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FINAL FEASIBILITY STUDY ADDENDUM FOR SITE 10 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 9, Site 10, Southeast Open Disposal Area A Surface and Subsurface Soil

Naval Air Station Whiting Field
Milton, Florida

USEPA ID No. FL2170023244

Contract Task Order 0369

August 2007



Southern Division

Naval Facilities Engineering Command

2155 Eagle Drive

North Charleston, South Carolina 29406

**FEASIBILITY STUDY ADDENDUM
FOR
OPERABLE UNIT 9 - SITE 10, SOUTHEAST OPEN DISPOSAL AREA A
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**

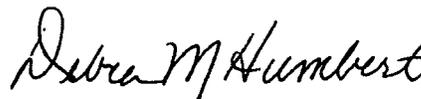
AUGUST 2007

PREPARED UNDER THE SUPERVISION OF:



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

APPROVED FOR SUBMITTAL BY:

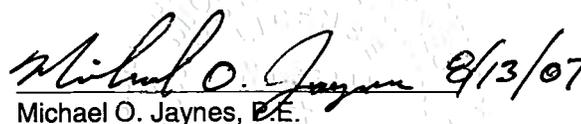


**DEBRA M. HUMBERT
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA**



This document, *Feasibility Study Addendum for Site 10, Southeast Open Disposal Area A, 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 official seal.

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 |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CG | Cleanup Goals |
| COC | constituent of concern |
| COPC | constituent of potential concern |
| cPAHs | carcinogenic polynuclear aromatic hydrocarbons |
| EC | Engineering Controls |
| 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 |
| IRA | Interim Remedial Action |
| LDRs | Land Disposal Restrictions |
| LUCs | Land Use Controls |
| 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 biphenyl |
| PRG | Preliminary Remediation Goal |
| RAGS | Risk Assessment Guidance for Superfund |
| RAOs | Remedial Action Objectives |
| RBC | Risk-Based Concentration |

ACRONYMS (Continued)

| | |
|-------|---|
| RI | Remedial Investigation |
| 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 |
| TSDf | Treatment, Storage, and Disposal Facility |
| 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 10, Southeast Open Disposal Area A, 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 10 were addressed in Sections 2.0 through 5.0 of the original FS.

The changed conditions at Site 10 addressed in this FSA include:

- Arsenic originally identified as a constituent of concern (COC) at Site 10 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 10.
- Over the course of the investigations at this site, the 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 10 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 10 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 10 at NAS Whiting Field. Remedial Alternatives were

developed in the original FS (HLA, 2001). The CERCLA Municipal Landfill Presumptive Remedy guidance for military landfills was not applied to Site 10.

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 10, Southeast Open Disposal Area A, is located adjacent to Site 9 at the eastern facility boundary near the South Air Field and is approximately 4 acres in size. From 1965 to 1973, this site was used for the disposal of inert wastes such as construction debris, trees, brush, metal cans, and similar materials not suitable for sanitary landfill disposal. Transformer oil and empty pesticide/herbicide containers were also reportedly disposed at the site. Historically, access to the site was uncontrolled, and other potentially hazardous wastes also may have been disposed at the site. The precise locations of the disposal areas at Site 10 are unknown; however, the approximate location of the disposal areas were determined based on a geophysical survey conducted during the RI Phase IIA fieldwork (ABB-ES, 1998).

The approximate location of Site 10 is shown on Figure 2-1.

