N61331.AR.001613
NSA PANAMA CITY
5090.3a

REVISED DRAFT STATEMENT OF BASIS DOCUMENT WITH TRANSMITTAL CSS PANAMA CITY
2/4/2000
TETRA TECH

0011

20

TETRA TECH NUS, INC.
1401 Oven Park Drive • Suite 102 • Tallahassee, FL 32312
(850) 385-9899 • FAX (850) 385-9860 • www.tetratech.com

February 4, 2000

Project Number 0038

Commanding Officer
Department of the Navy
Southern Division
Naval Facilities Engineering Command
ATTN: Mr. B. K. Moring (Code 1855)
Remedial Project Manager
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0076

Subject: Revised Draft Statement of Basis Document for Coastal Systems Station Panama City, Panama City, Florida

Dear Mr. Moring:

Tetra Tech NUS is pleased to submit for your review and approval, two copies of the Revised Draft Statement of Basis for Coastal Systems Station Panama City, Panama City , Florida. Additional copies have been forwarded to the U. S. Environmental Protection Agency, Florida Department of Environmental Protection, and the Coastal System Station Facility as indicated below.

If you have any questions regarding this document or require further information, please contact me at (850) 385-9899.

Sincerely,

Gerald Walker

Gerald Walker, P.G.
Task Order Manager

GW/gw

Enclosures (2)

cc: Ms. Liz Wild, USEPA (enclosure, 2 copies)
Mr. David Grapka, FDEP (enclosure, 2 copies)
Mr. Arturo McDonald, CSS Panama City PWD (enclosure, 3 copies)
Ms. D Wroblewski (w/o enclosure)
Mr. Mark Perry/File (unbound, 1 copy)

STATEMENT OF BASIS

Coastal Systems Station
Panama City, Florida

USEPA I.D. No.:	FL8 170 002 792
Number of SWMUs:	Three
Number of AOCs:	One
Contaminants:	Solvents, Polynuclear Aromatic Hydrocarbons, Pesticides, Metals
Media:	Soil, Groundwater, Surface Water, Sediment
Proposed Remedies:	Institutional Controls, Monitoring, Excavation and Disposal, Excavation and Thermal Treatment, Vacuum-Enhanced Extraction, Soil Vapor Extraction with Enhanced Biodegradation, Natural Attenuation

INTRODUCTION

The Navy and U.S. Environmental Protection Agency (USEPA) are issuing this Statement of Basis as part of their public participation responsibilities under § 7004(b) of the Resource Conservation and Recovery Act (RCRA). A RCRA Permit including a Hazardous and Solid Waste Amendment (HSWA) Attachment was issued on December 6, 1985 for the Coastal System Station (CSS) Panama City, Panama City, Florida. The HSWA attachment required an investigation of specified Areas of Concern (AOC) and Solid Waste Management Units (SWMUs). The RCRA Facility Investigation (RFI) was completed in June 1992. Following completion of the investigation, the RCRA permit required the facility develop a Corrective Measures Study (CMS) to identify and discuss various remedies for addressing contamination detected at each SWMU. The CMS was completed in April 1997. This Statement of Basis summarizes the information provided in the CMS and calls for public comment on the recommended remedies.

This Statement of Basis identifies and explains the proposed remedies for AOC 1 and SWMUs 3, 9, and 10, located at CSS Panama City in Panama City, Florida. It summarizes the Interim Measure Remedial Actions (IMRA) previously completed and briefly discusses the other alternatives considered, but not selected, for these SWMUs and the AOC.

This document summarizes information that may be found in greater detail in the RFI report and CMS and other documents contained in the Administrative Record for this facility. The Administrative Record is located at the Bay County Library, 25 West Government Street, Panama City, Florida and the telephone number is (850) 872-7500. USEPA, Florida Department of Environmental Protection (FDEP), and the Navy encourage the public to review these other documents to gain a more comprehensive understanding of the facility and the RCRA activities that have been conducted there.

The final remedies for the facility will be selected by USEPA, FDEP, and the Navy after the public comment period has ended and all relevant comments have been considered. The remedies proposed in this Statement of Basis may be modified based on new information or public comments; therefore, the public is encouraged to review and comment on all of the proposed remedies.

A list of acronyms presented in this report is included at the end of this document.

PROPOSED REMEDIES

An RFI was conducted for SWMUs and AOCs at CSS to assess the impact of releases of potentially hazardous substances on the environment. Based on the results of the RFI and risk assessments conducted at the facility, corrective action objectives (CAOs) were developed for three SWMUs and one AOC. The CAOs for these four areas, the remedies proposed to accomplish the objectives and the IMRA (either ongoing or previously completed) are presented in the following paragraphs.

SWMU 3: Landfill C, Burn and Disposal Area

Surface Soil

CAO: Manage risks to human health from exposure to surface soil containing benzo(a)pyrene and arsenic.

Proposed Remedy: The proposed remedy for surface soil is to implement industrial land use controls through the use of a Land Use Control Assurance Plan (LUCAP). The LUCAP is a written installation-wide plan that sets out the procedure to assure that land use controls remain effective over the long term in all areas where they are required. The LUCAP if required will be documented in a Memorandum of Agreement (MOA) or Federal Facilities Agreement between USEPA, FDEP and the Navy. Once the installation-wide LUCAP is in place, additional site-specific Land Use Control Implementation Plans (LUCIP; i.e. SWMU 3) will be completed and appended to it as final cleanup decisions are made.

The LUCAP requires, at a minimum,

- quarterly onsite monitoring by the facility for compliance with the LUCIP.
- Notification to USEPA and FDEP whenever major changes in land use are anticipated.
- An evaluation of whether the anticipated land-use change will pose an unacceptable risk to human health or the environment.
- An evaluation of the need for additional remedial action resulting from a major land use change.

Public health and the environment would be adequately protected by implementing this alternative because SWMU 3 will continue to be used for industrial purposes; risks to human health are currently within the USEPA acceptable range; and SWMU 3 does not support a habitat for terrestrial receptors.

Sediment

CAO: Manage risks to human health from exposure to sediment containing benzo(a)pyrene.

CAO: Manage risks to ecological receptors from exposure to sediment containing lead, iron, zinc, and copper.

Proposed Remedy: The proposed remedy for wetland sediment is monitoring. Surface water and sediments will be collected for analysis and biomonitoring parameters. This event will occur on an annual basis to determine whether or not concentrations of chemicals of concern are decreasing over time. If the concentrations of chemicals of concern increase, corrective action may be implemented at that time.

The proposed remedy for shoreline sediments is raking, collection and disposal of surface debris. The shoreline would be raked to collect any pieces of debris and a small layer of sediment (less than ½ foot) for removal. Collected materials would be disposed of at a permitted land disposal facility. This proposed remedy was completed as an IMRA in November 1997.

SWMU 9: Firefighting Training Area No. 2

Surface Soil

CAO: Manage risks to human health due to exposure to dieldrin and arsenic in surface soil.

Proposed Remedy: The proposed remedy for surface soil is excavation and offsite disposal.

The surface soil would be excavated to a depth of 2 feet below grade and transported to an appropriate offsite land disposal facility.

Removal of the surface soil from the site would eliminate dermal contact by humans. The proposed remedy was initiated as an IMRA in 1999. The surface soils were excavated to a depth 2-feet below land surface, and because the soils were found to be non-hazardous, they were disposed of appropriately. The excavated area was filled with clean soil.

Subsurface Soil and Groundwater

It is anticipated that corrective action for groundwater will not be necessary and that corrective action for subsurface soil may be necessary. As such, the CMS identified CAOs and alternatives for subsurface soil only. The objective and proposed remedy are discussed below.

CAO: Reduce concentrations of volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) in subsurface soil to remove a potential source of contamination to groundwater.

Proposed Remedy: The CMS indicated that the proposed remedy for subsurface soil is excavation and treatment via thermal desorption. However, as part of the IMRA for the SWMU 9 surface soils, subsurface soils were excavated at the site to a maximum depth of 6.8 feet below land surface (bls) and sampled for Contaminants of Concern. The subsurface soils were determined to be non-hazardous and were disposed of appropriately. The excavation was backfilled with clean fill material.

