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FINAL FEASIBILITY STUDY ADDENDUM FOR SITE 11 NAS WHITING FIELD FL
8/13/2007
TETRA TECH NUS

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888



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Feasibility Study Addendum 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

August 2007



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

**FEASIBILITY STUDY ADDENDUM
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**

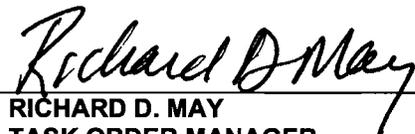
**Submitted to:
Naval Facilities Engineering Command
Southeast
2155 Eagle Drive
North Charleston, South Carolina 29406**

**Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220**

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

AUGUST 2007

PREPARED UNDER THE SUPERVISION OF:



**RICHARD D. MAY
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA**

APPROVED FOR SUBMITTAL BY:

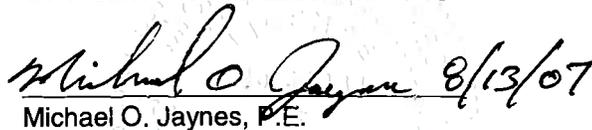


**DEBRA M. HUMBERT
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA**



This document, *Feasibility Study Addendum for Site 11, Southeast Open Disposal Area B, 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.

Tetra Tech NUS, Inc.
3360 Capital Circle N.E., Suite B
Tallahassee, FL 32308
Certificate of Authorization No. 7988

A handwritten signature in black ink that reads "Michael O. Jaynes" followed by the date "8/13/07". The signature is written over a faint circular stamp.

Michael O. Jaynes, P.E.
Professional Engineer
State of Florida License No. 55441
Expires: February 28, 2009

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ACRONYMS

| | |
|-----------|--|
| ABB-ES | ABB Environmental Services, Inc. |
| ARAR | applicable or relevant and appropriate requirements |
| bls | below land surface |
| CCI | CH2M Hill Constructors, Inc. |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CG | Cleanup Goals |
| COC | constituent of concern |
| COPC | constituent of potential concern |
| cPAH | carcinogenic Polynuclear Aromatic Hydrocarbons |
| CTE | Central Tendency Estimate |
| DDT | Dichloro-Diphenyl-Trichloroethane |
| EC | Engineering Control |
| 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 |
| IC | Institutional Control |
| ILCR | Incremental Lifetime Cancer Risk |
| LUCs | Land Use Controls |
| µg/dL | micrograms per deciliter |
| mg/day | milligrams per day |
| mg/kg | milligrams per kilogram |
| NAS | Naval Air Station |
| NAVFAC SE | Naval Facilities Engineering Command Southeast |
| NFA | No Further Action |
| NPW | Net Present Worth |
| OVA | Organic Vapor Analyzer |
| PAH | polynuclear aromatic hydrocarbon |
| PCBs | polychlorinated biphenyls |

ACRONYMS (Continued)

| | |
|-------|---|
| PRG | Preliminary Remediation Goal |
| RAGS | Risk Assessment Guidance for Superfund |
| RAOs | Remedial Action Objectives |
| RBC | Risk-Based Concentration |
| RI | Remedial Investigation |
| RME | reasonable maximum exposure |
| ROD | Record of Decision |
| SCTL | Soil Cleanup Target Level |
| SVOC | Semi-Volatile Organic Compound |
| TBC | To Be Considered |
| TOVCs | Total Organic Vapor Concentrations |
| TRPH | Total Recoverable Petroleum Hydrocarbons |
| TRW | technical review workgroup |
| TtNUS | Tetra Tech NUS, Inc. |
| 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 U.S. Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE), is submitting this Feasibility Study Addendum (FSA) to address changes at Site 11, Southeast Open Disposal Area B 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 Site 11 at Naval Air Station (NAS) Whiting Field.

The changed conditions at Site 11 addressed in this FSA include:

- Arsenic originally identified as a constituent of concern (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 [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 11.
- 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 11 did not likely contribute to the presence of the individual metal constituents, aluminum, iron, and vanadium in 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, and vanadium are not considered constituents of potential concern (COPCs) for Site 11 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 11 at NAS Whiting Field. Remedial Alternatives were

developed in the original FS (HLA, 2001). The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Municipal Landfill Presumptive Remedy guidance for military landfills was not applied to Site 11.

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 10 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, 2006). These sites were previously evaluated in 1999 and 2000 using the methodology described in the General Information Report (GIR) [ABB Environmental Services, Inc. (ABB-ES), 1998], the Remedial Investigation (RI) Report, and the FS. 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 revised remedial action objectives (RAOs), and finally, Chapter 4.0 presents and discusses amended remedial alternatives.

2.0 ENVIRONMENTAL CONDITIONS

Site 11, Southeast Open Disposal Area B, is located along the eastern facility property boundary near the South Air Field. Sites 9 and 10 are located to the northwest and Site 13 is immediately to the southeast. The site is identified as a 3-acre area encompassing 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 (ABB-ES, 1998).

The approximate location of Site 11 is shown on Figure 2-1.

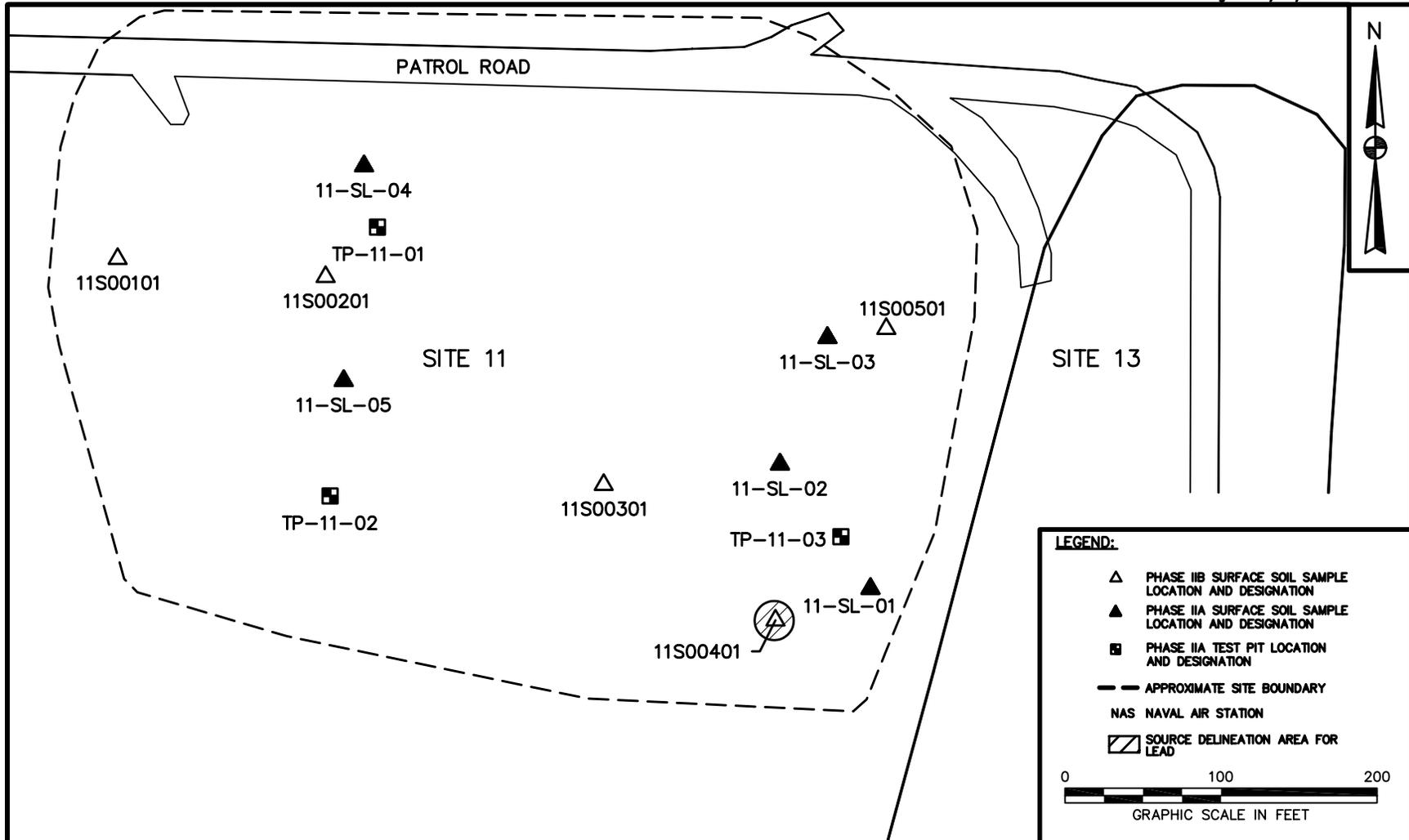
As part of a source removal action for carcinogenic polynuclear aromatic hydrocarbons (cPAHs) conducted by CH2M Hill Constructors, Inc. (CCI), soils in the vicinity of location 11-SL-04 (Figure 2-1) were excavated in June 1999 (CCI, 1999). Therefore, the sample from this location was not included in the surface soil dataset for the HHRA.

