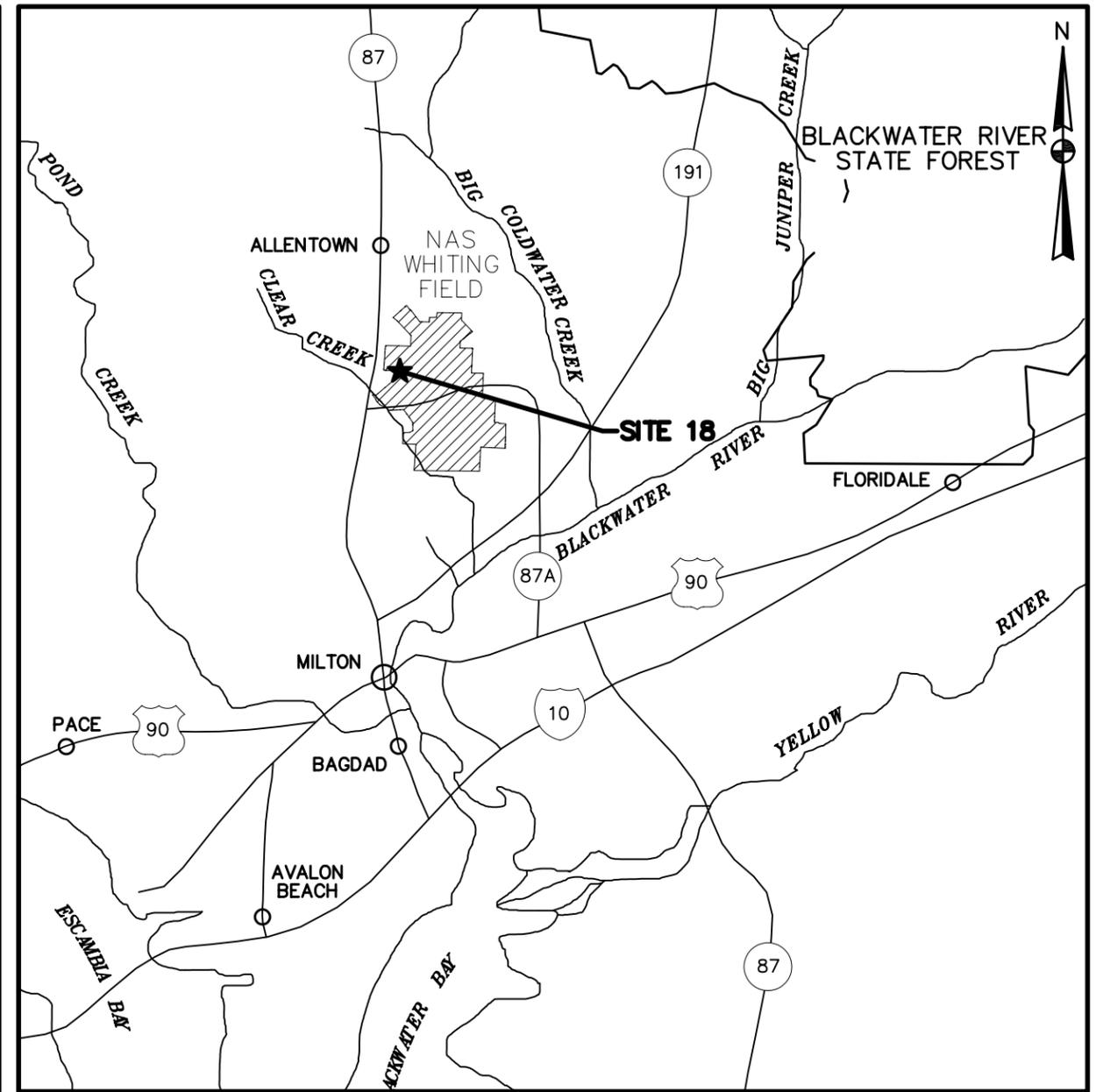
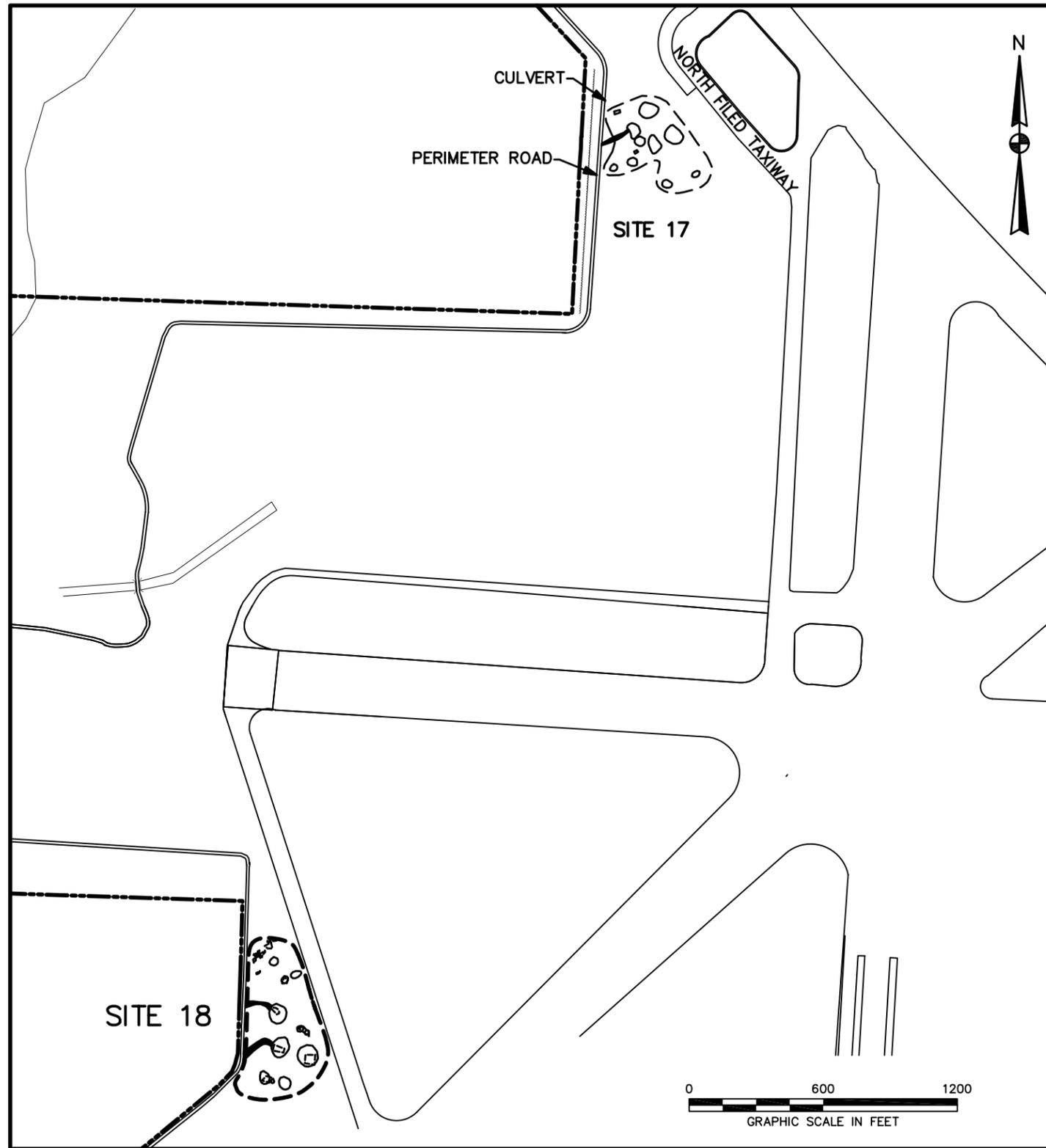


FIGURE 1-1 LOCATION AND AREA MAP  
 SITE 18 - CRASH CREW TRAINING AREA B  
 RECORD OF DECISION  
 NAS WHITING FIELD, MILTON, FLORIDA



*Soils, Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18* report [Tetra Tech NUS, Inc. (TtNUS), 2006b] and human health risks were identified for exposure to surface and subsurface soils at Site 18. A summary of site risks is provided in Section 2.6 of this Record of Decision (ROD).

No unacceptable ecological risks were identified in the ecological risk assessment (ERA) presented in the RI for Site 18; and further ecological study is unwarranted. A discussion of the ecological risk is presented in Section 2.6.2. Site 18 currently consists of vacant, unused land with exposed soil and sparse native grasses. During the 1999 interim remedial action (IRA) at Site 18, contaminated areas, including the burn pits and shallow depressions, were covered with a 24-inch soil cap and sod turf (Bechtel, 2000). The site was graded to slope gently towards the southwest, and is currently maintained as an open grassy field. Site 18 is not fenced; however, access is controlled at the perimeter security gate. No permanent surface water sources exist at Site 18.

The response action selected is necessary to protect public health or welfare or the environment from the actual or threatened releases of hazardous substances into the environment.

#### **1.4 DESCRIPTION OF THE SELECTED REMEDY**

This ROD presents the final action for surface and subsurface soils at Site 18 and is based on results of the RI (HLA, 1999), the Feasibility Study (FS) (HLA, 2001) and the revised HHRA (TtNUS, 2006b). This ROD only addresses surface and subsurface soil at Site 18.