SWMU 10: Building 363, Oil-Water Separator (OWS)

Groundwater

CAO: Remove Light Non-Aqueous Phase Liquid (LNAPL) present on the groundwater table in excess of 0.1 inch.

Proposed Remedy: At this SWMU, LNAPL will be removed from the water table surface through vacuum-enhanced extraction (VEE).

LNAPL will be pumped to the surface and analyzed. If it is nonhazardous, the removed liquid will be discharged to the facility's OWS for ultimate treatment at CSS's wastewater treatment plant (WWTP). If the liquid is hazardous, it will be disposed of at a permitted offsite treatment and disposal facility. Monitoring of the thickness of the LNAPL will occur initially on a weekly basis, then on a monthly basis, and finally, on a quarterly basis. Once the monitoring program has progressed to the quarterly basis, groundwater would be sampled and analyzed. At the end of the quarterly monitoring program, a report would be prepared summarizing the results of the groundwater sampling and recommending further groundwater actions, if necessary.

The proposed remedy was initiated as an IMRA on 1997. Quarterly monitoring of LNAPL and groundwater monitoring activities were completed in May 1999. The quarterly monitoring indicated that LNAPLs were not present in the monitoring point for a period of 17 months and analytical results for groundwater samples for specified monitoring wells did not contain VOCs, Semivolatile Organic Compounds (SVOCs) or metals at concentrations above the groundwater criteria.

The recommendations of the Final Quarterly LNAPL Measurement and Sampling Report for SWMU 10 Coastal Systems Station Panama City Florida (July 1999) was that the requirements of the CMS LNAPL monitoring plan been met. Therefore it is recommended that LNAPL measurements in monitoring well MW-1, and the associated groundwater sampling at SWMU 10 monitoring wells MW-1, MW-4 and MW-5D be discontinued in accordance with the CMS.

AOC 1: Firefighting Training Area No. 1

Subsurface Soil

CAO: Address subsurface soil that is acting as a source of LNAPL at AOC 1.

Proposed Remedy: The proposed remedy for AOC 1 is soil vapor extraction with enhanced bioremediation. As an IMRA, LNAPL at AOC 1 is being removed by a technology called bioslurping. The bioslurper has been in operation for over 26 months. The most recent Performance/Status Report (through November 25, 1999) recommended that because of very low free-product recovery over the last 12 months (15% of the total LNAPL recovered verses 85% the previous 12 months) the bioslurper operations should be discontinued. Additional investigation may be required to determine if further treatment of subsurface soil is necessary.

If necessary, the preferred remedy for subsurface soil will be vapor extraction with enhanced biological degradation. This technique extracts vapor from the subsurface for treatment. Also, nutrients can be added to the subsurface to promote the biological degradation of remaining contaminants. If this system were installed at AOC 1, equipment already installed for bioslurping could be used. Soil samples will be collected and analyzed to confirm removal of the contaminants.

Groundwater

CAO: Address groundwater containing chemicals with concentrations greater than maximum contaminant levels (MCLs) at AOC 1.

Proposed Remedy: The proposed remedy for groundwater at AOC 1 is a process called natural attenuation. Under this process, a combination of naturally occurring biological, physical, and chemical processes within the surficial aquifer at the site are relied upon to reduce the concentrations of chemicals of concern in groundwater. Physical processes, such as volatilization, sorption, and advection, further reduce chemical concentrations. During the natural attenuation process, monitoring of the conditions in the aquifer will be completed to ensure effective degradation of contaminants. If necessary, groundwater-use restrictions prohibiting the consumption of groundwater in this area could be employed until conditions in the aquifer are satisfactory.

In April 1997, the Navy completed a study assessing the feasibility of the Natural Attenuation process at AOC 1. The conclusion of the Study as documented in the Technical Memorandum Data Assessment, Coastal Systems Station, Panama City, Florida (April 1998) was that "The preliminary scoring for groundwater samples ... suggests that there is significant chemical evidence to confirm ongoing biodegradation." Further, the report recommended that "Given these factors, natural attenuation appears to be a viable remedial alternative for AOC 1."

FACILITY BACKGROUND

CSS is located on the western shore of St. Andrews Bay in Bay County, Florida (Figure 1). The facility is one of seven major research, test, and evaluation laboratories of the Space and Naval Warfare Systems Command. The site was first established in 1942 as a harbor for WWII convoy ships and later became an amphibious landing craft operations school.

The facility has undergone a variety of name changes during the years, and, most recently, was designated Coastal Systems Station in January 1992. It continues to provide mine and underseas countermeasures technology and to support special and amphibious warfare, diving, and other naval coastal missions. In support of It's mission, waste materials, including hazardous waste, have been disposed of or otherwise released to the environment within the

laboratory area of CSS.

The facility conducted an RCRA Facility Assessment (RFA) in 1987. The RFA identified the 12 SWMUs and 3 AOCs that were included in the facility's Hazardous and Solid Waste Amendment permit. The RFA recommended that four of these SWMUs and one AOC did not require further action. The eight remaining SWMUs and two AOCs were determined to warrant further study through the implementation of an RFI. The RFI was completed in 1994. SWMUs 1, 4, and 8 were recommended for no further action in the RFI. SWMUs 2 and 5 and AOCs 2 and 4 were recommended for quick removal actions, which have been completed, and AOC 1 and SWMUs 3, 9, and 10 were recommended for a CMS. The results and decisions for the four sites recommended for a CMS are summarized in this Statement of Basis.

SWMU 3, the Landfill C, Burn and Disposal Area, is located northeast of the Amphibious Assault Landing Craft Area (AALCA) (Building 319). The site is bordered on the east by St. Andrews Bay, on the north by a small tidal inlet and pond leading into the St. Andrews Bay, and on the west by Building 292. The site is approximately 150 feet long by 50 feet wide by 12 feet deep.

The landfill at SWMU 3 was the second landfill used at CSS and was in operation from 1953 to 1959. Waste disposal practices consisted of placing the waste on the ground surface and igniting them. Wastes disposed of and burned at this site included general household garbage, scrap lumber and metal, tree limbs, paint, paint thinner, empty solvent cans, bilge water, and waste oil. Between 24 and 48 cubic yards of waste were brought to the site each day, and burning took place once a month. During low tide, evidence of waste disposal is apparent near the tidal inlet of the wetland.

The major chemicals of concern identified in the RFI for surface soil at the site are arsenic and benzo(a)pyrene. For surface water and sediment, the major chemicals of concern include lead, iron, zinc, copper, and benzo(a)pyrene.

SWMU 9 is located southwest of Gull Circle, near Building 61, in the central part of CSS. This SWMU is bordered by an open field on the west, a wooded area on the south, the wastewater treatment facility on the east, and Gull Circle on the north.

SWMU 9 is a circular earthen area with an approximate diameter of 20 to 30 feet and was used for firefighting training exercises from approximately 1980 to 1985. Exercises consisted of pouring and igniting fuel on the ground in the circular area. Fuels used during these exercises included aviation fuel, diesel fuel, and gasoline. Flammable waste solvent may have also been used. Although flammable waste solvents were disposed of at the SWMU, the unit was not designated as a RCRA-regulated unit because materials used at the unit were being used as an effective substitute for commercial products.

Major chemicals of concern identified in the RFI at this SWMU are arsenic and dieldrin in surface soil. Also, elevated concentrations of VOCs and PAHs have been detected in subsurface soil.

SWMU 10, also identified as Building 363, is an in-ground OWS system located along the eastern boundary of CSS, approximately 120 feet directly south of Building 325 and approximately 120 feet from St. Andrews Bay.

The OWS system has been in operation since 1968 and consists of a 6,000-gallon underground waste oil tank, an OWS, pumps, controls, and associated piping. Two releases of oil and bilge water from the OWS were reported by CSS personnel in 1992. Sampling performed at the OWS in 1992 confirmed the presence of chlorinated solvents in soil and groundwater.

