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NAS WHITING FIELD
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FINAL RECORD OF DECISION FOR SITE 11 NAS WHITING FIELD FL
9/24/2007
TETRA TECH NUS

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888



Rev. 1
09/24/07

Record of Decision for OU 10, Site 11, Southeast Open Disposal Area B Surface and Subsurface Soil

**Naval Air Station Whiting Field
Milton, Florida**

USEPA ID No. FL2170023244

Contract Task Order 0369

September 2007



Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

**RECORD OF DECISION
FOR
OPERABLE UNIT 10 - SITE 11, SOUTHEAST OPEN DISPOSAL 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 2007

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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: 24 September 2007

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

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Task Technical Lead

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ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
bls	Below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CG	Cleanup Goals
COC	Constituent of concern
COPC	Constituent of Potential Concern
DERP	Defense Environmental Restoration Program
ERA	Ecological risk assessment
EE	Envirodyne Engineers, Inc.
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FFA	Federal Facility Agreement
FS	Feasibility Study
FSA	FS Addendum
ft	Feet
ft ²	Square feet
G&M	Geraghty & Miller, Inc.
GIS	Geographical information system
HHRA	Human health risk assessment
HI	Hazard Index
HLA	Harding Lawson Associates
IAS	Initial Assessment Study
IC	Institutional Control
ILCR	Incremental Lifetime Cancer Risk
IR	Installation Restoration
IRA	Interim Remedial Action
LUCs	Land Use Controls
mg/kg	milligrams per kilograms
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
NFA	No further action
NPL	National Priorities List
NPW	Net present worth
O&M	Operation and Management
OU	Operable Unit
PCB	Polychlorinated Biphenyl
PRG	Preliminary Remediation Goal
RA	Remedial Action
RAO	Remedial Action Objective
RBC	Risk-based concentration
RD	Remedial Design
RI	Remedial Investigation

ACRONYMS (Continued)

ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SCTL	Soil Cleanup Target Level
SVOC	Semivolatile organic compound
TAL	Target Analyte List
TBC	To Be Considered
TCL	Target Compound list
TRPH	Total recoverable petroleum hydrocarbons
TtNUS	Tetra Tech, NUS, Inc.
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound
yd ³	Cubic yard

1.0 DECLARATION OF THE RECORD OF DECISION

1.1 SITE NAME AND LOCATION

Naval Air Station (NAS) Whiting Field [United States Environmental Protection Agency (USEPA) Identification Number - FL2170023244] 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) 10 - Site 11, Southeast Open Disposal Area B, is located near the southeastern facility boundary near the South Air Field at NAS Whiting Field. The approximate location of Site 11 is presented on Figure 1-1.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for OU 10 - Site 11 as 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 at Site 11. The selected action was chosen by the United States Navy (Navy) and the 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 file 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 11 [Harding Lawson Associates (HLA), 2000] identified/detected one volatile organic compound (VOC), two semivolatile organic compounds (SVOCs), nine pesticides and polychlorinated biphenyls (PCBs), 22 inorganic constituents, total recoverable petroleum hydrocarbons (TRPH), and cyanide in surface soil and three VOCs, one SVOC, seven pesticides and PCBs, and 19 inorganic constituents in subsurface soil. Two constituents, dieldrin and lead, were identified as constituents of concern (COCs) in surface soil under a residential land use scenario based on the revised human health risk assessment (HHRA) included in the Risk Assessment

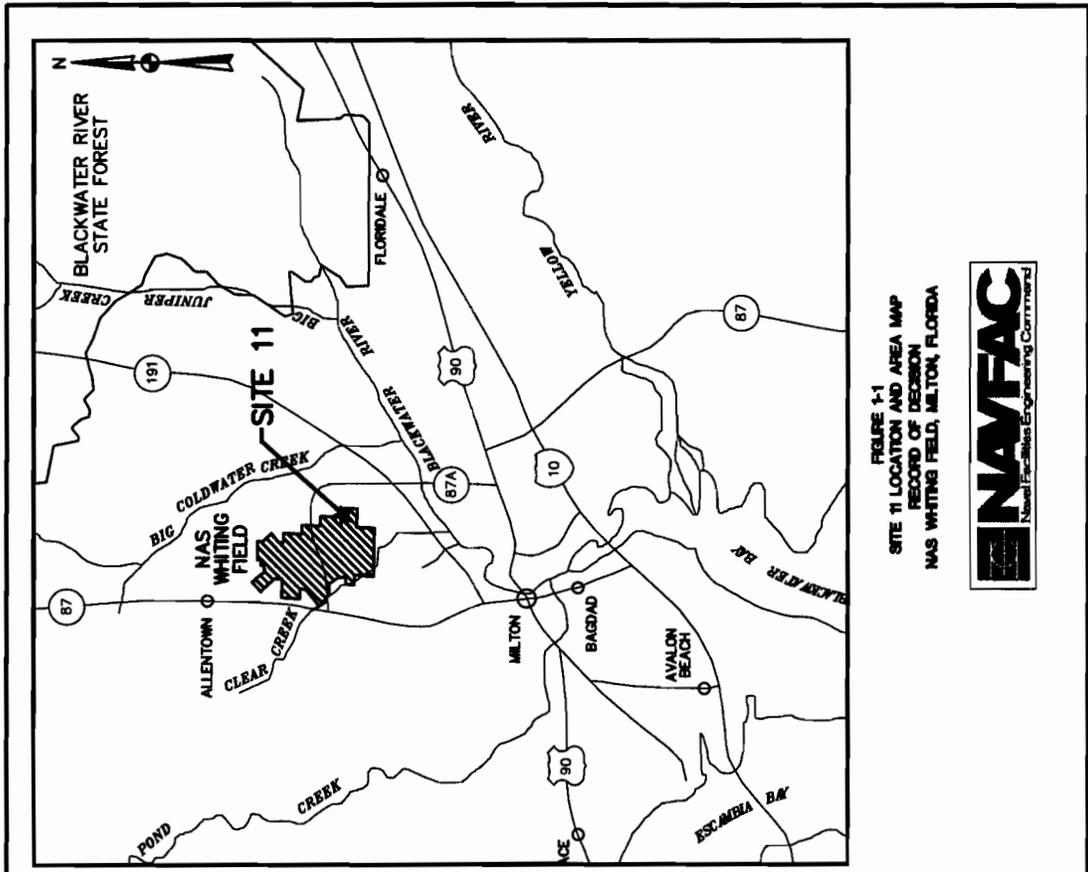
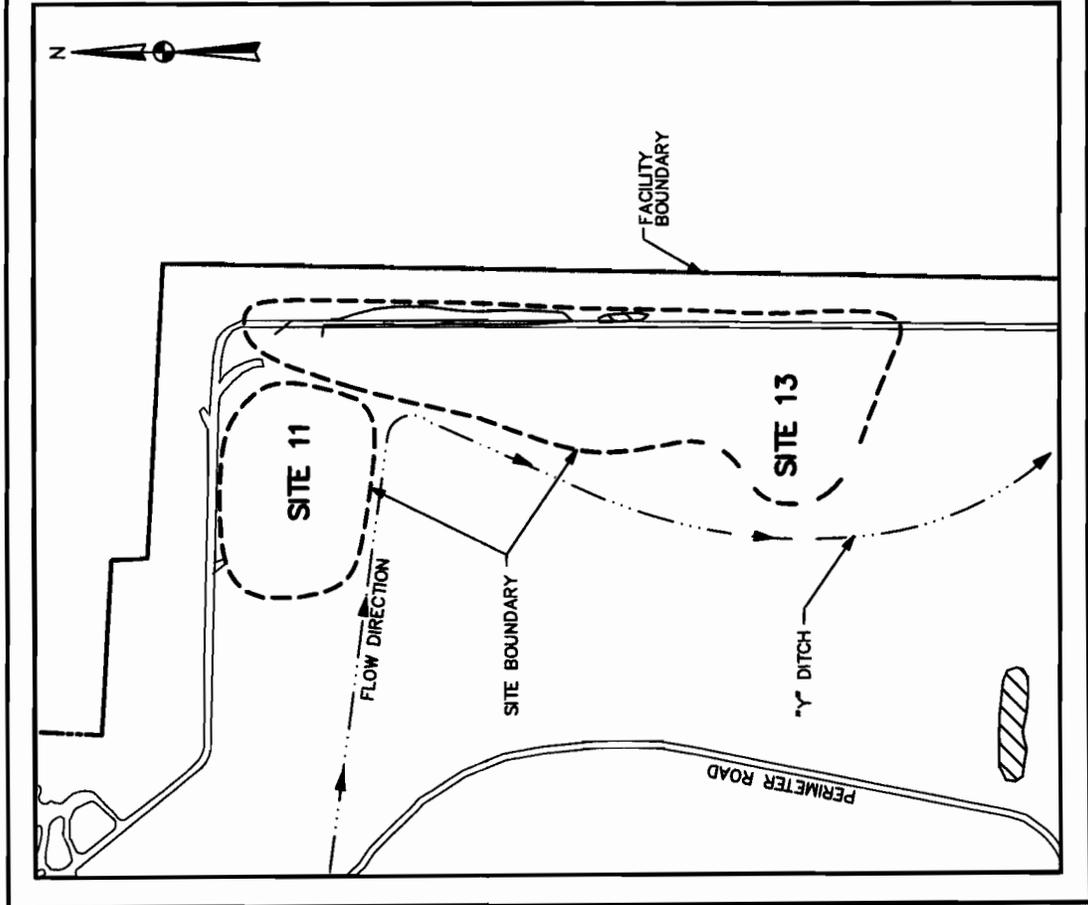