This ROD does not address actual or potential groundwater contamination at the site. Groundwater at NAS Whiting Field has been identified as a separate site (Site 40, Basewide Groundwater) and will be addressed in a future decision document. There is no surface water or sediment present at Site 18.

The selected remedy for Site 18 is ECs and LUCs for surface and subsurface soils. The ECs include the existing soil cover and the LUCs will be implemented as described in Alternative 2 in the FS (HLA, 2001). Implementation would include all activities at Site 18 as listed below:

- Development and implementation of LUCs prohibiting future residential development of the site
- ECs and LUCs prohibiting digging into or disturbance of the existing soil cover or subsurface soils at the site
- ECs maintaining the existing soil cover
- Post warning signs

Specific implementation and maintenance actions to ensure the viability of the selected remedy will be described in a Remedial Design (RD) document to be prepared in accordance with USEPA guidance.

Within 90 days of ROD signature, the Navy shall prepare and submit a RD to the USEPA and FDEP, for review and approval. The RD shall contain implementation and maintenance actions, including periodic inspections as well as the design and location of warning signs.

The RD will include ECs and LUCs consisting of, maintaining the integrity of the existing soil cover, restricting use/access to the land, and placing regulatory control on any activities at Site 18. The RD will be implemented and enforced in compliance with all local, state and federal regulations. The RD describes all planned operations, maintenance, inspections, and monitoring that will take place at the site.

As part of RD implementation, follow up site inspections/reviews are required to ensure compliance while the ECs and LUCs are in effect. Under CERCLA regulations, site reviews must take place every five years. Warning signs will be posted at the site to discourage trespassing. ECs and LUCs will be maintained until concentrations of hazardous substances in soil and groundwater reach levels that allow for unrestricted use and unlimited exposure. The Navy will be responsible for implementing, reporting on, and enforcing the ECs and LUCs.

The estimated total net present worth (NPW) cost of the selected remedy is approximately \$103,000 over a 30 year period. The selected remedy must remain in place indefinitely, unless all contaminated surface and subsurface soils are removed or subsequent sampling demonstrates they meet then applicable criteria for unrestricted use of the site.

## **1.5 STATUTORY DETERMINATIONS**

The EC and LUC remedy selected for surface and subsurface soils at Site 18 ensures protection of human health and the environment, complies with federal and state requirements legally applicable or relevant and appropriate, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

This remedy does not satisfy the statutory preference for treatment as a principal element of the remedy (i.e., reduction in the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants through treatment as a principal element) because contaminated soils will remain in place. Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site above

residential health-based levels, a statutory review will be required every five years after initiation of the remedy to ensure the remedy continues to be protective of human health and the environment.

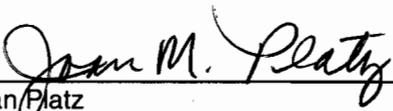
## 1.6 DATA CERTIFICATION CHECKLIST

The information required to be included in the ROD is summarized on Table 1-1. These data are presented in Section 2.0, Decision Summary, of this ROD. Additional information, if required, can be found in the NAS Whiting Field Administration Record for Site 18.

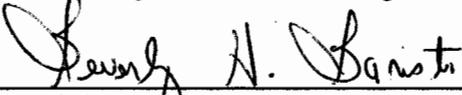
**TABLE 1-1**  
**DATA CERTIFICATION CHECKLIST**  
**SITE 18 - CRASH CREW TRAINING AREA B**  
**RECORD OF DECISION**  
**NAVAL AIR STATION WHITING FIELD**  
**MILTON, FLORIDA**

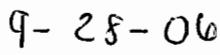
Information	ROD Reference
Constituents of Concern (COCs)	Sections 2.5.1.1 and 2.5.1.2 Pages 2-6 and 2-7
Baseline risk represented by the COCs	Section 2.6.1 and 2.6.3 Pages 2-8 and 2-10
Cleanup Goals (CGs) established for the COCs.	Section 2.7.1 Pages 2-13
Disposition of source materials constituting principal threat.	Section 2.2 Page 2-1
Current and reasonably anticipated future land use scenarios used for risk assessment.	Section 2.5.4 Page 2-8
Potential land uses available at the site as a result of the selected remedy.	Section 2.10.4 Page 2-23
Estimated capital, operation and maintenance (O&M), and net present worth (NPW) costs, discount rate used and timeframe these costs are projected for the selected remedy.	Section 2.10.3 Page 2-21  Table 2-5 Page 2-22
Key factors leading to the selection of the remedy.	Section 2.10.1 Page 2-19

**1.7 AUTHORIZING SIGNATURES**

  
\_\_\_\_\_  
Joan Platz  
Captain, United States Navy  
Commanding Officer, NAS Whiting Field

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Beverly H. Barister  
Acting Director, Waste Management Division  
USEPA, Region 4

  
\_\_\_\_\_  
Date

## 2.0 DECISION SUMMARY

### 2.1 SITE NAME, LOCATION, AND DESCRIPTION

Site 18, Crash Crew Training Area B, is approximately five acres in size and is located along the northwestern facility boundary near the North Air Field taxiway at NAS Whiting Field.

The approximate location of Site 18 is shown on Figure 2-1. There are currently no buildings at Site 18. No permanent surface water sources exist in the immediate vicinity of Site 18. Site 18 includes several shallow depressions that have been covered with a 24-inch soil cap and native grass. The site was graded to slope gently towards the southwest, and is currently maintained as an open grassy field.

### 2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

#### 2.2.1 NAS Whiting Field History

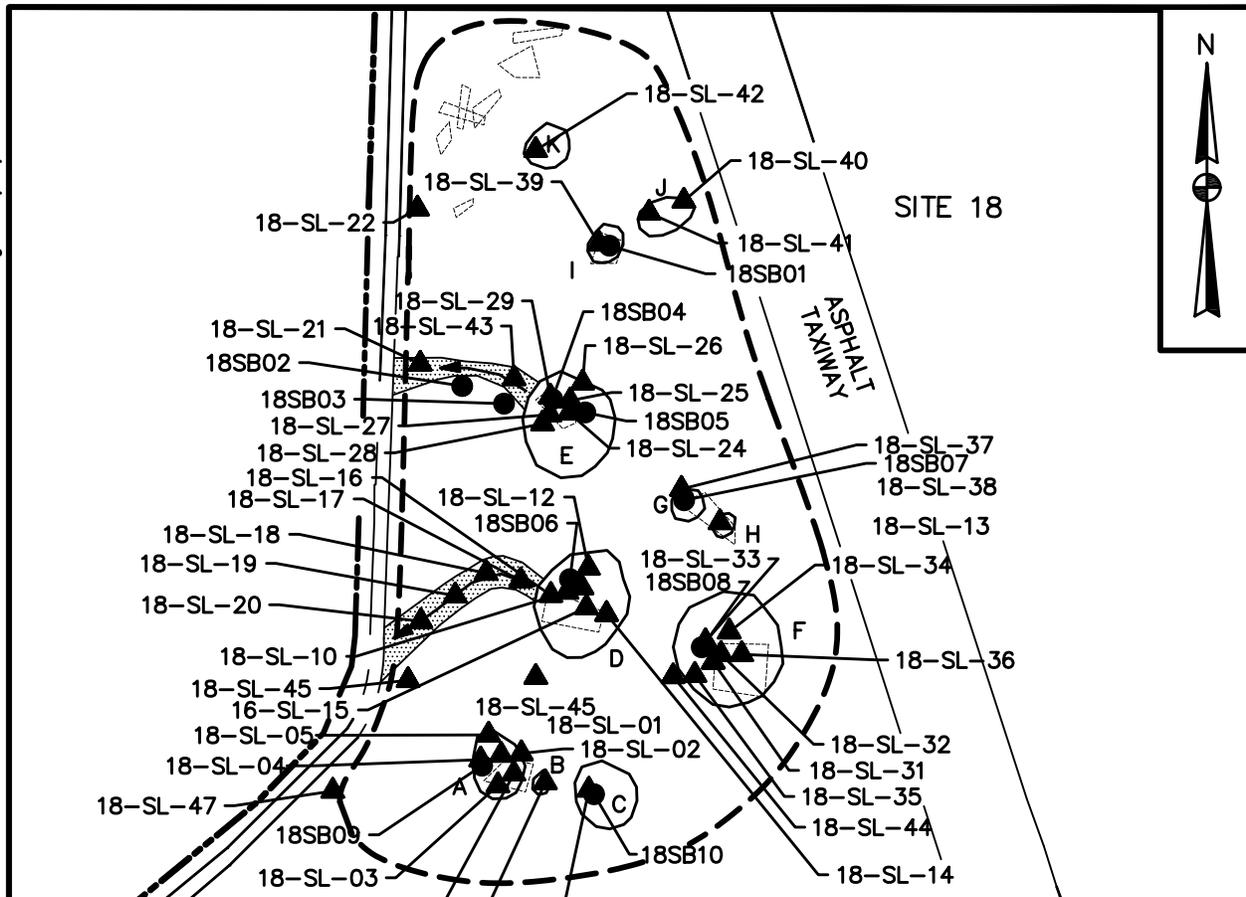
NAS Whiting Field was placed on the National Priorities List (NPL) by the USEPA in June 1994. Following the listing of NAS Whiting Field on the NPL, remedial response activities have been conducted pursuant to CERCLA authority. The decision documents and remedy selection for NAS Whiting Field are developed by the Navy, the lead agency, and the USEPA, a support agency, with concurrence from FDEP, a support agency.

