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NAS WHITING FIELD
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FINAL FEASIBILITY STUDY ADDENDUM FOR SITE 13 NAS WHITING FIELD FL
8/10/2006
TETRA TECH NUS

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888



Rev. 2
08/10/06

Feasibility Study Addendum for OU 12, Site 13, Sanitary Landfill Surface and Subsurface Soil

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

USEPA ID No. FL2170023244

Contract Task Order 0369

August 2006



Southeast

2155 Eagle Drive

North Charleston, South Carolina 29406

**FEASIBILITY STUDY ADDENDUM
FOR
OU 12, SITE 13, SANITARY LANDFILL
SURFACE AND SUBSURFACE SOIL**

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

USEPA ID No. FL2170023244

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

AUGUST 2006

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This document, *Feasibility Study Addendum for Site 13, Sanitary Landfill, Surface and Subsurface Soil, Naval Air Station Whiting Field, Milton, Florida*, has been prepared under the direction of a Florida Registered Professional Engineer. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice. This document was prepared for Naval Air Station Whiting Field, Milton, Florida and should not be construed to apply to any other site.

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ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
ARARs	Applicable or Relevant and Appropriate Requirements
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CG	Cleanup Goals
COC	constituent of concern
COPC	constituent of potential concern
CSF	Cancer Slope Factor
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
FSA	Feasibility Study Addendum
ft	foot/feet
GIR	General Information Report
HHRA	Human Health Risk Assessment
HI	Hazard Index
HLA	Harding Lawson and Associates
ILCR	Incremental Lifetime Cancer Risk
LUC	Land Use Controls
LUCIP	Land Use Controls Implementation Plan
mg/kg	milligrams per kilogram
NA	No Action
NAS	Naval Air Station
PRG	Preliminary Remediation Goal
RAGS	Risk Assessment Guidance for Superfund
RAOs	Remedial Action Objectives
RBC	Risk-Based Concentration
RI	Remedial Investigation
ROD	Record of Decision
SCTL	Soil Cleanup Target Level
NAVFAC SE	Naval Facilities Engineering Command Southeast
SVOC	semi-volatile organic compound
TBC	To Be Considered

ACRONYMS (continued)

TtNUS	Tetra Tech NUS, Inc.
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS), under contract N62467-94-D-0888 to the Department of the U.S. Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE), is submitting this Feasibility Study Addendum (FSA) to address changes at Site 13, Sanitary Landfill, since the original Feasibility Study (FS) was submitted in March 2001 [Harding Lawson and Associates (HLA), 2001]. The original FS addressed surface and subsurface soils at Naval Air Station (NAS) Whiting Field, Site 13.

The changed conditions at Site 13 addressed in this FSA include:

- Arsenic originally identified as a constituent of concern (COC) at Site 13 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 [Florida Department of Environmental Protection (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 13.
- Over the course of the investigations at this site, United States Environmental Protection Agency (USEPA) Region IV changed its screening criteria for evaluation of hazardous waste-related sites from USEPA Region III Risk-Based Concentrations (RBCs) to 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 process and procedures at Site 13 did not likely contribute to the presence of individual metal constituents, aluminum, iron, manganese, and vanadium in surface soil. Additionally, the site-specific values for these inorganics are within the typical range of levels found at NAS Whiting Field. 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, manganese and vanadium are not considered constituents of potential concern (COPCs) for Site 13 surface and subsurface soils.

1.1 PURPOSE

The purpose of this FSA is to evaluate the impact of the changes discussed above on the remedial alternatives for surface and subsurface soil at Site 13 at NAS Whiting Field. Remedial Alternatives were developed in the original FS (HLA, 2001).