FIGURE 1-1
 SITE 11 LOCATION AND AREA MAP
 RECORD OF DESIGN
 NAS WHITING FIELD, MILTON, FLORIDA



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Re-evaluation of Soils, Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18 report [Tetra Tech NUS, Inc. (TtNUS), 2006]. No COCs were identified for exposure to subsurface soil at Site 11.

The revised HHRA was required to evaluate the impact of the changed conditions for surface and subsurface soil at Site 11 at NAS Whiting Field.

The changed conditions at Site 11 include:

- Arsenic originally identified as a COC at Site 11 was determined to be naturally occurring at the site. Based on additional review of inorganic data from the facility and surrounding area in April 2001, the observed arsenic values were determined to represent naturally occurring levels (FDEP, 2001). Because the identified human health risks associated with arsenic are now considered to be due to naturally occurring levels, arsenic will not be retained as a COC, and remediation of arsenic in surface soil is not required at Site 11.
- Over the course of the investigations at this site, USEPA Region IV changed its screening criteria for evaluation of hazardous waste-related sites from the USEPA Region III Risk-Based Concentrations (RBCs) to the USEPA Region IX Preliminary Remediation Goals (PRGs) (USEPA, 2002). Therefore, analytical results are now compared to the USEPA Region IX PRGs and FDEP Soil Cleanup Target Levels (SCTLs) (FDEP, 2005).
- The inorganic constituents, aluminum, arsenic, iron, manganese, and vanadium, were detected above screening levels; however, there is no direct evidence of site-related use of these constituents at Site 11. Additionally, the detected concentrations of these inorganics are within the range of levels found at NAS Whiting Field (HLA, 2000). The technical memorandum "Inorganics in Soil at NAS Whiting Field" (TtNUS, 2005) presents the technical basis for this determination. Considering the information presented above, aluminum, iron, and vanadium are not considered constituents of potential concern (COPCs) for Site 11 surface and subsurface soils.

A summary of site risks is provided in Section 2.6 of this Record of Decision (ROD).

The ecological risk assessment (ERA) presented in the RI for Site 11 did not identify any unacceptable ecological risks at Site 11; therefore, further ecological study is unwarranted. A discussion of ecological risk is presented in Section 2.6.2.

The response action selected in this ROD is necessary to protect public health, welfare, or the environment from 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 11 and is based on results of the RI (HLA, 2000), Feasibility Study (FS) (HLA, 2001), FS Addendum (FSA) (TtNUS, 2007a), Proposed Plan (TtNUS, 2007b), and revised HHRA (TtNUS, 2006). This ROD only addresses surface and subsurface soils at Site 11, it 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 at Site 11.

The selected remedy for Site 11 is LUCs that will restrict future use of the site to nonresidential activities involving less than full-time human contact with surface and subsurface soil. The selected remedy was determined based on evaluation of the site conditions, site-related risks, anticipated future land use, and Remedial Action Objectives (RAOs).

The following LUC objectives have been established for Site 11:

- Prohibition of future residential development of the site
- Prohibition of excavation and/or removal of soil off site
- Posting of warning signs

The LUC objectives will be achieved by implementing Institutional Controls (ICs) as described in Section 2.10 of this ROD.

The Navy shall prepare a LUC Remedial Design (RD) document in accordance with USEPA guidance and submit the document to the USEPA and FDEP for review and comment. The document should

describe specific implementation and maintenance actions to ensure the viability of the selected remedy. The Navy will also prepare and submit to the USEPA and FDEP all other post-ROD documents as specified in the Federal Facility Agreement (FFA) and further described in the 2004 Department of Defense/USEPA Principles and Procedures for LUCs and Other Post-ROD Actions (LUC Principles).

1.5 STATUTORY DETERMINATIONS

The LUC remedy selected for surface and subsurface soils at Site 11 is protective of human health and the environment, complies with federal and state requirements legally applicable or relevant and appropriate, and is cost effective.

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 this remedy will result in contaminants remaining on site above residential risk-based levels, LUCs will be implemented to prevent residential uses and to ensure that RAOs are being achieved. The remedy will result in hazardous substances or contaminants remaining on site at levels that do not allow for unrestricted use and unlimited exposure; therefore, in accordance with Section 121(c) of CERCLA and NCP 300.430(f)(5)(iii)(c), a statutory review will be conducted within 5 years of initiation of remedial action, and every five years thereafter, to ensure the remedy continues to be protective of human health and the environment.

1.6 ROD 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 11.

TABLE 1-1
DATA CERTIFICATION CHECKLIST
SITE 11 – SOUTHEAST OPEN DISPOSAL AREA B
RECORD OF DECISION
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Information	ROD Reference
COCs	Sections 2.5.1.1 Pages 2-7
Baseline risk represented by the COCs	Section 2.6.1 and 2.6.3 Pages 2-9 and 2-12
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 2-9
Potential land uses available at the site as a result of the selected remedy	Section 2.10.4 Page 2-24
Estimated capital, operation and maintenance (O&M), and net present worth (NPW) costs, discount rate used, and time frame these costs are projected for the selected remedy	Section 2.10.3 Page 2-23 and Table 2-5 Page 2-25
Key factors leading to the selection of the remedy	Section 2.10.1 Page 2-15

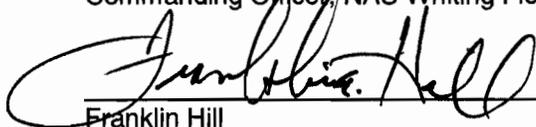
1.7 AUTHORIZING SIGNATURES



Enrique L. Sadsad
Captain, United States Navy
Commanding Officer, NAS Whiting Field

26 SEP 2007

Date



Franklin Hill
Director, Superfund Division
USEPA, Region 4

9/27/07

Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

Site 11, Southeast Open Disposal Area B, is located along the eastern facility boundary near the South Air Field and is approximately 3 acres in size. The site topography is generally flat.

The site layout of Site 11 is shown on Figure 2-1. There are no buildings at Site 11, and no permanent surface water bodies are located in the immediate vicinity of the site. At this time, Site 11 consists of vacant, unused land with exposed soil, sparse native grasses, scrub oak vegetative cover, and planted pine trees. Site 11 is not fenced; however, access is controlled at the perimeter security gate.