The first environmental studies for the investigations of waste handling and/or disposal sites at NAS Whiting Field were conducted during the Initial Assessment Study (IAS) (Envirodyne Engineers, Inc. (EE), 1985). A record search indicated throughout its years of operation, NAS Whiting Field generated a variety of wastes related to pilot training, operation and maintenance of aircraft and ground support equipment, and facility maintenance programs.

NAS Whiting Field presently consists of two airfields (North and South Fields) and serves as a naval aviation training facility providing support facilities for flight and academic training. The current and anticipated future land use at Site 18 is recreational.

#### 2.2.2 Site 18 History

Site 18 was used for the training of firefighting crews between 1951 and 1991. Site 18 consists of 11 burn pits [shallow depressions approximately 1 to 2 feet (ft) deep] rimmed by mounded earth. Each of



**LEGEND:**

- ▲ SURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- SOIL BORING LOCATION AND DESIGNATION
- ▬▶ SURFACE RUNOFF PATHWAY AND FLOW DIRECTION
- A ○ PIT OR PILE BOUNDARY AND DESIGNATION
- SCRAP METAL BOUNDARY
- - - - - APPROXIMATE SITE BOUNDARY
- ~~~~~ TREELINE
- NAS NAVAL AIR STATION

0 160 320  
GRAPHIC SCALE IN FEET

<b>DRAWN BY</b> HJB	<b>DATE</b> 12/27/05
<b>CHECKED BY</b>	<b>DATE</b>
<b>REVISED BY</b>	<b>DATE</b>
<b>SCALE</b> AS NOTED	



**PLAN MAP**  
**SITE 18 - CRASH CREW**  
**TRAINING AREA B**  
**RECORD OF DECISION**  
**NAS WHITING FIELD**  
**MILTON, FLORIDA**

<b>CONTRACT NO.</b> 0006	
<b>OWNER NO.</b> 0000	
<b>APPROVED BY</b>	<b>DATE</b>
<b>DRAWING NO.</b> FIGURE 2-1	<b>REV.</b> 0

the burn pits contained decommissioned fuel tanks or aircraft fuselage to simulate aircraft crashes. Firefighting training activities consisted of pouring approximately 110 gallons of jet propellant (JP-5) fuel into the burn pits and igniting it. As part of the training exercises, the fires were then extinguished using aqueous film-forming foam (AFFF). According to facility records, 6,285 gallons of fuel and 3,148 gallons of AFFF were used during 1984 alone.

Past uses of hazardous waste (described above) at Site 18, although acceptable at the time, had the potential to cause long-term problems through the release of hazardous constituents into the soil and groundwater. As part of the Installation Restoration (IR) Program and the Navy Assessment and Control of Installation Pollutants (NACIP), Site 18 was included in the Verification Study [Geraghty & Miller (G&M), 1986] for NAS Whiting Field.

The 1992/1993 Phase IIA RI field investigation soil samples were collected from drainage ditches or swales suspected of channeling overland flow occurring during heavy rains from the 11 burn pit areas. In the 1992/1993 Phase IIA field investigation, the suspected burn pit areas and drainage ditches were well defined. In 1994, fuel tanks and aircraft bodies used in training activities were removed from the burn pits, and earth-moving equipment spread the rim of mounded soil from around the burn pit depressions to the adjacent areas. As part of the 1999 IRA, contaminated areas of the site were covered with two ft of soil and native grass cover was placed over the soil cover (Bechtel, 2000).

During the RI, seven VOCs, 15 SVOCs, 22 inorganic constituents, and TRPH were detected in the surface soil and four VOCs, eight SVOCs, one pesticide, 19 inorganic compounds, TRPH, and cyanide were detected in the subsurface soil at Site 18. The individual inorganic constituents, aluminum, arsenic, iron, manganese, and vanadium, detected at the site have no direct evidence of site-related use at Site 18 and the procedures at this site did not likely contribute to the presence of these inorganics in surface soil. Additionally, the site-specific values for these inorganics are within the range of levels found at NAS Whiting Field. Considering the information presented above, arsenic, aluminum, iron, manganese, and vanadium were dropped from consideration as constituents of potential concern (COPCs) for Site 18 surface and subsurface soils.

Table 2-1 summarizes the Site 18 investigative history.

**TABLE 2-1  
INVESTIGATIVE HISTORY  
RECORD OF DECISION  
SITE 18, CRASH CREW TRAINING AREA B  
NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA**

Date	Investigation Title	Activities	Findings
1986	<i>Verification Study, Assessment of Potential Groundwater Pollution at NAS Whiting Field, Florida</i> (Geraghty & Miller, Inc., 1986)	<ul style="list-style-type: none"> <li>• On-site survey and interviews</li> <li>• Installation of one monitoring well and groundwater sampling</li> </ul>	<ul style="list-style-type: none"> <li>• Between 1951 and 1991, Crash Crew training exercises and activities were conducted at Site 18 at NAS Whiting Field. The exercises typically involved igniting approximately 100 gallons of AVGAS or jet fuel (JP-5) within a shallow depression containing a mock-up airframe, and extinguishing the fire with AFFF.</li> <li>• Site 18 was recommended for additional investigation due to the potential for off-site migration and impact on human and ecological receptors.</li> </ul>
1992 - 1999	<i>Remedial Investigation Report, Site 18, NAS Whiting Field, Milton, Florida</i> , [Harding Lawson Associates (HLA), 1999]	<ul style="list-style-type: none"> <li>• Geological assessment</li> <li>• Hydrogeological assessment</li> <li>• Collection and analysis of surface and subsurface soil samples</li> <li>• Installation of groundwater monitoring wells and groundwater sampling</li> <li>• Soil gas survey</li> <li>• HHRA</li> <li>• ERA</li> </ul>	<ul style="list-style-type: none"> <li>• The groundwater flow direction is to the south-southwest across the site.</li> <li>• The HHRA determined the carcinogenic risk from exposure to surface soil was within USEPA's acceptable risk range for current and future receptors at Site 18.</li> <li>• The total ILCR associated with exposure to surface soil by a hypothetical future resident and industrial worker exceeded FDEP's target level of concern (<math>1 \times 10^{-6}</math>) due to the presence of cPAHs.</li> <li>• The non-cancer risk associated with ingestion and direct contact of soil under current and hypothetical future land-uses are below USEPA's and FDEP's target HI of 1.0.</li> <li>• The ERA does not predict unacceptable risks to ecological receptors from constituents present in surface and subsurface soil at Site 18.</li> </ul>
2001	<i>Feasibility Study for Site 18, NAS Whiting Field, Milton, Florida</i> (HLA, 2001).	<ul style="list-style-type: none"> <li>• Evaluated remedial alternatives for site cleanup of COCs.</li> </ul>	<ul style="list-style-type: none"> <li>• Four COCs identified for surface soil.</li> </ul>
2006	<i>Risk Assessment Re-Evaluation of Soils at Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18, NAS Whiting Field, Milton, Florida</i> (TtNUS 2006c)	<ul style="list-style-type: none"> <li>• Evaluated changed conditions at the site and changes in regulatory screening criteria.</li> </ul>	<ul style="list-style-type: none"> <li>• Four COCs were identified for surface soil. One COC was identified for subsurface soil.</li> </ul>
2006	<i>Proposed Plan, Site 18, Crash Crew Training Area B, NAS Whiting Field, Milton, Florida</i> , (TtNUS, 2006b)	<ul style="list-style-type: none"> <li>• Established public comment period from 15 Aug through Sep 14, 2006.</li> </ul>	<ul style="list-style-type: none"> <li>• Proposed remedy: ECs and LUCs for Site 18 surface and subsurface soils.</li> <li>• No comments received.</li> </ul>

Notes:

ILCR = incremental lifetime cancer risk	FDEP = Florida Department of Environmental Protection
HLA = Harding Lawson Associates	TtNUS = Tetra Tech NUS, Inc.
USEPA = United States Environmental Protection Agency	COC = constituents of concern
HHRA = human health risk assessment	SCTLs = Soil Cleanup Target Levels
ERA = ecological risk Assessment	HI = hazard index
PAH = poly aromatic hydrocarbon	

## **2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION**

The FS and Proposed Plan (HLA 2001 and TtNUS 2006a) for Site 18 were made available to the public for review in August 2006. These documents, and other IR program information, are contained within the Administrative Record in the Information Repository at the West Florida Regional Library, Milton, Florida.

The notice of availability of all site-related documents was published in the Pensacola News Journal and Santa Rosa Press Gazette on 12 August and 13 August 2006, respectively, and targeted the communities closest to NAS Whiting Field. The availability notice presented information on the RI, and FS at Site 18 and invited community members to submit written comments on the Proposed Plan.

A public comment period was held from 15 August through 14 September 2006, to solicit comments on the Proposed Plan. The comment period included an opportunity for the public to request a public meeting; however, a public meeting was not held because one was not requested. The site-related documents were placed in the Information Repository and made available for the public to review. Comments received during the public comment period are presented in the Responsiveness Summary in Appendix A.

