BUREAU OF WASTE CLEANUP

MAR 2 0 2003

TECHNICAL REVIEW SECTION

Former Homestead Air Force Base, Florida

Prepared for
Air Force Center for Environmental Excellence
Brooks Air Force Base, Texas

FINAL

RECORD OF DECISION FOR OPERABLE UNIT 9 AND THE CANAL PORTION OF OPERABLE UNIT 11 (EXCLUDING IRP SITES LF-019 AND WP-023)

Contract F41624-97-D-8017

January 2003

MONTGOMERY WATSON

BUREAU OF WASTE CLEANUP

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17-B-09

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ACRONYM LIST

ACC	Air Combat Command
AFCEE	Air Force Center for Environmental Excellence
AFRC	Air Force Reserve Command
AFRPA	Air Force Real Property Agency
AOCs	Areas of Concern
AOF	Audubon of Florida
ARARs	Applicable or Relevant and Appropriate Requirements
ARB	Air Reserve Base
AWQC	Ambient Water Quality Criteria
BCT	BRAC Cleanup Team
BNA	Base Neutral/ Acid
BNP	Biscayne National Park
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Conversion
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERP	Comprehensive Everglades Restoration Program
cfs	cubic feet per second
COCs	Chemicals of Concern
COPC	Chemicals of Potential Concern
Cv	Coefficient of Variation
DBHYDRO	South Florida Water Management District Hydrologic and Water Quality database
DCAD	Miami-Dade County Aviation Department
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DEHP	bis(2-ethylhexyl)phthalate
DERM	Miami-Dade County Department of Environmental Resources Management
DERP	Defense Environmental Restoration Program
DO	dissolved oxygen
DOD	Department of Defense
ELCR	Excess Lifetime Cancer Risk
F	Reported value less than reporting limit and greater than method detection limit
FDEP	Florida Department of Environmental Protection
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
HAFB	Homestead Air Force Base
HI	hazard Index
HQ	hazard Quotient

ACRONYM LIST (Continued)

HRS	hazard Ranking System
HTC	Homestead Technical Committee
ICs	Institutional Controls
IRA	interim Removal Action
IRP	Installation Restoration Program
J	Estimated value
K_d	Distribution Coefficient
LC_{50}	Lethal concentration to 50 % of test organisms
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDL	Method Detection Limit
mg/kg	milligrams/kilogram
mg/L	milligrams/liter
NCP	National Oil and Substances Pollution Contingency Plan
NFA	No Further Action
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NPCA	National Parks Conservation Association
NPL	National Priorities List
NURP	National Urban Runoff Program
OC	organochlorine
O&M	Operation and Maintenance
OU	Operable Unit
OWS	Oil/Water Separator
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PRG	Preliminary Remediation Goal
PSC	Potential Source of Contamination
RAB	Restoration Advisory Board
RAOs	Remedial Action Objective
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RfD	Reference Dose
RI	Remedial Investigation
RI/FS	Remedial Investigation Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RTV	Reference Toxicity Values
SAC	Strategic Air Command
SARA	Superfund Amendment and Reauthorization Act
SDWA	Safe Drinking Water Act
SERA	Screening-level Ecological Risk Assessment
SFWMD	South Florida Water Management District
SMDP	Scientific/ Management Decision Point

ACRONYM LIST (Continued)

SPLP	Synthetic Precipitation Leaching Procedure
STDA	Stormwater Treatment and Distribution Area
SVOCs	Semivolatile Organic Compound
SWQC	Surface Water Quality Criteria
TAG	Technical Advisory Group
TAL	Target Analyte List
TBC	To-be-considered
TCL	Target Compound List
T/E	Threatened/ Endangered
TEL	Threshold Effects Limit
TFW	Tactical Fighter Wing
TMV	Toxicity, Mobility, or Volume
TRPH	Total Recoverable Petroleum Hydrocarbon
TSS	Total Suspended Solid
UCL	Upper Confidence Limit
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCAs	Voluntary custodial actions
VOC	Volatile Organic Compound
W-C	Woodward-Clyde

Symbols

µg/kg	micrograms/kilogram
µg/L	micrograms/liter

DECLARATION STATEMENT FOR THE RECORD OF DECISION FOR OPERABLE UNIT 9 AND OPERABLE UNIT 11 (EXCLUDING IRP SITES LF-019 AND WP-023)

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

This Record of Decision (ROD) is for the following Operable Units at former Homestead Air Force Base (HAFB), United States Environmental Protection Agency (USEPA) Facility Identification Number, FL7570024037:

- Operational Unit (OU) OU-9 Boundary Canal System, including the Boundary Canal, Flightline Canals, interior drainage canals, and the Stormwater Reservoir.
- OU-11 Military Canal which extends from the pumphouse to Biscayne Bay and is located off the main Base property. This ROD excludes the terrestrial portion of OU-11 (former Incinerator Ash Disposal Area, LF-019 and former Wastewater Treatment Plant WP-023).