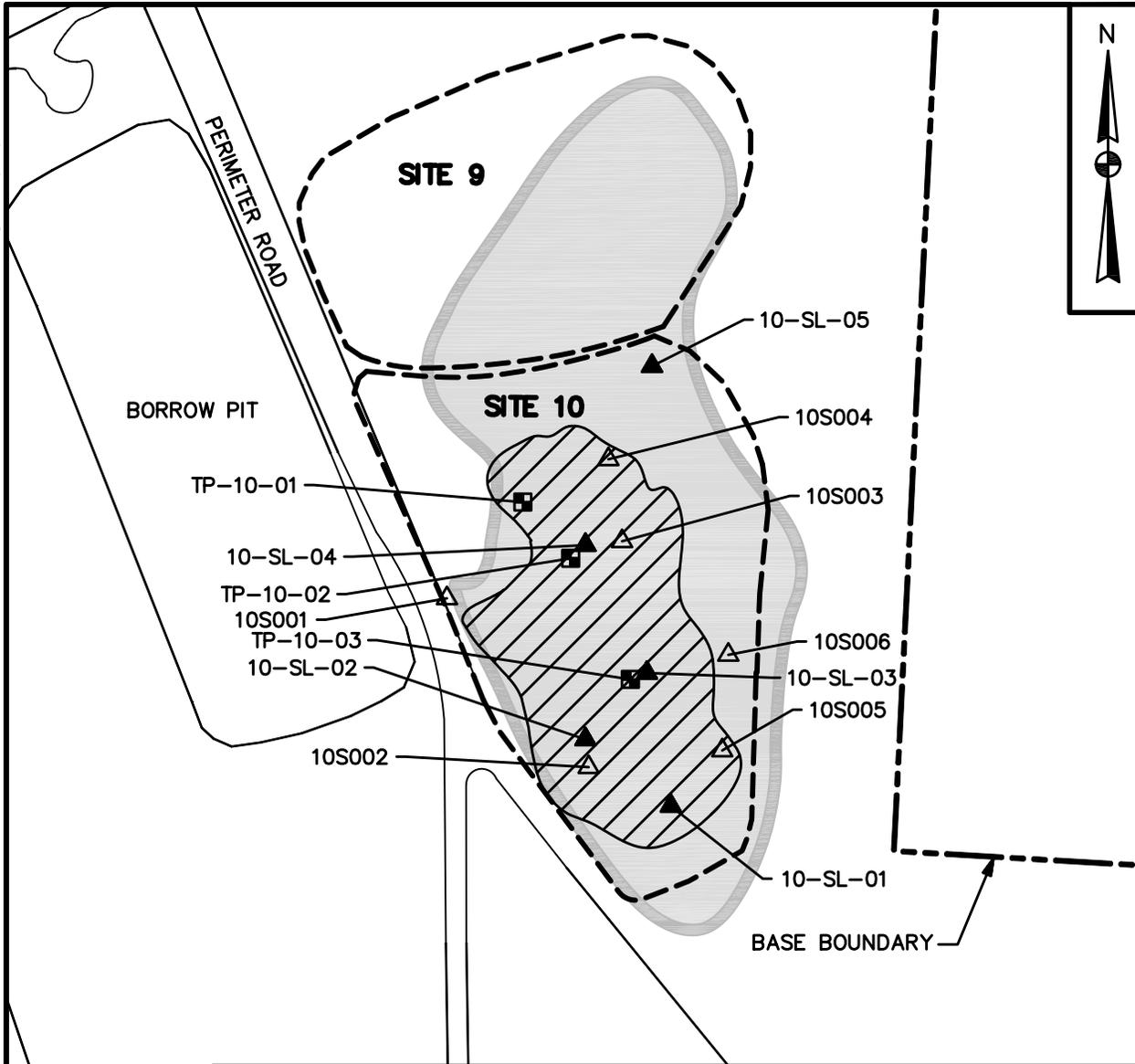
There are currently no buildings at Site 10. No permanent surface water sources exist at Site 10. In the early 1990s, Site 10 consisted of overgrown shrubs and planted pine trees, approximately 25 to 40 feet (ft) in height.

Current conditions reflect the emplacement of a 24-inch permeable soil layer and native grass cover (Figure 2-1) over the surface of the site (Bechtel, 2000). At this time, Site 10 consists of vacant, unused land. Groundwater underlying Site 10 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 10 (prior to the emplacement of the soil cover in 1999) are described in detail in the RI Report issued in 1999 (HLA, 1999). Constituents detected in the surface soils [0 to 1 ft below land surface (bls) or the bottom of the soil cover] include two volatile organic compounds (VOCs), 18 semi-volatile organic compounds (SVOCs), 10 pesticides/polychlorinated biphenyl (PCBs), 21 inorganic constituents, total recoverable petroleum hydrocarbons (TRPH), and cyanide. Constituents detected in the subsurface soils (below 1 ft bls or deeper than 1 ft below the bottom of the soil cover) include five VOCs, eight SVOCs, five pesticides/PCBs, 22 inorganic constituents, and cyanide. Only the revised HHRA at Site 10 is discussed in the following sections.

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



LEGEND:

- △ PHASE IIB SURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- ▲ PHASE IIA SURFACE SOIL SAMPLE LOCATION AND DESIGNATION
- PHASE IIA TEST PIT LOCATION AND DESIGNATION
- APPROXIMATE SITE BOUNDARY
- 2 FEET SOIL COVER
- TOE OF SOIL COVER
- NAS NAVAL AIR STATION
- APPROXIMATE FORMER LANDFILL AREA

0 160 320
GRAPHIC SCALE IN FEET

| | |
|--------------------------|------------------------|
| DRAWN BY MF | DATE 2/13/07 |
| CHECKED BY | DATE |
| REVISED BY | DATE |
| SCALE AS NOTED | |



**LOCATION OF SOIL COVER
AND SURFACE SOIL SAMPLES
SITE 10
SOUTHEAST OPEN DISPOSAL AREA A
FEASIBILITY STUDY ADDENDUM
NAS WHITING FIELD
MILTON, FLORIDA**

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

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, 1999).

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

As discussed in Section 1.0, arsenic, aluminum, iron, and vanadium are not considered COPCs for Site 10 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 10 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 10 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 11 soil samples collected from 0 to 1 ft below land surface (bls) at Site 10 (prior to the emplacement of the soil cover in 1999) 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 were retained as COPCs for surface soil at Site 10:

- SVOCs [bis(2-ethylhexyl) phthalate and carcinogenic polynuclear aromatic hydrocarbons (cPAHs)]
- Pesticides/PCBs (Aroclor-1254, Aroclor-1260, and dieldrin)
- Inorganics (barium and chromium)
- TPRH

Aroclor-1260 was detected in only two samples, and dieldrin was only detected in one sample. The maximum concentration of bis(2-ethylhexyl) phthalate exceeded the simple apportioned PRG but was less than the non-apportioned PRG and simple apportioned and non-apportioned SCTLs. The maximum concentration of cPAHs exceeded the simple apportioned and non-apportioned PRGs and SCTLs. The maximum concentrations of Aroclor-1260, dieldrin, and chromium exceeded the simple apportioned PRGs and SCTLs but were less than the non-apportioned PRGs and SCTLs. The maximum concentration of Aroclor-1254 exceeded the simple apportioned and non-apportioned PRGs and the simple apportioned SCTL but was less than the non-apportioned SCTL. The maximum concentration of barium exceeded the simple apportioned and non-apportioned SCTLs but was less than the simple apportioned and non-apportioned PRGs. The TRPH and barium concentrations exceeding the relevant SCTLs were reported for samples also demonstrating cPAH concentrations exceeding the SCTLs.