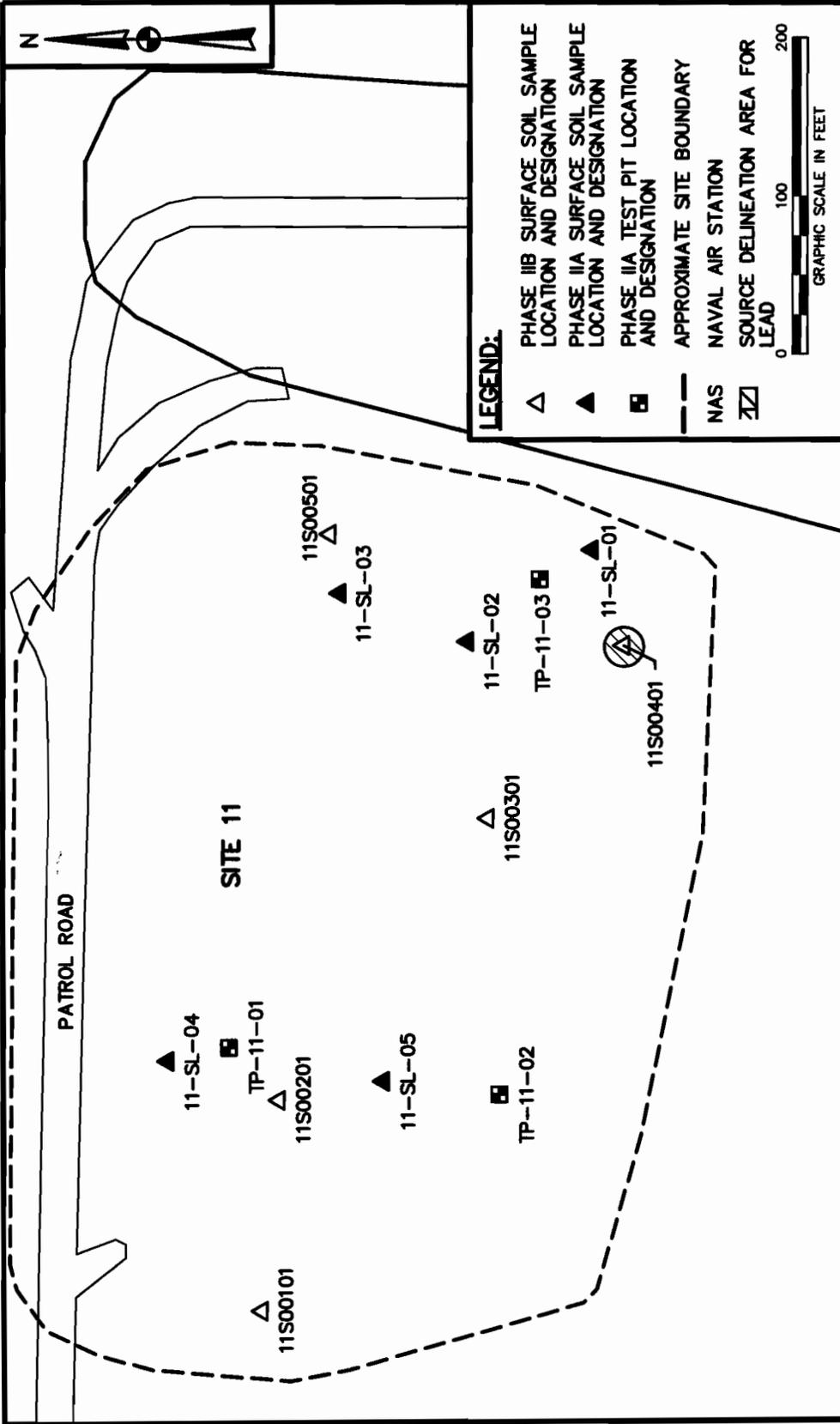
2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

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)]. The record search conducted during the IAS indicated that throughout its years of operation, NAS Whiting Field generated a variety of waste related to pilot training, operation and maintenance of aircraft and ground support equipment, and facility maintenance programs. There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of Site 11.

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 reasonably anticipated future land use at Site 11 is non-residential/recreational (such as parks or trails).



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REVIEWED BY		DATE	APPROVED BY	
SCALE AS NOTED		DRAWING NO. FIGURE 2-1		
<p>SITE 11 PLAN MAP SOUTHEAST OPEN DISPOSAL AREA B RECORD OF DECISION NAS WHITING FIELD MILTON, FLORIDA</p>			REV. 0	

2.2.2 Site 11 History

Site 11 is an old borrow pit used as an open disposal area from 1943 until approximately 1970. Access to the site was unrestricted during its use. The site received a wide variety of wastes including general refuse, construction debris, tree clippings, furniture, waste solvents, paint, transformer oils, hydraulic fluid, and various other oils. When disposal operations were discontinued in 1970, a final permeable native soil covering was placed over the site, and pine trees were planted (HLA, 2000).

Past uses of hazardous waste (described above) at Site 11, although acceptable at the time, had the potential to cause long-term problems through the release of hazardous constituents into soil and groundwater. As part of the Installation Restoration (IR) Program and the Navy Assessment and Control of Installation Pollutants (NACIP) Program, Site 11 was included in the Verification Study for NAS Whiting Field (G&M, 1986).

A surface soil assessment was conducted during the RI of Site 11 in two phases (Phase IIA and IIB). Phase IIA included the collection of soil samples from five locations (11-SL-01 through 11-SL-05) in 1992. The Phase IIB investigation included the collection of soil samples from 13 locations (11S00101 through 11S01301) in 1995. The Phase IIA samples were collected at locations where subsurface geophysical anomalies were interpreted to be present. Because the Phase IIA surface soil sample locations were biased based on geophysical anomalies, five of the Phase IIB surface soil samples were collected using a random sampling technique to more appropriately support the HHRA. Phase IIB sampling involved a systematic sampling method in which a point was chosen at random along a transect, and samples were collected at equidistant intervals. The other eight Phase IIB soil sample locations were collected on a 10-ft radius around Phase IIA soil sample 11S00401 to further delineate lead contamination detected at this location.

Additional soil sampling around soil sample location 11-SL-02 and a subsequent removal action near soil sample location 11-SL-04 were conducted in 1999 during an interim remedial action (IRA) at Site 11 (CCI, 2000). Details of this sampling event and removal action are provided in the Site 11 RI Report (HLA, 2000).

The Phase IIA and IIB surface soil samples were collected from a depth interval of 0 to 12 inches below land surface (bls) and analyzed for Target Compound List (TCL) VOCs, SVOCs, pesticides and PCBs, Target Analyte List (TAL) inorganics, TRPH, and cyanide.

During the RI, one VOC, two SVOCs, nine pesticides and PCBs, 22 inorganic constituents, TRPH, and cyanide were detected in surface soil and three VOCs, one SVOC, seven pesticides/PCBs, and 19 inorganic constituents were detected in subsurface soil at Site 11.

Table 2-1 summarizes the Site 11 investigative history.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Navy has conducted public participation activities in accordance with CERCLA and, to the extent practicable, the NCP throughout the CERCLA site cleanup process. The FS (HLA, 2001), FSA (TtNUS, 2007a) and Proposed Plan (TtNUS, 2007b) for Site 11 were made available to the public for review in August 2007. These documents, and other IR Program information, are contained within the NAS Whiting Field 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 Milton Press Gazette on August 12 and 18, 2007, respectively, and it targeted the communities closest to NAS Whiting Field. The availability notice presented information on the RI, FS, and FSA at Site 11 and invited community members to submit written comments on the Proposed Plan.

A public comment period was held from August 15 through September 14, 2007, 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.