## **2.4 SCOPE AND ROLE OF REMEDIAL ACTION SELECTED FOR SITE 18**

As with many Superfund sites, the problems are complex at NAS Whiting Field. As a result, NAS Whiting Field has been organized into 27 OUs. ECs and LUCs were designated as the preferred remedy in the Proposed Plan for the surface and subsurface soils at Site 18. Therefore, this ROD for Site 18 presents the final response action as ECs and LUCs for surface and subsurface soils. The groundwater at NAS Whiting Field has been designated as a separate site (Site 40, Basewide Groundwater) and is not addressed in this ROD. As stated previously, there is no surface water or sediment at Site 18.

## **2.5 SITE CHARACTERISTICS**

Site 18, Crash Crew Training Area B, is approximately five acres in size and is located along the northwestern facility boundary near the North Air Field taxiway at NAS Whiting Field.

### **2.5.1 Nature and Extent of Contamination**

As part of the RI conducted for Site 18, data were collected to determine the nature and extent of releases of site-derived contaminants in surface and subsurface soil, to identify potential pathways of migration in surface and subsurface soil, and to evaluate risks to human and ecological receptors.

The RI at Site 18 indicated contamination at the site posed unacceptable risks to human receptors from exposure to surface and subsurface soil under a potential future residential land-use scenario. Based on residential land use, the original HHRA identified one polynuclear aromatic hydrocarbon (PAH), six inorganics and TRPH as COCs in surface and subsurface soils. Based on changed conditions, changed risk screening criteria and other determinations made since the FS was submitted, a revised HHRA was conducted. As discussed in Section 2.2 of the ROD, those changes include the following:

- The 1999 IRA, during which, contaminated areas at Site 18, including the burn pits and shallow depressions, were covered with a 24-inch soil cap and sod turf (Bechtel, 2000).
- Observed arsenic values were determined to represent naturally occurring levels.
- FDEP Soil Cleanup Target Levels (SCTLs) were changed effective April 2005 and were used as screening criteria.
- USEPA Region IX Preliminary Remediation Goals (PRGs) were used as screening criteria.
- Observed values for aluminum, iron, manganese and vanadium were determined to represent naturally occurring levels; these selected inorganic analytes are not considered COCs for Site 18 surface and subsurface soils.

Based on the results of the revised HHRA, ECs and LUCs for surface and subsurface soils, remains the preferred remedy for Site 18. Therefore, this ROD documents the selected Remedial Action (RA) for Site 18 as ECs and LUCs for surface and subsurface soils. The groundwater at NAS Whiting Field has been designated as a separate site (Site 40, Basewide Groundwater) and is not addressed in this ROD.

#### **2.5.1.1 Surface Soil**

Surface soil sampling was conducted at Site 18 to determine the nature and extent of contamination at the site and to assess whether or not surface soil (the first two feet of soil under the existing soil cover) could potentially serve as an exposure pathway to human or ecological receptors. Constituents detected in surface soil at Site 18 included seven VOCs, 15 SVOCs, 22 inorganic constituents, and TRPH.

Eight COCs (2-methylnaphthalene, naphthalene, cPAHs, barium, cadmium, chromium, copper, and TRPH) were identified following the revised risk assessment for surface soils at Site 18. Of these constituents, four; cPAHs [max conc. – 1.3 milligrams per kilograms (mg/kg)], barium (290 mg/kg), copper (864 mg/kg), and TRPH (7,190 mg/kg), were identified as COCs, based on the revised HHRA, for surface soil exceeding criteria for the residential use scenario at the site. The maximum concentration of TRPH also exceeds the criteria for an industrial residential use scenario.

A complete list of all constituents sampled and their detected concentrations in surface soil is available in the RI report (HLA, 1999).

#### **2.5.1.2 Subsurface Soil**

Subsurface soil sampling was conducted at Site 18 to determine the nature and extent of contamination at the site and to assess whether or not subsurface soil (below 2 ft bls) could potentially serve as an exposure pathway to human or ecological receptors. Constituents detected in subsurface soil at Site 18 included, four VOCs, eight SVOCs, one pesticides, 19 inorganic constituents, TRPH, and cyanide. Three COPCs (2-methylnaphthalene, naphthalene, and TRPH) were identified following the revised risk assessment for subsurface soils at Site 18. Of these constituents, only TRPH (max conc. – 3,742 mg/kg), was identified as a COC, based on the revised HHRA (TtNUS, 2006b), for subsurface soil exceeding criteria for the residential and industrial land use scenarios at the site.

A complete list of all constituents sampled and their detected concentrations in subsurface soil is available in the RI report (HLA, 1999).

#### **2.5.2 Ecological Habitat**

Site 18 is limited in the quantity and quality of habitat for ecological receptors. Most importantly, the site comprises only a small portion of the home ranges of most wildlife and the limited size and habitat of the site serves to restrict the amount of food available to upper trophic level organisms.

#### **2.5.3 Migration Pathways**

cPAHs, Barium, copper, and TRPH are the primary COCs in soil at Site 18. The primary agents of migration acting on soil include wind, water, and human activity. Soil can also act as a source medium, allowing the COCs to be transported to other media.

Transport of COCs from soil via wind is not expected to be a major transport mechanism due to the presence of two feet of soil cover, vegetation and native grasses at Site 18. Vegetation is an effective means of limiting wind erosion of soil.

Humans and, to a lesser extent, ecological receptors are effective at moving soil and can greatly affect the transport of soil-bound constituents. Under the current land use scenario at Site 18, human activity is not a major transport mechanism for the COCs in soil and digging restrictions will support this.

The transport of soil by water and, therefore, COCs in soil, via the mechanisms of physical transport of soil or the leaching of constituents from the soil to groundwater, is a potential concern. Soil erosion - the physical transport of soil via surface water runoff - is currently not considered a major mechanism for the transport of the COCs in soil at Site 18 because (1) the minimal slope of the land surface at the site; (2) the existing soil cover and vegetation covering the site; and (3) the nature of the constituents remaining in the soil at the site.

#### **2.5.4 Current and Potential Future Land Use**

The current and anticipated future land use at Site 18 is recreational.

### **2.6 SUMMARY OF SITE RISKS**

A risk assessment was completed for Site 18 to predict whether the site would pose current or future threats to human health or the environment. Both a HHRA and an ERA were performed for Site 18. These risk assessments evaluated the constituents detected in site soil and the results are presented in the RI.

The HHRA and the ERA provide the basis for selecting the RA for Site 18. The HHRA was revised to evaluate the changed conditions at the site and changes in the regulatory screening criteria that have become effective since the original risk assessment was conducted. This section of the ROD summarizes the results of the revised HHRA and the ERA for Site 18.

#### **2.6.1 HHRA**

The HHRA was revised at Site 18 to characterize the risks associated with potential exposures to site-related contaminants for human receptors. Details of the revised HHRA are provided in Section 12.0 of the *Risk Assessment Re-evaluation of Soils, Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18* report (TtNUS, 2006b).

##### **2.6.1.1 Risk Characterization Summary**

For the risk characterization at Site 18 potential risks were estimated for five receptors (the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the recreational user/trespasser). Potential risks were calculated using the methodology presented in Section 2.0 of the revised HHRA (TtNUS, 2006b).

For carcinogens, risk are generally expressed as a probability. For example, a particular exposure to constituents at a site may present a 1 in 1,000,000 (or 1.0E-06) chance of development of cancer over an estimated lifetime of 70 years. The USEPA allowable carcinogen risk range is 1.0E-04 to 1.0E-06, and the FDEP acceptable excess lifetime cancer risk (ELCR) is 1.0E-06 [Rule 62-780 Florida Administrative Code (F.A.C.)].

For non-carcinogenic constituents, the dose a receptor may be exposed to is estimated and compared to the reference dose (RfD). The RfD is developed by USEPA scientists and represents an estimate of the amount of a chemical a person (including the most sensitive persons) could be exposed to over a lifetime without developing adverse effects. The measure of the likelihood of adverse effects other than cancer occurring in humans is called the Hazard Index (HI). An HI greater than 1.0 suggests adverse effects are possible.

Risk characterization evaluates the potential for adverse effects from exposure to COPC concentrations in environmental media by integrating information developed during the exposure and toxicity assessments. As noted previously, the exposure and toxicity assessments for this human health risk screening assessment are largely addressed during the development of the PRGs and SCTLs.

