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FINAL FEASIBILITY STUDY ADDENDUM FOR SITE 14 NAS WHITING FIELD FL
8/10/2006
TETRA TECH NUS

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888



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Feasibility Study Addendum for OU 13, Site 14, Short-Term 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 13, SITE 14, SHORT-TERM SANITARY LANDFILL
SURFACE AND SUBSURFACE SOIL**

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

USEPA ID No. FL2170023244

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This document, *Feasibility Study Addendum for Site 14, Short-Term 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
CGs	Cleanup Goals
COC	constituents of concern
COPCs	constituents of potential concern
EPC	exposure point concentration
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
NA	No Action
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command Southeast
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
SVOC	semi-volatile organic compound
TBCs	To Be Considered
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 14, Short-Term 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 14.

The changed conditions at Site 14 addressed in this FSA include:

- Arsenic, originally identified as a constituent of concern (COC) at Site 14, was determined to be naturally occurring at Site 14, based on additional review of inorganic data from the facility and surrounding area in April 2001 [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 14.
- 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 14 did not likely contribute to the presence of the 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 14 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 14 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 14 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 have been 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 including the revised HHRA, Chapter 3.0 presents the remedial action objectives (RAOs), and finally, Chapter 4.0 presents and discusses revised RAOs.

2.0 ENVIRONMENTAL CONDITIONS

Site 14 is approximately three acres in size and is located near the southeastern facility boundary. Site 14 is one of six sites (Sites 9 through Site 14) comprising the area known as the Southeast Disposal Area. Site 14 was the primary sanitary landfill at NAS Whiting Field for 6 to 9 months during the latter part of 1978 and the early part of 1979. Landfilling operations ceased in this area in early 1979 because the high clay content of the soil resulted in the ponding of rainwater throughout the site. The disposal area was subsequently covered with soil, and pine trees were planted.

The approximate location of Site 14 is shown on Figure 2-1.

No permanent surface water sources exist in the immediate vicinity of Site 14. However, surface drainage from Site 14 is toward an unlined, vegetated "Y" ditch located approximately 400 feet (ft) east of the site. The "Y" ditch drains east toward Big Coldwater Creek, which is located 1.8 miles east of Site 14.

Currently, Site 14 is vacant, unused land vegetated with native grasses and scrub oak interspersed between rows of planted pine trees. The central area has less dense vegetative cover revealing small areas of exposed surface soils.