TABLE 2-1
INVESTIGATIVE HISTORY
RECORD OF DECISION
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Date	Investigation	Activities	Findings
1986	Verification Study, Assessment of Potential Groundwater Pollution at NAS Whiting Field, Florida (G&M, 1986)	<ul style="list-style-type: none"> On-site survey and interviews Installation of one monitoring well and groundwater sampling 	<ul style="list-style-type: none"> Site 11 was an old borrow pit that was used as an open disposal area from 1943 to approximately 1970. The site received a wide variety of wastes including general refuse, construction debris, tree clippings, furniture, waste solvents, paint, transformer oils, hydraulic fluid, and various other oils. Site 11 was recommended for additional investigation due to the potential for off-site migration and impact on human and ecological receptors.
1992-1999	Remedial Investigation, Site 11, NAS Whiting Field, Milton, Florida (HLA, 2000)	<ul style="list-style-type: none"> Geophysical survey Geological assessment Hydrogeological assessment Collection and analysis of surface and subsurface soil samples Installation of groundwater monitoring wells and groundwater sampling Soil gas survey HHRA ERA 	<ul style="list-style-type: none"> Groundwater flow direction is to the southeast across the site. The HHRA determined that carcinogenic risk from exposure to surface soil may be unacceptable for current and future receptors. The total ILCR associated with exposure to soil by a hypothetical future resident and industrial worker exceeded FDEP's target level of concern (1×10^{-6}) due to arsenic. The non-cancer risk associated with ingestion of and direct contact with soil under current and hypothetical future land uses are less than USEPA's and FDEP's target HI of 1.0. The ERA did not predict unacceptable risks to ecological receptors from constituents present in surface and subsurface soil.
2001	Feasibility Study for Site 11, NAS Whiting Field, Milton, Florida (HLA, 2001)	<ul style="list-style-type: none"> Evaluated remedial alternatives for site cleanup of COCs. 	<ul style="list-style-type: none"> Six COCs identified for surface and subsurface soil.
2006	Risk Assessment Re-Evaluation of Soils at Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18, NAS Whiting Field, Milton, Florida (TNUS, 2006)	<ul style="list-style-type: none"> Evaluated changed conditions at the site and changes in regulatory screening criteria. 	<ul style="list-style-type: none"> Two COCs identified for surface soil.
2007	Feasibility Study Addendum for Site 11, NAS Whiting Field, Milton, Florida (TNUS, 2007a)	<ul style="list-style-type: none"> Evaluated remedial alternatives for site cleanup of COCs. 	<ul style="list-style-type: none"> Two COCs identified for surface soil based on the Risk Assessment Re-evaluation.
2007	Proposed Plan, Site 11, NAS Whiting Field, Milton, Florida (TNUS, 2007b)	<ul style="list-style-type: none"> Established public comment period from Aug 15 through Sep 14, 2007. 	<ul style="list-style-type: none"> Proposed remedy: LUCs for Site 11 surface and subsurface soil. No comments received.

HHRA = Human health risk assessment
ILCR = Incremental lifetime cancer risk
ERA = Ecological risk assessment
HI = Hazard index

FDEP = Florida Department of Environmental Protection
USEPA = United States Environmental Protection Agency
SCTLs = Soil Cleanup Target Levels
COCs = Constituents of concern

2.4 SCOPE AND ROLE OF OPERABLE UNIT 10 - SITE 11

The environmental concerns at NAS Whiting Field are complex. The environmental work at NAS Whiting Field is part of the Navy's ongoing Installation Restoration (IR) Program and has been organized into 27 OUs. The IR Program at NAS Whiting Field is governed by the FFA and Site Management Plan. Cleanup activities are being performed in accordance with the requirements of CERCLA; the Department of Defense Environmental Restoration Program (DERP); Executive Order 12580; USEPA issued CERCLA guidances including, where practicable, the NCP; as well as other federal and state environmental and facility siting laws, regulations, guidance, and policies to the extent required by CERCLA. The only exceptions to this are those sites subject to the State of Florida Underground Storage Tank Corrective Action Program.

The Proposed Plan recommended LUCs as the selected remedy for surface and subsurface soils at OU 10 - Site 11. Therefore, this ROD documents the selected remedy for Site 11 and presents the final response action as LUCs for surface and subsurface soil. Final RODs have been approved for OU 1 through OU 3; OU 5 and OU 6; OU 8; OU 11 through OU 14; OU 16 and OU 22, OU 23, and OU 26.

The groundwater at NAS Whiting Field has been designated as a separate site (OU 25 - Site 40, Basewide Groundwater) and is not addressed in this ROD. There is no surface water or sediment present at Site 11.

Investigations at OU 10 - Site 11 indicated the presence of soil contamination from past operating practices. This contamination would pose an unacceptable human health risk if the site was used for residential purposes. The remedy documented in this ROD will achieve the RAOs for OU 10 - Site 11, as listed in Section 2.7. Implementation of this remedy will allow recreational reuse of the site, as indicated for the area in the NAS Whiting Field Master Plan, which is in accordance with the overall cleanup strategy for Whiting Field of restoring the facility for beneficial reuse.

2.5 SITE CHARACTERISTICS

Site 11, Southeast Open Disposal Area B, is approximately 3 acres in size and is located along the southeastern facility boundary near the South Air Field at NAS Whiting Field. The site topography is generally flat.

Site 11 is an old borrow pit used as an open disposal area from 1943 until approximately 1970. Access to the site was unrestricted during its use. The site received a wide variety of wastes including general refuse, construction debris, tree clippings, furniture, waste solvents, paint, transformer oils, hydraulic fluid, and various other oils. When disposal operations were discontinued in 1970, a final permeable native soil covering was placed over the site, and pine trees were planted.

Currently, Site 11 consists of vacant, unused land covered with dense native vegetation and pine trees. No permanent surface water bodies exist in the immediate vicinity of Site 11.

The following sections summarize the nature and extent of contamination at Site 11. Further details of the investigation and a complete list of all constituents and their detected concentrations in surface and subsurface soil is available in the RI Report for Site 11 (HLA, 2000).

2.5.1 Nature and Extent of Contamination

As part of the RI conducted for Site 11, 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.

Surface and subsurface soil sample locations are presented on Figure 2-1.

2.5.1.1 Surface Soil

Surface soil sampling was conducted at Site 11 to determine the nature and extent of contamination at the site and to assess whether surface soil could potentially serve as an exposure pathway to human or ecological receptors.

Several organics [benzo(a)pyrene and several pesticides], lead, and TRPH were selected as human health COPCs for surface soil. Benzo(a)pyrene was detected in 1 of 16 surface soil samples. Benzo(a)pyrene, 4,4'-DDT, alpha-chlordane, and gamma-chlordane were detected at concentrations exceeding the simple apportioned SCTLs and preliminary remediation goals (PRGs) but were less than the non-apportioned PRGs and SCTLs. Dieldrin was detected at concentrations exceeding the simple apportioned and non-apportioned PRGs and SCTLs. Heptachlor and heptachlor epoxide were detected at concentrations exceeding the simple apportioned and non-apportioned PRGs and simple apportioned SCTL but were less than the non-apportioned SCTL. The maximum detected TRPH concentration exceeded the simple apportioned SCTL only.

Only dieldrin and lead were identified as COCs following the revised risk assessment for surface soils at Site 11.

2.5.1.2 Subsurface Soil

Subsurface soil sampling was conducted at Site 11 to determine the nature and extent of contamination at the site and to assess whether subsurface soil could potentially serve as an exposure pathway to human or ecological receptors.

Aldrin, Aroclor-1254, and Aroclor-1260 were detected in one sample. Concentrations of aldrin and cadmium exceeded the simple apportioned PRGs, but were less than the non-apportioned PRGs and simple apportioned and non-apportioned SCTLs. Concentrations of Aroclor-1260 exceeded the simple apportioned PRG and SCTL, but were less than the non-apportioned PRG and SCTL. Concentrations of Aroclor-1254 and dieldrin exceeded the simple apportioned and non-apportioned PRGs and simple apportioned SCTLs but were less than the non-apportioned SCTL.

No COCs were identified following the revised risk assessment for subsurface soils at Site 11.

2.5.2 Ecological Habitat

Site 11 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

Dieldrin and lead are the only COCs in soil at Site 11. The primary agents of migration acting on soil at Site 11 include wind, water, and human activity. Soil can also act as a source medium, allowing COCs to be transported to other media (groundwater, sediment, or surface water).

Transport of COCs from soil via wind is not expected to be a major transport mechanism based on the characteristics of dieldrin and lead and the presence of dense vegetation at Site 11. 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 11, human activity and ecological receptors are not major transport mechanisms for COCs in soil.

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 soil to groundwater is a potential concern at Site 11. 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 11 because of the following: (1) the minimal slope of the land surface at the site; (2) vegetation covering the site; and (3) the nature of the constituents remaining in soil at the site. Leaching of constituents from soil to groundwater will be evaluated as part of the RI/FS for Site 40, Basewide Groundwater. As stated earlier, there is no surface water or sediment present at Site 11.

2.5.4 Current and Potential Future Land and Resource Use

The current and reasonably anticipated future land use at Site 11 is recreational (such as parks and/or trails).