Further sampling in 1993 indicated the presence of LNAPL in groundwater. LNAPL is defined as free product in excess of 0.1 inch thickness on the water table. In addition, concentrations of chemicals are present in groundwater at

SWMU 10 above Federal MCLs and Florida Primary Standards; however, LNAPL is believed to be the source of the release of these chemicals to the groundwater. Therefore, once the LNAPL is removed, the source will likely be eliminated.

AOC 1 is located immediately west of Buildings 290 and 399 in a fenced and paved area used for open storage. Firefighting training occurred at AOC 1 from the 1950s to the 1970s, approximately once per month. Materials used for the firefighting exercises included waste oil, fuels, paint, paint thinners, and bilge water. These materials were poured in an unlined pit approximately 500 square feet in size and ignited. An estimated 2,000 to 6,000 gallons per year of waste materials were poured on the ground and ignited.

During the RFI, the presence of a LNAPL and VOCs, [specifically dichloroethene (DCE), trichloroethene (TCE), and benzene] were identified in the groundwater at this SWMU.

SUMMARY OF FACILITY RISKS

A baseline risk assessment (BRA) was performed at CSS. A BRA is an evaluation of whether or not existing or future exposure to contamination at the site could pose a risk to human health or the environment. For the BRA, the risks presented by the site are estimated with the assumption that no action would be taken to address contamination. This evaluation then serves as a baseline for determining whether or not cleanup of the site is necessary. In the BRA for CSS, risks from exposure to groundwater, soil, surface water, and sediment were estimated.

The BRA takes into account current and future land use in determining the exposure scenarios. In the BRA completed for CSS, current land use was assumed to be military use and as a conservative measure future land use was assumed to be residential use. Additional land use assumptions are provided in the RFI report.

For cancer-causing chemicals, risk is estimated as a probability. For example, a particular exposure to a certain chemical (or chemicals) may present a 1 in 10,000 chance (expressed as $1x10^{-4}$) of developing cancer over an estimated lifetime of 70 years.

For effects other than cancer (or noncancer effects), the dose of a chemical for which someone may be exposed is estimated and compared to a reference dose, which is developed by USEPA scientists. The reference dose represents an estimate of the amount of a chemical to which someone could be exposed over a lifetime without experiencing adverse effects. The estimated dose is divided by the reference dose; if the value is greater than 1, this indicates that adverse effects are possible.

The BRA is summarized for each site on the following pages.

SWMU 3: Landfill C Burn and Disposal Area

Risks were not identified for humans exposed to contaminants in subsurface soil at the site.

Under current land-use conditions, a potential cancer risk (8 in 1,000,000) was predicted based on exposure to surface soil. Noncancer effects were not predicted.

Under future land-use conditions, a potential cancer risk was predicted based on lifetime exposure to surface soil (6 in 100,000), groundwater (2 in 1,000), surface water (3 in 100,000), and sediment (1 in 100,000). Noncancer effects were also predicted for a child resident exposed to surface soil (hazard index = 3) and an adult resident ingesting groundwater (hazard index = 8).

For ecological receptors, sediments in the wetland may impair the benthic community or be toxic to certain aquatic organisms or terrestrial

receptors who forage in the waters. Also, surface water in this wetland may contain chemicals at concentrations that could pose a risk to terrestrial and aquatic receptors. Originally ecological receptors exposed to sediment along St. Andrews Bay in the vicinity of SWMU 3 may have been affected by wave action, activities at the AALCA, or the presence of metal debris along the shoreline.

SWMU 9: Firefighting Training Area No. 2

Risks were not identified for humans exposed to contaminants in subsurface soil at the site.

Under current land-use conditions, a potential cancer risk (1 in 100,000) was predicted based on exposure to surface soil. Noncancer effects were not predicted.

Under future land-use conditions, a potential cancer risk was predicted based on a lifetime exposure to surface soil (7 in 100,000) and groundwater (2 in 100,000). Noncancer effects were also predicted for a child resident exposed to surface soil (hazard index = 2) and an adult resident ingesting groundwater (hazard index = 1.4).

The ecological assessment completed for SWMU 9 did not identify adverse effects for ecological receptor exposure to site media.

SWMU 10: Building 363, OWS

Risks were not identified for humans exposed to contaminants in subsurface soil or sediment at the site.

Under current land-use conditions, no unacceptable cancer or noncancer effects are predicted.

Under future land-use conditions, a potential cancer risk was predicted based on exposure to surface soil (8 in 100,000), groundwater (5 in 1,000), and surface water (1 in 100,000). Noncancer effects were also predicted for an adult resident ingesting groundwater (hazard index = 10.4).

For ecological receptors, sediments in the wetland may impair the benthic community or be toxic to certain aquatic organisms, but the correlation between these effects and chemicals detected at the site could not be determined. Also, adverse effects may be occurring for exposure of terrestrial plants to chemicals in surface soil.

AOC 1: Firefighting Training Area No. 1

Risks were not identified for humans exposed to contaminants in subsurface soil at the site.

No unacceptable noncancer effects were predicted for human exposure to site media. Under current land-use conditions, no unacceptable cancer effects are predicted.

Under future land-use conditions, a potential cancer risk was predicted based on exposure to surface soil (7 in 1,000,000) and groundwater (8 in 10,000). No unacceptable effects to ecological receptors are predicted for exposure to site media.

SCOPE OF CORRECTIVE ACTION

Corrective action will take place in several phases at CSS. Interim measures have been implemented at all sites to expedite the cleanup process; each interim measure will be consistent with the final remedy selected for that site.

The IMRAs completed at each of the sites and

The date of completion are as follows:

- **SWMU 3** - Raking and collection of shoreline debris for offsite management - November 1997.
- **SWMU 9** - Surface and subsurface soil removal and offsite disposal - ongoing.
- **SWMU 10** - Vacuum-enhanced extraction - May 1999.
- **AOC 1** - Bioslurping to remove LNAPLs - October 1999.

Prior to implementation of final corrective actions for any site, Corrective Measures Implementation (CMI) documents that outline the engineering plan for implementing each corrective action alternative will be completed.

SUMMARY AND EVALUATION OF ALTERNATIVES

The alternatives analyzed for the three SWMUs and one AOC are presented below. First the alternatives for each medium at each site is summarized in tabular format. The numbers of the alternatives correspond to the numbers given in the CMS, and a single asterisk denotes the proposed remedy selected for that media. A double asterisk denotes that the alternative has been initiated as an IMRA. Next, a description of each alternative identified in the CMS is provided. Finally, a comparison of the alternatives against the corrective action evaluation criteria is made. These criteria reflect the major technical components of remedies, including cleanup of releases, source control, and management of wastes.

The chosen corrective action alternative should comply with four primary criteria:

- Protection of Human Health and the environment,
- Attainment of Media Protection Standards (MPSs),
- Control of the Source of Releases to the Environment, and
- Compliance with Applicable Standards for the Management of Wastes.

Each alternative is also considered against four other factors: (1) long-term reliability and effectiveness; (2) reduction in toxicity, mobility, and volume of wastes; (3) short-term effectiveness; and (4) implementability. Also, a summary of the costs of each alternative is included; a detailed cost breakdown is provided in the CMS.

SWMU 3: Landfill C, Burn and Disposal Area

Table 1a presents the alternatives considered for corrective action at SWMU 3. The following paragraphs describe and evaluate those alternatives. The cost for the alternatives identified for SWMU 3 is summarized in Table 1b.

Table 1a
Summary of Corrective Action Alternatives for SWMU 3

Surface Soil	
3-1	Limited Action *
3-2	Containment/Gravel Cover
3-3	Excavation and Offsite Disposal
Wetland Sediment	
3-4	Monitoring *
3-5	Excavation and Offsite Disposal
Shoreline Sediment	
3-6	No Action
3-7	Raking and collection of Debris for offsite management**

Notes: * = Proposed remedy for media.
** = Alternative initiated as IMRA.

