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FINAL FEASIBILITY STUDY ADDENDUM FOR SITE 9 NAS WHITING FIELD FL
9/27/2005
TETRA TECH NUS

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888



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Feasibility Study Addendum for Site 9, Waste Fuel Disposal Pit Surface and Subsurface Soil

Naval Air Station Whiting Field
Milton, Florida

USEPA ID No. FL2170023244

Contract Task Order 0369

September 2005



Southern Division

Naval Facilities Engineering Command

2155 Eagle Drive

North Charleston, South Carolina 29406

**FEASIBILITY STUDY ADDENDUM
FOR
SITE 9, WASTE FUEL DISPOSAL PIT
SURFACE AND SUBSURFACE SOIL**

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

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

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This document, *Feasibility Study Addendum for Site 9, Waste Fuel Disposal Pit, 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.
ARAR	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
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
LUCs	Land Use Controls
mg/kg	milligrams per kilogram
NAS	Naval Air Station
NAVFAC EFD	
SOUTH	Southern Division, Naval Facilities Engineering Command
OVA	Organic Vapor Analyzer
PAH	polynuclear aromatic hydrocarbon
PRG	Preliminary Remediation Goal
RAGS	Risk Assessment Guidance for Superfund
RAOs	Remedial Action Objectives
RBC	Risk-Based Concentration
RI	Remedial Investigation
SCTL	Soil Cleanup Target Level
SVOC	Semi-Volatile Organic Compound
TBC	To Be Considered
TOVCs	Total Organic Vapor Concentrations
TtNUS	Tetra Tech NUS, Inc.

ACRONYMS (Continued)

USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS), under contract N62467-94-D-0888 to the Department of the Navy, Southern Division, Naval Facilities Engineering Command (NAVFAC EFD SOUTH), is submitting this Feasibility Study Addendum (FSA) to address changes at Site 9, Waste Fuel Disposal Pit, since the original Feasibility Study (FS) was submitted in March 2001 [Harding Lawson and Associates (HLA), 2001]. The original FS included two sites at Naval Air Station (NAS) Whiting Field; Sites 9 and 10. Surface and subsurface soils at Site 9 were addressed in Sections 2.0 through 5.0 of the original FS.

The changed conditions at Site 9 addressed in this FSA include:

- Arsenic originally identified as a constituent of concern (COC) at Site 9 was determined to be naturally occurring at Site 9 - 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 9.
- United States Environmental Protection Agency (USEPA) Region IX Preliminary Remediation Goals (PRGs) used as Screening Criteria - Over the course of the investigations at this site, 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 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 individual metal constituents, aluminum, iron, and vanadium, have no direct evidence of site-related use at Site 9 and the process and procedures at this site did not likely contribute to the presence of these inorganic analytes in surface soil. Additionally, the site-specific values for these inorganics are within the range of levels found at NAS Whiting Field. The Remedial Investigation (RI) for NAS Whiting Field Site 40, Basewide Groundwater, contains the appendix "Inorganics in Soil at NAS Whiting Field" presenting 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 9 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 9 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 9 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 RI and FS 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 including the revised HHRA, Chapter 3.0 presents the remedial action objectives (RAOs), and finally, Chapter 4.0 presents and discusses revised remedial action alternatives.

2.0 ENVIRONMENTAL CONDITIONS

Site 9, Waste Fuel Disposal Pit, is located along the eastern facility boundary near the South Air Field and is approximately two acres in size (Figure 2-1). Historically, Site 9 was used for the disposal of an undetermined amount of waste aviation fuel. During the 1950s and 1960s, waste fuel (i.e., aviation fuel) containing tetraethyl lead was reportedly disposed of in the northern part of Site 9. Reportedly, a tanker truck was used to transport waste fuel to an unlined disposal pit where it was drained. Based on anecdotal information, approximately 200 to 300 gallons of waste fuel were disposed of at the site per trip. The total quantity of fuel disposed of at the site is unknown. Furthermore, the precise location of the disposal pit is unknown; however, at the approximate location of the suspected disposal pit, an ephemeral pond occurs during heavy rain periods. The approximate location of the disposal pit is shown on Figure 2-1 based on a geophysical survey conducted during Phase IIA fieldwork. A soil gas survey was also conducted at Site 9.

There are currently no buildings at Site 9. No permanent surface water sources exist at Site 9. In the early 1990s, Site 9 consisted of overgrown shrubs and planted pine trees, approximately 25 to 40 feet (ft) in height. Construction debris was present on the ground surface at the site. Current conditions reflect the emplacement of a 24-inch permeable soil layer and native grass cover over the surface of the site (Bechtel, 2000). At this time, Site 9 consists of vacant, unused land.