2.6 SUMMARY OF SITE RISKS

A HHRA and ERA were completed for Site 11 to evaluate current and potential future threats to human health or the environment. These risk assessments evaluated the constituents detected in site soil during the RI.

The results of the HHRA and ERA provide the basis for taking action and selecting the remedial action (RA) for Site 11. The HHRA at Site 11 was revised to evaluate the changed conditions (as discussed in Section 1.3) at the site and changes in regulatory screening criteria (Section 1.3) that became 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 11.

2.6.1 HHRA

The Site 11 HHRA was revised to characterize the risks associated with potential exposures to site-related contaminants by human receptors. Details of the revised HHRA are provided in Section 5.0 of the Risk Assessment Re-evaluation of Soils, Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18 report (TtNUS, 2006).

2.6.1.1 Risk Characterization

Potential risks at Site 11 were estimated for five receptors (the hypothetical future resident, typical industrial worker, construction worker, maintenance worker, and recreational user/trespasser). Dieldrin and lead were the only constituents detected at concentrations in excess of direct contact, risk-based COPC screening levels (SCTLs and PRGs) and consequently were retained as COPCs for surface and subsurface soil and evaluated in the quantitative HHRA.

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.

Non-Carcinogenic Risk

The non-cancer risk estimates (i.e., HIs) for the hypothetical future resident exposed to surface soil did not exceed 1.0, indicating that no adverse, non-carcinogenic health effects are anticipated under the conditions established in the exposure assessment. The non-cancer risk estimates (i.e., HIs) for the typical industrial worker or the construction worker also did not exceed 1.0.

Carcinogenic Risk

Cumulative ILCRs for exposures to subsurface soil were less than or within USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for all receptors. However, the ILCR for residents hypothetically exposed to surface soil exceeded 1×10^{-6} . The chemical-specific ILCR for dieldrin exceeded 1×10^{-6} for exposures of residents to surface soil.

The cancer risk estimate developed for the future resident hypothetically exposed to dieldrin in surface soil exceeded 1×10^{-6} . However, cancer risk estimates for the typical industrial worker and construction worker did not, and none of the cancer risk estimates exceeded the USEPA cancer risk range of 1×10^{-4} to 1×10^{-6} .

The primary risk driver for surface soil was dieldrin; chemical-specific risk estimates for all other COPCs are less than 1×10^{-6} . The risk evaluation of lead concentrations detected in the Site 11 surface soil indicated that exposure to the average lead concentration in surface soil would not result in blood lead concentrations exceeding USEPA benchmarks. However, the lead concentration reported for one surface soil location [11-SL-02, 2,230 milligrams per kilogram (mg/kg)] is five times the USEPA action level for residential land use (400 mg/kg). Extensive surface soil sampling for lead in the immediate vicinity of location 11-SL-02 suggests a very limited area of lead contamination.

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 11 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 constituents in the environmental media at the site.

2.6.2 ERA

A screening-level ERA was performed for Site 11 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 11 considered exposure of terrestrial plants, terrestrial invertebrates, and wildlife receptors to chemicals in soil at the site. All constituents detected in surface soil at Site 11, including VOCs, SVOCs, TRPH, pesticides/PCBs, and inorganic analytes, were evaluated during the screening-level assessment.

Dieldrin and lead were detected in surface soil at concentrations exceeding conservative screening levels and therefore were selected as COPCs. These COPCs were assessed in a less conservative evaluation, which analysis indicated that the constituents detected in surface soil at Site 11 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 is unlikely. For these reasons, no unacceptable risks were identified, and further ecological study at Site 11 is unwarranted.

2.6.3 Risk Summary

The risk assessment considered five receptors; the hypothetical future resident, typical industrial worker, construction worker, maintenance worker, and recreational user, assuming exposure via the ingestion, dermal contact, and inhalation routes of exposure.

Dieldrin and lead were identified as the only COCs for surface soil based on a comparison of maximum detected concentrations to screening levels and all HHRA and ecological risk assessment calculations. The non-cancer risk estimates (i.e., HIs) for the hypothetical future resident exposed to surface soil did not exceed 1.0, indicating that adverse non-carcinogenic health effects are not anticipated under the conditions established in the exposure assessment. The non-cancer risk estimates for the typical industrial worker or the construction worker also did not exceed 1.0. The cancer risk estimate developed for the future resident hypothetically exposed to dieldrin in surface soil exceeded 1×10^{-6} . However, cancer risk estimates for the typical industrial worker and construction worker did not, and none of the cancer risk estimates exceeded the USEPA cancer risk range of 1×10^{-4} to 1×10^{-6} . The risk evaluation of lead concentrations detected in the Site 11 surface soil indicated that exposure to average lead concentration in surface soil would not result in blood lead concentrations exceeding USEPA benchmarks.

The ecological COPCs were assessed in the ERA which indicated that the constituents detected in surface soil at Site 11 do not pose unacceptable risks to ecological receptors; therefore, no unacceptable risks were identified, and further ecological study at Site 11 is unwarranted.

Based on USEPA baseline risk assessment guidance, remedial action is not generally warranted at sites where cumulative risk does not exceed the 1×10^{-4} to 1×10^{-6} risk range. However, the guidance also stipulates that risk less than 1×10^{-4} may still be considered unacceptable for site-specific reasons. At Site 11, the suspected presence of buried wastes and debris create the significant possibility that an unacceptable risk will occur if these materials are exposed during excavation or if soil erosion occurs. These site uncertainties warrant implementation of a remedy that precludes potential future exposure to such materials.

Considering these factors, it is in the lead agency's (Navy) current judgment that the selected remedy (LUCs) for Site 11 described in this ROD is warranted and necessary to protect public health, welfare, or the environment from actual or threatened releases of hazardous substances into the environment at this site.

Implementing LUCs prohibiting residential land use and disturbance of soil at this site will allow the Navy to properly and effectively manage future land use at the site and to minimize potential threats to human health or the environment.

2.7 REMEDIAL ACTION OBJECTIVES

RAOs are medium-specific goals that define the objective of conducting remedial actions (RAs) to protect human health and the environment. RAOs specify COCs, potential exposure routes and receptors, and acceptable concentrations (i.e. cleanup goals) for a site, and they provide a general description of what the RA will accomplish. RAOs typically serve as the basis for the remedial alternatives described in Section 2.8.

The RAOs for Site 11 are as follows:

- To preclude unacceptable human health carcinogenic risks associated with incidental ingestion, inhalation, and/or dermal contact with surface soil contaminated with dieldrin and exposure to buried wastes and debris at the site.
- To preclude unacceptable human health non-carcinogenic risks associated with incidental ingestion, inhalation, and/or dermal contact with surface soil contaminated with lead and exposure to buried wastes and debris at the site.

2.7.1 Cleanup Goals

CGs establish acceptable exposure levels protective of human health and the environment. The following soil CGs were established for the Site 11 COCs:

COC	CG
Dieldrin	0.03 mg/kg ⁽¹⁾
Lead	400 mg/kg ⁽²⁾

1 USEPA PRG, residential

2 FDEP SCTL for direct exposure, residential

The CGs were used to determine the areas and volumes of surface soil with the potential to impact human health under a residential land use scenario. The estimated area of contaminated soil exceeding the CGs and/or suspected to contain buried wastes and debris creating unacceptable risk based on potential exposure is 130,680 square feet (ft²), and the estimated volume (to 1 ft bls) is 4,840 cubic yards (y³).

2.8 DESCRIPTION OF ALTERNATIVES

Based on changes in the evaluation criteria (Sections 1.3 and 2.6), the three remedial alternatives evaluated in the FS (HLA, 2001) for Site 11 required re-evaluation based on the revised HHRA (TtNUS, 2006). For further information on the remedial alternatives, refer to the FSA (TtNUS, 2007a), and Proposed Plan for Site 11 (TtNUS, 2007b). The Presumptive Remedy guidance for military landfills was not applied to Site 11 because the site has not been classified as a landfill. The following cleanup alternatives were developed by the Navy, USEPA, and FDEP and are summarized in Table 2-2:

Alternative S11-1: NFA

Alternative S11-2: LUCs

Alternative S11-3: Soil Cover and LUCs

These alternatives were developed in consideration of site risks, the current and reasonably anticipated future recreational land use, federal and state ARARs and guidance, and the limited ecological habitat at Site 11. These alternatives primarily address protection of human health because, as discussed previously, no unacceptable ecological risk was identified. Detailed descriptions of the three alternatives are provided below.