The specific items to be evaluated include:

- Soil screening criteria changed to USEPA Region IX PRGs
- Revised Human Health Risk Assessment (HHRA) and COC selection

The revised HHRA and methodology used to evaluate constituent concentrations in surface and subsurface soil at Site 13 at NAS Whiting Field is detailed in the *Risk Assessment Re-evaluation of Soils at Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18, NAS Whiting Field, Milton, Florida* (TtNUS, 2004). These sites were previously evaluated in 1999 and 2000 using the methodology described in the NAS Whiting Field General Information Report (GIR) [ABB Environmental Services, Inc. (ABB-ES), January 1998]. The risk assessments for these sites were re-evaluated and updated to assure they are in compliance with current USEPA, State of Florida, and Navy guidance/methods and to update any risk assessment results with potential impact on risk management decisions for these sites.

1.2 REPORT ORGANIZATION

This FSA is organized into four chapters. Chapter 1.0 presents the purpose of the FSA. Chapter 2.0 discusses environmental conditions at the site, Chapter 3.0 presents the remedial action objectives (RAOs), and finally, Chapter 4.0 presents and discusses revised RAOs.

2.0 ENVIRONMENTAL CONDITIONS

Site 13 is approximately four acres in size and is located along the eastern facility boundary near the South Air Field. The site is rectangular in shape and oriented north to south. The site was used as the primary sanitary landfill for NAS Whiting Field from 1979 to 1984. During 1979, waste solvents and residue from paint-stripping operations may have been disposed at the site. After 1979, the landfill reportedly received only general refuse and non-hazardous waste. At the time of the RI fieldwork, buried wastes were not exposed at the land surface, and there were no indications of other past waste disposal practices (e.g., stained soil or stressed vegetation).

The approximate location of Site 13 is shown on Figure 2-1.

No permanent surface water sources exist in the immediate vicinity of Site 13. However, a vegetated "Y" drainage ditch borders the landfill to the west and south. The general slope of the land is from northwest to southeast. The landfill is depressed relative to the surrounding land surface, and surface water runoff typically ponds on site. When there is surface runoff from the site, it drains toward Big Coldwater Creek located approximately 8,800 feet (ft) east of the site.

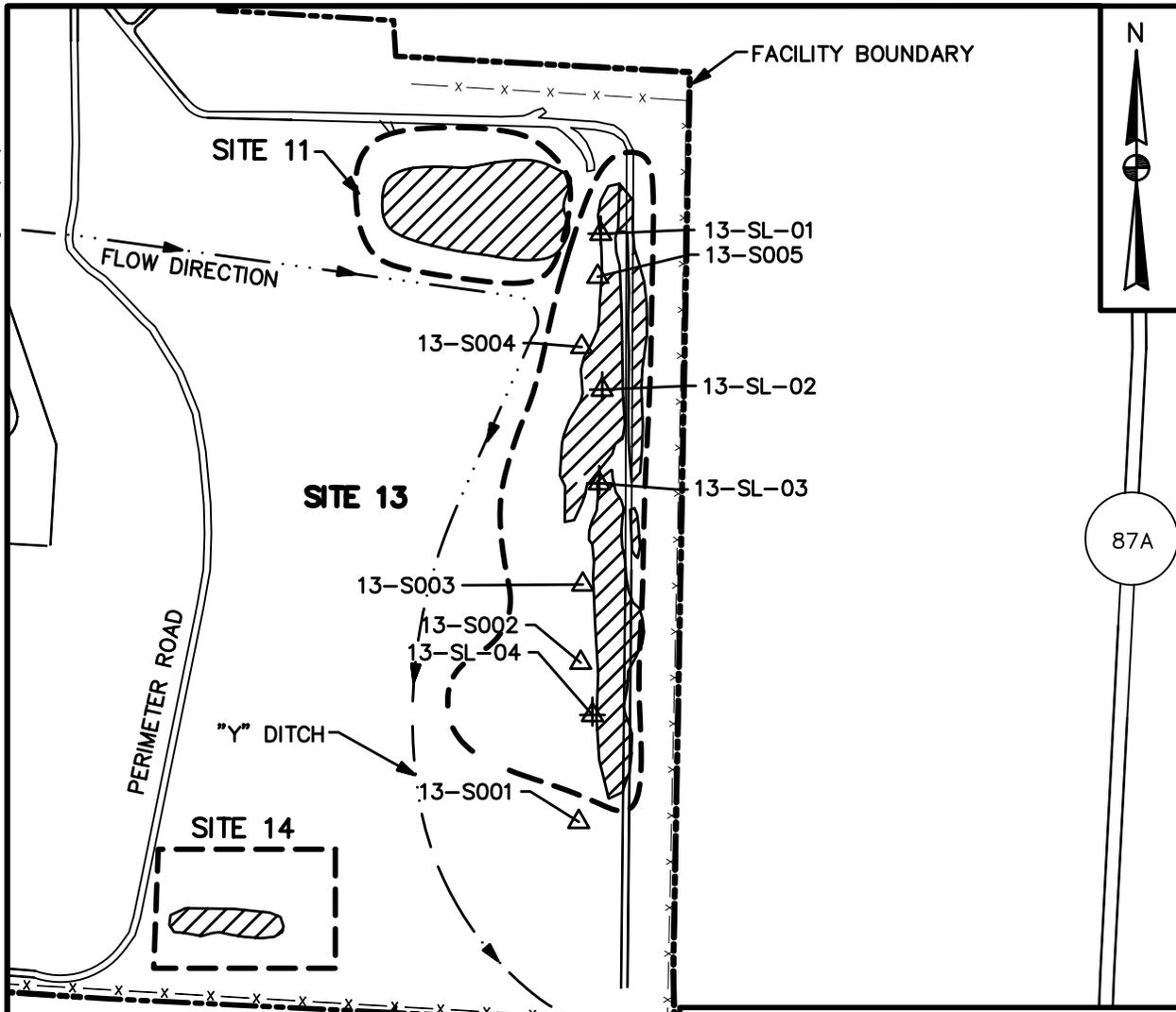
Currently, Site 13 consists of vacant, unused land with exposed soil and sparse native grasses and scrub oak vegetative cover in the central area. The bordering areas are predominantly covered with planted pine trees.