At Site 18, several constituents were detected at concentrations in excess of the direct contact, risk based COPC screening levels and consequently were retained as a COPCs. Three organics (2-methylnaphthalene, naphthalene, cPAHs), four inorganics (barium, cadmium, chromium, and copper), and TRPH were selected as COPCs for surface soil and evaluated in the quantitative HHRA. 2-methylnaphthalene, naphthalene, and TRPH were selected as COPCs for subsurface soil and also evaluated.

As discussed above in Section 2.2.2, although concentrations of aluminum, arsenic, iron, and vanadium in surface and subsurface soil exceed respective screening criteria, these inorganics are not known to be associated with past practices or processes at any NAS Whiting Field sites. Therefore, these inorganics were not retained as COPCs for direct contact exposures to soil at Site 18.

Quantitative risk estimates for potential human receptors were developed for the identified COPCs. Potential cancer risks and HIs were calculated and the results are discussed below.

### **Carcinogenic Risk**

Cumulative Incremental Life-Time Cancer Risk (ILCRs) for exposures to surface and subsurface soil were less than or within USEPA's target risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  for all receptors. However, ILCRs estimated for surface soil for hypothetical future exposure incurred by a resident or industrial worker

exceeded the State of Florida's target risk level of  $1 \times 10^{-6}$ . Only the chemical-specific risk estimates for cPAHs (benzo(a)pyrene) exceeded  $1 \times 10^{-6}$ .

### **Non-carcinogenic Risk**

The non-cancer risk estimates (i.e., HIs) developed for the resident, industrial worker, and construction worker exposed to TRPH in surface soils and for the resident and construction worker exposed to TRPH in subsurface soils exceeded 1.0 indicating a potential for non-carcinogenic health effects. Cumulative HIs estimated for exposures to surface and subsurface soil by all other receptors were less than or equal to 1, indicating adverse, non-carcinogenic effects are not anticipated for these receptors.

### **2.6.2 ERA**

A screening ERA was performed for Site 18. The purpose of the ERA for Site 18 was to evaluate the potential for adverse effects to ecological receptors at the site. Components of the screening level ERA included (1) preliminary problem formulation; (2) preliminary ecological effects evaluation; (3) preliminary exposure estimate; and (4) preliminary risk calculation. The ERA completed for Site 18 considered exposure of terrestrial plants, terrestrial invertebrates, and wildlife receptors to chemicals in soil at the site. All constituents detected in soil at Site 18 including VOCs, SVOCs, TRPH, pesticides, and inorganic analytes were evaluated during the screening level assessment.

Several organic and inorganic compounds were detected in surface and subsurface soil at concentrations exceeding conservative screening levels and, therefore, were selected as COPCs. These COPCs were assessed in a less conservative Step 3A evaluation. The results of the Step 3A analysis indicate the constituents detected in surface and subsurface soil at Site 18 do not pose unacceptable risks to ecological receptors.

The site is severely limited in the quantity and quality of habitat. Most importantly, the site comprises only a small portion of the home ranges of most of the terrestrial wildlife species found on the base. Therefore, reduction in growth, survival, and reproduction of small mammal and bird populations at and near the site due to chromium, lead, or other chemicals evaluated in the ERA is unlikely. For these reasons, potential risks are acceptable and further ecological study at Site 18 is unwarranted.

### **2.6.3 Risk Summary**

The risk assessment considered five receptors, the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the recreational user, assuming exposure

via the ingestion, dermal contact, and inhalation routes of exposure. However, with the possible exception of the maintenance worker, none of the receptors are currently contacting surface or subsurface soils at Site 18.

Three organics (cPAHs, 2-methylnaphthalene, and naphthalene), four inorganics (barium, cadmium, chromium, and copper), and TRPHs were selected as COPCs for surface soil and evaluated in the quantitative HHRA conducted per USEPA guidelines. 2-Methylnaphthalene, naphthalene, and TRPH were selected as COPCs for subsurface soil and also evaluated. The non-cancer risk estimates (i.e., HIs) developed for the resident, industrial worker, and construction worker exposed to TRPH in surface soils and for the resident and construction worker exposed to TRPH in subsurface soils exceeded 1.0 indicating a potential for non-carcinogenic health effects. However, the HIs developed for all other COPCs in surface or subsurface soil did not exceed 1.0. Although the cancer risk estimate developed for the COPCs for surface soil for the hypothetical future resident and the typical industrial worker exceeded the State of Florida cancer risk benchmark of  $1 \times 10^{-6}$ , none of the cancer risk estimates exceed the USEPA cancer risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ . The primary risk drivers for surface soils were the cPAHs (mainly benzo(a)pyrene); chemical-specific risk estimates for all other COPCs are less than  $4 \times 10^{-9}$ .

A 24-inch permeable soil layer and native grass cover were emplaced over the surface soil of Site 18 in 1999 (Bechtel, 2000). Consequently, the surface soil data evaluated in this risk assessment actually represent the shallow subsurface soils underlying this permeable cap. This is an important consideration when interpreting the risk characterization results summarized below because, barring construction activities or an excavation bringing contaminated soils to the surface, the emplacement of the cap has eliminated direct receptor contact (and risk) to the soils underlying the cap. According to Section 62-780.680(2)(b)(2) of Rule 62-780, F.A.C., the criteria for direct contact exposure under Risk Management Option Level II is met by the emplacement of an engineering control preventing human exposure, such as a permanent cover material or two ft of soil.

The response action selected in this ROD is necessary to protect public health or welfare or the environment from the actual or threatened releases of hazardous substances into the environment.

#### **2.6.4 Uncertainty Analysis**

General uncertainties associated with the risk estimation process and site-specific uncertainties are discussed or referenced in the RI. Uncertainties associated with the revised HHRA for surface and subsurface soil at Site 18 are summarized below:

- Overall site-related risks from soil may be overestimated by the background screening process.
- Potential risks are likely to be overestimated as a result of using the maximum concentration for the COCs.
- Risk is likely overestimated for the general populations exposed to the chemicals in the environmental media at the site.

#### **2.7 REMEDIAL ACTION OBJECTIVES**

The Remedial Action Objectives (RAOs) for Site 18 are:

- To prevent residential development on the site.
- To address surface and subsurface soil containing TRPH contamination exceeding non-carcinogenic risks associated with incidental ingestion of, inhalation of, and dermal contact with contaminated soils.
- To address possible future risk of direct exposure to subsurface soil exceeding action levels.
- To comply with federal and state applicable or relevant and appropriate requirements (ARARs) and consider to be considered (TBC) guidance in accordance with accepted USEPA and FDEP guidelines.

The RAOs for this site are formulated based on the following criteria:

- Unacceptable human health risk exists for direct exposure to surface or subsurface soils based on the current and anticipated future non-residential/recreational use of the site.
- FDEP SCTLs (residential land use).
- USEPA Region IX PRGs (residential land use).

The current and future use of the property at this site remains non-residential/recreational, and the current and future receptors are occupational workers and trespassers.

**2.7.1 Cleanup Goals**

Cleanup Goals (CGs) establish acceptable exposure levels protective of human health and the environment. The following soil CGs were established for the Site 18 COCs:

<b>COC</b>	<b>CG</b>
Barium	120 mg/kg <sup>(1)</sup>
Copper	150 mg/kg <sup>(1)</sup>
Benzo(a)pyrene	0.1 mg/kg <sup>(1)</sup>
TRPH	460 mg/kg <sup>(1)</sup>

(1) FDEP SCTL for direct exposure, residential

The CGs were used to determine the areas and volumes of surface and subsurface soils with the potential to impact human health under a residential land-use scenario. The estimated area of TRPH-contaminated surface soil exceeding the CG is 230,000 square feet with an estimated volume of 27,330 cubic yards. Calculations for the estimated area and volume of contaminated soils exceeding the CGs at Site 18 are presented in Appendix B of the FS (HLA, 2001).

**2.8 DESCRIPTION OF ALTERNATIVES**

As stated in the Proposed Plan (TtNUS, 2006a) and in previous sections of this document, the three remedial alternatives evaluated in the FS (HLA, 2001) require re-evaluation based on the revised HHRA (TtNUS, 2006b). Cleanup alternatives were developed by the Navy, the USEPA, and the FDEP. The three remedial alternatives are listed below and summarized in Table 2-2.