Table 1b
Cost of Alternatives for SWMU 3

Alt.	Capital Costs	O & M	Total Costs
3-1	0	0	0
3-2	$46,900	$47,400[1]	$104,800
3-3	$93,300-$398,200	0	$102,600-$438,000
3-4	0	$40,000[2]	$44,000
3-5	$107,300-$276,800	0	$118,000-$304,500
3-6	0	0	0
3-7	$98,100-$219,200	0	$10-7,900-$241,100

Notes: Alt. = Alternative
O&M =Operation and Maintenance
[1] = O&M costs annualized @ 6% over 100 years
[2] = O&M costs annualized @ 6% over 5 years

Surface Soil

Description of Surface Soil Alternatives

Alternative 3-1: Limited Action This alternative does not involve the implementation of a containment, treatment, or disposal technology for surface soil at SWMU 3. Instead, the surface soil remains in place and natural processes are relied upon to reduce the concentrations of organic chemicals of concern. Institutional land- and water-use controls will be implemented through an LUCAP. This alternative was considered because the concentrations of chemicals of concern, risks to human health, and prevailing site conditions indicate that limited action is a viable option for surface soil. In addition, surface soil is not an ongoing source of releases to the environment.

Alternative 3-2: Gravel Cover Under this alternative, the site would be covered with gravel. A geomembrane would be laid over the surface soil and then a layer of gravel would be placed over the geomembrane. The geomembrane and gravel cover would allow plants and other vegetation to grow through the cover and would also protect human receptors from contact with the surface soil. After placement of the cover is completed, equipment would be demobilized and the corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Alternative 3-3: Landfilling Under this alternative, the top 2 feet of soil at the site would be excavated. The excavated material would be sampled and analyzed for hazardous waste characteristics. The soil would then be transported offsite to the appropriate land disposal facility. Clean fill would be backfilled into the excavation, and the area would be revegetated and restored to its original condition. All equipment would be demobilized, and the corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Evaluation of Surface Soil Alternatives

The proposed remedy for surface soil at SWMU 3 is limited action (Alternative 3-1). The other alternatives proposed for this SWMU are construction of a soil cover (Alternative 3-2) and excavation and offsite management of surface soil (Alternative 3-3).

Protect Human Health and the Environment: Human health and the environment would be adequately protected by the proposed remedy (Alternative 3-1, limited action) because SWMU 3 will continue to be used for non-residential purposes. Also, risks to human health from exposure to SWMU 3 surface soil are within the USEPA acceptable risk range, and risks to the environment from exposure to surface soil at SWMU were not predicted.

Alternatives 3-2 and 3-3 would also meet this criteria. The construction of a gravel cover (Alternative 3-2) would prevent direct contact by humans or ecological receptors to chemicals of concern by eliminating the exposure pathway, and excavation and offsite disposal of surface

soil (Alternative 3-3) would eliminate all receptor exposures to contaminated soil.

Attain MPSs: No MPSs were developed for surface soil at SWMU 3 because neither USEPA nor FDEP had promulgated soil cleanup standards at the time of the CMS completion.

Control the Source of Releases to the Environment: This criteria is not applicable because surface soil is not a source for release of chemicals to other media.

Comply with Applicable Standards for Management of Wastes: This requirement is not applicable to Alternative 3-1 (the recommended remedy) because no wastes will be generated through implementation of this alternative.

Both Alternatives 3-2 and 3-3 would comply with this criteria. During implementation of Alternative 3-2, only wastes from the decontamination of equipment would be generated. This liquid would be managed in accordance with the appropriate regulatory requirements. Under Alternative 3-3, the excavated soil would be disposed of in an offsite landfill. For both alternatives, applicable documentation, such as waste manifests and profile sheets, would be prepared.

Long-Term Reliability and Effectiveness: Because no active removal or treatment of soil would be performed, the proposed remedy (Alternative 3-1) would not be effective in reducing concentrations of chemicals in soil. However, exposure would be controlled through an LUCAP; this is an effective means of controlling the risk of exposure.

Under Alternative 3-2, long-term protection from exposure to surface soil would be achieved because the direct contact exposure pathway for receptors would be eliminated. Alternative 3-3 is also effective in preventing exposure to surface soil because soil is removed from the site, thus eliminating all exposure to contaminated soil onsite.

Reduction in Toxicity, Mobility, and Volume of Wastes: The proposed remedy (Alternative 3-1) provides no active treatment for the reduction of concentrations of chemicals of concern in surface soil at SWMU 3. Naturally occurring processes would be relied upon to reduce toxicity over time.

Neither of the other alternatives (Alternative 3-2 and 3-3) would meet this criteria. Construction of a gravel cover (Alternative 3-2) would not reduce the toxicity, mobility, or volume of surface soil at SWMU 3. Although the volume of waste would be reduced onsite by disposal of the excavated soil within a land disposal facility (Alternative 3-3) thereby reducing any immediate risk to onsite personnel, the actual volume of waste would not be reduced because no treatment of the soil would occur.

Short-Term Effectiveness: No short-term effects to human or ecological receptors are predicted during implementation of any of the proposed alternatives. Because SWMU 3 is in a primarily industrial area, activities proposed under this alternative would not affect the surrounding community.

Implementability: The proposed remedy (Alternative 3-1) is presently in place at SWMU 3 with the exception of the LUCAP.

The implementation of Alternatives 3-2 and 3-3 would require mobilizing heavy equipment for construction of the soil cover or excavation of soil. Both alternatives would take approximately 2 weeks to complete.

Cost: No cost estimate was developed for Alternative 3-1 because no active corrective measures would be conducted as part of this remedy.

The cost of Alternative 3-2 is $104,800 and the cost of Alternative 3-3 ranges from $102,600 to $438,000, depending upon the type of landfill used for disposal.

Wetland Sediment

Description of Wetland Sediment Alternatives

Alternative 3-4: Monitoring Under this alternative, sediments would be sampled and analyzed for chemicals of concern on an annual basis. This would determine whether or not concentrations of organic chemicals of concern are decreasing through naturally occurring processes within the wetland. In addition, biological monitoring would be performed within the wetland, consisting of benthic macroinvertebrate and toxicity testing using indicator organisms. Effects on the indicator organisms would be assessed based on the results of the testing data. A report would be prepared summarizing the results of the monitoring and recommending either the closure of the SWMU, continued monitoring of the wetland sediment, or corrective action for the wetland sediment.

Alternative 3-5: Excavation and Offsite Management The top 2 feet of sediment within the wetland would be excavated and the removed sediments would be dewatered in preparation for land disposal. The sediment would be sampled and analyzed per the requirements of the land disposal facility. The dewatered sediment would then be transported to the appropriate land disposal facility, and the wetland would be returned to its original grade. The wetland area would be restored, and the corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Evaluation of Wetland Sediment Alternatives

The proposed remedy for wetland sediment is monitoring (Alternative 3-4). The other alternative proposed for wetland sediment is excavation and offsite management (Alternative 3-5).

Protect Human Health and the Environment: The proposed remedy (Alternative 3-4) would meet this criteria. Both chemical analysis and biological monitoring of sediment would be conducted within the wetland at SWMU 3 to assess whether or not natural processes were degrading concentrations of chemicals of concern over time. Data obtained from the monitoring program would be used to assess whether or not adverse effects to the environment based on exposure to wetland sediment were decreasing over time.

Alternative 3-5 (excavation of the sediment within the wetland and offsite management) meets this criteria because it would eliminate the source of possible risks to receptors; however, excavation within the wetland would cause other adverse effects to ecological receptors, including disruption of habitat.

Attain MPSs: No MPSs were developed for wetland sediments because neither USEPA nor FDEP had promulgated cleanup standards for sediment at the time of the CMS completion.

Control the Source of Releases to the Environment: The proposed remedy (Alternative 3-4) would not meet this criteria. Wetland sediments would remain in place under this alternative; however, monitoring the concentrations of chemicals within the sediments and the impact on ecological receptors would provide an assessment of whether or not further corrective action is necessary.

Alternative 3-5 would meet this criteria because wetland sediment would be excavated and disposed of offsite. As a result, releases of chemicals to surface water and migration of contaminated sediments through transport would be reduced or eliminated.

Comply with Applicable Standards for Management of Wastes: This criteria would not be applicable to the proposed remedy (Alternative 3-4) because no wastes would be generated through implementation.