The two OUs are located at former HAFB, which is located in southern Miami-Dade County, Florida, approximately 25 miles southwest of Miami and 7 miles east of the city of Homestead (Figure 1-1). The main Base covers approximately 2,916 acres. There are approximately 700 personnel currently working at Homestead Air Reserve Base; about half being military personnel and the other half are civilian employees An additional 200 to 300 reservists are at the Base for training, but are not full-time employees. The nearby city of Homestead has an approximate population of 18,700. Florida City is home to approximately 5,500 residents (Homestead Chamber of Commerce, 1994). The population of the greater Miami area is reported to be 1.9 million (Miami Chamber of Commerce, 1994). Figure 1-2 shows former HAFB and the surrounding area.

The topography at former HAFB and associated OUs is relatively flat. Many of the areas and buildings previously on the Base were destroyed in 1992 by Hurricane Andrew. The flightline, supporting buildings and hangars, and several office type buildings have been repaired or rebuilt since the hurricane. A security fence surrounds the Cantonment area of the former HAFB.

In 1993, Homestead AFB was designated for base closure under Base Realignment and Closure (BRAC), primarily since the cost to close the base was low when measured against the high cost of reconstruction.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Boundary Canal System, OU-9, and the Military Canal portion of OU-11, excluding the terrestrial portion of OU-11 (LF-019 and WP-023) at HAFB, Florida. The terrestrial portion of OU-11, former Wastewater Treatment Plant (WP-023) and Incinerator Ash Disposal Area (LF-019), has been excluded from this ROD due to open issues associated with land use controls. On March 19, 2002, it was agreed to by the members of the BRAC Cleanup Team (BCT), to develop a ROD that combines OU-9 and the aquatic portion (Military Canal) of OU-11. By this action, the physical remedial action planned for the OU-11 Military Canal can proceed without delay. The status of the ROD for remedial action for the aquatic portion of OU-11 {excluding Installation Restoration Program (IRP) sites LF-019 and WP-023} is a Final. The BCT includes representatives from the USEPA, the U.S. Air Force (USAF), Miami-Dade Environmental Resource Management (DERM), and Florida Department of Environmental Protection (FDEP). The terrestrial portion of OU-11 will be addressed in a separate ROD upon resolution of land use controls.

This document was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This ROD is based on the administrative record for this site. FDEP, the USEPA, and the USAF concur with the selected remedies presented in this ROD.

1.3 ASSESSMENT OF SITE

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 DESCRIPTION OF SELECTED REMEDY

Remedies have been selected which address the principal risks identified at each of the OUs. The selected remedies allow the former HAFB to meet its overall objective of protecting human health and the environment. The remedial alternative selected for each OU is summarized below:

Operable Unit	Media	Remedial Alternative
OU-9	Sediment, surface water	No remedial response, No further action (NFA)
OU-11	Sediment	Encapsulate a portion of OU-9 Stormwater Reservoir contiguous with OU-11 and construct a Sediment Control Structure in the Stormwater Reservoir, encapsulate sediment within the entire OU-11 Military Canal, and support the DERM Pilot Wetland Project.

The stormwater management system of the former HAFB comprises the Boundary Canal and interior canals (OU-9) and the aquatic portion of Military Canal (OU-11). This ROD combines OU-9 and the aquatic portion of OU-11 into one ROD to facilitate the cleanup and closure of these sites since they collectively comprise the Stormwater Management System of the former HAFB.

OU-9 Boundary Canal

A No Remedial Action response, or NFA has been selected for OU-9 based on the evaluation of the extensive data collected during the Remedial Investigation / Baseline Risk-Assessment (RI/BRA). These data and supporting studies indicate that the sediment and surface water in the Boundary Canal do not pose an unacceptable risk to human health or the environment. The sediment transport study conducted as part of the OU-9 RI did not indicate significant movement of sediment.