2.1 NATURE AND EXTENT OF CONTAMINATION

Environmental conditions and the nature and extent of contamination at Site 13 are described in detail in the RI Report issued in 1999 (HLA, 1999). Constituents detected in the surface soils include one volatile organic compound (VOC), three semi-volatile organic compounds (SVOCs), and 20 inorganic constituents. Constituents detected in the subsurface soils include seven VOCs, five SVOCs, 20 inorganic constituents, and cyanide. Only the revised HHRA at Site 13 is discussed in the following sections.

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

ACAD:0006CPO6.dwg 11/28/05 HJB PIT



FACILITY BOUNDARY
FENCE LINE

LEGEND:

- PHASE IIA SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- PHASE IIB SURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- INTERPRETED LANDFILL AREA
- APPROXIMATE SITE BOUNDARY

0 500 1000
GRAPHIC SCALE IN FEET

KEY:
NAS = NAVAL AIR STATION

DRAWN BY DM	DATE 3/17/05
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	



LOCATION OF SOIL SAMPLES,
SITE 13, SANITARY LANDFILL
FEASIBILITY STUDY ADDENDUM
NAS WHITING FIELD
MILTON, FLORIDA

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

2.2 REVISED HUMAN HEALTH RISK ASSESSMENT RESULTS

This section presents the revised HHRA results using analytical data from surface and subsurface soils. This revised HHRA includes the changed conditions discussed in Section 1.0. The original HHRA was included in the RI Report (HLA, 1999).

The first step of the re-evaluation was to determine a revised list of COPCs. The re-evaluation considered exposure to surface soil by hypothetical future residents. FDEP SCTLs and USEPA Region III RBCs were used to select COPCs in the original risk assessment. However, USEPA Region IV currently requires the use of USEPA Region IX PRGs to select COPCs, therefore, FDEP SCTLs and USEPA's Region IX PRGs were used in this analysis to select COPCs for this evaluation.