2.1 NATURE AND EXTENT OF CONTAMINATION

Environmental conditions at Site 9 are described in detail in the RI Report issued in 1999 (HLA, 1999) and the FS in 2001 (HLA, 2001). Section 2.2 of the original FS presents the nature and extent of contamination at Site 9. Constituents detected in the surface soils include two semi-volatile organic compounds (SVOCs) and 18 inorganic constituents. The subsurface soil below the 0 to 1 ft below land surface (bls) interval was not sampled at Site 9 based on results of a soil gas survey conducted at the site. Only the revised HHRA at Site 9 is discussed in the following sections.

2.2 REVISED HUMAN HEALTH RISK ASSESSMENT

This section presents the results of the revised HHRA using analytical data from soils from 0 to 1 ft bls. The revised HHRA includes the changed conditions discussed in Section 1.0. The original HHRA was included in the RI Report (HLA, 1999). The revised HHRA for Site 9 is provided in Chapter 3.0 of the *Risk Assessment Re-evaluation of Soils at Sites 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18* report (TtNUS, 2004).

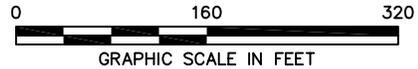
ACAD:0006CF01.dwg 03/17/05 HJB PIT



LEGEND:

- △ PHASE IIB SURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- APPROXIMATE SITE BOUNDARY
- NAS NAVAL AIR STATION
- ▨ APPROXIMATE FORMER LANDFILL AREA

- 2 FEET SOIL COVER
- TOE OF SOIL COVER



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**LOCATION OF SOIL COVER
AND SURFACE SOIL SAMPLES
SITE 9, WASTE FUEL DISPOSAL PIT
FEASIBILITY STUDY ADDENDUM
NAS WHITING FIELD
MILTON, FLORIDA**

CONTRACT NO. 0006	
OWNER NO. 0000	
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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 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, and vanadium are not considered COPCs for Site 9 surface soils; therefore, these inorganic constituents were not considered in the 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 the risk re-evaluation (USEPA, 2001).

For the revised HHRA, the exposure point concentration (EPC) was considered to be the maximum detected concentration (worst case condition).

The revised HHRA for Site 9 consisted 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

All soil samples collected from 0 to 1 ft bls at Site 9 were evaluated for 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.

Antimony was the only constituent detected at concentrations in excess of the direct contact, risk based COPC screening levels and background concentrations and consequently was retained as a COPC for surface soil at Site 9. The detected concentration exceeded the simple apportioned PRG but was less than the non-apportioned PRG and simple apportioned and non-apportioned SCTLs. No other COPCs were identified in surface or subsurface soil.

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 proposed FDEP risk assessment guidance. The results of the risk characterization are discussed below.

Quantitative risk estimates for potential human receptors were developed for the identified COPCs (i.e., antimony) and potential risks and Hazard Indices (HIs) were calculated and are summarized in the revised HHRA for surface soil only. Subsurface soil samples were not collected at Site 9 based on the results of the surface soil samples, the soil gas survey, and lack of evidence of buried wastes from the geophysical survey. A soil gas survey was conducted in June 1995 at Site 9 to assess the presence of methane gas and other volatile organic compounds (VOCs) potentially in subsurface soils at the site. Soil gas samples were collected across the site. At each location, an open-ended stainless-steel tube was pushed or driven to sampling depths of 1.5 ft and 3.0 ft bls and organic vapor measurements were recorded. Total organic vapor concentrations (TOVCs) were measured using a PortaFid or Foxboro organic vapor analyzer (OVA). The soil gas survey did not indicate the presence of TOVCs in the subsurface; therefore, soil gas samples were not submitted for laboratory analysis.

Risk estimates were not calculated for exposures to subsurface soil. No COCs were identified for surface soil based on the risk characterization.

None of the constituents detected in surface soils for Site 9 were selected as COCs using Florida direct contact SCTLs. Only the maximum concentrations and EPCs calculated for arsenic, iron, and vanadium exceeded SCTLs. Only the maximum concentrations and EPCs for arsenic and vanadium exceeded three times the residential SCTLs. However, as previously discussed arsenic, iron, and vanadium were not retained as COCs.

Cumulative HIs for exposures to surface soil were less than 1 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 soil (ingestion and dermal contact) for a resident (adult and child) at Site 9. Antimony was the only constituent detected at concentrations in excess of the direct contact, risk based COPC screening levels. Antimony was only

detected in one of five surface soil samples. The maximum detected antimony concentration of 8.3 milligrams per kilograms (mg/kg) is less than the FDEP SCTL of 27 mg/kg and only slightly exceeds the apportioned USEPA Region IX PRG of 3.1 mg/kg.