OU-11 Military Canal

Based on the findings in the OU-11 RI/BRA, Screening Ecological Risk Assessment (SERA) and the Focused Feasibility Study (FFS), remedial action is warranted at the OU-11 Military Canal. The selected remedy (alternative) consists of three parts. Part one will be implemented to eliminate future transport of contaminated sediment into the Military Canal via surface water. Part two of the remedy consists of encapsulating the contaminated sediment to prevent it from migrating to Biscayne National Park (BNP) and to protect the marine and fresh water environment from potential ecological risks.

1) Placing a sediment control structure in the reservoir before stormwater enters the Military Canal and redirecting flow into the reservoir from the northeast arm of the Boundary Canal.

2) Encapsulation of contaminated sediment in the Military Canal. Fabric formed concrete liners will be installed to encapsulate contaminated bottom sediments in the Military Canal and the base of the reservoir pump station intake and discharge. The discharge side of the Military Canal will be lined (as shown in the 90 Percent Design Analysis Report, Design Drawing C-3), with the intent of encapsulating contaminated bottom sediment. The bank on the discharge side of the pumphouse is heavily vegetated and provides a buffer against scour and will therefore not be lined.

3) In order to address impacts to waters of the United States (U.S.) resulting from CERCLA releases from HAFB, and under the authority of Executive Order 11990, the USAF will provide support for the DERM Wetland Pilot Project. The Wetland Pilot Project involves partial or complete diversion of flows from the Military Canal to adjacent wetlands. The concept is to improve the hydroperiod of discharges to Biscayne Bay and restore adjacent wetlands in a manner consistent with plans outlined in the Central and South Florida Project Comprehensive Review Study, and to promote a more natural sheet flow of water delivery to Biscayne Bay. The support to Miami-Dade County consists of funding of the following activities, not to exceed $800,000:

1. Installation of two 80 cubic feet per second (cfs) submersible electric axial flow pumps with control panel.
2. Provide required power services to the site for operation of the pump system.
3. Construct well housing and install pump.
4. Install intake box with manatee exclusion/trash rack grate.
5. Install two intake culverts.
6. Install two discharge culverts with stabilized headwall.
7. Construct a fill pad for pump station.

8. Construct culverts connecting the Pilot Project with the L31E Canal.

The USAF expects DERM, as part of Wetland Project, will be responsible for conducting the necessary sampling of water quality before reintroduction of any diverted surface water back into the Military Canal.

The selected remedy consists of the following components:

- Performing remedial design activities including preparation of a Design Report, Quality Assurance Project Plan, Site-Specific Safety and Health Plan, and Contractor Quality Control Plan.
- Performing health and safety monitoring requirements during construction activities of the workers
- Eliminating the potential exposure pathway from the former Wastewater Treatment Plant to the Military Canal by abandoning conduits leading from the former wastewater treatment plant to the Military Canal
- Constructing the sediment control structure in the reservoir to reduce transport of sediment from the Stormwater Reservoir to OU-11
- Redirect existing flow from the northeast arm of the Boundary Canal into the stormwater reservoir.
- Installation of a liner in the scour area between the pump intakes and the sediment control structure.
- Installing temporary silt curtains in the canals during construction activities to minimize downstream transport of resuspended sediment.
- Monitoring turbidity during construction activities at the downgradient end of the canal, prior to discharge to the BNP.
- Constructing a debris staging area to stockpile debris from the canal.
- Removing coarse debris from the entire Military Canal, prior to encapsulation, which would interfere with installation of the encapsulation liner. Debris will be disposed at a Subtitle D disposal facility.

- Installing a non-woven geotextile over the contaminated sediment in the Military Canal.

- Installing a 3-inch Uniform Section Lining over the contaminated sediment. A 2,000 psi grout will be injected into the liner until it is pumped to its full thickness.

- Divers will be used to assist with the installation of the geotextile and liner.

- System Performance Monitoring will be conducted annually (See Section 2.17).

1.5 STATUTORY DETERMINATIONS

Based on the results of the BRA completed as part of the OU-9 RI, no remedial action is necessary to ensure the protection of human health or the environment.

Based on the BRA and SERA completed as part of the OU-11 RI, a FFS was recommended due to the presence of contaminants detected in canal sediments that pose an unacceptable threat to ecological receptors. Impacts to the Military Canal as a result of past operations did not indicate significant levels of compounds that would adversely impact human receptors. Upon the recommendations of the RI/BRA, a FFS was conducted to evaluate remedial technology options for contaminated sediment the Military Canal.