Alternative 3-5 would comply with this criteria because wastes would be transported offsite to the appropriate land disposal facility and the applicable documentation, such as waste profile sheets and waste manifests, would be prepared.

Long-Term Reliability and Effectiveness: Because no active removal or treatment of sediment would be performed under Alternative 3-4, the alternative would not be effective in reducing the risks posed to receptors by exposure to sediments. However, monitoring the wetland sediments for concentrations of chemicals of concern and biological parameters would assist in evaluating whether or not naturally occurring processes are reducing the concentrations of chemicals over time.

Excavation of the sediments under Alternative 3-5 could effectively remove the source of risk to receptors and would be effective indefinitely. However, it may be difficult to restore the wetland to its original function and revegetate the area if the sediment was excavated.

Reduction in Toxicity, Mobility, and Volume of Wastes: No active measures would be implemented under the proposed remedy (Alternative 3-4) to reduce the toxicity, mobility, or volume of affected wetland sediment.

However, naturally occurring processes, such as biodegradation and transformation, may eventually reduce the concentrations of chemicals of concern thereby reducing the toxicity of sediments.

Although the volume of waste would be reduced onsite by disposal of the excavated sediment within a land disposal facility (Alternative 3-5) thereby immediately reducing risk to ecological receptors, the actual volume of waste would not be reduced because no treatment of the sediment would occur.

Short-Term Effectiveness: No short-term effects to human or ecological receptors are predicted during implementation of the proposed remedy (Alternative 3-4). Because SWMU 3 is in a primarily industrial area, activities proposed under this alternative would not affect the surrounding community.

However, under Alternative 3-5, an immediate disruption of ecological habitat within the wetland would be realized.

Implementability: The proposed remedy (Alternative 3-4) is easy to implement because monitoring within the wetland would not disrupt station operations and would only occur on an annual basis.

If Alternative 3-5 were implemented, the stormwater outfall located at the mouth of the wetland would have to be relocated (temporarily) and permits would have to be obtained.

Cost: The cost of the proposed remedy (Alternative 3-4) is $45,400. The cost of Alternative 3-5 ranges from $118,000 to $304,500, depending upon where the excavated soil would need to be disposed of (i.e., a hazardous or nonhazardous waste landfill).

Shoreline Sediment

Description of Shoreline Sediment Alternatives

Alternative 3-6: No Action This alternative does not involve the implementation of a containment, treatment, or disposal technology for the shoreline sediments. The no action alternative is included because concentrations of chemicals of concern, risks to human health, and prevailing site conditions indicate that no action is a viable option.

Alternative 3-7: Raking , Collection, and disposal of Shoreline Sediment: Under this alternative the top layer of sediment would be raked. Material collected would be retained for offsite disposal at a land disposal facility. The excavated sediments would be dewatered in preparation for land disposal. The sediment would be sampled and analyzed per the requirements of the land disposal facility. The dewatered sediment would then be transported to the appropriate land disposal facility. The shoreline area would be restored, and the corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Evaluation of Shoreline Sediment Alternatives

The proposed remedy for shoreline sediment is raking, collection and disposal of shoreline sediments (Alternative 3-7). This alternative was completed as in IMRA in November 1997. The other alternative proposed for shoreline sediment is no action (Alternative 3-6).

Protect Human Health and the Environment: By raking the shoreline a potential source of impairment to the benthic macroinvertebrates community is reduced, because by removing debris along the shoreline , the physical source of probable effects to ecological receptors would be eliminated.

Alternative 3-6 (no action) meets this criteria because human health risks from exposure were within the USEPA acceptable risk range and although the benthic community was observed to be impaired, the reason for the impairment could not be conclusively stated. Removal of the debris may improve the benthic community but other effects (i.e. wave action and activities at the AALCA) may continue to impair the community even after debris removal.

Attain MPSs: No MPSs were developed for shoreline sediments because neither USEPA nor FDEP had promulgated cleanup standards for sediment at the time of the CMS completion.

Control the Source of Releases to the Environment: The proposed remedy (Alternative 3-7) would meet this criteria by raking and removing materials for disposal of offsite.

Under Alternative 3-6 the shoreline sediments potentially causing impairment of the benthic community would remain in place.

Comply with Applicable Standards for Management of Wastes: Based on the initial sampling activities no pretreatment of excavated materials would be required prior to land disposal. However because of the limited data material would require disposal in a RCRA Subtitle C (hazardous) land disposal facility or a RCRA Subtitle D (nonhazardous) land disposal facility. Applicable documentation, such as waste profiles sheets and waste manifests would be required.

Wastes would not be generated through implementation of Alternative 3-6.

Long-Term Reliability and Effectiveness: Raking the shoreline sediments would reduce the potential source of impairment of the benthic community at SWMU 3. As a result Alternative 3-7 is effective at maintaining protection of the environment.

Because no active removal or treatment of sediment would be performed under Alternative 3-6, the alternative would not be effective in reducing the potential impairment observed in the benthic community.

Reduction in Toxicity, Mobility, and Volume of Wastes: Disposal of the raked materials (Alternative 3-7) within an approved landfill would not reduce the toxicity, mobility, or volume of the wastes.

No active measures would be implemented under the Alternative 3-6 to reduce the toxicity, mobility, or volume of affected wetland sediment.

Short-Term Effectiveness: During implementation of Alternative 3-7 appropriate level of protective gear would be worn by site workers to address potential exposure to site-related chemicals. Because no corrective measures would be conducted as part of Alternative 3-6 there would be no short term effects to human health or ecological receptors.

Implementability: Some implementation issues such as obtaining beach sand for fill, would need to be addressed if the preferred alternative were selected.

Alternative 3-7 is currently in place at SWMU 3. No special implementation concerns have been encountered.

Cost: The projected cost of the proposed remedy (Alternative 3-7) ranged from $107,900 to $241,100, depending upon where the excavated soil would be disposed of (i.e., a hazardous or nonhazardous waste landfill). No cost estimate was developed for Alternative 3-6, because no corrective measures would be conducted.

SWMU 9: Firefighting Training Area No. 2

Table 2a presents the alternatives considered for corrective action at SWMU 9. The following paragraphs describe and evaluate those alternatives. The cost for all alternatives identified for SWMU 9 is summarized on Table 2b.

Table 2a
Summary of Corrective Action Alternatives for SWMU 9

Surface Soil	
9-1	No Action
9-2	Containment/Soil Cover
9-3	Excavation and Off-Site Disposal**
Subsurface Soil	
9-4	Excavation and Offsite Thermal Treatment
9-5	Excavation and Off-Site Treatment via Soil Recycling.

Notes: * = Proposed remedy for media.
** = Alternative initiated as IMRA.

Table 2b
Cost of Alternatives for SWMU 9

Alt.	Capital Costs	O & M	Total Costs
9-1	0	0	0
9-2	$26,200	$32,400[1]	$64,500
9-3	$48,400-$137,700	0	$53,200-$151,500
9-4	$283,800	$30,900[2]	$346,200
9-5	$270,000	$30,900[2]	$331,000

Notes: Alt. = Alternative
O&M =Operation and Maintenance
[1] = O&M costs annualized @ 6% over 100 years
[2] = O&M costs annualized @ 6% over 5 years

Surface Soil

Description of Surface Soil Alternatives

Alternative 9-1: No Action This alternative does not involve the implementation of any containment, treatment or disposal technologies for surface soil at SWMU 9; no action would be taken to address surface soil at the site.

Alternative 9-2: Soil Cover Under this alternative, a soil cover would be constructed over the old firefighting training area at SWMU 9. The cover would consist of a 6-inch layer of soil over a geotextile fabric. The geotextile would act as a divider between the contaminated and uncontaminated soil (i.e., the soil cover). The soil cover would serve to reduce exposure to contaminated soil by human and ecological receptors.

The soil cover would be graded so that water would drain radially from the center, thus preventing the ponding of water over the area. The cover would then be seeded and fertilized, which would prevent wind erosion of the soil. Land-use restrictions would also be implemented to prevent future excavation at SWMU 9. The corrective action would then be terminated in accordance with the HSWA portion of the

Facility's RCRA permit.