There are currently no buildings at Site 11. No permanent surface water sources exist at Site 11. Currently, the site is densely vegetated with native species. At this time, Site 11 consists of vacant, unused land. Groundwater underlying Site 11 will be addressed under the Site 40 – Basewide Groundwater Investigation.

2.1 NATURE AND EXTENT OF CONTAMINATION

Environmental conditions and the nature and extent of contamination at Site 11 are described in detail in the RI Report issued in 2000 (HLA, 2000). Constituents detected (pre-1999 removal action) in the surface soils [0 to 1 foot (ft) below land surface (bls)] include one volatile organic compound (VOC), two semi-volatile organic compounds (SVOCs), nine pesticides/polychlorinated biphenyls (PCBs), 22 inorganics, total recoverable petroleum hydrocarbons (TRPH), and cyanide. Constituents detected (pre-1999 removal action) in the subsurface soils (below 1 ft bls) include three VOCs, one SVOC, seven pesticides/PCBs, and 19 inorganics. Only the revised HHRA for surface and subsurface soil at Site 11 is discussed in the following sections.

Surface and subsurface soil sample locations from the Phase IIA and IIB RI are presented on Figure 2-1. Additional soil samples collected during the source removal in 1999 are presented and discussed in the Technical Memorandum “Results of Additional Soil Sampling at Site 11, NAS Whiting Field, Milton, Florida” (CCI, 1999), included in Appendix E of the original FS (HLA, 2001).



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**SITE 11, LOCATION OF SURFACE SOIL
SAMPLES, AND TEST PITS
FEASIBILITY STUDY ADDENDUM
NAS WHITING FIELD
MILTON, FLORIDA**

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2.2 SUMMARY OF REVISED HUMAN HEALTH RISK ASSESSMENT

This section presents the revised HHRA results using analytical data from surface and subsurface soils. The revised HHRA includes the changed conditions discussed in Section 1.0. The original HHRA was included in the RI Report (HLA, 2000).

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 11 surface or subsurface 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).

The revised HHRA for Site 11 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 at Site 11 were evaluated for COPC selection. A comparison of the maximum detected surface and subsurface soil concentrations to screening levels based on USEPA Region IX PRGs and FDEP SCTLs for residential exposures was conducted.

Surface Soils

All 47 soil samples collected from 0 to 1 ft bls at Site 11 were evaluated for surface soil COPC selection. The following constituents were detected in surface soils at maximum concentrations exceeding the direct contact, risk based COPC screening levels and background, and they were retained as COPCs for surface soil at Site 11:

- SVOCs [benzo(a)pyrene]
- Pesticides/PCBs (4,4'-Dichloro-Diphenyl-Trichloroethane (DDT), alpha-chlordane, dieldrin, gamma-chlordane, heptachlor, heptachlor epoxide)
- Lead
- TRPH

Benzo(a)pyrene was only detected in one of 16 surface soil samples. Benzo(a)pyrene, 4,4'-DDT, alpha-chlordane, and gamma-chlordane were detected at concentrations exceeding the simple apportioned PRGs and SCTLs 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.

Subsurface Soil

All three soil samples collected below 1 ft bls at Site 11 were evaluated for subsurface soil COPC selection. The following constituents were detected in subsurface soils at maximum concentrations exceeding the direct contact, risk based COPC screening levels and background concentrations and were retained as COPCs for subsurface soil at Site 11:

- Pesticides/PCBs (aldrin, Aroclor-1254, Aroclor-1260, and dieldrin)
- Cadmium

Aldrin, Aroclor-1254, and Aroclor-1260 were only 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.

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.

Quantitative risk estimates for potential human receptors were developed for the identified COPCs and potential risks, and Hazard Indices (HIs) were calculated and are summarized in the revised HHRA for surface and subsurface soil at Site 11. Several organics [benzo(a)pyrene and several pesticides], lead, and TRPH were selected as COPCs for surface soil and were evaluated in the quantitative HHRA conducted per USEPA guidelines. Two pesticides (aldrin and dieldrin), two PCBs (Aroclor-1254, Aroclor-1260) and cadmium were selected as COPCs for subsurface soil and were also evaluated per USEPA guidelines. Cumulative HIs for exposures to surface and subsurface soil by all receptors were less than one, indicating adverse non-carcinogenic effects are not anticipated for these receptors under the conditions established in the exposure assessment. Cumulative Incremental Lifetime Cancer Risk (ILCRs) for exposures to surface and subsurface soil were within the USEPA's target risk range of 10^{-4} to 10^{-6} for all receptors. However, ILCRs exceeded the State of Florida's target risk level of 1×10^{-6} for exposures to surface soil by residents. Only the chemical-specific ILCR for dieldrin exceeded 1×10^{-6} for exposures to surface soil by residents.

Risks from Lead

Lead was identified as a COPC in surface soil at Site 11. The maximum detected concentration of 2,230 milligrams per kilograms (mg/kg) in surface soil (location 11-SL-02) exceeded the USEPA screening level of 400 mg/kg for residential exposures. However, extensive surface soil sampling for lead in the immediate vicinity of location 11-SL-02 suggests very limited lead contamination in this area.

Exposures to lead in surface soil by construction workers and occupational workers were evaluated using a slope-factor approach developed by the USEPA Technical Review Workgroup (TRW) for Lead (January 2003). The receptor of concern addressed by the TRW model is the fetus carried by a pregnant worker. As recommended by the model, the average lead concentration (93.1 mg/kg) in surface soil was used as the Exposure Point Concentration (EPC). ILCRs and HIs were calculated for most chemicals using reasonable maximum exposure (RME) assumptions, whereas the adult lead model guidance recommends the use of central tendency estimate (CTE) assumptions in evaluating adult exposures to lead in soil (USEPA, 2003). Therefore, the incidental soil ingestion rate was assumed to be 200 mg/day for the construction worker and 50 milligrams per day (mg/day) for the occupational worker (USEPA, 2004), and the exposure frequency was assumed to be 219 days per year. For construction workers

exposed to surface soil, the average lead soil concentration of 93.1 mg/kg results in 0.8 percent of receptors (fetuses) having a blood lead level greater than 10 µg/dL and for occupational workers exposed to surface soil, 0.3 percent of receptors (fetuses) having a blood lead level greater than 10 micrograms per deciliter (µg/dL). These results do not exceed the USEPA goal of no more than 5 percent of children (or the fetuses of exposed women) exceeding a 10 µg/dL blood lead level.