The FFS, completed December 2001, evaluated three remedial alternatives for overall protection of health and the environment, compliance with ARARs, implementability cost, effectiveness, and State and Community acceptance. A detailed analysis of these three remedial alternatives was developed using USEPA "*Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*" (USEPA, 1998) criteria. One of the three alternatives evaluated in the FFS was a "No Further Action" alternative. Alternative two evaluated removal of the sediment from the OU-11 canal via dredging, while alternative three evaluated encapsulation of contaminated sediment in the entire canal. The alternative with the highest rating for addressing the environmental concerns at the Military Canal was Alternative 3: Encapsulate Entire OU-11 Canal,

Install a Sediment Control Structure in the base reservoir, and support of DERMs Pilot Wetland Project.

The Selected Remedy for OU-11, Alternative 3, is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies, to the maximum extent practicable for the Site. This Remedy is a ~~is a~~ containment process and not a treatment process; thus it reduces the mobility and toxicity of the contaminated sediments by encapsulation, but does not reduce volume, and by definition does not satisfy the statutory preference for treatment as a principal element. Because this Remedy results in hazardous substances remaining on-Site (encapsulated sediment) above ecological screening levels that allow for unlimited use and unrestricted exposure, a five-year review will be required for this remedial action.

1.6 ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of Concern (COCs) and their respective concentrations;
- Baseline risk represented by the COCs;
- Action levels established for COCs and the basis for the levels;
- Current and future land and ground-water use assumptions used in the Baseline Risk Assessment and ROD;
- Land use that will be available at the Site as a result of the Selected Remedy;
- Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the Remedy cost estimates are projected; and
- Decisive factors that led to selecting the Remedy (i.e., description of how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria).

1.7 AUTHORIZING SIGNATURES

ALBERT F. LOWAS, JR.,
Director, Air Force Real Property Agency

March 12, 2003
Date

U.S. Environmental Protection Agency

May 28, 2003
Date

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

April 22, 2003

Mr Albert F. Lowas
Air Force Real Property Agency
1400 Key Boulevard, 4th Floor
Arlington, Virginia 22209-2802

Dear Mr. Lowas:

The Department of Environmental Protection concurs with the proposed final remedy of No Further Action for Operable Unit 9 (Boundary Canal and associated canals) and the construction of a sediment transport control structure, support of DERM's wetland project, and sediment encapsulation of the entire Military Outfall Canal as the CERCLA Remedial Action for Operable Unit 11 at the former Homestead Air Force Base.

We appreciate your continued cooperation and look forward to an expeditious environmental recovery of the former Homestead Air Force Base. If you have any questions concerning this letter of concurrence, please contact Jorge R. Caspary, our Remedial Project Manager, at (850) 245-7502.

Sincerely,

John M. Ruddell

John M. Ruddell, Director
Division of Waste Management

JMR/jrc

1.7 AUTHORIZING SIGNATURES

Albert F. Lowas Jr.
ALBERT F. LOWAS, JR.,
Director, Air Force Real Property Agency

March 12, 2003
Date

U.S. Environmental Protection Agency

Date

1.7 AUTHORIZING SIGNATURES

Albert F. Lowas Jr.
ALBERT F. LOWAS, JR.,
Director, Air Force Real Property Agency

March 12, 2003
Date

U.S. Environmental Protection Agency

Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

On March 1, 1991, a Federal Facilities Agreement (FFA) was signed by Homestead AFB, the USEPA, and FDEP establishing the framework for the CERCLA actions at HAFB. The FFA also establishes the U.S. Air Force as the lead agency in the cleanup process. This ROD is for the following Operable Units at the former HAFB, EPA facility Identification Number, FL7570024037·

- OU-9 Boundary Canal System, including the Boundary Canal, Flightline Canals, interior drainage canals, and the Stormwater Reservoir.
- OU-11 Military Canal which extends from the pumphouse to Biscayne Bay, located off the main Base property. This ROD excludes the terrestrial portion of OU-11 (IRP Sites LF-019 and WP-023).

The former HAFB is located in Homestead, Miami-Dade County, Florida, (Figure 1-1). The facility's geographic coordinates are 25° 29' 30" North latitude and 80° 23' 56" West longitude, as provided in the USEPA Envirofacts database.