**Alternative 1:** No Action (NA)

**Alternative 2:** ECs and LUCs

**Alternative 3:** Soil Removal and Disposal

These alternatives were developed in consideration of site risks, the anticipated future non-residential land use, federal and state ARARs and guidance, and the very limited ecological habitat at Site 18. These alternatives primarily address protection of human health because, as discussed previously, potential risks to ecological receptors are acceptable. All alternatives (except Alternative 1) include a provision for five-year site reviews to verify the selected alternative continues to be protective of human health and the environment. A detailed description of the four alternatives is provided below.

TABLE 2-2

**SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED  
RECORD OF DECISION  
SITE 18, CRASH CREW TRAINING AREA B  
NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA**

<b>Alternative</b>	<b>Description of Key Components</b>	<b>Cost<sup>(1)</sup></b>	<b>Duration<sup>(2)</sup></b>
<b>Alternative 1: No Action</b>	No remedial actions are performed at Site 18	\$0	30 Years
<b>Alternative 2: ECs and LUCs</b>	ECs in place in the form of the existing soil cover at the site.  Prohibit digging into or disturbing existing soil cover at the site  Post warning signs.  Implementation of ECs and LUCs will address contaminants in soil above residential standards. An RD will be submitted to USEPA and FDEP and will detail the implementation plans to maintain current soil cover and to prohibit residential use of the property.	\$103,000 <sup>(3)</sup>	30 Years
<b>Alternative 3: Surface and Subsurface Soil Removal (exceeding CGs) and Disposal</b>	Develop project plans for excavation to include delineation/confirmatory sampling.  Excavate surface and subsurface soils exceeding residential land use CGs.  Backfill excavated areas with clean soil.  A RD will be submitted to USEPA and FDEP and will detail the implementation plans to maintain the site.	\$6,450,000	30 Years

<sup>(1)</sup> Net present worth costs rounded to the nearest thousand dollars.

<sup>(2)</sup> A period of 30 years was chosen for present worth costing purposes only. Under CERCLA, remedial actions must continue as long as hazardous substances, pollutants, or contaminants remain at a site.

<sup>(3)</sup> The cost for implementation of Alternative 2 includes the cost of the required 5-year reviews.

Notes: CG(s) = Cleanup goal(s)  
FDEP = Florida Department of Environmental Protection  
ECs = engineering controls  
LUCs = land use controls  
RD = Remedial Design  
USEPA = United States Environmental Protection Agency

**Alternative 1:** No Action. This alternative [estimated total NPW cost of \$0] is required by CERCLA as a baseline for comparison with the other alternatives. The NA alternative assumes no RA would occur and establishes a basis for comparison with the other alternatives. No RA, treatment, LUCs, or monitoring of site conditions would be implemented under the NA alternative. Alternative 1 does not meet chemical-specific ARARs, and there are no action-specific ARARs for this alternative.

**Alternative 2:** ECs and LUCs. (estimated total NPW cost \$103,000): ECs and LUCs are to prohibit the disturbance of existing soil covers and to prohibit future use of the site for non-residential purposes precluding full-time human contact with contaminated surface or subsurface soils. Contaminated soil (contaminants exceeding residential soil cleanup levels) covered with the 24-inch soil cover would not require soil removal because the existing cover material is a barrier and is preventing exposure to the contaminated soil, as long as the soil cover remains in place and is properly maintained. Future and current land-use concerns are addressed by the ECs and LUCs. Alternative 2 achieves compliance with chemical-specific ARARs by implementing ECs and LUCs to prevent exposure to surface and subsurface soils exceeding CGs. Compliance with action-specific ARARs would be achieved by proper selection, implementation, and maintenance of ECs and LUCs.

**Alternative 3:** Surface and subsurface soils removal. This alternative (estimated total NPW cost \$6,450,000, estimate provided in the FS) involves removal and off-site disposal of surface and subsurface soils exceeding levels allowed for Florida residential sites and LUCs, as described above. Alternative 3 meets chemical-specific ARARs for surface and subsurface soils. Compliance with action-specific ARARs would be achieved by proper design and execution of contaminated soil removal and off-site disposal activities.

## **2.9 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES**

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

**TABLE 2-3**  
**EXPLANATION OF DETAILED ANALYSIS CRITERIA**  
**RECORD OF DECISION**  
**SITE 18, CRASH CREW TRAINING AREA B**  
**NAVAL AIR STATION WHITING FIELD**  
**MILTON, FLORIDA**

Criterion	Description
Threshold	<p><b>Overall Protection of Human Health and the Environment.</b> This criterion evaluates the degree each alternative eliminates, reduces, or controls threats to human health and the environment through treatment, engineering methods, or institutional controls (e.g., access restrictions).</p> <p><b>Compliance with State and Federal Regulations.</b> The alternatives are evaluated for compliance with environmental protection regulations determined to be applicable or relevant and appropriate to the site conditions.</p>
Primary Balancing	<p><b>Long-Term Effectiveness and Permanence.</b> The alternatives are evaluated based on their ability to maintain reliable protection of human health and the environment after implementation.</p> <p><b>Reduction of Contaminant Toxicity, Mobility, and Volume Through Treatment.</b> 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.</p> <p><b>Short-Term Effectiveness.</b> The potential risks to workers and nearby residents posed by implementation of a particular remedy (e.g., whether or not contaminated dust will be produced during excavation), as well as the reduction in risks resulting from controlling the contaminants, are assessed. The length of time needed to implement each alternative is also considered.</p> <p><b>Implementability.</b> 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.</p> <p><b>Cost.</b> The benefits of implementing a particular alternative are weighted against the cost of implementation.</p>
Modifying	<p><b>USEPA and FDEP Acceptance.</b> The final Feasibility Study and the Proposed Plan, placed in the Administrative Record, represent a consensus by the Navy, USEPA, and FDEP.</p> <p><b>Community Acceptance.</b> The Navy assesses community acceptance of the selected alternative by giving the public an opportunity to comment on the remedy selection process and the selected alternative and then responds to those comments.</p>

TABLE 2-4

**SUMMARY OF COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES  
RECORD OF DECISION  
SITE 18, CRASH CREW TRAINING AREA B  
NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA  
PAGE 1 OF 2**

<b>Evaluation Criteria</b>	<b>Soil Alternative 1: No Action</b>	<b>Soil Alternative 2: ECs and LUCs</b>	<b>Soil Alternative 3: Surface and Subsurface Soil Removal</b>
Overall Protection of Human Health and Environment	Would not be protective to human receptors exposed to soils at the site.	Would be protective to human receptors. ECs and LUCs would prevent unacceptable potential exposure because of soil cover and residential use would be prohibited. This alternative would include maintenance of the existing soil cover.	Would be most protective because all surface and subsurface soils exceeding CGs (commercial/industrial standards) would be removed, eliminating the risk of exposure. Would also provide protection to ecological receptors however, may end up altering the ecological habitat at the site.
Compliance with ARARs and TBCs: Chemical-Specific Location-Specific Action-Specific	Would not comply Not applicable Not applicable	Would comply Not applicable Would comply	Would comply Not applicable Would comply
Long-Term Effectiveness and Permanence	Would not have long-term effectiveness and permanence because contaminants would remain on site. Any long-term effectiveness would not be known since monitoring would not occur.	Would provide long-term effectiveness and permanence through soil cover protections and LUCs preventing residential development. ECs and LUCs would preclude existing soil cover disturbance. Would require long-term management would be administered by the facility through implementing an approved Remedial Design.	Would provide highest level of long-term effectiveness and permanence by active removal of all impacted soil exceeding commercial/industrial cleanup levels. Would require long-term management and five-year reviews and implementing an approved RD.
Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment but may achieve some reduction through natural processes.	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment but may achieve some reduction through natural processes.	Would permanently and significantly reduce mobility of contaminants by excavation, transport, and disposal of impacted soil in a secure, regulated landfill. Provides the greatest reduction of risk through soil removal and off-base disposal. Toxicity of excavated soil may be reduced by treatment at a TSDF.