As discussed in Section 1.0, arsenic, aluminum, iron, manganese, and vanadium are not considered COPCs for Site 13 surface and subsurface soils; therefore, these inorganic constituents are not considered in this revised risk assessment. In addition, since the original risk assessment was prepared, the methodology for estimating risks resulting from dermal exposures to soil has changed. USEPA's Risk Assessment Guidance for Superfund (RAGS), Part E dermal guidance was used for this risk evaluation (USEPA, 2001).

The revised HHRA for Site 13 consists of the following steps:

- Selection of COPCs
- Exposure assessment
- Toxicity assessment
- Risk characterization

The risk screening for human health uses the FDEP SCTLs (FDEP, 2005) and the USEPA Region IX PRGs (USEPA, 2002) to conservatively assess exposure and toxicity.

2.2.1 Selection of Human Health COPCs

Surface Soils

All soil samples collected from 0 to 1 ft below land surface (bls) at Site 13 were evaluated for surface soil COPC selection. A comparison of the maximum detected surface soil concentrations to screening levels based on USEPA Region IX PRGs and FDEP SCTLs for residential exposures was conducted.

No constituents were detected in surface soils at concentrations in excess of the direct contact, risk based COPC screening levels and background concentrations and, therefore no COPCs were identified for surface soil at Site 13.

Subsurface Soils

All soil samples collected from 5 to 10 ft bls at Site 13 were evaluated for subsurface soil COPC selection. A comparison of the maximum detected subsurface soil concentrations to screening levels based on USEPA Region IX PRGs and FDEP SCTLs for residential exposures was conducted.

Mercury was the only constituent detected at a concentration in excess of direct contact, risk based COPC screening levels and background concentrations, and was retained as a COPC for subsurface soil at Site 13. Concentrations of mercury exceeded the simple apportioned PRG and simple apportioned and non-apportioned SCTLs.

2.2.2 Risk Characterization Summary

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) using USEPA and FDEP risk assessment guidance. The results are discussed below.

No COPCs were retained for surface soil at Site 13; therefore, risks were only calculated for exposures to subsurface soil.

The cumulative Hazard Indices (HI) for exposure to mercury in subsurface soil were greater than 1.0 for the hypothetical future resident (adult and/or child), indicating that unacceptable adverse non-carcinogenic effects may be anticipated under a residential land use scenario.

The HIs for exposure to subsurface soil for all other potential receptors (the typical industrial worker, the construction worker, the maintenance worker, and the recreational user/trespasser) are all less than 1.0 indicating no unacceptable risks for these potential receptors.

Mercury was the only constituent identified as exceeding the Level 1 SCTL [3 milligrams per kilograms (mg/kg)], and was retained as a COC for residential exposures to subsurface soil at Site 13 based on the risk characterization. However, the maximum detected mercury concentration did not exceed the FDEP industrial Level 2 SCTL (17 mg/kg); therefore, mercury was not retained as a COC for industrial exposures to subsurface soil.

2.2.3 Evaluation of Results

The maximum detected mercury concentration of 4.2 mg/kg exceeds the FDEP Residential SCTL of 3.0 mg/kg. Therefore, mercury was retained as a COC for residential exposures to subsurface soil at Site 13.

There are no carcinogenic risks associated with exposure to surface or subsurface soil (ingestion and dermal contact) for a resident (adult and child) at Site 13. Mercury was the only constituent detected at concentrations in excess of the direct contact, risk based COPC screening levels and mercury is not a carcinogen.

The HI for exposure to surface and subsurface soil at Site 13 by a hypothetical future resident (adult and/or child) is greater than 1.0 indicating unacceptable risks based on mercury.

The HI for exposure to subsurface soil for the other potential receptors (the typical industrial worker, the construction worker, the maintenance worker, and the recreational user/trespasser) are all less than 1.0 indicating no unacceptable risks for these potential receptors.

3.0 REMEDIAL ACTION OBJECTIVES

The RAOs presented in the original FS for Site 13 were:

RAO 1: Address surface soil at Site 13 where concentrations of arsenic exceed the FDEP approved site specific cleanup goal.

RAO 2: Establish and maintain a Land Use Control (LUC) Plan for Site 13.