Alternative 9-3: Excavation and Offsite Disposal Under this alternative, contaminated soil would be excavated and transported to a permitted landfill facility for disposal. The excavation would then be sampled and analyzed to confirm that all soil contaminated with dieldrin and arsenic was removed. The excavation would be backfilled with clean borrow material, seeded, and fertilized. The corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Evaluation of Surface Soil Alternatives

The proposed remedy for surface soil at SWMU 9 is excavation with offsite disposal (Alternative 9-3). The other alternatives considered for surface soil were no action (Alternative 9-1) and construction of a soil cover (Alternative 9-2).

Protect Human Health and the Environment: The proposed remedy (Alternative 9-3) would meet this criteria. Human exposure to chemicals of concern in SWMU 9 surface soil would be eliminated because surface soil would be excavated and disposed of offsite.

Of the other alternatives proposed for surface soil, only Alternative 9-2 (construction of a soil cover) would eliminate human receptor exposure to surface soil. Alternative 9-1 proposes no action.

Attain MPSs: No MPSs were developed for surface soil at SWMU 9 because neither USEPA nor FDEP had promulgated cleanup standards for surface soil at the time of the CMS completion.

Control the Source of Releases to the Environment: The proposed remedy (Alternative 9-3) would meet this criteria. Excavation and disposal of surface soil would eliminate the source of potential risk to human health. In addition, firefighting training activities at SWMU 9 have been discontinued, thus eliminating future releases of chemicals to surface soil.

Under Alternative 9-2, long-term protection from exposure to surface soil would be achieved because the direct contact exposure pathway would be eliminated.

Alternative 9-1 would not meet this criteria because no active corrective measures would be implemented.

Comply with Applicable Standards for Management of Wastes: The proposed remedy (Alternative 9-3) would meet this criteria. Wastes would be transported offsite to the appropriate land disposal facility and the applicable documentation, such as waste profile sheets and waste manifest, would be prepared as necessary.

This criteria would not be applicable to Alternatives 9-1 and 9-2 because no wastes would be generated in implementing these alternatives.

Long-Term Reliability and Effectiveness: The proposed remedy (Alternative 9-3) would meet this criteria because surface soil would be removed and transported offsite thus preventing further exposure by humans.

Alternative 9-2 would also meet this criteria; once the soil cover is constructed it would provide adequate protection from exposure to receptors, as long as proper maintenance was performed.

Alternative 9-1 would not meet this criteria because no corrective measures would be implemented.

Reduction in Toxicity, Mobility, and Volume of Wastes: The proposed remedy (Alternative 9-3) would not meet this criteria. Although the

volume of waste would be reduced onsite by disposal of the excavated soil within a land disposal facility, thereby reducing any immediate risk to onsite personnel, the actual volume of waste would not be reduced since no treatment of the soil would occur.

Neither Alternative 9-1 or 9-2 would meet this criteria because no active treatment of contaminated soil would occur.

Short-Term Effectiveness: Through implementation of Alternative 9-3, there would be an immediate reduction in the predicted risks to human health. Because SWMU 9 is in a primarily industrial area, activities proposed under this alternative would not affect the surrounding community.

This criteria is not applicable to Alternatives 9-1 and 9-2. Alternative 9-1 proposes no action. No short-term effects to human health or the environment are expected if Alternative 9-2 were implemented because SWMU 9 does not support an ecological habitat nor are humans regularly in the area.

Implementability: Implementation of the proposed remedy (Alternative 9-3) would involve mobilizing heavy equipment to SWMU 9 to remove surface soil. It is estimated that it would take approximately 2 weeks to conduct mobilization, excavation, transportation, and demobilization activities. This implementation may impact activities scheduled at the current firefighting training area, located adjacent to SWMU 9.

If Alternative 9-2 were implemented, activities at the current firefighting training area would have to be restricted. Construction activities, including placement of the geotextile and soil cover, would take approximately 3 to 4 weeks.

This criteria is not applicable to Alternative 9-1 because no corrective measures would be implemented.

Cost: The estimated cost for the proposed remedy (Alternative 9-3) ranges from $53,200 to $151,500, depending upon where the soil would have to be disposed of. The cost of Alternative 9-2 is approximately $64,500. No cost estimate was developed for Alternative 9-1 because no active corrective measures would be conducted as part of this remedy.

Subsurface Soil

Prior to implementing a corrective action for subsurface soil at SWMU 9, an assessment of groundwater would be conducted. Data generated from this assessment would be analyzed to determine whether or not corrective action for groundwater and subsurface soil would be warranted and what, if any, corrective actions would be taken.

At this time, it is not anticipated that groundwater would require corrective action; therefore, no corrective action alternatives were identified for groundwater in the CMS. Alternatives for corrective action for subsurface soil were identified in the CMS and are discussed below.

Description of Subsurface Soil Alternatives

Alternative 9-4: Thermal Desorption Contaminated subsurface soil would be excavated, stockpiled, and treated via thermal desorption. Treated soil would then be sampled and analyzed to ensure compliance with treatment levels.

A combination of treated soil and clean borrow fill would be used to backfill the excavated area. Groundwater sampling and analysis would be performed. Once monitoring results were satisfactory the corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Alternative 9-5: Soil Recycling Under this alternative, contaminated soil would be excavated and transported off-site to a permitted soil recycling facility. Clean borrow fill would be used to backfill the excavated area, and the

area would be seeded and restored. Groundwater sampling and analysis would be implemented. Once monitoring results were satisfactory, the corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Evaluation of Subsurface Soil Alternatives

Prior to corrective action for subsurface soil, an assessment of groundwater will be conducted to determine whether or not corrective action for either medium is warranted. As previously stated, it is not anticipated that groundwater would require corrective action; therefore, no corrective action alternatives were identified for groundwater in the CMS. However, if during the groundwater assessment MCLs are exceeded, corrective action alternatives for groundwater would be considered at that time.

Alternatives for corrective action for subsurface soil were identified in the CMS, and, if corrective action is needed for this medium, the preferred remedy would be excavation and treatment via thermal desorption (Alternative 9-4). The other proposed alternative was excavation and offsite recycling of soil (Alternative 9-5).

Protect Human Health and the Environment: This criteria is not relevant to either proposed alternative because no unacceptable risks were predicted for human receptors based on exposure to SWMU 9 subsurface soil, and no exposure to subsurface soil was identified for ecological receptors.

Attain MPSs: No MPSs were developed for subsurface soil at SWMU 9 because neither USEPA nor FDEP had promulgated cleanup standards for soil at the time of the completion of the CMS.

Control the Source of Releases to the Environment: By removing contaminated subsurface soil from SWMU 9, the remedy (Alternative 9-4) would remove a potential source of contamination to groundwater. Several measures would be taken during implementation to ensure the control of releases to the environment. First, mobile thermal treatment units are equipped with air pollution control equipment to prevent releases of particulates and vaporized contaminants to the atmosphere. Also, contaminated soil that is stockpiled prior to treatment would be covered to prevent erosion. Finally, if necessary, treated soil that is stockpiled prior to use as backfill would be watered periodically to prevent dust emissions.

By removing contaminated subsurface soil from SWMU 9, the preferred remedy would remove a potential source of contamination to groundwater. Again, measures would be taken during implementation to ensure the control of releases to the environment; such as, engineering controls (e.g., use of covers) to control wind erosion and emissions of dust and VOCs from stockpiled soil.

Comply with Applicable Standards for Management of Wastes: Under Alternative 9-4 soil would be treated to applicable treatment goals established for thermal treatment. Samples of treated soil would be collected and analyzed; if concentrations of contaminants were greater than treatment goals, the soil would be reprocessed through the thermal treatment unit.

Under the proposed remedy Alternative 9-5, the contaminated subsurface soil would be treated off-site at a permitted soil recycling facility. The soil would be handled, transported, and treated in accordance with all applicable standards and regulations.

Long-Term Reliability and Effectiveness: It is anticipated that Alternative 9-4 would provide permanent and effective removal of contaminants from soil. Thermal treatment has been routinely used at similar sites and on similar wastes to remove VOCs and PAHs from soil.