**TABLE 2-4**  
**SUMMARY OF COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES**  
**RECORD OF DECISION**  
**SITE 18, CRASH CREW TRAINING AREA B**  
**NAVAL AIR STATION WHITING FIELD**  
**MILTON, FLORIDA**  
**PAGE 2 OF 2**

<b>Evaluation Criteria</b>	<b>Soil Alternative 1: No Action</b>	<b>Soil Alternative 2: ECs and LUCs</b>	<b>Soil Alternative 3: Surface and Subsurface Soil Removal</b>
Short-Term Effectiveness	Would not result in short-term risks to site workers or adversely impact the surrounding community and would not achieve the soil RAOs and CGs.	Would not result in short term risks to site workers or adversely impact the surrounding community and would not achieve the soil CGs.  Estimated time to reach RAOs is less than one year.	Would create short-term risks of worker exposure and potential fugitive dust during excavation, transportation and/or soil cover construction. Would pose potential short-term risks to community members due to spills during transportation of contaminated soil to an off-site landfill. Environmental impacts (fugitive dust and runoff) are expected to be minimal. RAOs and CGs would be met within less than one year.
Implementability	Would be simple to implement because no action.	Would be easily implemented. Would require monitoring of the barriers for removal or other damage and potential exposure.  Equipment, specialists, and materials for this alternative are readily available.	Would be easily implemented. This remedial technology is proven and reliable. Would require use of a TSDF, which are available and have sufficient capacity to meet the requirements of this alternative. Equipment, specialists, and materials for this alternative are readily available.
Cost: Capital NPW O&M (30 year) Total cost, NPW (30 year)	\$0 \$0 \$0	\$23,000 \$80,000 \$103,000	\$5,840,000 \$17,000 \$6,440,000

CG = Cleanup Goals  
ECs = engineering controls  
LUC = land use control  
NPW = net present worth  
PPE = personal protection equipment  
RAO = Remedial Action Objective  
RD = Remedial Design  
TSDF = Transport, Storage, and Disposal Facility

## **2.10 SELECTED ALTERNATIVE**

### **2.10.1 Summary of Rationale for Remedy**

The goals of the selected RA are to protect human health and the environment by eliminating, reducing or controlling hazards posed by the site and to meet ARARs. Based upon the consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public comments, Alternative 2 – ECs and LUCs was selected to address surface and subsurface soils at Site 18.

This remedy was selected for the following reasons:

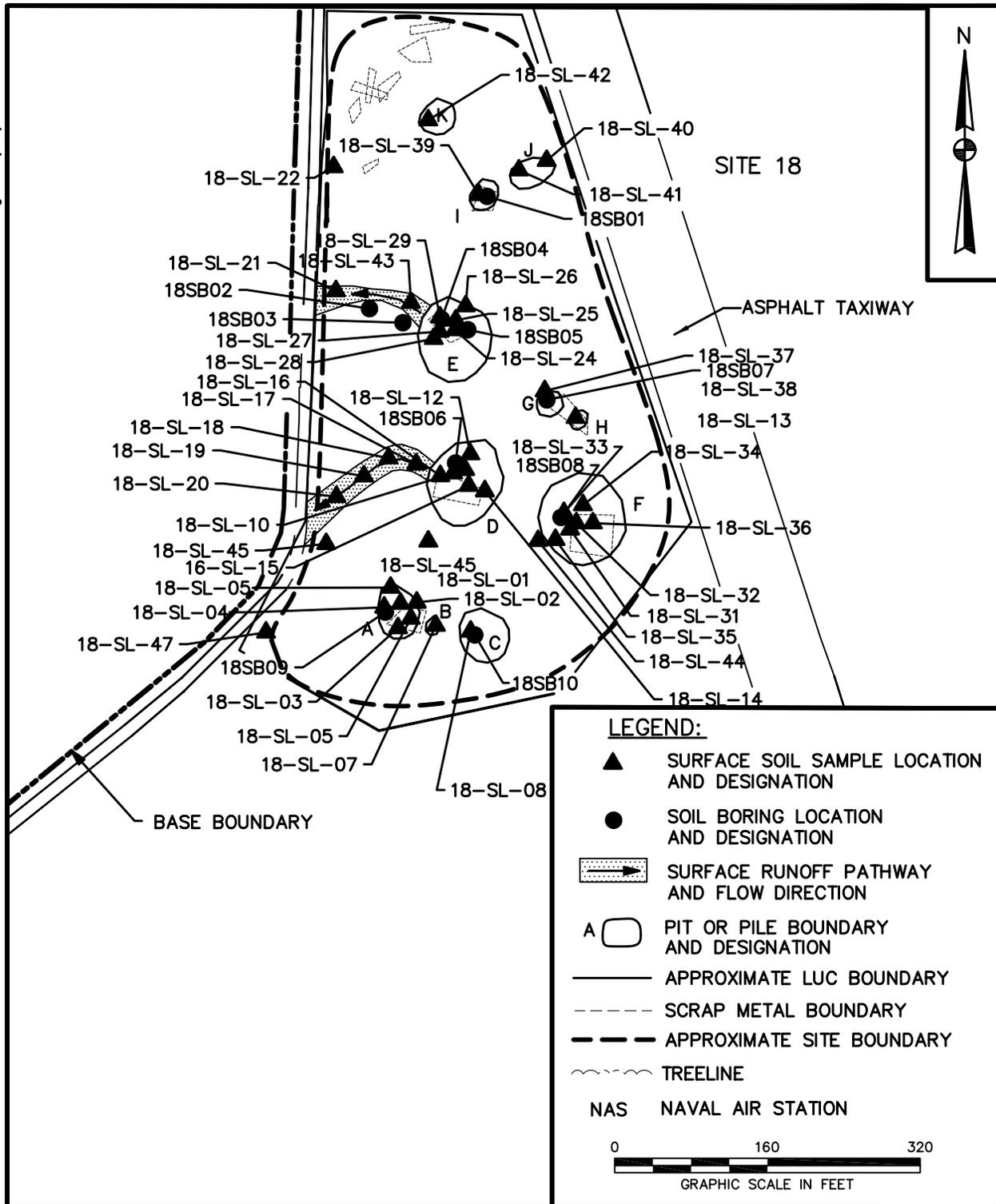
- Although concentrations of COCs remaining in soil (benzo(a)pyrene, barium, copper, and TRPH) exceed screening level criteria for a residential use scenario, they do not present an unacceptable threat to human health or the environment assuming only future recreational land uses are permitted at Site 18.
- Potential ecological risks are acceptable. The site comprises only a small portion of the home ranges of most of the terrestrial wildlife species found on the base.
- The current and future use of the property at this site remains recreational and the current and future receptors are construction workers and the recreational user/trespasser.
- Areas of surface soil contamination are covered with 24-inch soil cap, preventing exposure as long as this barrier remains in place.

### **2.10.2 Remedy Description – ECs and LUCs**

Soil contamination remains at Site 18 at concentrations precluding unrestricted reuse; therefore, the remedy includes ECs and LUCs to address unacceptable risk. These ECs and LUCs will be implemented to prohibit residential development and use eliminating unacceptable risks from exposure to contaminated soil. ECs and LUCs, prohibiting residential use and digging into or disturbing of the existing soil cover, will be placed on an area of land slightly larger than the boundaries of the Site 18 ensuring an appropriate buffer zone is created. Warning signage will be placed along the boundary in locations to be designated in the RD. Figure 2-2 presents the approximate EC/LUC boundaries for Site 18. The ECs and LUCs cover only surface and subsurface soils.

The EC and LUC performance objectives for Site 18 are:

- Maintain the integrity of the remedial system, ECs/LUCs.
- Prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds.
- Prohibit digging into or disturbance of the existing soil cover or subsurface soils at the site.



<b>DRAWN BY</b> HJB	<b>DATE</b> 12/27/05
<b>CHECKED BY</b>	<b>DATE</b>
<b>REVISED BY</b>	<b>DATE</b>
<b>SCALE</b> AS NOTED	



**APPROXIMATE LUC BOUNDARY**  
**SITE 18 - CRASH CREW**  
**TRAINING AREA B**  
**RECORD OF DECISION**  
**NAS WHITING FIELD**  
**MILTON, FLORIDA**

<b>CONTRACT NO.</b> 0006	
<b>OWNER NO.</b> 0000	
<b>APPROVED BY</b>	<b>DATE</b>
<b>DRAWING NO.</b> FIGURE 2-2	<b>REV.</b> 0

- Maintain the existing soil cover.

The ECs and LUCs will:

- Restrict future use of the site to recreational activities involving less than full-time human contact with surface and subsurface soils such as parks or trails.

The Navy or any subsequent owners shall not modify, delete, or terminate any LUC without USEPA and FDEP concurrence. The ECs and LUCs shall be maintained until the concentrations of hazardous substances in the soils have been reduced to levels allowing for unlimited exposure and unrestricted use. The Navy will be responsible for implementing, maintaining, inspecting, reporting, and enforcing the ECs and LUCs described in this ROD in accordance with the approved RD. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity. Should this remedy fail, the Navy will ensure appropriate actions are taken to re-establish its protectiveness and may initiate legal action to either compel action by a third party(ies) and/or to recover the Navy's costs for remedying any discovered EC and LUC violation(s).

Within 90 days of ROD signature, the Navy shall prepare a RD in accordance with USEPA guidance and submit to the USEPA and FDEP, for review and approval. The RD shall contain EC and LUC implementation and maintenance actions, including periodic inspections. When the selected remedy is implemented, predicted site risks will be minimized.

### **2.10.3 Summary of Estimated Remedy Costs**

The estimated total NPW cost of Alternative 2 at Site 18 is approximately \$103,000 over a 30-year period, based upon an annual discount rate of six percent. Table 2-5 summarizes the cost estimate data for Alternative 2. The information is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an explanation of significant differences, or a ROD amendment. The estimate is an order-of-magnitude engineering cost estimate expected to be within +/- 25 percent of the actual project cost.

TABLE 2-5

**SELECTED ALTERNATIVE COST ESTIMATE SUMMARY  
RECORD OF DECISION  
SITE 18, CRASH CREW TRAINING AREA B  
NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA**

<b>CAPITAL COSTS</b>	
<b>Description</b>	<b>Cost</b>
1. Project Planning	\$1,379
2. Mobilization/Demobilization	\$0
3. Decontamination	\$0
4. Site Preparation	\$0
5. Excavation/Backfill	\$0
6. Off-site Transportation and Disposal	\$0
7. Site Restoration	\$0
8. EC/LUC Implementation	<u>\$18,242</u>
Subtotal	\$19,591
Contingency Allowance (10%)	\$1,959
Engineering/Project Management (5%)	<u>\$978</u>
<b>Total Capital Cost</b>	<b>\$22,529</b>
<b>OPERATION AND MAINTENANCE COSTS</b>	
<b>Description</b>	<b>Cost</b>
1. Total Operation and Maintenance Costs (including 5-year reviews)	<b>\$80,380</b>
<b>Total Net Present Worth Cost for Selected Alternative</b>	<b>\$102,909</b>

#### **2.10.4 Expected Outcome of the Selected Remedy**

Immediately upon implementation, Site 18 will be environmentally safe for its current and intended future use as recreational, as long as the ECs and LUCs are in place and observed.

#### **2.11 STATUTORY STATEMENT**

The alternative selected for Site 18 is consistent with the Navy's IR program, CERCLA, and NCP. The selected remedy for surface and subsurface soil is protective of human health and the environment.

The selected remedy eliminates, reduces, or controls risks by implementing LUCs to restrict future use of the site to non-residential activities involving less than full-time human contact with surface and subsurface soil, and (2) maintain the existing soil cover. No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy. Comparison of the selected remedy to the nine USEPA evaluation criteria is summarized in Table 2-6.

The selected remedy achieves compliance with chemical-specific ARARs by implementing ECs and LUCs to prevent exposure to surface and subsurface soils exceeding CGs. Compliance with action-specific ARARs will be achieved by the proper selection, implementation, and maintenance of ECs and LUCs. Table 2-7 provides a summary of ARARs and guidance documents specific to the selected remedy.

The selected remedy is cost effective and provides a balance between cost and overall effectiveness in the protection of human health and the environment. Permanent solutions and treatment are used to the maximum practicable extent; however, the selected remedy does not provide for on-site treatment of contaminated material due to the nature of the contaminants and their location. Although the statutory preference for treatment is not met by the selected remedy, the remedy provides the best balance among the evaluated alternatives, with respect to the balancing and modifying evaluation criteria listed in Table 2-7.