Alternative S11-1: NFA [estimated total NPW cost of \$0]. This alternative is required by the NCP and CERCLA as a baseline for comparison with other alternatives. The NFA alternative assumes no RA would occur (beyond the previous 1999 IRA) and establishes a basis for comparison with the other alternatives. No RA, treatment, LUCs, or monitoring of site conditions would be implemented under the NFA alternative. Alternative S11-1 does not meet chemical-specific applicable or relevant and appropriate requirements (ARARs) or action-specific ARARs.

Alternative S11-2: LUCs (estimated total NPW cost \$103,000). This alternative addresses the principal threats through the implementation of LUCs for surface and subsurface soil. The LUCs would ensure that future access to soil at the site will be restricted. The LUCs for Site 11 would limit exposure to soil contamination through a digging prohibition and the use of warning signs. The LUCs would also ensure

appropriate non-residential future land use. Prohibited uses of the site would include, but are not limited to, residential housing, elementary and secondary schools, child care facilities, playgrounds, and adult convalescent or nursing home facilities.

TABLE 2-2
SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED
RECORD OF DECISION
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Alternative	Description of Key Components	Cost ⁽¹⁾	Duration ⁽²⁾
Alternative S11-1: No Further Action	No additional remedial actions are performed at Site 11	\$0	NA
Alternative S11-2: LUCs	Post warning signs. Implement LUCs to address contaminants in soil at concentrations in excess of residential standards. An LUC RD will be submitted to USEPA and FDEP and will detail the implementation plans to prohibit residential use of the property.	\$103,000 ⁽³⁾	30 Years
Alternative S11-3: Soil Cover and LUCs	Construct soil cover for area of site with soil exceeding residential land use CGs. Provide a vegetative cover for soil cover area. Post warning signs. Implement LUCs will address contaminants in soil at concentrations in excess of residential standards. An LUC RD will be submitted to USEPA and FDEP and will detail the implementation plans to prohibit residential use of the property.	\$348,000	30 Years

¹ - Net present worth costs rounded to the nearest thousand dollars.

² - A period of 30 years was chosen for present worth costing purposes only. Under CERCLA, remedial actions must continue until contaminants remaining on site reach levels that allow for unrestricted reuse and unlimited exposure.

³ - The cost for implementation of Alternative S11-2 and S11-3 includes the cost of the required 5-year reviews.

CGs = Cleanup goals
 FDEP = Florida Department of Environmental Protection
 LUCs = Land use controls
 RD = Remedial Design
 USEPA = United States Environmental Protection Agency

Alternative S11-2 alone does not achieve compliance with chemical-specific ARARs; however, compliance will be achieved over time and implementing LUCs would prevent exposure to surface and subsurface soils until that time. Compliance with action-specific ARARs would be achieved by proper implementation and maintenance of LUCs. There are no location-specific ARARs at Site 11.

Alternative S11-3: Soil cover and LUCs (estimated total NPW cost \$348,000). This alternative would provide containment of all surface soil containing COCs at concentrations exceeding levels allowed for Florida residential sites and would include LUCs, as described in Alternative S11-2 above. The soil cover would be constructed over the entire site and include all former disposal areas. The soil cover would consist of clean fill placed and compacted to a minimum thickness of 18 inches, and then 6 inches of topsoil would be placed on top of the clean fill for a total cover thickness of 24 inches. Post-closure monitoring and maintenance of the installed soil cover would be implemented. This program would include visual inspections and maintenance of the cover.

Alternative S11-3 does not meet chemical-specific ARARs for surface and subsurface soils. Compliance with action-specific ARARs would be achieved by proper design and execution of the soil cover.

2.9 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

This section summarizes the comparison of each of the soil remedial alternatives with respect to the nine criteria outlined in the NCP at 40 CFR 300.430(e)(9)(iii). 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. Further information on the detailed comparison of remedial alternatives is presented in the FS (HLA, 2001) and FSA (TtNUS, 2007a). Table 2-4 presents a summary comparison of this analysis.

2.10 SELECTED REMEDY

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. Based on the consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public comments, Alternative S11-2 - LUCs was selected to address surface and subsurface soil at Site 11.

TABLE 2-3
EXPLANATION OF REMEDY SELECTION CRITERIA
RECORD OF DECISION
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Criterion	Description
Threshold	<p>Overall Protection of Human Health and the Environment. Addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering methods, and/or institutional controls.</p> <p>Compliance with ARARs. CERCLA Section 121(d) and NCP §300.430(f)(1)(II)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations, which are collectively referred to as ARARs, unless such ARARs are waived under CERCLA Section 121(d)(4). This criterion addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes or provides a basis for invoking a waiver.</p>
Primary Balancing	<p>Long-Term Effectiveness and Permanence. Refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time after cleanup levels have been met. Also includes consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.</p> <p>Reduction of Contaminant Toxicity, Mobility, and Volume Through Treatment. Refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.</p> <p>Short-Term Effectiveness. Addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.</p> <p>Implementability. Addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other government entities are also considered.</p> <p>Cost. The benefits of implementing a particular alternative are weighted against the cost of implementation.</p>
Modifying	<p>State/Support Agency Acceptance. The FDEP is provided an opportunity to review the selected remedy and concur. The final Feasibility Study Addendum and the Proposed Plan are then placed in the Administrative Record, representing a consensus by the Navy, USEPA, and FDEP.</p> <p>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.</p>

TABLE 2-4
SUMMARY OF COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
RECORD OF DECISION
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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Evaluation Criterion	Soil Alternative 1: No Further Action	Soil Alternative 2: LUCs	Soil Alternative 3: Soil Cover and LUCs
Overall Protection of Human Health and Environment	Would not be protective of human receptors exposed to soil at the site.	Would be protective of human receptors. LUCs would prevent unacceptable potential exposure because future residential use would be prohibited.	Would be very protective because all surface and subsurface soil with concentrations exceeding CGs would be covered, eliminating the risk of exposure. LUCs would prevent potential future residents from coming into contact with soil. Would also provide protection to ecological receptors.
Compliance with ARARs: Chemical-Specific Location-Specific Action-Specific	Would not comply Not applicable Would not comply	Would comply over time Not applicable Would comply	Would comply over time Not applicable Would comply
Long-Term Effectiveness and Permanence	Would not have long-term effectiveness and permanence because contaminants would remain on site.	Would provide long-term effectiveness and permanence through LUCs preventing residential development. LUCs would preclude soil disturbance. Would require long-term management to be administered by the facility through implementing an approved LUC RD and 5-year reviews.	Would provide high level of long-term effectiveness and permanence by covering all impacted soil with concentrations exceeding residential cleanup levels, reducing residual risk from impacted soil at the site, and implementing LUCs to prevent residential development. Would require long-term management and five-year reviews. LUCs would be administered by the facility through implementing an approved LUC RD.
Reduction of Contaminant Toxicity, Mobility, or Volume through treatment	Would not achieve reduction of toxicity, mobility, or volume of contaminants through Treatment.	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment.	Would permanently and significantly reduce mobility of contaminants by covering impacted soil. Volume of impacted soil would not be reduced.

TABLE 2-4
SUMMARY OF COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES
RECORD OF DECISION
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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Evaluation Criterion	Soil Alternative 1: No Further Action	Soil Alternative 2: LUCs	Soil Alternative 3: Soil Cover and LUCs
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 1 year.	Would create short-term risks of workers and potential fugitive dust during soil cover construction. Environmental impacts (fugitive dust and runoff) are expected to be minimal. Engineering controls would minimize any environmental impacts. RAOs and CGs would be met within less than 1 year.
Implementability	Would be simple to implement because no action would occur.	Would be easily implemented. Equipment, specialists, and materials for this alternative are readily available.	Would be easily implemented. This remedial technology is proven and reliable. Equipment, specialists, and materials for this alternative are readily available.
Cost:			
Capital	\$0	\$23,000	\$270,000
NPW O&M (30 year)	\$0	\$80,000	\$78,000
Total cost, NPW (30 years)	\$0	\$103,000	\$348,000

CGs = Cleanup Goals
LUCs = Land use controls
NPW = Net present worth
RAOs = Remedial Action Objectives
RD = Remedial Design

This remedy was selected for the following reasons:

- Concentrations of COCs remaining in soil exceed screening levels for a residential use scenario, however, they do not present an unacceptable threat to human health or the environment if future residential land uses are prohibited at Site 11.
- No unacceptable ecological risks were identified.
- The current and reasonably anticipated future land use of the property at Site 11 is recreational.