The risk assessment conducted per the State of Florida regulations and guidelines evaluated risks to a hypothetical future resident and a typical industrial worker using the published SCTLs for the residential and industrial land use scenario, respectively. Additionally, risks to a hypothetical future recreational user were evaluated using SCTLs specifically developed for this risk assessment as allowed in the State of Florida regulations and guidelines.

Surface Soil

The following constituents were identified as potential COCs for surface soils based on a comparison to SCTLs:

| Residential SCTLs | Industrial SCTLs | Recreational SCTLs |
|-------------------|------------------|--------------------|
| Dieldrin | None | None |
| Lead | None | None |

The results of the Level 1 or residential evaluation identified two COCs; therefore, a Level 2 or industrial evaluation was conducted. A comparison of the maximum detected concentrations for surface soil to the FDEP industrial SCTLs was conducted. No constituents were identified as exceeding the Level 2 SCTLs. Therefore, no constituents were retained as COCs for industrial or recreational exposures to surface soil.

Greater than 50 percent of the estimated cancer risk for the surface soils is attributable to dieldrin. As discussed previously, the surface soil removal action in the vicinity of 11-SL-04 did not result in soils concentrations less than residential SCTLs. However, lead and dieldrin were the only potential COCs detected in surface soils at concentrations exceeding the FDEP SCTLs for residential land use.

Subsurface Soil

No COCs were identified for subsurface soils at Site 11.

2.2.3 Evaluation of Results

Several organics, lead, and TRPH were selected as COPCs for surface soil and evaluated in the HHRA. Two pesticides, two PCBs, and cadmium were selected as COPCs for subsurface soil. The non-cancer

risk estimates did not exceed 1.0 for any of the receptors evaluated. Consequently, adverse non-carcinogenic health effects are not anticipated under the conditions defined for the exposure assessment. Although the cancer risk estimate developed for the COPCs for surface soil for one of the five receptors evaluated (the hypothetical future resident) exceeded the State of Florida cancer risk benchmark of 1×10^{-6} , none of the cancer risk estimates exceed the USEPA cancer risk range of 1×10^{-4} to 1×10^{-6} . The primary risk driver for surface soils 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 soils indicates that exposure to average lead concentration in the surface soils 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 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.

Ecological risks were not affected by the changes in the criteria and USEPA and FDEP standards or the revised list of COCs. Spatial analyses indicate potential ecological risk from lead appears to be present at the southwest corner, northwest corner, the center of the site, and at one isolated sample location in the southeastern portion of the site.

Dieldrin and lead were identified as the only COCs for surface soils based on a comparison of maximum detected concentrations to screening levels and all HHRA and ecological risk assessment calculations.

No constituents were identified as COCs for subsurface soils.

3.0 REMEDIAL ACTION OBJECTIVES

The RAOs presented in the original FS for Site 11 were:

RAO 1: Address surface soil at Site 11 where concentrations of contaminants exceed action levels (residential SCTLs).

RAO 2: Complete closure of the disposal area in accordance with State and Federal 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 soil based on the site specific cleanup goal for arsenic and residential SCTLs for dieldrin and lead
- FDEP SCTLs (residential land use, 1999)
- 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 11. 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 revised RAOs are applicable for Site 11.

RAO 1: To preclude unacceptable human health carcinogenic risks associated with incidental ingestion, inhalation, and/or dermal contact with surface soil contaminated with dieldrin.

RAO 2: To preclude unacceptable human health non-carcinogenic risks associated with incidental ingestion, inhalation, and/or dermal contact with surface soil contaminated with lead.

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

- FDEP SCTLs (residential land use, 2005)
- USEPA Region IX PRGs (residential land use)

3.1 REVISED 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 estimate areas and volumes of impacted media and set performance standards for potential remedial alternatives.

CGs are determined based on applicable or relevant and appropriate requirements (ARARs), 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 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 risk assessment results along with the FDEP SCTLs and USEPA Region IX PRGs for residential direct exposure were used to determine the CGs. Table 3-1 provides a list of the revised surface and subsurface soil CGs for Site 11.

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 six COCs in surface soil and none in subsurface soil at Site 11. The revised HHRA identified two COCs (dieldrin and lead) in surface soil and none in subsurface soil at Site 11.

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, as shown in Table 3-2, there are two COCs for surface soil at Site 11.

**TABLE 3-1
DETERMINATION OF REVISED CLEANUP GOALS AT SITE 11
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 CG |
|---|-------|--|---|-------------|--------------------------|-------------------------|-----------------|--------------------|
| Dieldrin | mg/kg | 0.06 | 0.03 | 0.03 | C | NA | 0.03 | NA |
| Lead | mg/kg | 400 | 400 | 400 | N | 11.4 | 400 | NA |

¹ Combined list of all COPCs for Site 11.

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

³ USEPA Region IX Preliminary Remediation Goal Table, 2002.
notes: 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 11**

**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 | | |
| Dieldrin | mg/kg | 0.21 | J | 0.21 | max | (1) | 0.03 | yes |
| Lead | mg/kg | 2,230 | -- | 2,230 | max | (1) | 400 | yes |

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).

³Rationale

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

CG = Cleanup goal

COC = constituent of concern

mg/kg = milligrams per kilogram

UCL = upper confidence limit

3.3 REVISED AREAS AND VOLUMES OF SOIL REQUIRING REMEDIAL ACTION

The estimated area and volume of soil with COCs exceeding CGs at Site 11 has not been revised from the original FS. Appendix C of the original FS presents the area and volume calculations for soil requiring remedial action under conditions at that time.

The changes discussed in Section 1.0 and the revised COCs result in a change in the area and volume of soil requiring remedial action or removal based on current conditions at Site 11. The majority of the initial soil samples (12 out of 14), collected site wide, contain dieldrin at concentrations exceeding CGs. Therefore, the entire area and volume of soil within the site boundary (Figure 2-1) to a depth of 1 ft bls will be used for cost estimating purposes in this FSA.

In summary, the estimated area and volume of soil requiring remedial action or removal at Site 11 is 130,680 square feet and 4,840 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 11 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 11 (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.

In the original FS (HLA, 2001) three alternatives were evaluated for Site 11 representing a range of actions including no action, limited action addressing principal threats, and containment minimizing potential exposures to receptors. The three alternatives evaluated for Site 11 are listed below:

- Alternative S11-1: No Action
- Alternative S11-2: Land Use Controls (LUCs)
- Alternative S11-3: Soil Cover and LUCs

The three alternatives for Site 11 that will be reevaluated in this FSA include No Further Action (NFA), LUCs, and a surface soil cover with LUCs. The alternatives are described in the following sections:

Alternative S11-1: NFA

In an FS, the No Action or NFA alternative is typically considered to serve as a baseline consideration or to address sites not requiring any active remediation. The NFA alternative for Site 11 assumes no further remedial action would occur and establishes a basis for comparison with the other alternatives. No remedial action, treatment, LUCs, or monitoring of conditions would remain or be implemented under the NFA alternative.