The following paragraphs describe the primary components of OU-9 and OU-11 A series of interior canals drains most of the Base into the OU-9 Boundary Canal (Figure 2-1). The Boundary Canal then terminates in the Stormwater Reservoir. The Military Canal, located immediately downgradient of the stormwater reservoir pumphouse, leads to Biscayne Bay, approximately 2 miles east of the reservoir. The Military Canal, which is outside of the main Base boundary, was originally investigated as part of the OU-9 RI; the Military Canal was subsequently removed and linked to the former Base Sewage Treatment Plant and Incinerator Ash Disposal Area (OU-11) due to the presence of treated water outfalls extending from this area to the Military Canal. For the purposes of this ROD, only the aquatic portion of OU-11 will be discussed in conjunction with OU-9. The terrestrial portion of OU-11 (IRP Sites LF-019 and WP-023) will be addressed in a separate ROD.

2.1.1 OU-9 Boundary Canal System

The Boundary Canal system at HAFB is shown in Figure 2-1. This system, in general, consists of the Boundary Canal, the Flightline Canal, other selected drainage canals, and the Stormwater Reservoir. The Boundary Canal has essentially two major segments, the West-South segment and the North-East segment (Figure 2-1). A dike is present along the outside bank of the Boundary Canal to minimize off-Base runoff from entering the canal. The two segments of the Boundary Canal converge at the Stormwater Reservoir located at the southeast corner of the former Base (Figure 2-1).

2.1.1.1 West-South Boundary Canal Segment

The West-South Boundary Canal segment begins in the northwestern corner of HAFB at Biscayne Drive (Southwest 288th Street) (see Figure 2-1). It flows south and then turns west at the Ordnance Storage Area past Phantom Lake. The segment flows along the west and south perimeters of the Base and leads to the Stormwater Reservoir at its western edge The total length of the West-South Boundary Canal segment is approximately 25,800 feet (4.9 miles)

The width of the West-South Boundary Canal varies from less than 10 feet wide near its origin at Biscayne Avenue and generally widens downstream to over 40 feet. Total depth of the West-South Boundary Canal segment ranges from 4 to 6 feet, while water depth ranges from 2 to 5 feet with the greatest depths occurring after precipitation events.

The bottom of the West-South Boundary Canal segment has significant plant cover. Vegetation has been observed to cover from 75 percent to 100 percent of the sediment bed. According to Hilsenbeck (1993), the plants present in the West-South Boundary Canal segment include *Chara sp.*, sawgrass, cocoplum, and several species of ferns. Algae also covers much of the sediment bed.

2.1.1.2 North-East Boundary Canal Segment

The North-East Boundary Canal Segment begins at the north end of the Base south of the former golf course at Southwest 280th Street (Walden Drive) (see Figure 2-1). It flows east past Mystic Lake and along the north and east perimeters of the Base. The North-East Boundary Canal segment leads to the Stormwater Reservoir in its northeast corner. The total length of the North-East Boundary Canal is approximately 15,400 feet (2.9 miles).

The width of the North-East Boundary Canal segment ranges from 5 feet at the upper reaches in urbanized areas to 20 to 35 feet in other areas. Total depth of the canal ranges from 4 to 6 feet; water depth generally ranges from 3 to 6 feet, with the greatest water depths occurring after precipitation events.

Like the West-South Boundary Canal segment, the bottom of the North-East Boundary Canal has significant plant cover Vegetation has been observed to cover from 75 percent to 100 percent of the sediment bed. Although a survey was not made of plant cover in the North-East Boundary Canal segment by Hilsenbeck (1993) as was done for the West-South canal segment, plants present in the canal generally include *Chara sp*, sawgrass, cocoplum, and several species of ferns.

2.1.1.3 Flightline Canal and Other Drainage Canals

The primary Flightline Canal generally runs parallel to and is located southeast of the Base flightline (Figure 2-1). Secondary drainage canals connect the primary Flightline Canal with a parallel canal north of the flightline and run beneath the flightline. The primary Flightline Canal leads into the West-South segment of the Boundary Canal at a point approximately 1,000 feet west of the reservoir and is approximately 19,400 feet long (3.7 miles), while the secondary canal is approximately 4,200 feet long (0.8 miles). Its width ranges from 20 to 30 feet and is generally consistent throughout its length. Total canal depth ranges from 3 to 6 feet while water depth ranges from 2 to 6 feet.

The Flightline Canal was observed to have significant plant cover. Plant species in the Flightline Canal are not described by Hilsenbeck (1993). Algae and *Chara sp.* appear to cover nearly all of the sediment bed. Cattails are also present south of the Flightline Canal.