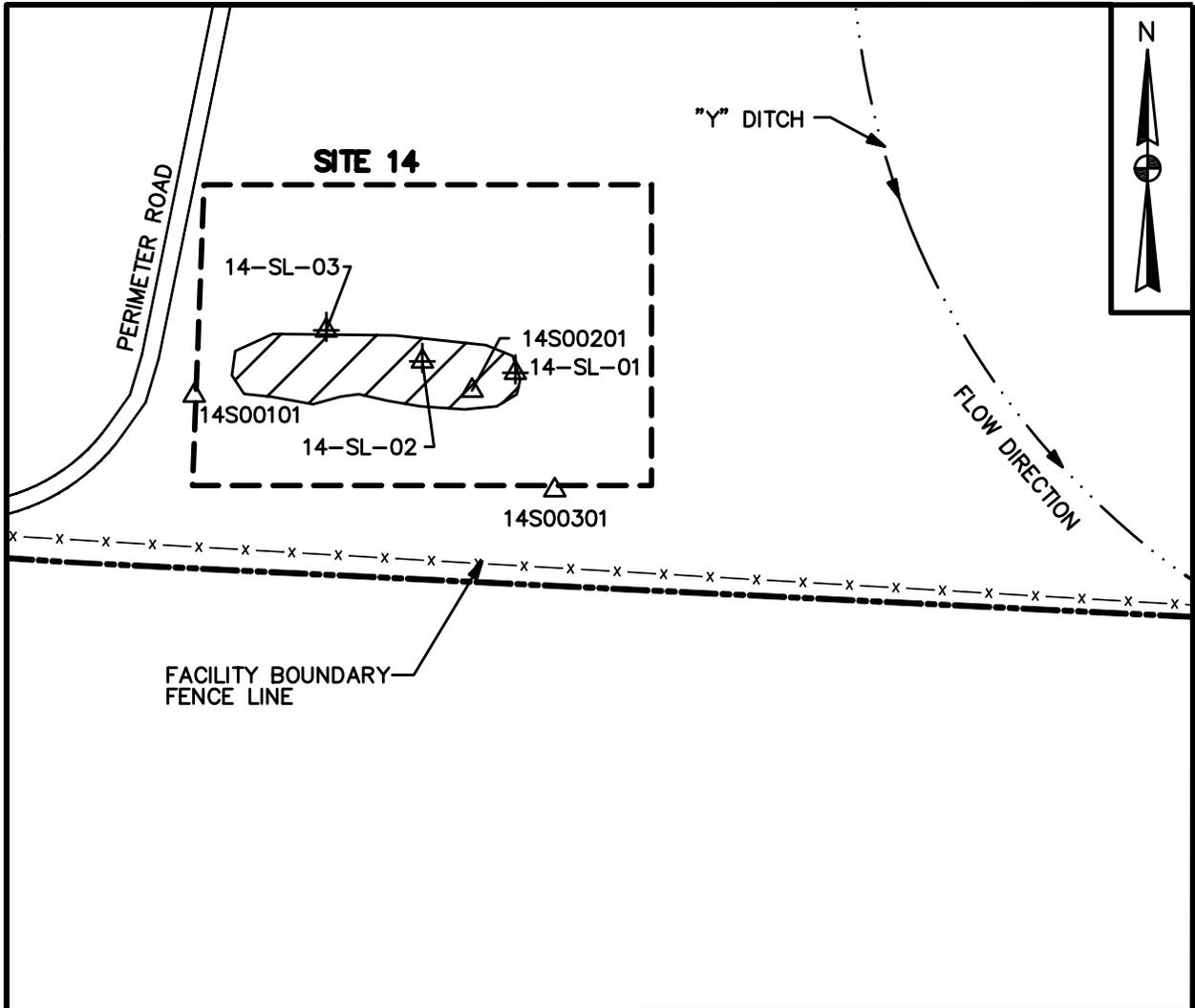
2.1 NATURE AND EXTENT OF CONTAMINATION

Environmental conditions at Site 14 are described in detail in the RI Report issued in 1999 (HLA, 1999) and the FS in 2001 (HLA, 2001). Constituents detected in the surface soils include two volatile organic compounds (VOCs), two semi-volatile organic compounds (SVOCs), and 19 inorganic constituents, and cyanide. Constituents detected in the subsurface soils include four VOCs, three SVOCs, and 19 inorganic constituents. Only the revised HHRA at Site 14 is discussed in the following sections.

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

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 Remedial Investigation (RI) Report (HLA, 1999).



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

0 200 400
GRAPHIC SCALE IN FEET

KEY:
NAS = NAVAL AIR STATION

DRAWN BY DM	DATE 4/11/05
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	



LOCATION OF SOIL SAMPLES
SITE 14, SHORT-TERM
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

The first step of the re-evaluation was to determine a revised list of COPCs. The re-evaluation will consider 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 14 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 14 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

Six samples collected from 0 to 1 ft below land surface (bls) at Site 14 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 14.

Subsurface Soils

Two soil samples collected from 5 to 12.5 ft bls at Site 14 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.

No constituents were detected in subsurface soils at concentrations in excess of the direct contact, risk based COPC screening levels and background concentrations and therefore, no COPCs were identified for subsurface soil at Site 14.

2.2.2 Risk Characterization

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 proposed FDEP risk assessment guidance.

Potential risks and Hazard Indices (HIs) were calculated and are summarized in the revised HHRA. No COCs were identified for surface or subsurface soil based on the risk characterization at Site 14.

Cumulative HIs for exposures to surface soil were less than 1.0 for all receptors evaluated, indicating adverse non carcinogenic effects are not anticipated under the conditions defined in the exposure assessment.

2.2.3 Evaluation of Results

There are no carcinogenic or non-carcinogenic risks associated with exposure to surface or subsurface soil (ingestion and dermal contact) for any potential receptor at Site 14. Also, no constituents were detected in surface or subsurface soil at concentrations in excess of the direct contact, risk based COPC screening levels.

The HI for exposure to surface and subsurface soil by an adult are less than 1.0 indicating no unacceptable risks. The HI for exposure to surface and subsurface soil by a child is also less than 1.0, indicating no unacceptable risks.

The HI for exposure to surface and 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 any potential receptor.

3.0 REMEDIAL ACTION OBJECTIVES

The RAOs presented in the original FS for Site 14 were:

RAO 1: Reduce risks associated with exposure to surface soil containing contaminant concentrations greater than action levels.

RAO 2: Complete closure of disposal area in accordance with State and Federal Applicable or Relevant and Appropriate Requirements (ARARs) for landfill closure.

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

- FDEP SCTLs (residential land use) and landfill closure regulations.
- 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 14. 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 use receptors, two RAOs are applicable for Site 14.

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

RAO 2: To comply with Federal and State ARARs and (to be considered) TBC 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.

Cleanup Goals 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.

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 two COCs, arsenic and vanadium, in surface soil at Site 14. The revised HHRA did not confirm these constituents as COPCs for surface or subsurface soil at Site 14.

This was 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, there are no COCs for surface or subsurface soil at Site 14 under a residential land use scenario.

3.3 REVISED AREAS AND VOLUMES OF SOIL REQUIRING REMEDIAL ACTION

Because there are no COCs for Site 14, there are no areas of soil with COCs exceeding CGs and therefore, volumes of soil will not be estimated.

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 14 were presented in the FS. Each technology was then screened based on site- and waste-limiting characteristics. Three soil remedial alternatives were developed in the original FS representing a range of options for Site 14 (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 three remedial alternatives in accordance with the nine 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

Due to the changes discussed in Section 1.0 and the elimination of COCs as determined by the revised HHRA for Site 14, there is a change in the relative overall protection of human health and the environment provided by Alternative 1 [No Action (NA)]. Alternative 1 becomes protective of human health and the environment and joins Alternatives 2 and 3 which remain protective of human health and the environment.