Alternative S11-2: LUCs (including ICs and ECs)

Alternative S11-2 addresses the principal threats through the implementation of LUCs for surface soil. The LUCs for Site 11 would include Institutional Controls (ICs) and Engineering Controls (ECs) that would limit site access and exposure pathways at the site. ICs in the form of a non-residential use prohibition and restrictions on activities which would disturb the site soil would be implemented to ensure appropriate future

land use. ECs at Site 11 would also limit exposure pathways at the site by implementing the use of posted signage, or other containment barriers to ensure appropriate future land use.

The application of LUCs and the containment of wastes at Site 11 would be consistent with USEPA's Presumptive Remedy guidance for military landfill sites.

Alternative S11-3: Soil Cover and LUCs

Alternative S11-3 provides containment of all surface soils containing COCs exceeding CGs. The soil cover would be constructed over the entire site and includes all former disposal areas. The soil cover would consist of clean fill placed and compacted to minimum thickness of 18 inches, and then 6 inches of top soil would be placed on top of the clean fill for a total cover thickness of 24 inches.

Post RA monitoring and maintenance of the installed soil cover will be implemented. This program would include visual inspections and maintenance of the cover. LUCs would be implemented to assess the need for continued soil cover monitoring.

Because the RI did not identify constituents that posed a significant threat to human health or the environment, only limited action (i.e. LUCs) and containment (i.e. soil cover) alternatives were considered in the original FS. More aggressive treatment alternatives were eliminated in the screening process, mainly due to cost. This was confirmed during preliminary estimates developed during the reevaluation for 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

The changes discussed in Section 1.0 and the revised COCs, as determined by the revised HHRA for Site 11, do not result in a change in the relative overall protection of human health and the environment provided by Alternatives 1, 2, or 3. Alternative 1 remains unprotective of human health and the environment. Alternatives 2 and 3 remain protective of human health and the environment.

4.2.2 Compliance with ARARs

The change in COCs, as determined by the revised HHRA for Site 11, does not result in a change in the

compliance of Alternative 1, 2, or 3 with ARARs. There is no change in the compliance of Alternatives 1, 2, and 3 with constituent-, location-, and action-specific-ARARs.

4.2.3 Long-Term Effectiveness and Permanence

The change in COCs as determined by the revised HHRA for Site 11, does not impact the long-term effectiveness and permanence of Alternative 1, 2, or 3. Alternative 1 will not provide long-term effectiveness and permanence and Alternatives 2 and 3 will continue to provide long-term effectiveness and permanence.

4.2.4 Reduction of Mobility, Toxicity, or Volume through Treatment

The change in COCs does not impact Alternative 1. Alternative 1 does not provide reduction of mobility, toxicity, or volume because there is no action. The reduced list 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 change in COCs does not impact Alternative 1. Alternative 1 will not provide short-term effectiveness because there is no action. Alternatives 2 and 3 would still provide short-term effectiveness.

4.2.6 Implementability

The change in COCs has no impact on the implementability of any of the three alternatives. They would all be easily implementable.

4.2.7 Cost

Changes in unit costs and components of Alternatives 2 and 3 will result in minor changes in the alternative cost estimates from the original FS, but overall the cost will not change significantly. Table 4-2 shows the revised costs for Alternatives 2 and 3. The net present worth (NPW) cost estimates for Alternatives 2 and 3 are detailed in Appendix A. There would be no cost for Alternative 1.

4.2.8 State Acceptance

The FDEP will review and comment on the Draft FSA for Site 11 prior to final approval and subsequent acceptance.

4.2.9 Community Acceptance

The information concerning community acceptance will be addressed following public comment on the Proposed Plan for Site 11 in the responsiveness summary to be included in the Record of Decision (ROD) for Site 11.

**TABLE 4-1
COMPARISON OF ORIGINAL FS AND FSA DESCRIPTION OF SOIL REMEDIAL ALTERNATIVES
SITE 11, SOUTHEAST OPEN DISPOSAL AREA B
NAS WHITING FIELD
MILTON, FLORIDA**

| Alternative Number | | Alternative Type | | Representative Process Options Combined into Alternatives | | Alternative Description | |
|---|---|--|--|---|------------------------|---|---|
| FS (March 2001) | FSA (August 2007) | FS (March 2001) | FSA (August 2007) | FS (March 2001) | FSA (August 2007) | FS (March 2001) | FSA (August 2007) |
| Alternative 1 No Action | Alternative 1 No Further 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 | 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 (LUC RD) Posting of warning signs (Five-year reviews will be required). |
| Alternative 3 Soil Cover and LUCs | Alternative 3 Soil Cover and LUCs | Containment – No or Minimal Treatment | Containment – No or Minimal Treatment | Soil Cover and LUCs | Soil Cover and LUCs | <ul style="list-style-type: none"> LUCs including LUCAP and LUCIP Construction of soil cover over surface soil exceeding PRGs. Establish vegetative cover. Posting of warning signs. Five-year site reviews. | <ul style="list-style-type: none"> LUCs (LUC RD), including maintenance of soil cover Construction of soil cover over surface soil exceeding PRGs. Establish vegetative cover. Posting of warning signs. (Five-year reviews will be required). |

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 11 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

PAGE 1 OF 2

| CRITERIA | ALTERNATIVE 1 NFA | ALTERNATIVE 2 LUCs | ALTERNATIVE 3 Soil Cover and LUCs |
|---|----------------------|---|---|
| THRESHOLD CRITERIA | | | |
| Overall Protection of Human Health and the Environment | | | |
| Human Health Protection | No change | No change | No change |
| Environmental Protection | 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 |
| Compliance with Action-Specific ARARs | No change | No change | No change |
| Compliance with Location-Specific ARARs | No change | 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 | No change | Decreased risk due to reduction of COCs | Decreased risk due to reduction of COCs |
| Long-Term Reliability of Controls | No change | No change | No change |
| Need for 5-Year Review | No change | 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 | Decreased due to reduction of COCs | Decreased due to reduction of COCs |

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TABLE 4-2

SUMMARY OF COMPARATIVE IMPACT OF CHANGES IN COCs ON EVALUATION OF REMEDIAL ALTERNATIVES
SITE 11 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

| CRITERIA | ALTERNATIVE 1 NFA | ALTERNATIVE 2 LUCs | ALTERNATIVE 3 Soil Cover 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 | \$32,134 (decrease) | \$22,142 (decrease) |
| 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) | \$32,134 (decrease) \$102,954 (Total) | \$140,685 (decrease) \$348,368 (Total) |
| State Acceptance | | | |
| FDEP Review and Comment | No change | No change | No change |
| Community Acceptance | | | |
| Public Review and Comment | No change | No change | No change |

NOTES:

- ARAR Applicable or relevant and appropriate requirement
- COC Constituent of concern
- 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 a 5-year reviews are not required for NFAs.

4.3 EVALUATION SUMMARY

As discussed in the above sections and further illustrated in Table 4-2, recent changes and developments at Site 11 have had some impact on the findings of the original FS, specifically the revised costs for Alternatives 2 and 3. The remedial alternatives and their comparative evaluation as presented in this FSA are not significantly different from those presented in the original FS for Site 11.