Several canals receive stormwater runoff from other areas of the Base (Figure 2-1). The system that drains the eastern area of the Base includes three canals that run parallel to Bikini and St Lo Boulevards: one canal is located just north of St. Lo Boulevard, one between St. Lo and Bikini Boulevards, and one just south of Bikini Boulevard. These canals converge along Schweinfurt Road and lead to the North-East segment of the Boundary Canal. The total length of drainage canals in this eastern drainage system is approximately 12,800 feet (2.4 miles).

A drainage canal is also located on the western edge of the Base (Figure 2-1). This canal begins along Westover Road and runs to the northwest, bends to the west, and connects to the West-South segment of the Boundary Canal. This canal is approximately 2,200 feet long (0.4 miles).

In addition to the primary and secondary Flightline Canals described, a drainage canal is also located near the southwest end of the flightline and taxiway (Figure 2-1). This canal runs southwest past the Ordnance Storage area and enters the West-South segment of the Boundary Canal just southwest of the runway. It is approximately 3,800 feet long (0.7 miles).

The widths of these drainage canals range from 5 to 20 feet. Total canal depths range from 3 to 5 feet, while water depths are highly variable and range from less than 1 to 5 feet. The east and west drainage canals are very highly vegetated by cattails and ferns, which cover virtually all of the sediment bed in these canals. In many locations, cattails extend above the top of the canal banks. Where cattails are not present, the canal bed is covered by *Chara sp.*, algae, and/or ferns.

2.1.2 Stormwater Reservoir

The Stormwater Reservoir, located on the eastern side of the Base, was designed to receive flow from both segments of the Boundary Canal. The Stormwater Reservoir is approximately 300 feet wide and 900 feet long The lowest reservoir bottom elevation is approximately –13.6 feet National Geodetic Vertical Datum (NVGD), however average bottom elevations range from –6 to –9 ft NVGD. Assuming an average depth of 12 feet, the reservoir volume is estimated at 46.3 acre feet.

A pump house and control structure is located at the eastern edge of the stormwater reservoir. The pump house structure includes pumps to mechanically deliver water to the Military Canal. Submerged gates in the control structure can be used to release water. According to Base personnel, water is pumped from the reservoir and discharged into the Military Canal when a flightline staff gauge is above a criteria level. This is done to prevent the flightline from becoming submerged during storm events. According to Base personnel and records obtained by Montgomery Watson, the pumps have been used periodically throughout the years.

2.1.3 Military Canal (OU-11)

The Military Canal is located immediately east of the pumphouse and stormwater reservoir. The canal is approximately 11,400 feet long with an average width of approximately 40 ft. The depth of the canal from the top of the bermed sidewalls averages 15 feet from top to the base of the canal. The surface water level in the canal is maintained at an elevation of +2 to +2.5 feet NGVD. The operation range of the saltwater control structure S20G is seasonally adjusted to between 1.4 feet NGVD and 2.2 feet NGVD. The three 100,000 gpm pumps located at the pumphouse are controlled manually. According to the Air Force pump records, the three pumps are rarely operated concurrently. Measured flows from the S20G indicate surface water flow exceeds 5 times the volume coming from the former HAFB.

2.2 SITE HISTORY

2.2.1 Regulatory History

The IRP is the USAF's vehicle for implementing the Defense Environmental Restoration Program (DERP). The DERP was developed by the Department of Defense (DOD) to meet the requirements of CERCLA in accordance with the NCP. In 1986, DERP was expanded to incorporate the requirements of SARA. The program goals of the IRP are consistent with the program goals of DERP: to identify, investigate, clean up and close contaminated sites.

In 1987, Executive Order 12580 delegated the lead agency responsibilities for CERCLA/SARA to the Secretary of Defense to carry out environment restoration at military facilities Under DERP, the activities are carried out consistent with CERCLA §120 and in consultation with the USEPA. DERP also gives DOD the authority to enter into agreements with federal and state agencies and local governments for assistance in carrying out environmental restoration programs.

The IRP was initiated at HAFB in 1983 and a Records Search was completed for the Base. Beginning in 1986, a series of more detailed investigations were completed at various locations on the Base. In accordance with SARA, the USEPA prepared a final Hazard Ranking System (HRS) scoring package for HAFB. This led to the final listing of HAFB on the National Priorities List (NPL) on August 30, 1990.