The HI for exposure to surface soil by an adult (0.004) is less than 1.0 indicating no unacceptable risks. The HI for exposure to surface soil by a child (0.006) is also less than 1.0, indicating no unacceptable risks.

The HI for exposure to surface 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.

No COCs were identified for subsurface soil; therefore, no carcinogenic or non-carcinogenic human health risks have been identified for subsurface soil at Site 9.

3.0 REMEDIAL ACTION OBJECTIVES

The RAOs presented in the original FS for Site 9 were:

RAO 1: To address human health concerns due to arsenic and polynuclear aromatic hydrocarbon (PAH) concentrations greater than residential SCTLs.

RAO 2: To incorporate provisions into land use controls (LUCs) to address risk of exposure to an excavation worker from risks associated with incidental ingestion of, inhalation of, and dermal contact with contaminated soils.

RAO 3: To complete closure of the disposal area in accordance with federal and state applicable or relevant and appropriate requirements (ARARs) for landfill closures.

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

- Unacceptable human health risk for direct exposure to surface or subsurface soil based on the site specific cleanup goal for arsenic and residential SCTLs for PAHs.
- FDEP SCTLs (residential land use).
- USEPA Region IX PRG (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 9. The current and future anticipated 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 9.

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

RAO 2: To comply with federal and state ARARs and to be considered (TBC) criteria 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.)] (FDEP, 2005), and USEPA Region IX PRGs (USEPA, 2002). The current and future anticipated use of the site is for nonresidential/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 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 9.

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 9. The revised HHRA identified antimony as the only COPC for surface soil at Site 9.

The revised COCs (or lack of) 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, there are no COCs for surface or subsurface soil at Site 9.

**TABLE 3-1
DETERMINATION OF REVISED CLEANUP GOALS AT SITE 9
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
Antimony	mg/kg	27	31	27	N	NA	26	NA	NA

¹ Combined list of all COPCs for Site 9.

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

³ USEPA Region IX Preliminary Remediation Goal 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
SURFACE SOIL
SITE 9**

**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		
Antimony	mg/kg	8.3	J	8.3	max	n<10	26	no

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.

²Statistics: 95% 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.

mg/kg = milligrams per kilogram

CG = Cleanup goal

COC = Constituent of concern

UCL = upper confidence limit

3.3 REVISED AREAS AND VOLUMES OF SOIL REQUIRING REMEDIAL ACTION

Because there are no COCs for Site 9, there are no areas of soil with COCs exceeding CGs and therefore, volumes of soil requiring remedial action 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 9 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 9 (HLA, 2001) This section of the FSA presents a revised description of the three original remedial alternatives. 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 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

Due to the changes discussed in Section 1.0 and the elimination of COCs as determined by the revised HHRA for Site 9, there is a change in the relative overall protection of human health and the environment provided by Alternative 1 (No Action). 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 9 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 impact 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 9, WASTE FUEL DISPOSAL PIT
NAS WHITING FIELD
MILTON, FLORIDA**

Alternative Number	Alternative Type		Representative Process Options Combined into Alternatives		Alternative Description	
	FS (March 2001)	FSA (July 2005)	FS (March 2001)	FSA (July 2005)	FS (March 2001)	FSA (July 2005)
Alternative 1 No Action	No Action	None	None	None	<ul style="list-style-type: none"> Five-year Reviews. 	<ul style="list-style-type: none"> No Action
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 Surface Soil (exceeding PRGs) Removal, and LUCs	Treatment/Bulk Removal – Minimizes Long-Term Management	Treatment/Bulk Removal – Minimizes Long-Term Management	LUCs, Bulk Excavation, Disposal	LUCs, Bulk Excavation, Disposal	<ul style="list-style-type: none"> LUCs including LUCAP and LUCIP Excavation/disposal of surface 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>).

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 9 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

PAGE 1 OF 2

CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 2 LUCs	ALTERNATIVE 3 Surface Soil (exceeding CGs) Removal, and LUCs
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

TABLE 4-2
SUMMARY OF COMPARATIVE IMPACT OF CHANGES IN COCs ON EVALUATION OF REMEDIAL ALTERNATIVES
SITE 9 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

PAGE 2 OF 2

CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 2 LUCs	ALTERNATIVE 3 Surface Soil (exceeding CGs) Removal and LUCs
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 \$60,000 (Total)	No change NA

NOTES:

- ARAR
- COC
- LUC
- RAO
- CG
- NAI
- Not Available

Applicable or relevant and appropriate requirement
Constituent of concern
Land use control
Remedial action objective
Cleanup goals
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.

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 remain unchanged.

4.3 SUMMARY

As discussed in the above sections and further illustrated on Table 4-2, recent changes and developments at Site 9 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 9 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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