Subsurface Soil

All three soil samples collected from 4 to 10 ft bls (prior to the emplacement of the soil cover in 1999) at Site 10 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 10:

- Pesticides (aldrin and dieldrin)
- Inorganics (antimony and chromium)

Maximum concentrations of aldrin and dieldrin exceeded the simple apportioned PRGs but were less than the simple apportioned and non-apportioned SCTLs and the non-apportioned PRGs. Maximum concentrations of antimony and chromium exceeded the simple apportioned PRGs and SCTLs but were less than the non-apportioned PRGs and SCTLs.

2.2.2 Risk Characterization Summary

Potential risks were estimated for five receptors (the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the recreational user/trespasser) using USEPA and FDEP risk assessment guidance. The results are discussed below.

A 24-inch permeable soil layer and native grass cover was emplaced over the surface soil of Site 10 in 1999 (Bechtel, 2000); consequently, the surface soil data evaluated in this risk assessment actually represent the shallow subsurface soils underlying the soil cover. This is an important consideration when interpreting the risk characterization results summarized below because, barring excavation activities bringing contaminated soils to the surface, the soil cover has eliminated direct receptor contact (and risk) to the soils underlying the cover.

Quantitative risk estimates for potential human receptors were developed for the identified COPCs, and potential risks and Hazard Indices (HIs) were calculated in the revised HHRA for Site 10. Several organics (primarily cPAHs, dieldrin, and two Aroclors) and two inorganics (barium and chromium) were selected as COPCs for surface soil and were evaluated in the HHRA conducted per USEPA guidelines. Two pesticides (aldrin and dieldrin) and two inorganics (antimony and chromium) were selected as COPCs for subsurface soil and were also evaluated. Although cancer risk estimates developed for four of the five receptors evaluated (the hypothetical future resident, the typical industrial worker, the construction worker, and the recreational user) exceed 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 drivers for surface soils were the cPAHs; chemical-specific risk estimates for all other COPCs are less than 1×10^{-6} . The only risk driver for subsurface soils was chromium (construction worker only).

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. The following chemicals were identified as COCs for surface soils based on a comparison of maximum detected concentrations to these SCTLs:

| Residential SCTLs | Industrial SCTLs | Recreational SCTLs |
|--------------------------|-------------------------|---------------------------|
| cPAHs | cPAHs | cPAHs |
| Barium | | |
| TRPH | | |

Over 90 percent of the estimated cancer risk is attributable to cPAHs. The total cancer risk estimates for the industrial and recreational land use scenarios would not exceed 1×10^{-6} if cPAHs were not detected or were only detected at concentrations approximately equal to the SCTLs. The TRPH and barium concentrations exceeding the relevant SCTLs were reported for samples also demonstrating cPAH concentrations exceeding the SCTLs.

2.2.3 Evaluation of Results

The non-cancer risk estimates (i.e., the HIs) did not exceed 1.0 for any of the receptors evaluated. Consequently, adverse non-carcinogenic health effects are not anticipated under a residential land use scenario.

Although cancer risk estimates developed for four of the five receptors evaluated (the hypothetical future resident, the typical industrial worker, the construction worker, and the recreational user) exceed 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 drivers for surface soils were the cPAHs; chemical-specific risk estimates for all other COPCs approximate or are less than 1×10^{-6} . The only risk driver for subsurface soils was chromium (construction worker only).

Ecological risks were not affected by the changes in the criteria and USEPA and FDEP standards or the revised list of COCs.

The HHRA was conducted for the constituents detected in 11 surface soil and 3 subsurface soil samples collected at Site 10 (prior to the emplacement of the soil cover in 1999). The evaluation was conducted using both USEPA and State of Florida regulations and guidelines for HHRA. The risk assessment considered five receptors; the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the recreational user, assuming exposure via the ingestion, dermal contact, and inhalation route of exposures. However, none of the receptors are currently contacting surface or subsurface soils at the Site 10. The risk evaluations performed using USEPA guidelines and State of Florida regulations and guidelines yielded comparable results.

No constituents were identified as COCs for subsurface soils.

3.0 REMEDIAL ACTION OBJECTIVES

The RAOs presented in the original FS for Site 10 were:

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

RAO 2: Incorporate provisions into land use controls (LUCs) to address risk of exposure to an excavation worker at Site 10.

RAO 3: 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 PAHs
- 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 10. The current and future anticipated use of the property at this site remains non-residential/recreational, and the current and future receptors are trespassers, recreational users, and maintenance workers.