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APPENDIX A
REMEDIAL ALTERNATIVE COST ESTIMATES

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 2: LAND USE CONTROLS
CAPITAL COSTS

| Cost Item | Quantity | Unit | Subcontract | Unit Cost | | | Subcontract | Extended Cost | | | Subtotal |
|--|----------|-------|-------------|-----------|----------|------------|-------------|---------------|---------|-----------|----------|
| | | | | Material | Labor | Equipment | | Material | Labor | Equipment | |
| 1 PROJECT PLANNING | | | | | | | | | | | |
| 1.1 Prepare Remedial Design (Engineer) | 40 | hr | | | \$26.44 | | \$0 | \$0 | \$1,058 | \$0 | \$1,058 |
| 1.2 Project Scheduling and Procurement (Project Manager) | 8 | hr | | | \$40.12 | | \$0 | \$0 | \$321 | \$0 | \$321 |
| 2 MOBILIZATION/DEMOBILIZATION | | | | | | | | | | | |
| 2.1 Equipment Mob/Demob (Exc. & Dozier) | 0 | ea | | | \$200.00 | \$250.00 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 2.2 Mobilize/Demobilize Personnel (2-persons) | 0 | ea | | \$375.00 | \$300.00 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 3 DECONTAMINATION | | | | | | | | | | | |
| 3.1 Temporary Decon Pad | 0 | ls | | \$250.00 | \$200.00 | \$75.00 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 3.2 Decon Water Disposal | 0 | drum | \$125.00 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 3.3 Decon Water Storage Drums | 0 | ea | | \$45.00 | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 3.4 PPE (2 p * 2 days) | 0 | m-day | | \$30.00 | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 3.5 Decontaminate Equipment (Pressure Washer) | 0 | ea | | | \$134.45 | \$50.00 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 4 SITE PREPARATION | | | | | | | | | | | |
| 4.1 Erosion Control Fencing | 0 | lf | | \$0.23 | \$1.17 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 4.2 Collect/Analyze Delineation Samples (TPH) | 0 | ea | \$200.00 | \$10.00 | \$22.24 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 4.3 Construction Surveys (2-man crew) | 0 | day | \$648.36 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 4.4 Utility Location and Site Delineation/Layout | 0 | hrs | | | \$26.44 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5 EXCAVATION/BACKFILL | | | | | | | | | | | |
| 5.1 Excavate/Load Contaminated Soil (1.0 cy Hyd. Excavator) | 0.00 | cy | | | \$1.27 | \$2.23 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.2 Standby, Crawler Mounted 1.0 CY Hydraulic Excavator | 0 | hrs | | | | \$20.50 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.3 Health & Safety Monitoring with OVA during Excavation | 0 | day | | | \$188.16 | \$100.00 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.4 Collect/Analyze Confirmatory Samples | 0 | ea | \$200.00 | \$10.00 | \$22.24 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.5 Import (Offsite) Place, Compact Clean Fill Material | 0.00 | cy | | \$7.82 | \$0.85 | \$1.81 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.6 UST Removal | 0 | ea | | \$340.72 | \$485.04 | \$1,638.12 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 6 OFF-SITE TRANSPORTATION/DISPOSAL | | | | | | | | | | | |
| 6.1 Waste Profile | 0 | ls | \$750.00 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 6.2 Transport and Dispose of Soil (Non-hazard.) in Landfil | 0.00 | ton | \$45.00 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 6.3 Prepare Shipment Manifests | 0 | hrs | | | \$26.44 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 7 SITE RESTORATION | | | | | | | | | | | |
| 7.1 Import Vegetative Cover Material (Topsoil) | 0.00 | cy | | \$15.00 | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 7.2 Place/Grade Topsoil (6") | 0 | day | | | \$227.20 | \$435.00 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 7.3 Sod Disturbed Area | 0.0 | acre | | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 7.4 Warning Signs | 6.0 | ls | \$50.00 | \$25.00 | | | \$300 | \$150 | \$0 | \$0 | \$450 |
| 8 LAND USE CONTROLS | | | | | | | | | | | |
| 8.1 Site Survey (2-man crew) | 2 | days | \$700.00 | | | | \$1,400 | \$0 | \$0 | \$0 | \$1,400 |
| 8.2 Survey Plat | 1 | ls | \$2,600.00 | | | | \$2,600 | \$0 | \$0 | \$0 | \$2,600 |
| 8.3 Prepare Land Use Control Implementation Plan/Docs (Engineer) | 100 | hours | | | \$26.44 | | \$0 | \$0 | \$2,644 | \$0 | \$2,644 |
| 8.4 Modify Master Plan and Prepare Deed Restrictions (Eng/PM) | 80 | hours | | | \$40.12 | | \$0 | \$0 | \$3,210 | \$0 | \$3,210 |
| Subtotal Direct Capital Costs less Subcontract | | | | | | | | \$150 | \$7,232 | \$0 | \$7,382 |
| Local Area Adjustment | | | | | | | | 84% | 84% | 84% | |
| | | | | | | | | \$126 | \$6,075 | \$0 | \$6,201 |
| Overhead on Labor Cost @ 30% | | | | | | | | | \$1,823 | | \$1,823 |
| G & A on Labor Cost @ 10% | | | | | | | | | \$608 | | \$608 |
| G & A on Material Cost @ 10% | | | | | | | | \$13 | | | \$13 |
| Total Direct Capital Cost | | | | | | | | \$139 | \$8,505 | \$0 | \$8,644 |

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 2: LAND USE CONTROLS
CAPITAL COSTS

| Cost Item | Quantity | Unit | Subcontract | Unit Cost | | | Subcontract | Extended Cost | | | Subtotal | |
|--|----------|------|-------------------------------|-----------|-------|-----------|-------------|---------------|-------|-----------|----------|-----------------|
| | | | | Material | Labor | Equipment | | Material | Labor | Equipment | | |
| Indirects on Total Direct Labor Cost @ 75% | | | | | | | | | | | \$6,379 | \$6,379 |
| Profit on Total Direct Cost @ 10% | | | | | | | | | | | | \$864 |
| Subtotal | | | | | | | | | | | | \$15,887 |
| Health & Safety Monitoring @ 3% | | | (Includes Subcontractor cost) | | | | | | | | | \$606 |
| Total Field Cost | | | | | | | | | | | | \$16,492 |
| Subtotal Subcontractor Cost | | | | | | | \$4,300 | | | | | \$4,300 |
| G & A on Subcontract Cost @ 10% | | | | | | | \$430 | | | | | \$430 |
| Profit on Subcontractor Cost @ 5% | | | | | | | | | | | | \$215 |
| Subcontractor Cost | | | | | | | | | | | | \$4,945 |
| Contingency on Total Field and Subcontractor Costs @ 10% | | | | | | | | | | | | \$2,144 |
| Engineering on Total Field and Subcontractor Costs @ 5% | | | | | | | | | | | | \$1,072 |
| TOTAL Capital COST | | | | | | | | | | | | \$24,653 |