Because the selected remedy would result in hazardous substances remaining on site, five-year reviews will be required after commencement of the RA (for a period of at least 30 years) to ensure the remedy continues to provide protection of human health and the environment.

TABLE 2-6

**SUMMARY EVALUATION OF SELECTED REMEDY  
RECORD OF DECISION  
SITE 18, CRASH CREW TRAINING AREA B  
NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA**

Evaluation Criteria	Assessment
Overall Protection of Human Health and the Environment	Human receptors will be protected if this alternative is implemented. Regulatory controls (i.e., ECs and LUCs) will prohibit potential future residents from exposure to the site because residential use of the site will be restricted under the proposed ECs and LUCs. ECs and LUCs will also maintain and prohibit digging into or disturbing existing soil cover at the site.
Compliance with ARARs	This alternative achieves compliance with chemical-specific ARARs and TBC guidance by implementing ECs and LUCs to prevent exposure to surface and subsurface soils exceeding CGs. It meets action-specific ARARs by proper selection and maintenance of the ECs and LUCs.  Meets all other NAS Whiting Field requirements.
Long-Term Effectiveness	The risks to future workers or trespassers based on exposure to surface and subsurface soils at the site is addressed by ECs and LUCs. The long-term effectiveness and permanence of these controls will be controlled by the installation through the implementation of an approved RD.  Administrative actions proposed in this alternative (e.g., 5-year site reviews) would provide a means of evaluating the effectiveness of the alternative. These administrative actions are considered to be reliable controls, as long as the facility implements the approved RD.
Reduction of Toxicity, Mobility, and Volume through Treatment	This alternative does not treat the soil contaminants and thus does not reduce the toxicity, mobility, or volume through treatment.
Short-Term Effectiveness	The implementation of this alternative is estimated to take less than 1 year. No adverse impacts are expected as a result of implementing ECs and LUCs.
Implementability	Would be easily implemented. Would require monitoring of the soil cover for removal or other damage and potential exposure. Equipment, specialists, and materials for this alternative are readily available.
Cost	The total present worth cost of Alternative 2 is \$103,000.
Federal and State Acceptance	The USEPA has approved and the FDEP has concurred with the selected remedy.
Community Acceptance	The community was given the opportunity to review and comment on the selected remedy. No comments were received and no public meeting was requested (see Appendix A). Therefore, the selected RA proposed in the Proposed Plan was not altered.
<p>Notes: ARAR = applicable or relevant and appropriate requirement  FDEP = Florida Department of Environmental Protection  ECs = engineering controls  LUCs = land use controls  RA = remedial action  RD = remedial design  TBC = to be considered  USEPA = United States Environmental Protection Agency</p>	

**TABLE 2-7**  
**SUMMARY OF FEDERAL AND STATE ARARS AND GUIDANCE SPECIFIC TO ALTERNATIVE 2**  
**RECORD OF DECISION**  
**SITE 18, CRASH CREW TRAINING AREA B**  
**NAVAL AIR STATION WHITING FIELD**  
**MILTON, FLORIDA**

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<b>Authority</b>	<b>Requirement</b>	<b>Citation</b>	<b>Status/Type</b>	<b>Synopsis</b>	<b>Evaluation/Action To Be Taken</b>
Federal Regulatory Requirement	USEPA Region IX Preliminary Remedial Goals (PRGs)		Relevant and Appropriate / Chemical-Specific	These guidelines aid in the screening of constituents in soil. USEPA has requested use of these PRGs as ARARs at NAS Whiting Field.	Will be used to identify constituents of concern (COCs) and for the development of soil cleanup goals at Site 18.
Federal Regulatory Requirement	Cancer Slope Factors (CSFs)		TBC / Chemical-Specific	Guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.	Were considered for development of human health protection PRGs for soil at this site
Federal Regulatory Requirement	Reference Doses (RfDs)		TBC / Chemical-Specific	Guidance values used to evaluate the potential noncarcinogenic hazard caused by exposure to contaminants	Were considered for development of human health protection PRGs for soil at this site
State Regulatory Requirement	Contaminant Cleanup Target Levels Rule [Soil Cleanup Target Levels (SCTLs)]	F.A.C. Chapter 62-777	TBC / Chemical-Specific	This rule provides guidance for soil cleanup levels developed on a site-by-site basis.	Will be used to identify COCs and for the development of soil cleanup goals at this site.
Federal Regulatory Requirement	Occupational Safety and Health Administration (OSHA) General Industry Standards	29 CFR Part 1910	Applicable / Action Specific	Requires establishment of programs to assure worker health and safety at hazardous waste sites, including employee-training requirements	These regulations will apply to all soil remedial activities at Site 18.
Federal Regulatory Requirement	OSHA, Occupational Health and Safety Regulations	29 CFR Part 1910, Subpart Z	Applicable / Action Specific	Establishes permissible exposure limits for workplace exposure to a specific listing of chemicals	Will be applied to control worker exposure to OSHA hazardous chemicals during remedial activities.
Federal Regulatory Requirement	OSHA, Recordkeeping, Reporting, and Related Regulations	29 CFR Part 1904	Applicable / Action Specific	Provides recordkeeping and reporting requirements applicable to remedial activities.	These requirements will apply to all site contractors and subcontractors and will be followed during all site work.

TABLE 2-7

**SUMMARY OF FEDERAL AND STATE ARARS AND GUIDANCE SPECIFIC TO ALTERNATIVE 2  
RECORD OF DECISION  
SITE 18, CRASH CREW TRAINING AREA B  
NAVAL AIR STATION WHITING FIELD  
MILTON, FLORIDA**

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<b>Authority</b>	<b>Requirement</b>	<b>Citation</b>	<b>Status/Type</b>	<b>Synopsis</b>	<b>Evaluation/Action To Be Taken</b>
Federal Regulatory Requirement	OSHA, Health and Safety Standards	29 CFR Part 1926	Applicable / Action Specific	Specifies the type of safety training, equipment, and procedures to be used during the site investigation and remediation.	All phases of the remedial response project will be executed in compliance with these standards.
Federal Regulatory Requirement	CERCLA and the NCP Regulations	40 CFR, Section 300.430	Applicable / Action Specific	Discusses the types of institutional controls to be established at CERCLA sites.	These regulations may be used as guidance in establishing appropriate institutional controls at Site 18.
State Regulatory Requirement	Florida Rules on Hazardous Waste Warning Signs	F.A.C. Chapter 62-730	Applicable / Action Specific	Requires warning signs at NPL and FDEP-identified hazardous waste sites to inform the public of the presence of potentially harmful conditions.	This requirement will not be met.
State Regulatory Requirement	Florida Rules on Cancer Risk Levels	F.A.C. Rule 62-780	TBC / Chemical-Specific	This rule provides guidance for cancer risk target levels developed on a site-by-site basis.	Will be used to identify COCs and for the development of soil cleanup goals at Site 18.
Federal Regulatory Requirement	NA	NA	NA	NA	There are no Federal Location-Specific ARARs specific to this site.

Notes: NA = Not Applicable

## **2.12 DOCUMENTATION OF SIGNIFICANT CHANGES**

No significant changes have occurred at Site 18 since the public comment period for the Proposed Plan (TtNUS, 2006a).

## REFERENCES

Geraghty & Miller, Inc. (G&M), 1986. *Verification Study, Assessment of Potential Groundwater Pollution at NAS Whiting Field, Milton, Florida*. Final Report. Prepared for NAVFAC EFD SOUTH, North Charleston, South Carolina.

Bechtel Environmental, Inc. February 2000. Interim Remedial Action Completion Report. Sites 9, 10, 17, 18, 31C Surface Soil Remediation, NAS Whiting Field, Milton, Florida. Prepared for Department of the Navy, Southern Division.

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HLA, 2001. *Feasibility Study Site 18, Crash Crew Training Area B, Naval Air Station Whiting Field, Milton, Florida*. Prepared for NAVFAC EFD SOUTH, North Charleston, South Carolina. March.

Tetra Tech NUS, Inc. (TtNUS), 2006a. *Proposed Plan for Site 18, Crash Crew Training Area B, Naval Air Station Whiting Field, Milton, Florida*. Prepared for NAVFAC SE, North Charleston, South Carolina. January.

TtNUS, 2006b. *Risk Assessment Re-evaluation for Soils at Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18, Naval Air Station Whiting Field, Milton, Florida*. Prepared for NAVFAC SE, North Charleston, South Carolina. October.

**APPENDIX A**

**COMMUNITY RELATIONS  
RESPONSIVENESS SUMMARY**

**Responsiveness Summary  
Site 18, Crash Crew Training Area B  
Naval Air Station Whiting Field  
Milton, Florida**

A public comment period on the Site 18 Proposed Plan was held from 15 Aug through 14 Sep 2006. No public comments were received, and because a public meeting was not requested one was not held.