Based on the current and future use receptors, two amended RAOs are applicable for Site 10.

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

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

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 to set performance standards for potential remedial alternatives.

CGs are determined based on 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, recreational users, and maintenance workers.

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 soil CGs for Site 10.

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 four COCs in surface soil and none in subsurface soil at Site 10. The revised HHRA identified three COCs (cPAHs, barium, and TRPH) in surface soil and none in subsurface soil at Site 10.

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 three COCs for surface soil at Site 10.

**TABLE 3-1
DETERMINATION OF REVISED CLEANUP GOALS AT SITE 10
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 |
|---|-------|--|---|-------------|--------------------------|-------------------------|-----------------|--------------------|
| cPAHs | mg/kg | 0.1 | 0.062 | 0.062 | C | NA | 0.062 | NA |
| Barium | mg/kg | 120 | 5400 | 120 | N | 23.2 | 120 | NA |
| TRPH | mg/kg | 460 | --- | 460 | N | NA | 460 | NA |

¹ Combined list of all COPCs for Site 10.

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
No value for TRPH.

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

CG – Cleanup Goal

TRPH – total recoverable petroleum hydrocarbons

mg/kg – milligrams per kilogram

NA – Not Applicable

**TABLE 3-2
REVISED CONSTITUENT OF CONCERN EVALUATION
SURFACE SOIL
SITE 10**

**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 | | |
| cPAHs/ BaPEq | mg/kg | 4.2 | -- | 4.2 | max | (1) | 0.062 | yes |
| Barium | mg/kg | 361 | J | 361 | max | (1) | 120 | yes⁴ |
| TRPH | mg/kg | 666 | -- | 666 | max | (1) | 460 | yes⁴ |

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.

⁴COC under residential use scenario only, not industrial.

CG = Cleanup goal

COC = constituent of concern

BaPEq = benzo(a)pyrene equivalent

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 10 has been revised from the original FS. Appendix C of the original FS presents area and volume calculations for Site 9 and Site 10 as one combined area requiring remedial action under conditions at that time.

Due to the changes discussed in Section 1.0, the revised COCs, and the separation of Site 10 into a single area, the revised area and volume of soil requiring remedial action or removal based on current conditions encompasses the areal extent where the 2 ft soil cover was emplaced during the Interim Remedial Action (IRA) in 1999 (Figure 2-1). However, the vertical extent to be addressed at Site 10 includes only the 2 feet of native soil directly below the soil cover where concentrations exceeding CGs remain. The top 2 feet of "clean" soil would be stockpiled and used as backfill if the soil removal alternative was selected.

In summary, the estimated area and volume of soil requiring remedial action or removal at Site 10 is approximately 174,000 square ft or 12,889 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 10 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 10 (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 10 representing a range of actions including no action, limited action addressing principal threats, and an aggressive action minimizing the need for long-term management. The three alternatives evaluated for Site 10 in the original FS are listed below:

- Alternative S10-1: No Action
- Alternative S10-2: Land Use Controls (LUCs)
- Alternative S10-3: Soil Removal and LUCs

The three alternatives for Site 10 that will be reevaluated in this FSA include No Further Action (NFA), LUCs, and surface soil removal. The alternatives are described in the following sections:

Alternative S10-1: No Further Action

In an FS, the No Action or NFA alternative is considered to serve as a baseline consideration or to address sites not requiring any active remediation. The NFA alternative for Site 10 assumes no remedial action would occur (beyond the already completed IRA) and establishes a basis for comparison with the other alternatives. No remedial action, treatment, LUCs, or monitoring of conditions would be implemented under the NFA alternative.

Alternative S10-2: LUCs (including ECs and ICs)

Alternative S10-2 addresses the principal threats through the implementation of LUCs, including both Engineering Controls (ECs) and Institutional Controls (ICs) for surface soil. The ECs are in place at Site 10 in the form of a 24-inch soil cover that covers the entire site and will provide a barrier precluding direct exposure to contaminated soil. ECs at Site 10 would also limit site access and exposure pathways at the

site by implementing the use of posted signage, or other containment barriers to ensure appropriate future land use. ICs in the form of a non-residential use prohibition and restrictions on activities which would disturb the site's soil cover and ensure that the soil cover remains in place and is properly maintained would also be implemented to ensure appropriate future land use.

The application of LUCs and the containment of wastes at Site 10 would be consistent with USEPA's Presumptive Remedy guidance for military landfill sites.

Alternative S10-3: Surface Soil Removal

Alternative S10-3 minimizes the need for long-term management because all surface soils containing COCs exceeding CGs would be removed. Excavation would be used to remove all impacted soil exceeding CGs. The existing soil cover would be removed and stockpiled for later use as backfill. The excavation would consist of removing the contaminated soil from below the soil cover down to approximately 2 ft below the soil cover. After all impacted soil within the excavation area exceeding CGs is removed, the excavated area would be backfilled with 2 ft of clean, native material, 2 ft of the stockpiled soil cover material, compacted, and revegetated with no long-term monitoring or maintenance required. Disposal in an approved off-base Treatment, Storage, and Disposal Facility (TSDF) and/or landfill would be used for the excavated soil from Site 10. Some pretreatment of the excavated soils may be necessary to meet Land Disposal Restrictions (LDRs) and would be provided by the TSDF, if required.