The RAOs for this site were based on the following criteria:

- Unacceptable human health risk for direct exposure to surface soil based on the site specific cleanup goal for arsenic.
- FDEP SCTLs (residential land use).
- USEPA Region III RBCs (residential land use).

Based on the changes discussed in Section 1.0 and current and potential future land use, the RAOs need to be revised for Site 13. The current and future use of the property at this site remains non-residential/recreational, and the current and future receptors are trespassers and recreational users.

Based on the current and future land use receptors, two RAOs are applicable for Site 13.

RAO 1: To protect human health from carcinogenic and noncarcinogenic risks associated with incidental ingestion of, inhalation of, and dermal contact with contaminated soils (mercury).

RAO 2: To comply with federal and state Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBCs) in accordance with accepted USEPA and FDEP guidelines.

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

- FDEP SCTLs (residential land use).
- USEPA Region IX PRG (residential land use).

3.1 REVISED AND CLEANUP GOALS

Cleanup Goals (CGs) establish acceptable exposure levels protective of human health and the environment. CGs are based on regulatory requirements, USEPA-acceptable risk levels, and

assumptions regarding ultimate land uses, as well as contaminant pathways. Specifically, CGs are used to determine COCs, to estimate areas and volumes of impacted media and set performance standards for potential remedial alternatives.

CGs are determined based on ARARs and TBC criteria, constituents and media of interest, and exposure pathways. The CGs for this site are now formulated based on the following criteria: FDEP SCTLs for residential exposure [Chapter 62-777, Florida Administrative Code (F.A.C.)], and USEPA Region IX PRGs. The current and future use of the site is for non-residential/recreational purposes; therefore, the exposure pathways are trespassers and recreational users.

Cleanup of inorganic analytes below their established background concentrations will not be performed; therefore, background concentrations will be used as the lower limit for CGs. The CG selection process is summarized below.

The lower value of the FDEP SCTLs (Chapter 62-777, F.A.C.) and the USEPA Region IX PRGs for residential direct exposure will be used as CGs. Background concentration will be used as the lower limit for the CG of inorganic COCs. Table 3-1 provides a list of the revised surface and subsurface soil CGs for Site 13.

3.2 REVISED CONSTITUENTS OF CONCERN

A re-evaluation of the constituents remaining in surface and subsurface soil was conducted in the revised HHRA. The RI identified only one COC, arsenic, in surface soil at Site 13. The revised HHRA identified mercury as the only COC for subsurface soil at Site 13 under a residential land use scenario.

The revised COCs have been determined by comparing the soil CG value against the COPC's site-specific representative concentration (or maximum value if less than 10 samples). Any COPC with a site-specific representative concentration exceeding the CG becomes a COC. In summary, as shown in Table 3-2, mercury is the only COC at Site 13 under a residential land use scenario following the HHRA and risk characterization screening, but there are no COCs for surface or subsurface soil at Site 13 under a non-residential or industrial land use scenario.

**TABLE 3-1
DETERMINATION OF REVISED CLEANUP GOALS AT SITE 13
NAS WHITING FIELD
MILTON, FLORIDA**

Constituent of Potential Concern ¹	Units	62-777, F.A.C. Residential SCTL ²	USEPA Region IX Residential PRGs ³	Lower Value	Risk Driver ⁴	Surface Soil Background	Surface Soil CG	Subsurface Soil Background	Subsurface Soil CG
Mercury	mg/kg	3	23	3	N	NA	NA	NA	3

¹ Combined list of all COPCs for Site 13.

² FDEP Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., April 2005.

³ USEPA Region IX Preliminary Remediation Goal (PRG) Table, October 2002. (note: 1/10th value used for non-carcinogens).

⁴ Risk Driver Codes: N = Non-carcinogen, C = Carcinogen.

CG – Cleanup Goal

mg/kg – milligrams per kilogram

NA – Not Applicable

**TABLE 3-2
REVISED CONSTITUENT OF CONCERN EVALUATION
SUBSURFACE SOIL
SITE 13**

**NAS WHITING FIELD
MILTON, FLORIDA**

Constituent of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Representative Concentration ¹			CG	COC
				Value	Statistic ²	Rationale ³		
Mercury	mg/kg	4.2	none	4.2	max	n<10	3	Yes ⁴

¹For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the average value was used in the calculation.