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 3: SOIL COVER AND LUCs
ANNUAL COSTS**

| Cost Item | Quantity | Unit | Unit Cost | Labor Overhead ^a | Total Cost |
|---|----------|------|-----------|-----------------------------|----------------|
| 1 FIVE YEAR SITE REVIEWS (FOR 30 YEAR PERIOD) | | | | | |
| 1.1 Site Review Meeting (2-persons for 2-days) | | | | | |
| Project Manager | 16 | hr | \$40.12 | \$40.12 | \$1,284 |
| Staff Engineer | 16 | hr | \$26.44 | \$26.44 | \$846 |
| ODCs (travel, etc.) | 1 | ls | \$400.00 | | \$400 |
| 1.2 Five Year Review Report | | | | | |
| Project Manager | 8 | hr | \$40.12 | \$40.12 | \$642 |
| Staff Engineer | 32 | hr | \$26.44 | \$26.44 | \$1,692 |
| ODCs (photocopies, telephone, etc.) | 1 | ls | \$250.00 | | \$250 |
| Subtotal Five Year Review Cost | | | | | \$5,114 |
| G&A and Profit @ 15% | | | | | \$767 |
| Subtotal | | | | | \$5,881 |
| Contingency @ 10% | | | | | \$588.11 |
| Total Five Year Review Cost | | | | | \$6,469 |
| 2 LAND USE CONTROL MONITORING (FOR 30 YEAR PERIOD) | | | | | |
| 2.1 Quarterly Site Inspections | | | | | |
| Project Manager (2 hrs for each Inspection) | 8 | hr | \$40.12 | \$40.12 | \$642 |
| Staff Engineer | 32 | hr | \$26.44 | \$26.44 | \$1,692 |
| 2.2 Annual Review and Repor | | | | | |
| Project Manager | 4 | hr | \$40.12 | \$40.12 | \$321 |
| Staff Engineer | 12 | hr | \$26.44 | \$26.44 | \$635 |
| ODCs (photocopies, telephone, etc.) | 1 | ls | \$250.00 | | \$250 |
| 2.3 Sign/Fence Maintenance | | | | | |
| | 1 | ls | \$50.00 | | \$50 |
| Subtotal Land Use Control Monitoring | | | | | \$3,590 |
| G&A and Profit @ 15% | | | | | \$538 |
| Subtotal | | | | | \$4,128 |
| Contingency @ 10% | | | | | \$412.80 |
| Total Land Use Control Monitoring Cost | | | | | \$4,541 |

^a Overhead on professional labor @ 100%

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 3: SOIL COVER AND LUCs
Operation and Maintenance Costs per Year

| Item | Qty | Unit | Unit Cost | Subtotal Cost | Notes |
|--|-----|-------|------------|---------------|--|
| 1 Energy - Electric | | kWh | \$0.06 | \$0 | |
| 2 Maintenance | | ls | | \$0 | 5% of Installation Cost |
| 3 Carbon Unit Changeout/Regeneration of Spent Carbon | | pound | \$3.00 | \$0 | once a year |
| 4 Labor, Mobilization/Demobilization, Per Diem, Supplies | | wk | \$925.00 | \$0 | 1 visit per week - 1 day |
| 5 Labor, Mobilization/Demobilization, Per Diem, Supplies | | mo | \$1,950.00 | \$0 | 1 visit per quarter - 2 laborers, 2 days |
| 6 Analysis of Off-gas samples | | ea | \$250.00 | \$0 | 1 per month, VOCs |
| 7 Quarterly Reports | | ea | \$4,000.00 | \$0 | |
| Total Cost for One Year Operation | | | | \$0 | |

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 3: SOIL COVER AND LUCs
CAPITAL COSTS

| Cost Item | Quantity | Unit | Subcontract | Unit Cost | | | Extended Cost | | | Subtotal | |
|--|----------|-------|-------------|------------|----------|------------|---------------|----------|----------|----------|-----------|
| | | | | Material | Labor | Equipment | Subcontract | Material | Labor | | Equipment |
| 1 PROJECT PLANNING | | | | | | | | | | | |
| 1.1 Prepare Remedial Design (Engineer) | 120 | hr | | | \$26.44 | | \$0 | \$0 | \$3,173 | \$0 | \$3,173 |
| 1.2 Project Scheduling and Procurement (Project Manager/TEEx | 40 | hr | | | \$40.12 | | \$0 | \$0 | \$1,605 | \$0 | \$1,605 |
| 2 MOBILIZATION/DEMOBILIZATION | | | | | | | | | | | |
| 2.1 Equipment Mob/Demob (Exc., Loader, & Dozier) | 2 | ea | | | \$400.00 | \$600.00 | \$0 | \$0 | \$800 | \$1,200 | \$2,000 |
| 2.2 Mobilize/Demobilize Personnel (3-persons) | 2 | ea | | \$400.00 | \$350.00 | | \$0 | \$800 | \$700 | \$0 | \$1,500 |
| 2.3 Portable Toilet | 1 | mo | \$74.18 | | | | \$74 | \$0 | \$0 | \$0 | \$74 |
| 2.4 Storage Trailer (28' x 10') | 1 | mo | \$98.33 | | | | \$98 | \$0 | \$0 | \$0 | \$98 |
| 2.5 Office Trailer (32' x 8') | 0 | mo | \$221.49 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 2.6 Site Utilities | 0 | mo | \$1,500.00 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 3 DECONTAMINATION | | | | | | | | | | | |
| 3.1 Temporary Decon Pad | 1 | ls | | \$450.00 | \$400.00 | \$155.00 | \$0 | \$450 | \$400 | \$155 | \$1,005 |
| 3.2 Decon Water Disposal | 5 | drum | \$150.00 | | | | \$750 | \$0 | \$0 | \$0 | \$750 |
| 3.3 Decon Water Storage Drums | 5 | ea | | \$45.00 | | | \$0 | \$225 | \$0 | \$0 | \$225 |
| 3.4 PPE (3 p * 5 days * 1 Weeks) | 15 | m-day | | \$30.00 | | | \$0 | \$450 | \$0 | \$0 | \$450 |
| 3.5 Decontaminate Equipment (Pressure Washer) | 2 | ea | | | \$134.45 | \$50.00 | \$0 | \$0 | \$269 | \$100 | \$369 |
| 4 SITE PREPARATION | | | | | | | | | | | |
| 4.1 Erosion Control Fencing | 2200 | lf | | \$5.00 | | | \$0 | \$11,000 | \$0 | \$0 | \$11,000 |
| 4.2 Signs | 10 | ea | \$75.00 | | | | \$750 | \$0 | \$0 | \$0 | \$750 |
| 4.3 Construction Surveys (2-man crew) | 2 | day | \$648.36 | | | | \$1,297 | \$0 | \$0 | \$0 | \$1,297 |
| 4.4 Utility Location and Site Delineation/Layout | 2 | hrs | | | \$33.23 | | \$0 | \$0 | \$66 | \$0 | \$66 |
| 4.5 Backhoe and Operator | 5 | day | \$1,500.00 | | | | \$7,500 | \$0 | \$0 | \$0 | \$7,500 |
| 4.6 Frontend Loader and Operator | 5 | day | \$900.00 | | | | \$4,500 | \$0 | \$0 | \$0 | \$4,500 |
| 4.7 Concrete Debris Disposal | 0 | cy | \$20.70 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5 EXCAVATION/BACKFILL | | | | | | | | | | | |
| 5.1 Excavate/Load Contaminated Soil (2.0 cy Hyd. Exc. | 0 | cy | | | \$0.68 | \$1.71 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.2 Standby, Crawler Mounted 2.0 CY Hydraulic Excavato | 0 | hrs | | | | \$37.54 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.3 Wheel Loader, 3 cy | 0 | hrs | | | \$27.20 | \$56.31 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.4 Standby, Wheel Loader, 3 cy | 0 | hrs | | | | \$14.07 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.5 Health & Safety Monitoring with OVA during Constructio | 5 | day | | | \$188.16 | \$100.00 | \$0 | \$0 | \$941 | \$500 | \$1,441 |
| 5.6 Collect/Analyze Confirmatory Samples | 0 | ea | \$200.00 | \$10.00 | \$23.52 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.7 Import (Offsite) Place, Compact Clean Fill Materia | 0 | cy | | \$12.00 | \$0.85 | \$1.81 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.8 Backfill with Clean Excavated Materia | 0 | cy | | \$0.28 | \$2.02 | \$0.76 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 5.9 UST Removal | 0 | ea | | \$340.72 | \$485.04 | \$1,638.12 | \$0 | \$0 | \$0 | \$0 | \$0 |
| 6 OFF-SITE TRANSPORTATION/DISPOSAL | | | | | | | | | | | |
| 6.1 Waste Profile | 0 | ls | \$750.00 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 6.2 Transport and Dispose of Soil (Non-haz.) in Landfil | 0 | ton | \$45.00 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 6.3 Prepare Shipment Manifests | 0 | hrs | | | \$33.23 | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 7 SITE RESTORATION | | | | | | | | | | | |
| 7.1 Soil Cover (clean fill - spread and compaction) | 9680 | cy | \$11.00 | | | | \$106,480 | \$0 | \$0 | \$0 | \$106,480 |
| 7.2 Top soil (haul and spread) | 2900 | cy | \$9.50 | | | | \$27,550 | \$0 | \$0 | \$0 | \$27,550 |
| 7.3 Fertilize, seed, mulch | 3 | acre | | \$2,500.00 | | | | \$7,500 | \$0 | \$0 | \$7,500 |
| 8 LAND USE CONTROLS | | | | | | | | | | | |
| 8.1 Site Survey (2-man crew) | 2 | days | \$700.00 | | | | \$1,400 | \$0 | \$0 | \$0 | \$1,400 |
| 8.2 Survey Plat | 1 | ls | \$2,700.00 | | | | \$2,700 | \$0 | \$0 | \$0 | \$2,700 |
| 8.3 Prepare Land Use Control Implementation Plan/Docs (Engi | 100 | hours | | | \$26.44 | | \$0 | \$0 | \$2,644 | \$0 | \$2,644 |
| 8.4 Modify Master Plan and Prepare Deed Restrictions (Eng/PA | 80 | hours | | | \$40.12 | | \$0 | \$0 | \$3,210 | \$0 | \$3,210 |
| Subtotal Direct Capital Costs less Subcontract | | | | | | | | \$20,425 | \$13,807 | \$1,955 | \$36,187 |