As a result of the NPL listing, the USAF entered into a Federal Facilities Agreement (FFA) with the USEPA and the FDEP on May 25, 1990. The FFA required the identified OUs to be investigated under the FFA. Eight OUs were originally designated from potential sources of contamination (PSC) listed in the FFA. OU-9 was not identified as a PSC in the FFA, but on January 22, 1993, the FFA Project Managers agreed to designate the Boundary Canal system as an additional, separate OU. The Military Canal was originally investigated as part of the OU-9 Boundary Canal system. It was subsequently combined with the OU-11 former Wastewater Treatment Plant/Incinerator Ash Disposal Area upon discovery of two cleanwater discharge lines that extend from the terrestrial

portion of OU-11 to the Military Canal. OU-11 was identified as a PSC and is included in this ROD.

A Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was requested by the USEPA in order to assess potential releases at the site subsequent to Hurricane Andrew. The RFA, completed in 1993, identified sixty-two (62) on-Base sites and four (4) off-Base sites, designated as units/areas of concern (AOCs) by the USAF, the USEPA, and the FDEP. Subsequent to this listing, two more on-Base units (Munitions Storage Area and Jet Engine Test Cell) were added. These units were selected to be evaluated for the potential of a release that would have resulted from Hurricane Andrew or specific waste handling activities at the sites. In July 1993, a RFA was conducted by Woodward-Clyde (W-C) at the 68 sites/AOCs (W-C, 1994). The RFA included record searches, personal interviews, and site inspections. As a result of the RFA and transference of certain sites to the Base Underground Storage Tank/Oil Water Separator (UST/OWS) Program, 31 sites were eliminated from further consideration The remaining 37 units were recommended for Confirmation Sampling due to their potential for a release of hazardous constituents to the environment identified in the RFA.

Sampling for the 37 units was conducted from April 1994 through July 1994, which included the sampling of the surface soil, subsurface limestone, and groundwater. As a result of Confirmation Sampling and agreements reached during subsequent BCT meetings, of the 37 sites, 15 sites required NFA, 10 sites were reassigned to be addressed in other programs, 6 sites were recommended for an RI, and 6 were recommended for further investigation as expanded Site Investigation sites in accordance with CERCLA/SARA.

2.2.2 History of Site Operations

The land at former HAFB was originally developed by Pan American Air Ferries, Inc., and used for pilot training. The Boundary Canal was constructed prior to 1942 (Geraghty and Miller, 1993). In September 1942, the Caribbean Wing Headquarters took over the air field, and Homestead Air Field was activated. Homestead Army Airfield was initially

used by the Army Transport Command for dispatching aircraft overseas. However, in 1943, the Second Operational Training Unit began using the airfield to train the transport pilots and crews

In October 1945, the base was placed on inactive status due to extensive damage caused by a hurricane in the previous month and anticipated post-war reductions in military activities. The Base property was turned over to Dade County. Crop dusters used the runways and a few small industrial and commercial industries used the buildings. The Dade County Port Authority managed the Base until 1953, when the federal government re-acquired it along with the surrounding property.

By 1955, the Homestead facility had been rebuilt as a Strategic Air Command (SAC) Base, HAFB, and in February, the first operational squadron arrived. The Base was formally reactivated in November of the same year. During 1960, modifications were made to the facility to accommodate B-52 aircraft.

A command change from SAC to the Tactical Air Command occurred in July 1968. The 4351st Tactical Fighter Wing (TFW), which flew F-100s, was the new host unit until October 1970. In October 1970, the 31st TFW, which flew F-4s, returned from Southeast Asia became the host unit for HAFB. In 1981, the 31st TFW was renamed the 31st Tactical Training Wing, but was changed back to the 31st TFW in October 1984. The 31st TFW was redesignated again in 1991 to the 31st Fighter Wing. In 1993, HAFB was reassigned under the newly formed Air Combat Command (ACC).

On August 24, 1992, HAFB was struck by Hurricane Andrew. Approximately 97 percent of the Base facilities were rendered dysfunctional As a result of the hurricane, most of the previous 33 tenants vacated the Base, and many of the damaged buildings were demolished and removed. Following Hurricane Andrew, the Base was operated by a small contingent of Base personnel from September 1992 until April 1994. During this period, the administration of environmental programs at HAFB changed to reflect a change in Base command structure from ACC to the USAF Base Conversion Agency. On April 1, 1994, approximately one-third of the Base officially became Homestead Air

Reserve Base. Currently, the 482nd Fighter Wing of the USAF Reserves utilizes this portion of the Base for daily operations and training. The remainder of the Base is currently under an interim short-term lease to Miami-Dade County and is being considered for property transfer to Miami-Dade County in accordance with the USAF Base Realignment and Conversion program.