²Statistic: 95% upper confidence limit (UCL) of log-transformed data (95% UCL-T), 95% UCL of data (95% UCL-N). Maximum value used (max) since the sample size was <10 samples.

³Rationale

(1) The 95% UCL exceeded the maximum (n<10); therefore, the maximum was used.

⁴COC under residential use scenario only, not industrial.

mg/kg = milligrams per kilogram

CG = Cleanup goal

COC = Constituent of concern

3.3 REVISED AREAS AND VOLUMES OF SOIL REQUIRING REMEDIAL ACTION

Because there are no COCs for Site 13 under a non-residential/industrial land use scenario, the anticipated future land use, area and volumes of soil will not be estimated.

The estimated area and volume of soil with COCs exceeding CGs has changed from the original FS. Appendix C of the original FS presents the area (400 square feet) and volume (59 cubic yards) calculations for soil requiring remedial action under conditions at that time.

Due to the changes discussed in Section 1.0 and the change in COCs, the revised area and volume of soil requiring remedial action or removal based on current conditions encompasses only the area around subsurface soil sample location 13-S005 (Figure 2-1). This sample contained mercury at concentrations exceeding CGs. To account for an adequate buffer around and below the location, the area to be addressed consists of a 10 ft by 10 ft area to a depth of 10 ft bls (one ft below the depth of the sample collected at this location).

In summary, the estimated area and volume of soil requiring remedial action or removal at Site 15 is 100 square feet or 37 cubic yards.

4.0 AMENDED DESCRIPTION AND EVALUATION OF REMEDIAL ALTERNATIVES

4.1 AMENDED DESCRIPTION OF ALTERNATIVES

Identification and screening of appropriate remedial alternative technologies addressing the RAOs developed for Site 13 were presented in the FS. Each technology was then screened based on site- and waste-limiting characteristics. Four soil remedial alternatives were developed in the original FS representing a range of options for Site 13 (HLA, 2001). Table 4-1 shows a comparison between the soil remedial alternatives identified in the original FS and this FSA.

4.2 AMENDED EVALUATION OF ALTERNATIVES

This section compares the impact of the changes in surface soil COCs on the evaluation of the four remedial alternatives in accordance with the seven Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) criteria, as originally provided in the FS. A summary of this comparison is provided in Table 4-2.

4.2.1 Overall Protection of Human Health and the Environment

As a result of the changes discussed in Section 1.0, there is no change in the relative overall protection of human health and the environment provided by Alternative 1 [No Action (NA)]. Alternative 1 is not protective of human health and the environment. Alternatives 2, 3, and 4 remain protective of human health and the environment.

4.2.2 Compliance with ARARs

The changes discussed in Section 1.0 do not result in a change in the compliance of Alternative 1 with ARARs. Alternative 1 is not in compliance with constituent-, location-, and action-specific ARARs. There is no change in the compliance of Alternatives 2, 3, and 4 with constituent-, location-, and action-specific-ARARs.

4.2.3 Long-Term Effectiveness and Permanence

The changes discussed in Section 1.0 do not impact the long-term effectiveness and permanence of Alternative 1. Alternative 1 does not provide long-term effectiveness and permanence. Alternatives 2, 3, and 4 continue to provide long-term effectiveness and permanence.