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 3: SOIL COVER AND LUCs
CAPITAL COSTS

| Cost Item | Quantity | Unit | Subcontract | Unit Cost | | | Subcontract | Extended Cost | | | Subtotal |
|--|----------|------|-------------|-----------|-------|-----------|-------------|---------------|----------|-----------|-----------|
| | | | | Material | Labor | Equipment | | Material | Labor | Equipment | |
| Local Area Adjustment | | | | | | | | 84% | 84% | 84% | |
| | | | | | | | | \$17,157 | \$11,598 | \$1,642 | \$30,397 |
| Overhead on Labor Cost @ 30% | | | | | | | | | \$3,479 | | \$3,479 |
| G & A on Labor Cost @ 10% | | | | | | | | | \$1,160 | | \$1,160 |
| G & A on Material Cost @ 10% | | | | | | | | \$1,716 | | | \$1,716 |
| Total Direct Capital Cost | | | | | | | | \$18,873 | \$16,237 | \$1,642 | \$36,752 |
| Indirects on Total Direct Labor Cost @ 75% | | | | | | | | | \$12,178 | | \$12,178 |
| Profit on Total Direct Cost @ 10% | | | | | | | | | | | \$3,675 |
| Subtotal | | | | | | | | | | | \$52,606 |
| Health & Safety Monitoring @ 3% | | | | | | | | | | | \$6,171 |
| Total Field Cost | | | | | | | | | | | \$58,777 |
| Subtotal Subcontractor Cost | | | | | | | \$153,099 | | | | \$153,099 |
| G & A on Subcontract Cost @ 10% | | | | | | | \$15,310 | | | | \$15,310 |
| Profit on Subcontractor Cost @ 5% | | | | | | | | | | | \$7,655 |
| Subcontractor Cost | | | | | | | | | | | \$176,064 |
| Contingency on Total Field and Subcontractor Costs @ 10% | | | | | | | | | | | \$23,484 |
| Engineering on Total Field and Subcontractor Costs @ 5% | | | | | | | | | | | \$11,742 |
| TOTAL Capital COST | | | | | | | | | | | \$270,067 |

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 2: LAND USE CONTROLS
PRESENT WORTH ANALYSIS**

| Year | Capital Cost | Operation and Maintenance Cost | Annual Cost | Total Yearly Cost | Present-Worth Factor (i = 6%) | Present Worth |
|----------------------------|--------------|--------------------------------|-------------|-------------------|-------------------------------|------------------|
| 0 | \$24,653 | | | \$24,653 | 1.000 | \$24,653 |
| 1 | | \$0 | \$4,541 | \$4,541 | 0.943 | \$4,284 |
| 2 | | \$0 | \$4,541 | \$4,541 | 0.890 | \$4,041 |
| 3 | | \$0 | \$4,541 | \$4,541 | 0.840 | \$3,813 |
| 4 | | \$0 | \$4,541 | \$4,541 | 0.792 | \$3,597 |
| 5 | | \$0 | \$11,010 | \$11,010 | 0.747 | \$8,227 |
| 6 | | \$0 | \$4,541 | \$4,541 | 0.705 | \$3,201 |
| 7 | | \$0 | \$4,541 | \$4,541 | 0.665 | \$3,020 |
| 8 | | \$0 | \$4,541 | \$4,541 | 0.627 | \$2,849 |
| 9 | | \$0 | \$4,541 | \$4,541 | 0.592 | \$2,688 |
| 10 | | \$0 | \$11,010 | \$11,010 | 0.558 | \$6,148 |
| 11 | | \$0 | \$4,541 | \$4,541 | 0.527 | \$2,392 |
| 12 | | \$0 | \$4,541 | \$4,541 | 0.497 | \$2,257 |
| 13 | | \$0 | \$4,541 | \$4,541 | 0.469 | \$2,129 |
| 14 | | \$0 | \$4,541 | \$4,541 | 0.442 | \$2,008 |
| 15 | | \$0 | \$11,010 | \$11,010 | 0.417 | \$4,594 |
| 16 | | \$0 | \$4,541 | \$4,541 | 0.394 | \$1,787 |
| 17 | | \$0 | \$4,541 | \$4,541 | 0.371 | \$1,686 |
| 18 | | \$0 | \$4,541 | \$4,541 | 0.350 | \$1,591 |
| 19 | | \$0 | \$4,541 | \$4,541 | 0.331 | \$1,501 |
| 20 | | \$0 | \$11,010 | \$11,010 | 0.312 | \$3,433 |
| 21 | | \$0 | \$4,541 | \$4,541 | 0.294 | \$1,336 |
| 22 | | \$0 | \$4,541 | \$4,541 | 0.278 | \$1,260 |
| 23 | | \$0 | \$4,541 | \$4,541 | 0.262 | \$1,189 |
| 24 | | \$0 | \$4,541 | \$4,541 | 0.247 | \$1,121 |
| 25 | | \$0 | \$11,010 | \$11,010 | 0.233 | \$2,565 |
| 26 | | \$0 | \$4,541 | \$4,541 | 0.220 | \$998 |
| 27 | | \$0 | \$4,541 | \$4,541 | 0.207 | \$942 |
| 28 | | \$0 | \$4,541 | \$4,541 | 0.196 | \$888 |
| 29 | | \$0 | \$4,541 | \$4,541 | 0.185 | \$838 |
| 30 | | \$0 | \$11,010 | \$11,010 | 0.174 | \$1,917 |
| TOTAL PRESENT WORTH | | | | | | \$102,954 |