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 10, 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 changes do not impact 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.

**TABLE 4-1
COMPARISON OF ORIGINAL FS AND FSA DESCRIPTION OF SOIL REMEDIAL ALTERNATIVES
SITE 10, SOUTHEAST OPEN DISPOSAL AREA A
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 (including ECs and ICs) | 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), including maintenance of existing soil cover. Posting of warning signs (Five-year review will be required) |
| Alternative 3 Surface Soil (exceeding PRGs) Removal and LUCs | Alternative 3 Surface Soil (exceeding CGs) Removal | Treatment/Bulk Removal – Minimizes Long-Term Management | Treatment/Bulk Removal – Minimizes Long-Term Management | LUCs, Bulk Excavation, Disposal | 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"> Excavation/disposal of surface soil (to 2' below soil cover) exceeding CGs. Backfill excavations with clean fill. Establish vegetative cover. |

CG = Cleanup Goal
 FS = Feasibility Study
 FSA Feasibility Study Addendum
 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 10 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

PAGE 1 OF 2

| CRITERIA | ALTERNATIVE 1 NFA | ALTERNATIVE 2 LUCs (ECs and ICs) | ALTERNATIVE 3 Soil Removal |
|---|----------------------|---|---|
| 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 10 FS ADDENDUM

NAS WHITING FIELD
MILTON, FLORIDA

| CRITERIA | ALTERNATIVE 1 NFA | ALTERNATIVE 2 LUCs (ECs and ICs) | ALTERNATIVE 3 Soil Removal |
|---|--------------------------|--|---|
| 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 | \$80,350 (decrease) | \$2,404,252 (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) | \$80,350 (decrease) \$102,893 (Total) | \$2,404,252 (decrease) \$1,332,602 (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 alternative cost estimates for Sites 9 and 10 combined, this FSA includes cost estimates for Site 10 only. In addition the FS included costs for 5 year reviews; however the 5-year reviews are not included for the No Action Alternative in this re-evaluation as 5-year reviews are not required for NFAs.

4.2.3 Long-Term Effectiveness and Permanence

The changes do not impact the long-term effectiveness and permanence of Alternative 1 but do impact Alternatives 2 and 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 changes do 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 slightly impacts the reduction of mobility, toxicity, or volume provided by Alternatives 2 and 3 because the type and quantity of residuals remaining on site has been reduced.

4.2.5 Short-Term Effectiveness

The changes do 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 changes have no impact on the implementability of any of the three alternatives.

4.2.7 Cost

The changes do have an impact on the costs for Alternatives 2 and 3 resulting in a reduction in costs from the original FS cost estimates for these alternatives. The decrease in capital costs for Alternative 3 is mainly due to the decrease in area and volume resulting from the separation of Site 10 into one single area. 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 10 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 10 in the responsiveness summary to be included in the Record of Decision (ROD) for Site 10.

4.3 EVALUATION SUMMARY

As discussed in the above sections and further illustrated in Table 4-2, recent changes and developments at Site 10 have had some impact on the findings of the original FS. In particular, the cost decrease to implement Alternative 3 for Site 10 surface soils. The remedial alternatives and their comparative

evaluation as presented in this FSA are somewhat different from those presented in the original FS mainly because the original FS combined Sites 9 and 10.

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APPENDIX A
REMEDIAL ALTERNATIVE COST ESTIMATES

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 10
SOIL ALTERNATIVE 2: LAND USE CONTROLS (including ECs and ICs)
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 |
| 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 |
| 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 |
| 5.2 Standby, Crawler Mounted 1.0 CY Hydraulic Excavator | 0 | hrs | | | | | \$20.50 | \$0 | \$0 | \$0 | \$0 |
| 5.3 Health & Safety Monitoring with OVA during Excavation | 0 | day | | | | \$188.16 | \$100.00 | \$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 |
| 5.6 UST Removal | 0 | ea | | | \$340.72 | \$485.04 | \$1,638.12 | \$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 |
| 7.3 Sod Disturbed Area | 0.0 | acre | \$20,859.00 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 7.4 Warning Sigs | 4.0 | ls | \$50.00 | | \$25.00 | | \$200 | \$100 | \$0 | \$0 | \$300 |
| 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 (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 | | | | | | | | \$100 | \$7,232 | \$0 | \$7,332 |
| Local Area Adjustment | | | | | | | | 84% | 84% | 84% | |
| | | | | | | | | \$84 | \$6,075 | \$0 | \$6,159 |
| Overhead on Labor Cost @ 30% | | | | | | | | | \$1,823 | | \$1,823 |
| G & A on Labor Cost @ 10% | | | | | | | | | \$608 | | \$608 |
| G & A on Material Cost @ 10% | | | | | | | | \$8 | | | \$8 |
| Total Direct Capital Cost | | | | | | | | \$92 | \$8,505 | \$0 | \$8,597 |