2.10.2 Remedy Description

Soil contamination remains at Site 11 at concentrations precluding unrestricted use and unlimited exposure; therefore, the remedy consists of LUCs to address unacceptable risk. These LUCs in the form of institutional controls (ICs) and engineering controls (ECs) will be implemented to prohibit residential development and eliminate unacceptable risks from exposure to contaminated soil.

ICs prohibiting residential use and digging, disturbing, or removing of soil will be placed on an area of land slightly larger than the boundaries of the Site 11 to ensure that an appropriate buffer zone is created. ECs in the form of warning signage will be placed along the boundary of the site. Figure 2-2 presents the approximate LUC boundaries for Site 11.

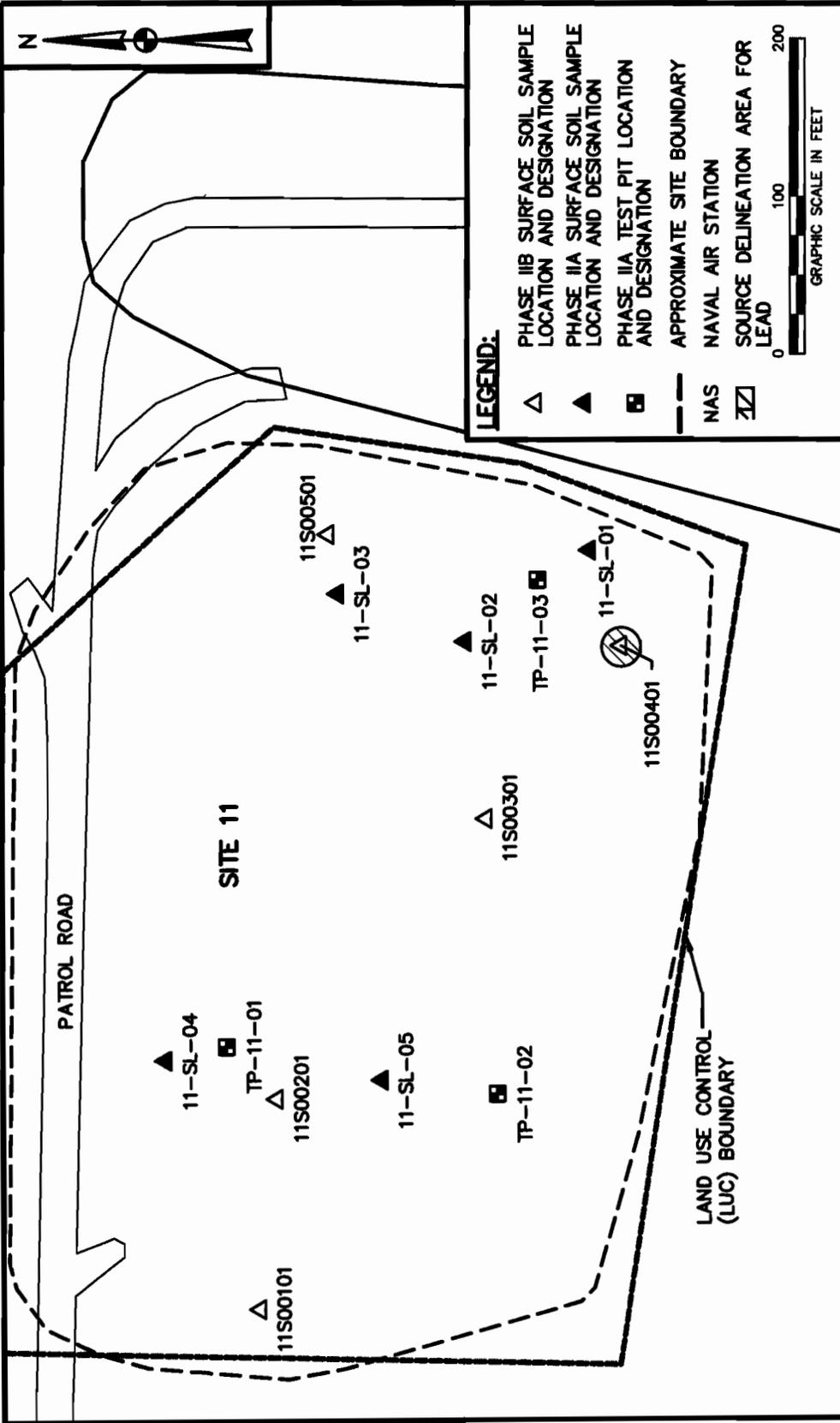
The LUC performance objectives for Site 11 are as follows:

- Maintain the integrity of the remedial system, LUCs;
- Prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities, playgrounds, and adult convalescent and nursing home facilities; and
- Prohibit digging into or disturbance of the existing soil or removal of surface and/or subsurface soil off site.

The LUCs cover only surface and subsurface soil and will be implemented as follows:

Institutional Controls:

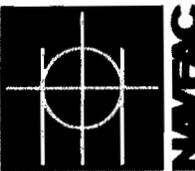
- The designated boundaries for LUCs at Site 10 (as presented in Figure 2-2) and all prohibited uses will be annotated via text and figure/map in the NAS Whiting Field Base Master Plan;



LEGEND:

- △ PHASE IIB SURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- ▲ PHASE IIA SURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- PHASE IIA TEST PIT LOCATION AND DESIGNATION
- - - APPROXIMATE SITE BOUNDARY
- NAS NAVAL AIR STATION
- ⊠ SOURCE DELINEATION AREA FOR LEAD



DRAWN BY MF		DATE 7/30/07		CONTRACT NO. 0006	
CHECKED BY		DATE		OWNER NO.	
REVIEWED BY		DATE		APPROVED BY	
SCALE AS NOTED			DRAWING NO. FIGURE 2-2		
SITE 11 - APPROXIMATE LUC BOUNDARY SOUTHEAST OPEN DISPOSAL AREA B RECORD OF DECISION NAS WHITING FIELD MILTON, FLORIDA			REV. 0		

- The boundaries of Site 11 and all prohibited uses will be annotated in the NAS Whiting Field geographical information system (GIS).

Engineering Controls:

- Warning signs will to be posted along the boundary of Site 11. The signage will advise that site access is restricted and digging is prohibited. The location, size, and wording of the signs will be designated in the LUC RD and will be approved by the Navy, USEPA, and FDEP.

The LUCs/ICs will restrict future use of the site to recreational activities involving less than full-time human contact with surface and subsurface soil.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site at levels greater than levels that allow for unrestricted use and unlimited exposure, a statutory review will be conducted every 5 years after initiation of the remedy to ensure that the remedy continues to be protective of human health and the environment.

The Navy or any subsequent owners shall not modify, delete, or terminate any LUC without USEPA and FDEP concurrence. The LUCs will be maintained until the concentrations of hazardous substances in surface soil at the site have been reduced to levels that allow for unrestricted use and unlimited exposure.

The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs described in this ROD. 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 any LUC remedy fail, the Navy will ensure that appropriate actions are taken to reestablish the remedy's protectiveness and may initiate legal action to either compel action by a third party(ies) and/or to recover the Navy's costs for remedying any discovered LUC violation(s).

The LUC implementation actions including site monitoring and enforcement requirements will be provided in a LUC RD that will be prepared by the Navy as the LUC component of the overall RD. Within 90 days of ROD signature, the Navy shall prepare and submit to USEPA and FDEP for review and approval (pursuant to the primary document review process stipulated in the FFA) the LUC RD for Site 11, which shall contain such requirements including periodic inspections. The Navy will maintain, monitor, and enforce the LUCs according to the LUC RD. LUCs have been developed in accordance with the

Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions, per a letter dated on October 2, 2003, from Raymond F. DuBois, Deputy Under Secretary of Defense (Installations and Environment), to Hon. Marianne Lamont Horinko, Acting Administrator, USEPA.