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 2: LAND USE CONTROL:
ANNUAL COSTS**

| Cost Item | Quantity | Unit | Unit Cost | Labor Overhead ^a | Total Cost |
|---|----------|------|-----------|-----------------------------|----------------|
| 1 FIVE YEAR SITE REVIEWS (FOR 30 YEAR PERIOD) | | | | | |
| 1.1 Site Review Meeting (2-persons for 2-days) | | | | | |
| Project Manager | 16 | hr | \$40.12 | \$40.12 | \$1,284 |
| Staff Engineer | 16 | hr | \$26.44 | \$26.44 | \$846 |
| ODCs (travel, etc.) | 1 | ls | \$400.00 | | \$400 |
| 1.2 Five Year Review Report | | | | | |
| Project Manager | 8 | hr | \$40.12 | \$40.12 | \$642 |
| Staff Engineer | 32 | hr | \$26.44 | \$26.44 | \$1,692 |
| ODCs (photocopies, telephone, etc.) | 1 | ls | \$250.00 | | \$250 |
| Subtotal Five Year Review Cos | | | | | \$5,114 |
| G&A and Profit @ 15% | | | | | \$767 |
| Subtotal | | | | | \$5,881 |
| Contingency @ 10% | | | | | \$588.11 |
| Total Five Year Review Cost | | | | | \$6,469 |
| 2 LAND USE CONTROL MONITORING (FOR 30 YEAR PERIOD) | | | | | |
| 2.1 Quarterly Site Inspections: | | | | | |
| Project Manager (2 hrs for each Inspection) | 8 | hr | \$40.12 | \$40.12 | \$642 |
| Staff Engineer | 32 | hr | \$26.44 | \$26.44 | \$1,692 |
| 2.2 Annual Review and Repor | | | | | |
| Project Manager | 4 | hr | \$40.12 | \$40.12 | \$321 |
| Staff Engineer | 12 | hr | \$26.44 | \$26.44 | \$635 |
| ODCs (photocopies, telephone, etc.) | 1 | ls | \$250.00 | | \$250 |
| 2.3 Sign/Fence Maintenance: | | | | | |
| | 1 | ls | \$50.00 | | \$50 |
| Subtotal Land Use Control Monitorin: | | | | | \$3,590 |
| G&A and Profit @ 15% | | | | | \$538 |
| Subtotal | | | | | \$4,128 |
| Contingency @ 10% | | | | | \$412.80 |
| Total Land Use Control Monitoring Cos | | | | | \$4,541 |

^a Overhead on professional labor @ 100%

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 2: LAND USE CONTROLS
Operation and Maintenance Costs per Year

| Item | Qty | Unit | Unit Cost | Subtotal Cost | Notes |
|--|-----|-------|------------|---------------|--|
| 1 Energy - Electric | | kWh | \$0.06 | \$0 | |
| 2 Maintenance | | ls | | \$0 | 5% of Installation Cost |
| 3 Carbon Unit Changeout/Regeneration of Spent Carbon | | pound | \$3.00 | \$0 | once a year |
| 4 Labor, Mobilization/Demobilization, Per Diem, Supplies | | wk | \$925.00 | \$0 | 1 visit per week - 1 day |
| 5 Labor, Mobilization/Demobilization, Per Diem, Supplies | | mo | \$1,950.00 | \$0 | 1 visit per quarter - 2 laborers, 2 days |
| 6 Analysis of Off-gas samples | | ea | \$250.00 | \$0 | 1 per month, VOCs |
| 7 Quarterly Reports | 0 | ea | \$4,000.00 | \$0 | |
| Total Cost for One Year Operation | | | | \$0 | |

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 11
SOIL ALTERNATIVE 3: SOIL COVER AND LUCs
PRESENT WORTH ANALYSIS

| Year | Capital Cost | Operation and Maintenance Cost | Annual Cost | Total Yearly Cost | Present-Worth Factor (i = 6%) | Present Worth |
|----------------------------|--------------|--------------------------------|-------------|-------------------|-------------------------------|------------------|
| 0 | \$270,067 | | | \$270,067 | 1.000 | \$270,067 |
| 1 | | \$0 | \$4,541 | \$4,541 | 0.943 | \$4,284 |
| 2 | | \$0 | \$4,541 | \$4,541 | 0.890 | \$4,041 |
| 3 | | \$0 | \$4,541 | \$4,541 | 0.840 | \$3,813 |
| 4 | | \$0 | \$4,541 | \$4,541 | 0.792 | \$3,597 |
| 5 | | \$0 | \$11,010 | \$11,010 | 0.747 | \$8,227 |
| 6 | | \$0 | \$4,541 | \$4,541 | 0.705 | \$3,201 |
| 7 | | \$0 | \$4,541 | \$4,541 | 0.665 | \$3,020 |
| 8 | | \$0 | \$4,541 | \$4,541 | 0.627 | \$2,849 |
| 9 | | \$0 | \$4,541 | \$4,541 | 0.592 | \$2,688 |
| 10 | | \$0 | \$11,010 | \$11,010 | 0.558 | \$6,148 |
| 11 | | \$0 | \$4,541 | \$4,541 | 0.527 | \$2,392 |
| 12 | | \$0 | \$4,541 | \$4,541 | 0.497 | \$2,257 |
| 13 | | \$0 | \$4,541 | \$4,541 | 0.469 | \$2,129 |
| 14 | | \$0 | \$4,541 | \$4,541 | 0.442 | \$2,008 |
| 15 | | \$0 | \$11,010 | \$11,010 | 0.417 | \$4,594 |
| 16 | | \$0 | \$4,541 | \$4,541 | 0.394 | \$1,787 |
| 17 | | \$0 | \$4,541 | \$4,541 | 0.371 | \$1,686 |
| 18 | | \$0 | \$4,541 | \$4,541 | 0.350 | \$1,591 |
| 19 | | \$0 | \$4,541 | \$4,541 | 0.331 | \$1,501 |
| 20 | | \$0 | \$11,010 | \$11,010 | 0.312 | \$3,433 |
| 21 | | \$0 | \$4,541 | \$4,541 | 0.294 | \$1,336 |
| 22 | | \$0 | \$4,541 | \$4,541 | 0.278 | \$1,260 |
| 23 | | \$0 | \$4,541 | \$4,541 | 0.262 | \$1,189 |
| 24 | | \$0 | \$4,541 | \$4,541 | 0.247 | \$1,121 |
| 25 | | \$0 | \$11,010 | \$11,010 | 0.233 | \$2,565 |
| 26 | | \$0 | \$4,541 | \$4,541 | 0.220 | \$998 |
| 27 | | \$0 | \$4,541 | \$4,541 | 0.207 | \$942 |
| 28 | | \$0 | \$4,541 | \$4,541 | 0.196 | \$888 |
| 29 | | \$0 | \$4,541 | \$4,541 | 0.185 | \$838 |
| 30 | | \$0 | \$11,010 | \$11,010 | 0.174 | \$1,917 |
| TOTAL PRESENT WORTH | | | | | | \$348,368 |