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 10
SOIL ALTERNATIVE 2: LAND USE CONTROLS (Including ECs and ICs)
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% | | | | | | | | | | | | \$860 |
| Subtotal | | | | | | | | | | | | \$15,836 |
| Health & Safety Monitoring @ 3% | | | (Includes Subcontractor cost) | | | | | | | | | \$604 |
| Total Field Cost | | | | | | | | | | | | \$16,440 |
| 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% | | | | | | | | | | | | \$2,139 |
| Engineering on Total Field and Subcontractor Costs @ 5% | | | | | | | | | | | | \$1,069 |
| TOTAL Capital COST | | | | | | | | | | | | \$24,593 |

NAVAL AIR STATION WHITING FIELD

MILTON, FLORIDA

SITE 10

SOIL ALTERNATIVE 2: LAND USE CONTROLS (including ECs and ICs)

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 10
SOIL ALTERNATIVE 2: LAND USE CONTROLS (including ECs and IC
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 Inspection: | | | | | |
| 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 Report | | | | | |
| 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 Cos | | | | | \$4,541 |

^a Overhead on professional labor @ 100%

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 10
SOIL ALTERNATIVE 2: LAND USE CONTROLS (including ECs and ICs)
PRESENT WORTH ANALYSIS**

| Year | Capital Cost | Operation and Maintenance Cost | Annual Cost | Total Yearly Cost | Present-Worth Factor (i = 6%) | Present Worth |
|----------------------------|--------------|--------------------------------|-------------|-------------------|-------------------------------|------------------|
| 0 | \$24,593 | | | \$24,593 | 1.000 | \$24,593 |
| 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 | | | | | | \$102,893 |

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 10
SOIL ALTERNATIVE 3: SURFACE SOIL (EXCEEDING CGs) REMOVAL, TRANSPORT, AND OFFSITE DISPOSAL
CAPITAL COSTS

| Cost Item | Quantity | Unit | Unit Cost | | | Extended Cost | | | Subtotal | | |
|---|----------|-------|-------------|----------|----------|---------------|-------------|-----------|----------|----------|-----------|
| | | | Subcontract | Material | Labor | Equipment | Subcontract | Material | | Labor | Equipment |
| 1 PROJECT PLANNING | | | | | | | | | | | |
| 1.1 Prepare Remedial Design | 120 | hr | | | \$33.79 | | \$0 | \$0 | \$4,055 | \$0 | \$4,055 |
| 1.2 Project Scheduling and Procurement | 50 | hr | | | \$33.79 | | \$0 | \$0 | \$1,690 | \$0 | \$1,690 |
| 2 MOBILIZATION/DEMOBILIZATION | | | | | | | | | | | |
| 2.1 Equipment Mob/Demob (Exc., Loader, & Dozier) | 2 | ea | | | \$200.00 | \$250.00 | \$0 | \$0 | \$400 | \$500 | \$900 |
| 2.2 Mobilize/Demobilize Personnel (3-persons) | 2 | ea | | \$375.00 | \$300.00 | | \$0 | \$750 | \$600 | \$0 | \$1,350 |
| 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') | 1 | mo | \$221.49 | | | | \$221 | \$0 | \$0 | \$0 | \$221 |
| 2.6 Site Utilities | 1 | mo | \$1,000.00 | | | | \$1,000 | \$0 | \$0 | \$0 | \$1,000 |
| 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 | 10 | drum | \$125.00 | | | | \$1,250 | \$0 | \$0 | \$0 | \$1,250 |
| 3.3 Decon Water Storage Drums | 10 | ea | | \$45.00 | | | \$0 | \$450 | \$0 | \$0 | \$450 |
| 3.4 PPE (3 p * 5 days * 4 Weeks) | 30 | m-day | | \$30.00 | | | \$0 | \$900 | \$0 | \$0 | \$900 |
| 3.5 Decontaminate Equipment (Pressure Washer) | 8 | ea | | | \$134.45 | \$50.00 | \$0 | \$0 | \$1,076 | \$400 | \$1,476 |
| 4 SITE PREPARATION | | | | | | | | | | | |
| 4.1 Erosion Control Fencing | 8000 | lf | | \$0.23 | \$1.17 | | \$0 | \$1,840 | \$9,360 | \$0 | \$11,200 |
| 4.2 Collect/Analyze Delineation Samples (TPH & others) | 8 | ea | \$200.00 | \$10.00 | \$23.52 | | \$1,600 | \$80 | \$188 | \$0 | \$1,868 |
| 4.3 Construction Surveys (2-man crew) | 3 | day | \$648.36 | | | | \$1,945 | \$0 | \$0 | \$0 | \$1,945 |
| 4.4 Utility Location and Site Delineation/Layout | 8 | hrs | | | \$33.23 | | \$0 | \$0 | \$266 | \$0 | \$266 |
| 4.5 Concrete Demolition/Removal (6" reinforced) | 2 | cy | \$45.58 | | | | \$91 | \$0 | \$0 | \$0 | \$91 |
| 4.6 Concrete Debris Disposal | 2 | cy | \$20.70 | | | | \$41 | \$0 | \$0 | \$0 | \$41 |
| 5 EXCAVATION/BACKFILL | | | | | | | | | | | |
| 5.1 Excavate/Load Contaminated Soil (2.0 cy Hyd. Exc. | 12888 | cy | | | \$0.68 | \$1.71 | \$0 | \$0 | \$8,764 | \$22,038 | \$30,802 |
| 5.2 Standby, Crawler Mounted 2.0 CY Hydraulic Excavato | 200 | hrs | | | | \$37.54 | \$0 | \$0 | \$0 | \$7,508 | \$7,508 |
| 5.3 Wheel Loader, 3 cy | 60 | hrs | | | \$27.20 | \$56.31 | \$0 | \$0 | \$1,632 | \$3,379 | \$5,011 |
| 5.4 Standby, Wheel Loader, 3 cy | 20 | hrs | | | | \$14.07 | \$0 | \$0 | \$0 | \$281 | \$281 |
| 5.5 Health & Safety Monitoring with OVA during Excavation | 20 | day | | | \$188.16 | \$100.00 | \$0 | \$0 | \$3,763 | \$2,000 | \$5,763 |
| 5.6 Collect/Analyze Confirmatory Samples | 8 | ea | \$200.00 | \$10.00 | \$23.52 | | \$1,600 | \$80 | \$188 | \$0 | \$1,868 |
| 5.7 Import (Offsite) Place, Compact Clean Fill Material | 12888 | cy | | \$7.82 | \$0.85 | \$1.81 | \$0 | \$100,784 | \$10,955 | \$23,327 | \$135,066 |
| 5.8 Backfill with Clean Excavated Material | 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 | 4 | ls | \$750.00 | | | | \$3,000 | \$0 | \$0 | \$0 | \$3,000 |
| 6.2 Transport and Dispose of Soil (Non-haz.) in Landfill | 15500 | ton | \$45.00 | | | | \$697,500 | \$0 | \$0 | \$0 | \$697,500 |
| 6.3 Prepare Shipment Manifests | 40 | hrs | | | \$33.23 | | \$0 | \$0 | \$1,329 | \$0 | \$1,329 |
| 7 SITE RESTORATION | | | | | | | | | | | |
| 7.1 Concrete Slab (Reinforced) on Grade (6") | 0 | sf | \$4.03 | | | | \$0 | \$0 | \$0 | \$0 | \$0 |
| 8 LAND USE CONTROLS | | | | | | | | | | | |
| 8.1 Site Survey (2-man crew) | 2 | days | \$648.36 | | | | \$1,297 | \$0 | \$0 | \$0 | \$1,297 |
| 8.2 Prepare Land Use Plan | 100 | hours | | | \$33.79 | | \$0 | \$0 | \$3,379 | \$0 | \$3,379 |
| 8.3 Modify Master Plan and Prepare Deed Restriction: | 80 | hours | | | \$33.79 | | \$0 | \$0 | \$2,703 | \$0 | \$2,703 |
| Subtotal Direct Capital Costs less Subcontract | | | | | | | | \$105,334 | \$50,747 | \$59,589 | \$215,670 |