It is anticipated that Alternative 9-5 would provide permanent effective removal of contaminants from the excavated soil. Soil recycling has been used at similar sites and on similar wastes to remove VOCs and PAHs from soil. The soil type at SWMU 9 and contaminant characteristics are well suited for treatment via soil recycling.

Reduction in Toxicity, Mobility, and Volume of Wastes: The toxicity of contaminants present in subsurface soil would be reduced by either alternative because the treatment process used under both alternatives would transfer contaminants from a solid medium (soil) to a gaseous medium (vapors). The mobility of contaminants and the volume of contaminated subsurface soil at SWMU 9 would also be reduced because soil would be excavated and treated to remove contaminants.

Short-Term Effectiveness: Contaminated soil would be removed and treated offsite as part of Alternative 9-5. In addition, to reduce potential exposures to contaminants during corrective action, activities at the adjacent firefighting training area would be temporarily suspended.

Implementability: Under Alternative 9-4, a mobile thermal treatment unit would need to be mobilized to the site. No specific implementation issues are associated with this because there is plenty of space to stage the unit at the SWMU.

Implementation of proposed remedy Alternative 9-5 would require the soil recycling facility accept SWMU 9 soil at their facility. Additional planning and scheduling may be required.

Cost: The cost for implementation of Alternative 9-4 is approximately $346,200. The estimated cost for implementation of Alternative 9-5 is approximately $331,000.

SWMU 10: Building 363, OWS

Table 3a presents the one alternative considered for corrective action at SWMU 10. The following paragraphs describe and evaluate that alternative. The cost for the alternative is summarized in Table 3b, which is included at the end off this section.

Table 3a
Summary of Corrective Action Alternatives for SWMU 10

Groundwater	
10-1	Vacuum-Enhanced Extraction *
Notes: * = Proposed remedy for media.	

Table 3b
Cost of Alternative for SWMU 10

Alt.	Direct Cost	Indirect Cost	Total Cost
10-1	$21,500	$4,400	$28,500
Note Alt. = alternative			

Groundwater

Description of Groundwater Alternatives

At SWMU 10, only technologies for removal of LNAPL were identified. Because only one alternative, vacuum-enhanced extraction, passed the technology screening process, it was the only technology evaluated for SWMU 10.

Alternative 1-1: Vacuum-Enhanced Extraction (VEE). Under this alternative, the thickness of LNAPL on the water table would initially be measured. If LNAPL is present at greater than 0.1-inch thickness, a sample of LNAPL would be collected for analysis. Analytical results would be evaluated to determine appropriate disposal methods for LNAPL. If the thickness of LNAPL is greater than 0.1 inch, a vacuum

truck consisting of a vacuum pump, total fluids collection tank, and vapor containment and treatment unit, would be mobilized to the site, and LNAPL and associated groundwater would be extracted.

If LNAPL is determined to be nonhazardous, these fluids would be discharged to the facility's OWS for ultimate treatment at CSS's wastewater treatment plant (WWTP). Otherwise, these fluids would be treated off-site. Vapor extracted from the well could be treated, as necessary.

After LNAPL has been extracted, the well will be sampled first weekly, then monthly, then quarterly; if no LNAPL has been detected for four consecutive quarters, the monitoring would be discontinued. Also during quarterly sampling, groundwater samples will be collected for analysis. If results of the sampling indicate that corrective action is necessary for groundwater (i.e., concentrations of chemicals of concern exceed MCLs), alternatives for groundwater will be developed at that time.

Evaluation of Groundwater Alternatives
Only one alternative was identified for SWMU 10 because only one technology passed the technology screening process in the CMS. An explanation of how the selected alternative (VEE of LNAPL) compares to the evaluation criteria is presented.

Protect Human Health and the Environment: Because no unacceptable risks to human health and the environment were identified based on exposure to LNAPL at SWMU 10, this criteria is not applicable.

Attain MPSs: VEE has been used at other sites (e.g., underground storage tank sites) and has been successful in removing LNAPL. It is anticipated that VEE would be able to remove LNAPL on the water table and achieve the MPSs of less than 0.1 inch of measurable LNAPL on the water table.

Control the Source of Releases to the Environment: Recovery of LNAPL at SWMU 10 would eliminate the source of groundwater contamination at the SWMU. Releases of chemicals to the air during VEE would be treated via carbon adsorption or thermal oxidation, as necessary.

Comply with Applicable Standards for Management of Wastes: LNAPL, groundwater, and vapor extracted from the site during VEE would be managed in accordance with applicable regulations. A sample of LNAPL would be collected and analyzed prior to initiation of VEE to determine if LNAPL can be disposed of within the facility's WWTP or if it requires disposal as a hazardous waste (off-site).

Long-Term Reliability and Effectiveness: It is anticipated that VEE of LNAPL would be an effective treatment for removal of LNAPL because this technology has been used successfully at other underground storage tank sites. It is not anticipated that specific site or waste characteristics would impede the effectiveness of this alternative at SWMU 10.

Reduction in Toxicity, Mobility, and Volume of Wastes: VEE would reduce the volume of LNAPL on the water table at SWMU 10, thereby removing a source of groundwater contamination.

Short-Term Effectiveness: No short-term adverse effects to human or ecological receptors would be expected if VEE were implemented at SWMU 10.

Implementability: Vendors capable of supplying a vacuum truck are readily available.

Cost: The estimated cost for Alternative 10-1 is approximately $28,500.

AOC 1: Firefighting Training Area No. 2

Table 4a presents the alternatives considered for corrective action at AOC 1. The following paragraphs describe and evaluate those alternatives. The cost for all alternatives identified for AOC 1 is summarized in Table 4b.

Table 4a Summary of Corrective Action Alternatives for AOC 1	
Subsurface Soil	
1-1	Soil Vapor Extraction with Enhanced Biodegradation *
Groundwater	
1-2	Natural Attenuation *
Notes: * = Proposed remedy for media.	

Table 4b Cost of Alternative 1-2 for AOC 1			
Alt.	**Capital**	**O & M**	**Total Costs**
1-2	$66,700	$21,600[1]	$157,700
Notes	Alt. = alternative. O&M = operation and maintenance. [1] = O&M costs annualized at 6% over 5 years.		

Subsurface Soil

Description of Subsurface Soil Alternatives

Alternative 1-1: Bioventing Prior to initiating corrective action at AOC 1, an interim measure will be performed. During this interim measure, LNAPL is being removed from the groundwater table through a technology called bioslurping.

After bioslurping is completed, subsurface soil samples would be collected and analyzed to determine whether or not further treatment for subsurface soil is necessary to ensure that LNAPL will no longer be produced.

If treatment of subsurface soil is deemed necessary, a soil vapor extraction system, enhanced with biodegradation, would be used to treat subsurface soil. This system could be established by modifying the equipment already installed at the site for bioslurping.

Under this alternative, vapor would be extracted from the subsurface and treated, if necessary, prior to discharge to the ambient air. The subsurface would be monitored to ensure that optimum conditions for biodegradation were maintained. If not, nutrients could be added to the subsurface soil via injection to enhance microbial growth.

Once treatment of subsurface soil is completed, equipment would be dismantled and demobilized. Groundwater monitoring would be implemented as part of this alternative (see Alternative 1-2). Once groundwater monitoring results are satisfactory, the corrective action would be terminated in accordance with the HSWA portion of the Facility's RCRA permit.

Evaluation of Subsurface Soil Alternatives

Protect Human Health and the Environment: The proposed remedy would meet this criteria; the risk assessment completed for AOC 1 did not predict unacceptable risks to humans or ecological receptors due to exposure to subsurface soil.

Attain MPSs: No MPSs were developed for subsurface soil at AOC 1 because no soil cleanup standards have been promulgated by USEPA or FDEP at the time of CMS completion.

Control the Source of Releases to the Environment: By treating the contamination in subsurface soil, Alternative 1-1 would control the source of LNAPL and potential groundwater degradation at the AOC. Additionally, releases to the environment from the vapor treatment process (e.g., air vapors) would be treated by adsorption or granular activated carbon (GAC), if necessary, prior to discharge to the atmosphere.