4.2.2 Compliance with ARARs

As mentioned in Section 4.2.1, the elimination of COCs as determined by the revised HHRA for Site 14 results in a change in the compliance of Alternative 1 with ARARs. Alternative 1 is now in compliance with constituent-, location-, and action-specific ARARs. There is no change in the compliance of Alternatives 2 and 3 with constituent-, location-, and action-specific-ARARs.

4.2.3 Long-Term Effectiveness and Permanence

As mentioned in Section 4.2.1, the elimination of COCs impacts the long-term effectiveness and permanence of Alternative 1. Alternative 1 now provides long-term effectiveness and permanence and Alternatives 2 and 3 continue to provide long-term effectiveness and permanence.

**TABLE 4-1
COMPARISON OF ORIGINAL FS AND FSA DESCRIPTION OF SOIL REMEDIAL ALTERNATIVES
SITE 14, SHORT-TERM 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 site 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 LUCs</i>). Posting of warning signs <i>(Five-year review will be part of LUC RD)</i>.
Alternative 3 Soil Excavation/ Removal, and Disposal	Alternative 3 Soil Excavation/ Removal, and Disposal	Treatment /Bulk Removal – Minimizes Long-Term Management	Treatment /Bulk Removal – Minimizes Long-Term Management	Bulk Excavation, Disposal	Bulk Excavation, Disposal	<ul style="list-style-type: none"> Excavation/disposal of soil exceeding PRGs. Backfill excavations with clean fill. Site Restoration. Posting of warning signs. Five-year site reviews. 	<ul style="list-style-type: none"> Excavation/disposal of surface soil exceeding CGs. Backfill excavations with clean fill. Establish vegetative cover. Posting of warning signs. Five-year site reviews.

CGs = Cleanup Goals
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 14 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

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CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 2 LUCs	ALTERNATIVE 3 Soil Excavation and Disposal
THRESHOLD CRITERIA			
Overall Protection of Human Health and the Environment			
Human Health Protection	With no COCs, now protective	No change	No change
Environmental Protection	With no COCs, now protective	No change	No change
Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)			
Compliance with Chemical-Specific ARARs	With no COCs, now compliant	No change	No change
Compliance with Action-Specific ARARs	With no COCs, now compliant	No change	No change
Compliance with Location-Specific ARARs	With no COCs, now compliant	No change	No change
Compliance with Other Criteria	No change	No change	No change
BALANCING CRITERIA			
Long-Term Effectiveness and Permanence			
Reduction in Residual Risk	With no COCs, no risk	No change	No change
Long-Term Reliability of Controls	No change	No change	No change
Need for 5-Year Review	With no COCs, not needed	No change	No change
Prevention of Exposure to Residuals	No change	No change	No change
Potential Need for Replacement of Technical Components after Remedial Objectives Are Achieved	No change	No change	No change
Long-Term Management	No change	No change	No change
Reduction of Mobility, Toxicity, or Volume through Treatment			
Amount Destroyed or Treated	No change	No change	No change
Reduction in Mobility, Toxicity, or Volume	No change	No change	No change
Irreversibility of Treatment	No change	No change	No change
Type and Quantity of Residuals Remaining after Treatment	No change	No change	No change

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TABLE 4-2

SUMMARY OF COMPARATIVE IMPACT OF CHANGES IN COCs ON EVALUATION OF REMEDIAL ALTERNATIVES
SITE 14 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

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

NOTES:

- ARAR Applicable or relevant and appropriate requirement
- COC Constituent of concern
- LUC Land use control
- RAO Remedial action objective
- CG Cleanup goals
- NA Not Available

^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 elimination of COCs does not impact Alternative 1. Alternative 1 does not provide the reduction of mobility, toxicity, or volume because there is no action. The elimination of COCs also does not impact the reduction of mobility, toxicity or volume provided by Alternatives 2 and 3.

4.2.5 Short-Term Effectiveness

The elimination of COCs does not impact Alternative 1. Alternative 1 will not provide short-term effectiveness or risks because there is no action. Alternatives 2 and 3 would still provide short-term effectiveness.

4.2.6 Implementability

The elimination of COCs has no impact on the implementability of any of the three alternatives.

4.2.7 Cost

The elimination of COCs does not have an impact on the costs for any of the three alternatives. The cost to implement each of the three 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 14 prior to final approval and subsequent acceptance. The FDEP comments have been addressed in this Final FSA for Site 14.

4.2.9 Community Acceptance

The information concerning community acceptance will be addressed following public comment on the Proposed Plan for Site 14 in the responsiveness summary to be included in the Record of Decision (ROD) for Site 14.

4.3 SUMMARY

As discussed in the above sections and further illustrated on Table 4-2, recent changes and developments at Site 14 have had some impact on the findings of the original FS. In particular, the conversion of Alternative 1 to a viable, compliant, implementable, and cost effective remedial alternative for Site 14 surface and subsurface soils. The remedial alternatives and their comparative evaluation as presented in this FSA are not significantly different from those presented in the original FS except for Alternative 1.

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