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 10
SOIL ALTERNATIVE 3: SURFACE SOIL (EXCEEDING CGs) REMOVAL, TRANSPORT, AND OFFSITE DISPOSAL
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% | |
| | | | | | | | | \$88,481 | \$42,628 | \$50,055 | \$181,163 |
| Overhead on Labor Cost @ 30% | | | | | | | | | \$12,788 | | \$12,788 |
| G & A on Labor Cost @ 10% | | | | | | | | | \$4,263 | | \$4,263 |
| G & A on Material Cost @ 10% | | | | | | | | \$8,848 | | | \$8,848 |
| Total Direct Capital Cost | | | | | | | | \$97,329 | \$59,679 | \$50,055 | \$207,062 |
| Indirects on Total Direct Labor Cost @ 75% | | | | | | | | | \$44,759 | | \$44,759 |
| Profit on Total Direct Cost @ 10% | | | | | | | | | | | \$20,706 |
| Subtotal | | | | | | | | | | | \$272,527 |
| Health & Safety Monitoring @ 3% | | | (Includes Subcontractor cost) | | | | | | | | \$29,467 |
| Total Field Cost | | | | | | | | | | | \$301,995 |
| Subtotal Subcontractor Cost | | | | | | | \$709,718 | | | | \$709,718 |
| G & A on Subcontract Cost @ 10% | | | | | | | \$70,972 | | | | \$70,972 |
| Profit on Subcontractor Cost @ 5% | | | | | | | | | | | \$35,486 |
| Subcontractor Cost | | | | | | | | | | | \$816,176 |
| Contingency on Total Field and Subcontractor Costs @ 10% | | | | | | | | | | | \$111,817 |
| Engineering on Total Field and Subcontractor Costs @ 5% | | | | | | | | | | | \$55,909 |
| TOTAL Capital COST | | | | | | | | | | | \$1,285,897 |