Comply with Applicable Standards for Management of Wastes: Wastes generated from implementation of the proposed remedy, such as spent air filters or spent carbon, would be

managed in accordance with applicable regulations.

Long-Term Reliability and Effectiveness: The proposed remedy would meet this criteria. During implementation of the soil vapor extraction, contaminants in subsurface soil would be volatilized. During the biodegradation phase, oxygen would be supplied to microorganisms in the subsurface soil, which would eventually biodegrade contaminants to carbon dioxide, water, and biomass (U.S. Army Corps of Engineers, 1995). Nutrients such as carbon, nitrogen, and hydrogen, in the form of methane and ammonia gases, may be introduced to the air injection stream to promote biodegradation during the biodegradation phase. It is not anticipated that specific site or waste characteristics would impede the effectiveness of this proposed remedy.

Reduction in Toxicity, Mobility, and Volume of Wastes: The proposed remedy would meet this criteria. The vapor extraction and enhanced biological degradation process would reduce concentrations of chemicals in the subsurface soil. Therefore, the toxicity, mobility, and volume of concentrations of chemicals in the subsurface soil would be reduced.

Short-Term Effectiveness: No short-term effects to human health or the environment would be expected if this alternative were implemented. Because AOC 1 is in a primarily industrial area, activities proposed under this alternative would not affect the surrounding community.

Implementability: The proposed remedy is able to be implemented at AOC 1. The proposed treatment system would utilize existing equipment in place for bioslurping (the interim measure for LNAPL) to minimize capital costs. Additional extraction and/or air wells may be required to treat a greater extent of subsurface soil contamination.

It is estimated that treatment duration for this alternative would take 1.5 to 3 years at AOC 1. The vapor extraction phase would require 6 months to 1 year of operation, and the biodegradation phase would require 1 to 2 years of operation.

Cost: A cost estimate for Alternative 1-1 will not be developed until the results from implementation of the bioslurping study are available.

Groundwater

Description of Groundwater Alternatives

Alternative 1-2: Natural Attenuation Under this alternative, natural biological, and chemical processes occurring within the surficial aquifer would reduce contaminant concentrations in groundwater at AOC 1. The feasibility of this technology to reduce contaminant concentrations is currently being evaluated; if this technology is deemed infeasible based on the results of this study, other corrective action alternatives will be considered at that time.

Under natural attenuation, microorganisms within the aquifer use organic contaminants such as VOCs and semivolatile organic compounds (SVOCs) as substrate (food), and are thus able to reduce contaminant concentrations through metabolic activity. Physical processes such as volatilization, sorption, advection, and dispersion would further reduce contaminant concentrations within the aquifer. Groundwater monitoring would be performed to assess the degradation and reduction of organics within the aquifer and provide an evaluation of this technology's effectiveness.

Groundwater will be monitored on a quarterly basis for the first year and annually every year thereafter. Samples will be collected from the existing monitoring wells for the following parameters: VOCs, SVOCs sulfate, sulfite, chloride, nitrate, nitrite, total and dissolved iron, dissolved organic carbon, methane, ethene, ethane, and carbon dioxide.

Measurements of these parameters over time at

AOC 1 will assist in evaluating the extent of natural biodegradation, the overall conditions within the aquifer, and the migration of contaminants. On a yearly basis the data will help determine whether or not natural attenuation is effective in reducing contaminant concentrations at AOC 1. If so deemed as such, groundwater monitoring would be discontinued.

Evaluation of Groundwater Alternatives

Protect Human Health and the Environment: This alternative would not provide a maximum standard of protection to humans because no active treatment measures would be taken at the AOC; however, no adverse short-term or cross-media effects are anticipated as a result of implementing natural attenuation. In addition, it is not anticipated that the upper portion of the surficial aquifer at AOC 1 would be used for a potable water supply (although the groundwater is classified as G-II and could conceivably be used as such).

Attain MPSs: The concentrations of DCE, benzene, and other organic chemicals of concern detected in groundwater at AOC 1 are only slightly above MCLs (i.e., MPSs). Bioremediation of the source (currently in progress) and natural attenuation of the existing plume are expected to lower the concentrations of chemicals of concern below MPSs.

Control the Source of Releases to the Environment: Through implementing bioslurping for LNAPL at AOC 1 (i.e., the interim measure) and, if necessary, treating contamination in subsurface soil (Alternative 1-1), the source of groundwater contamination would be addressed.

Comply with Applicable Standards for Management of Wastes: Wastes would not be generated through implementation of this alternative.

Long-Term Reliability and Effectiveness: Naturally occurring processes are expected to reduce contaminant concentrations in the aquifer over the long term. In April 1997, the Navy completed a study assessing the feasibility of the Natural Attenuation process at AOC 1. The conclusion of the was that "The preliminary scoring for groundwater samples ... suggests that there is significant chemical evidence to confirm ongoing biodegradation." Further the report recommended that "Given these factors, natural attenuation appears to be a viable remedial alternative for AOC 1."

Groundwater monitoring would provide a means of evaluating concentrations of chemicals in groundwater as well as assessing the degradation rate of contaminants. Also, monitoring of indicator parameters within the aquifer would allow further evaluation of the effectiveness of natural attenuation. It is anticipated that this monitoring would occur annually over a 5-year period; at the end of this time, the results of the annual monitoring events would be evaluated to determine whether or not monitoring should be continued or discontinued, or if other active corrective actions were necessary.

Reduction in Toxicity, Mobility, and Volume of Wastes: Although no active treatment is included in this alternative, toxicity would be reduced as concentrations of chemicals of concern decrease over time through natural degradation processes. Groundwater monitoring will allow an assessment of the effectiveness and rate of natural degradation processes.

Short-Term Effectiveness: Implementation of this alternative would not have any short-term effects to human or ecological receptors. Because AOC 1 is in a primarily industrial area, activities proposed under this alternative would not affect the surrounding community.

Implementability: This alternative does not require any construction for implementation. Other activities, such as groundwater monitoring and modeling, are easily implemented.

Cost: The cost of Alternative 1-2 is $157,700. A cost estimate for Alternative 1-1 was not developed because the system to be installed for this alternative will depend upon the results of the interim measure (bioslurping), and these results are not yet available.

PUBLIC PARTICIPATION

The public is encouraged to submit comments on this Statement of Basis. The dates for the public comment period are ---- - ----. Comments should be sent to Mr. Narindar Kumar of USEPA's RCRA Programs Branch, whose address is listed below. The public may request a public hearing; prior notice of the meeting date will be announced in the local newspaper.

The information repository and administrative record for CSS are located at the Main Branch of the Bay County Public library at 25 West Government Street, Panama City, Florida. The library is open from 9 a.m. to 8 p.m. Monday-Wednesday, 9 a.m. to 5 p.m. Thursday-

Saturday, and 1 p.m. to 5 p.m. Sunday. The public is encouraged to review the RFI report and CMS, available at the library.

Send Comments to:

Mr. Narindar Kumar, Chief
RCRA Programs Branch
U.S. EPA Region IV
61 Forsyth St. SW
Atlanta, GA 30303

Acronym List

AALCA	Amphibious Assault Landing Craft Area
AOC	Area of Concern
BLS	below land surface
BRA	Baseline Risk Assessment
AOC	Area of Concern
CAO	Corrective Actions ObjectivesCMI Corrective Measures Implementation
CMS	Corrective Measures Study
CSS	Coastal System Station
DCE	Dichloroethene
FDEP	Florida Department of Environmental Protection
HSWA	Hazardous and Solid Waste Attachment
IMRA	Interim Measures Remedial Action
LNAPL	Light Non-Aqueous Phase Liquids
LUCAP	Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
MCL	Maximum Contaminant Levels
MOA	Memorandum of Agreement
MPS	Media Protection Standards
OWS	oil water separator
PAHs	polynuclear aromatic hydrocarbons
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
USEPA	US Environmental Protection Agency
VEE	vacuum-enhanced extraction
VOCs	volatile organic compounds
WWTP	Wastewater Treatment Plant