2.10.3 Summary of Estimated Remedy Costs

The estimated total NPW cost of Alternative S11-2 at Site 11 is approximately \$103,000 over a 30-year period, based on an annual discount rate of 6%. Table 2-5 summarizes the cost estimate data for Alternative S11-2. 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% of the actual project cost.

2.10.4 Expected Outcome of the Selected Remedy

Immediately upon implementation of the selected remedy, Site 11 will be acceptable for its current and intended future use as recreational areas (such as parks or trails), when the LUCs are in place.

The LUCs will be required until the concentrations of COCs in surface soil at the site have been reduced to levels that allow for unrestricted use and unlimited exposure.

2.11 STATUTORY DETERMINATIONS

The alternative selected for Site 11 is consistent with the Navy's IR program, CERCLA, and the NCP. Under CERCLA §121 and the NCP, the selected remedy must be protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The following sections discuss how the selected remedy meets these statutory requirements.

TABLE 2-5

**SELECTED ALTERNATIVE COST ESTIMATE SUMMARY
RECORD OF DECISION
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

CAPITAL COSTS	
Description	Cost
1. Project Planning	\$1,379
2. LUC Implementation	<u>\$20,019</u>
Subtotal	\$21,398
Contingency Allowance (10%)	\$2,140
Engineering/Project Management (5%)	<u>\$1,070</u>
Total Capital Cost	\$24, 608
OPERATION AND MAINTENANCE COSTS	
Description	Cost
1. Total Operation and Maintenance Costs (including 5-year reviews)	\$78,301
Total Net Present Worth Cost for Selected Alternative	\$102,909

2.11.1 Protection of Human Health and the Environment

The selected remedy, Alternative S11-2, will protect human health and the environment.

LUCs restricting future use of the site to non-residential uses will protect human health and the environment. The selected remedy eliminates, reduces, or controls risks by implementing LUCs to: (1) restrict future use of the site to non-residential activities involving less than full-time human contact with surface and subsurface soil and (2) prohibit digging into or disturbance of the existing soil. 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 remedy selection criteria is summarized in Table 2-6.

2.11.2 Compliance with ARARs

CERCLA Section 121(d) specifies in part that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more stringent state environmental laws and regulations that are applicable or relevant and appropriate (i.e., ARARs) to the hazardous substances or particular circumstances at a site or obtain a waiver (see also 40 CFR 300.430(f)(1)(ii)(B)). ARARs include only federal and state environmental or facility citing laws/regulations and do not include occupational safety or worker protection requirements. In addition, per 40 Code of Federal Regulations (CFR) 300.405(g)(3), other advisories, criteria, or guidance may be considered in determining remedies [so-called To-Be-Considered (TBC) criteria].

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that, although not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the

particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

In accordance with 40 CFR 300.400(g), the Navy, FDEP, and USEPA have identified the specific ARARs for the selected remedy. The selected remedy is expected to comply with all ARARs related to implementing the selected action. Tables 2-7 list the chemical-specific and action-specific ARARs associated with implementation of the selected remedy.

2.11.3 Cost Effectiveness

The selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." [NCP §300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the "overall effectiveness" of the alternative that satisfied the threshold criteria (i.e., protective of human health and the environment and ARAR compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence Alternative S11-2 represents a reasonable value for the money spent. The estimated 30-year NPW cost of the selected remedy is \$103,000.

2.11.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The Navy, in consultation with USEPA and FDEP, has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at Site 11. Of those alternatives that are protective of human health and the environment and comply with ARARs, the Navy, in consultation with USEPA and FDEP, has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria while also considering the statutory preference for treatment as a principle element and bias against off-site treatment and disposal and considering State and Community acceptance.

2.11.5 Five-Year Review Requirement

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site in excess of levels that allow for unrestricted use and unlimited exposure, in accordance with Section 121(c) of CERCLA and NCP §300.430(f)(5)(iii)(c), a statutory review will be conducted within 5 years of initiation

TABLE 2-6
SUMMARY EVALUATION OF SELECTED REMEDY
RECORD OF DECISION
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Evaluation Criterion	Assessment
Threshold Criteria:	
Overall Protection of Human Health and the Environment	Human receptors will be protected if this alternative is implemented. Regulatory controls (i.e., LUCs) will prohibit potential future residents from exposure to the site because residential use of the site will be prohibited the proposed LUCs. LUCs will also prohibit excavation/digging into or removal of existing soil at the site.
Compliance with ARARs	This alternative prevents exposure to surface and subsurface soils with concentrations exceeding CGs by implementing LUCs and will meet chemical-specific ARARs over time. It meets action-specific ARARs by proper implementation and maintenance of the LUCs. There are no location specific ARARs.
Primary Balancing Criteria:	
Long-Term Effectiveness	The risks to future workers or trespassers for exposure to surface and subsurface soils at the site is addressed by implementing LUCs. The long-term effectiveness and permanence will be controlled by the installation through the implementation of an approved LUC RD. Administrative actions proposed in this alternative (e.g., 5-year site reviews) will provide a means of evaluating the effectiveness of the alternative. These administrative actions are considered to be reliable controls, if the facility implements the approved LUC RD.
Reduction of Toxicity, Mobility, and Volume through Treatment	This alternative does not treat 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 LUCs.
Implementability	Easily implemented.
Cost	The total net present worth cost of Alternative S11-2 is \$103,000.
Modifying Criteria:	
Federal and State Acceptance	The USEPA approves and the FDEP concurs 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>ARARs = Applicable or Relevant and Appropriate Requirements FDEP = Florida Department of Environmental Protection LUCs = Land use controls RA = Remedial Action RD = Remedial Design USEPA = United States Environmental Protection Agency</p>	

TABLE 2-7

**SUMMARY OF FEDERAL AND STATE ARARs SPECIFIC TO THE SELECTED REMEDY
 RECORD OF DECISION
 SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
 NAVAL AIR STATION WHITING FIELD
 MILTON, FLORIDA**

Authority	Requirement	Citation	Status/Type	Synopsis	Evaluation/Action To Be Taken
Federal Regulatory Requirement	USEPA Region 9 Preliminary Remedial Goals (PRGs)	NA	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.	Were used to identify constituents of concern (COCs) and for the development of soil cleanup goals at Site 11.
State Regulatory Requirement	Florida Contaminant Cleanup Target Levels Rule [Soil Cleanup Target Levels (SCTLs)]	Chapter 62-777(1)(a), F.A.C.	Relevant and Appropriate / Chemical-Specific	Provides guidance for soil cleanup levels that can be developed on a site-by-site basis.	Were used to identify COCs and for the development of soil cleanup goals at Site 11.
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 11.
State Regulatory Requirement	Florida Rules on Hazardous Waste Warning Signs	Chapter 62-730, F.A.C.	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 be met.

NA = Not applicable
 F.A.C. = Florida Administrative Code

of remedial action and every 5 years thereafter to ensure that the remedy continues to be protective of human health and the environment.

2.12 DOCUMENTATION OF SIGNIFICANT CHANGES

The public was provided with an opportunity to review and comment on the Site 11 Proposed Plan. A Public Notice was published in the Pensacola News Journal on August 12, 2007, and in the Milton Press Gazette on August 18, 2007, informing the public that the Proposed Plan (TtNUS, 2007b) was available for review at the NAS Whiting Field Information Repository and requesting that all comments be submitted to the Navy by September 14, 2007. CERCLA Section 117(b) requires an explanation of significant changes from the selected remedy presented in the Proposed Plan that was published for public comment. No comments were received from the public during the comment period; therefore, no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

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United States Environmental Protection Agency (USEPA), 2002. Region IX PRGs Table 2002 Update. USEPA Region IX, San Francisco, California. October 1 and December 20 update.

APPENDIX A

**COMMUNITY RELATIONS
RESPONSIVENESS SUMMARY**

**Responsiveness Summary
Site 11, Southeast Open Disposal Area B
Naval Air Station Whiting Field
Milton, Florida**

A public comment period on the Site 11 Proposed Plan was held from August 15, 2007 through September 14, 2007. No public comments were received, and a public meeting was not held because one was not requested.