**TABLE 4-1
COMPARISON OF ORIGINAL FS AND FSA DESCRIPTION OF SOIL REMEDIAL ALTERNATIVES
SITE 13, SANITARY LANDFILL
NAS WHITING FIELD
MILTON, FLORIDA**

Alternative Number		Alternative Type		Representative Process Options Combined into Alternatives		Alternative Description	
FS (March 2001)	FSA (August 2006)	FS (March 2001)	FSA (August 2006)	FS (March 2001)	FSA (August 2006)	FS (March 2001)	FSA (August 2006)
Alternative 1 No Action	Alternative 1 No Action	No Action	No Action	None	None	<ul style="list-style-type: none"> Five-year Reviews. 	<ul style="list-style-type: none"> No Action
Alternative 2 LUCs	Alternative 2 LUCs	Limited Action – No or Minimal Treatment	Limited Action – No or Minimal Treatment	LUCs	LUCs	<ul style="list-style-type: none"> LUCs including LUCAP and LUCIP Posting of warning signs. Five-year site reviews. 	<ul style="list-style-type: none"> LUCs (<i>LUC RD will establish LUCIP</i>). Posting of warning signs (<i>Five-year review will be part of LUC RD</i>).
Alternative 3 Limited Soil (“hot spot”) Removal, and LUCs	Alternative 3 Limited Soil (“hot spot”) Removal and LUCs	Treatment /Limited Removal – Minimizes Long-Term Management	Treatment /Bulk Removal – Minimizes Long-Term Management	LUCs, Limited Excavation, Diposal	LUCs, Limited Excavation, Disposal	<ul style="list-style-type: none"> LUCs including LUCAP and LUCIP Excavation/disposal of “hot spot” soil exceeding PRGs. Backfill excavations with clean fill. Establish vegetative cover. Posting of warning signs. Five-year site reviews. 	<ul style="list-style-type: none"> LUCs (<i>LUC RD will establish LUCIP</i>). Excavation/disposal of surface soil exceeding CGs. Backfill excavations with clean fill. Establish vegetative cover. Posting of warning signs. (<i>Five-year review will be part of LUC RD</i>).
Alternative 4 Surface Soil Cover and LUCs	Alternative 4 Soil Cover and LUCs	Containment – Minimizes Long-Term Management	Containment – Minimizes Long-Term Management	LUCs, Containment	LUCs, Containment	<ul style="list-style-type: none"> LUCs including LUCAP and LUCIP Establish vegetative cover. Posting of warning signs. Five-year site reviews. 	<ul style="list-style-type: none"> LUCs (<i>LUC RD will establish LUCIP</i>). Establish vegetative cover. Posting of warning signs. (<i>Five-year review will be part of LUC RD</i>).

CG = Cleanup Goal
LUCs = Land Use Controls
LUCAP = LUC Assurance Plan

LUCIP = LUC Implementation Plan
PRGs = Preliminary Remediation Goals (site specific goal as defined in the FS; similar to the CG in the FSA).
RD = Remedial Design

TABLE 4-2

SUMMARY OF COMPARATIVE IMPACT OF CHANGES IN COCs ON EVALUATION OF REMEDIAL ALTERNATIVES
SITE 13 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

PAGE 1 OF 2

CRITERIA	<u>ALTERNATIVE 1</u> No Action	<u>ALTERNATIVE 2</u> LUCs	<u>ALTERNATIVE 3</u> Soil ("hot spot") Removal, and LUCs	<u>ALTERNATIVE 4</u> Soil Cover and LUCs
THRESHOLD CRITERIA				
Overall Protection of Human Health and the Environment				
Human Health Protection	No change	No change	No change	No change
Environmental Protection	No change	No change	No change	No change
Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)				
Compliance with Chemical-Specific ARARs	No change	No change	No change	No change
Compliance with Action-Specific ARARs	No change	No change	No change	No change
Compliance with Location-Specific ARARs	No change	No change	No change	No change
Compliance with Other Criteria	No change	No change	No change	No change
BALANCING CRITERIA				
Long-Term Effectiveness and Permanence				
Reduction in Residual Risk	No change	No change	No change	No change
Long-Term Reliability of Controls	No change	No change	No change	No change
Need for 5-Year Review	No change	No change	No change	No change
Prevention of Exposure to Residuals	No change	No change	No change	No change
Potential Need for Replacement of Technical Components after Remedial Objectives Are Achieved	No change	No change	No change	No change
Long-Term Management	No change	No change	No change	No change
Reduction of Mobility, Toxicity, or Volume through Treatment				
Amount Destroyed or Treated	No change	No change	No change	No change
Reduction in Mobility, Toxicity, or Volume	No change	No change	No change	No change
Irreversibility of Treatment	No change	No change	No change	No change
Type and Quantity of Residuals Remaining after Treatment	No change	No change	No change	No change