NAVAL AIR STATION WHITING FIELD

MILTON, FLORIDA

SITE 10

SOIL ALTERNATIVE 3: SURFACE SOIL (EXCEEDING CGs) REMOVAL, TRANSPORT, AND OFFSITE DISPOSAL

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 10**

**SOIL ALTERNATIVE 3: SURFACE SOIL (EXCEEDING CGs) REMOVAL, TRANSPORT, AND OFFSITE DISPOSAL
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 | 0 | hr | \$40.12 | \$40.12 | \$0 |
| Staff Engineer | 0 | hr | \$26.44 | \$26.44 | \$0 |
| ODCs (travel, etc.) | 0 | ls | \$400.00 | | \$0 |
| 1.2 Five Year Review Report | | | | | |
| Project Manager | 0 | hr | \$40.12 | \$40.12 | \$0 |
| Staff Engineer | 0 | hr | \$26.44 | \$26.44 | \$0 |
| ODCs (photocopies, telephone, etc.) | 0 | ls | \$250.00 | | \$0 |
| Subtotal Five Year Review Cos | | | | | \$0 |
| G&A and Profit @ 15% | | | | | \$0 |
| Subtotal | | | | | \$0 |
| Contingency @ 10% | | | | | \$0.00 |
| Total Five Year Review Cost | | | | | \$0 |
| 2 LAND USE CONTROL MONITORING (FOR 30 YEAR PERIOD) | | | | | |
| 2.1 Quarterly Site Inspections | | | | | |
| Project Manager (2 hrs for each Inspection) | 0 | hr | \$40.12 | \$40.12 | \$0 |
| Staff Engineer | 0 | hr | \$26.44 | \$26.44 | \$0 |
| 2.2 Annual Review and Repor | | | | | |
| Project Manager | 0 | hr | \$40.12 | \$40.12 | \$0 |
| Staff Engineer | 0 | hr | \$26.44 | \$26.44 | \$0 |
| ODCs (photocopies, telephone, etc.) | 0 | ls | \$250.00 | | \$0 |
| 2.3 Sign/Fence Maintenance | 0 | ls | \$50.00 | | \$0 |
| Subtotal Land Use Control Monitoring | | | | | \$0 |
| G&A and Profit @ 15% | | | | | \$0 |
| Subtotal | | | | | \$0 |
| Contingency @ 10% | | | | | \$0.00 |
| Total Land Use Control Monitoring Cost | | | | | \$0 |

^a Overhead on professional labor @ 100%

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
SITE 10**

**SOIL ALTERNATIVE 3: SURFACE SOIL (EXCEEDING CGs) REMOVAL, TRANSPORT, AND OFFSITE DISPOSAL
PRESENT WORTH ANALYSIS**

| Year | Capital Cost | Operation and Maintenance Cost | Annual Cost | Total Yearly Cost | Present-Worth Factor (i = 6%) | Present Worth |
|----------------------------|--------------|--------------------------------|-------------|-------------------|-------------------------------|--------------------|
| 0 | \$1,285,897 | | | \$1,285,897 | 1.000 | \$1,285,897 |
| 1 | | \$0 | \$0 | \$0 | 0.943 | \$0 |
| 2 | | \$0 | \$0 | \$0 | 0.890 | \$0 |
| 3 | | \$0 | \$0 | \$0 | 0.840 | \$0 |
| 4 | | \$0 | \$0 | \$0 | 0.792 | \$0 |
| 5 | | \$0 | \$0 | \$0 | 0.747 | \$0 |
| 6 | | \$0 | \$0 | \$0 | 0.705 | \$0 |
| 7 | | \$0 | \$0 | \$0 | 0.665 | \$0 |
| 8 | | \$0 | \$0 | \$0 | 0.627 | \$0 |
| 9 | | \$0 | \$0 | \$0 | 0.592 | \$0 |
| 10 | | \$0 | \$0 | \$0 | 0.558 | \$0 |
| 11 | | \$0 | \$0 | \$0 | 0.527 | \$0 |
| 12 | | \$0 | \$0 | \$0 | 0.497 | \$0 |
| 13 | | \$0 | \$0 | \$0 | 0.469 | \$0 |
| 14 | | \$0 | \$0 | \$0 | 0.442 | \$0 |
| 15 | | \$0 | \$0 | \$0 | 0.417 | \$0 |
| 16 | | \$0 | \$0 | \$0 | 0.394 | \$0 |
| 17 | | \$0 | \$0 | \$0 | 0.371 | \$0 |
| 18 | | \$0 | \$0 | \$0 | 0.350 | \$0 |
| 19 | | \$0 | \$0 | \$0 | 0.331 | \$0 |
| 20 | | \$0 | \$0 | \$0 | 0.312 | \$0 |
| 21 | | \$0 | \$0 | \$0 | 0.294 | \$0 |
| 22 | | \$0 | \$0 | \$0 | 0.278 | \$0 |
| 23 | | \$0 | \$0 | \$0 | 0.262 | \$0 |
| 24 | | \$0 | \$0 | \$0 | 0.247 | \$0 |
| 25 | | \$0 | \$0 | \$0 | 0.233 | \$0 |
| 26 | | \$0 | \$0 | \$0 | 0.220 | \$0 |
| 27 | | \$0 | \$0 | \$0 | 0.207 | \$0 |
| 28 | | \$0 | \$0 | \$0 | 0.196 | \$0 |
| 29 | | \$0 | \$0 | \$0 | 0.185 | \$0 |
| 30 | | \$0 | \$0 | \$0 | 0.174 | \$0 |
| TOTAL PRESENT WORTH | | | | | | \$1,285,897 |