TNUS/TAL-06-057/0006-5.1

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TABLE 4-2

SUMMARY OF COMPARATIVE IMPACT OF CHANGES IN COCs ON EVALUATION OF REMEDIAL ALTERNATIVES
SITE 13 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 2 LUCs	ALTERNATIVE 3 Surface Soil (exceeding CGs) Removal and LUCs	ALTERNATIVE 4 Soil Cover and LUCs
Short-Term Effectiveness				
Community Protection During Implementation	No change	No change	No change	No change
Worker Protection During Implementation	No change	No change	No change	No change
Environmental Impacts	No change	No change	No change	No change
Construction Time	No change	No change	No change	No change
Time Until RAOs and CGs are Achieved	No change	No change	No change	No change
Implementability				
Ability to Construct and Operate the Technology	No change	No change	No change	No change
Reliability of Technology	No change	No change	No change	No change
Ease of Undertaking Additional Remedial Action, if Required	No change	No change	No change	No change
Ability to Monitor Effectiveness	No change	No change	No change	No change
Permitting Requirements	No change	No change	No change	No change
Coordination with Other Agencies	No change	No change	No change	No change
Availability of Services and Capabilities	No change	No change	No change	No change
Availability of Equipment, Specialists, and Materials	No change	No change	No change	No change
Cost^a				
Capital Costs	No change	No change	No change	No change
Short-Term O&M	No change	No change	No change	No change
Long-Term O&M				No change
5-Year Review	a	No change	No change	No change
Land-Use Controls	No change	No change	No change	No change
Total Project Present Worth Cost	No change \$0 (Total)	No change \$103,000 (Total)	No change NA	No change NA
State Acceptance				
FDEP Review and Comment	No change	No change	No change	No change
Community Acceptance				
Public Review and Comment	No change	No change	No change	No change

NOTES:

- ARAR Applicable or relevant and appropriate requirement
- LUC Land use control
- RAO Remedial action objective
- CG Cleanup goals

^aThe original FS included costs for 5 year review; however the 5-year reviews are not included for the No Action Alternative in this re-evaluation.

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4.2.4 Reduction of Mobility, Toxicity, or Volume through Treatment

The changes discussed in Section 1.0 do not impact Alternative 1. Alternative 1 does not provide reduction of mobility, toxicity, or volume because there is no action. The change in COCs also does not impact the reduction of mobility, toxicity or volume provided by Alternatives 2, 3, and 4.

4.2.5 Short-Term Effectiveness

The changes discussed in Section 1.0 do not impact Alternative 1. Alternative 1 will not provide short-term effectiveness or risks because there is no action. Alternatives 2, 3, and 4 would still provide short-term effectiveness.

4.2.6 Implementability

The changes discussed in Section 1.0 have no impact on the implementability of any of the four alternatives.

4.2.7 Cost

The changes discussed in Section 1.0 do not have an impact on the costs for any of the four alternatives. The cost to implement each of the four alternatives as estimated in the original FS cost estimate would remain the same with a slight increase to adjust for inflation.

4.2.8 State Acceptance

The FDEP has reviewed and commented on the Draft FSA for Site 13 prior to final approval and subsequent acceptance. The FDEP comments have been addressed in this Final FSA for Site 13.

4.2.9 Community Acceptance

The information concerning community acceptance will be addressed following public comment on the Proposed Plan for Site 13 in the responsiveness summary to be included in the Record of Decision (ROD) for Site 13.

4.3 EVALUATION OF ALTERNATIVES SUMMARY

As discussed in the above sections and further illustrated on Table 4-2, recent changes and developments at Site 13 have had some impact on the findings of the original FS. The remedial alternatives and their comparative evaluation as presented in this FSA are not significantly different from those presented in the original FS.

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