In 1993, Homestead AFB was designated for base closure, primarily because the cost to close the base was low when measured against the high cost of reconstruction. The aftermath of the 1992 hurricane left new environmental concerns and areas of potential contamination that must be addressed before the installation property can be transferred to the community

2.2.3 Previous OU-9 Investigations

In 1991 and 1992, sediment and surface water samples were collected at 18 locations from the Boundary Canal (Geraghty and Miller, 1992). Sediment and water samples were analyzed for semivolatile organic compounds (SVOCs), metals, and selected pesticides.

The RI Work Plan (Geraghty and Miller 1993a) was implemented for OU-9 by W-C to determine the nature and extent of contamination, evaluate the fate and transport of contamination, and assess the risks to human health and the environment. The results of the RI are presented in the Final OU-9 Remedial Investigation Report (W-C, 1995).

2.2.4 Previous OU-11 Investigations

Numerous investigations of the Military Canal were performed by a variety of agencies to determine the presence or absence of significant contamination. The following is a summary of previous investigations performed in the Military Canal portion of OU-11.

- In 1983, Corcoran, et. al. collected two surface water and sediment samples under a study directed by the Rosentiel School of Marine and Atmospheric Sciences (W-C, 1996).

- In 1989/1990 DERM collected four sediment samples as part of an ongoing water quality monitoring program (USEPA, 1997). DERM has operated the Biscayne Bay Surface Water Quality Monitoring Program in Miami-Dade County for the past 20 years. The Program's database consists of approximately 10 years worth of monthly and storm event water quality data for three stations (MI01, MI02, and MI03) along the Military Canal (DERM, undated).

- In 1995, Woodward-Clyde Consultants completed an RI/BRA for OU-9, which at the time of the investigation, included the Military Canal (W-C, 1995).

- In 1995 and early 1996, Woodward-Clyde conducted a supplemental study of the Military Canal to attempt to resample three locations where competent sediment was not available or obtainable during the OU-9 RI (W-C, 1996). Also in 1995, the USEPA conducted field investigations of the Military Canal as part of their oversight activities. During the investigation, four surface water and sediment samples were collected from stations located along the Military Canal.

- In 1995/96, Miami-Dade Department of Environmental Resources Management collected sediment samples from canals throughout the county, including the Military Canal, and collaborated with National Oceanic and Atmospheric Administration (NOAA) and FDEP in evaluation of sediment chemistry and toxicity as part of a regional study of Biscayne Bay and its watershed (DERM Unpublished Study Data).

- In 1997, the USEPA Region 4 completed a comprehensive investigation of the contaminants present in the sediments within the Military Canal. The objectives of the investigation were to identify the contaminants present, to determine the sources of sediment contamination, the associated toxicological effects on ecological receptors, and the potential impacts to Biscayne National Park. The investigation findings were presented in the *1997 Military Canal Special Study* (USEPA, 1997).

- In 1997, Montgomery Watson completed a Draft RI/BRA of OU-11 (consisting of the former Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area and the Military Canal (Montgomery Watson, 1998). Prior to this, the Military Canal was investigated in conjunction with the OU-9 Boundary Canal. The RI/BRA included a human and ecological risk assessment based on the sediment and toxicological testing of sediment, surface water, and fish tissue from the Military Canal.

- In 1998, Montgomery Watson conducted an evaluation of the 1997 *Military Canal Special Study* (USEPA, 1997). The *Military Canal Special Study Report* (Montgomery Watson, 1998) summarized and interpreted the USEPA data and evaluated the toxicological effects for ecological receptors in accordance with criteria established in the OU-9 and OU-11 RI/BRAs.

- In 1999, Montgomery Watson prepared a SERA to evaluate the potential for risk to sensitive receptors as a result of past operations at the former HAFB. The SERA was intended to support the Scientific/Management Decision Point (SMDP) for the further

study of OU-11/OU-9. The SERA included a general description of the ecological communities, flora, fauna, and habitats near the site, contaminants detected at the site, potential contaminant fate and transport mechanisms, potential receptors, potentially complete exposure pathways, and screening level assessment and measurement endpoints (Montgomery Watson, 1999).

- The National Oceanic and Atmospheric Administration (NOAA) completed a study entitled, *Magnitude and Extent of Chemical Contamination and Toxicity in Sediments of Biscayne Bay and Vicinity* (Long, et. al., 2000)

2.3 COMMUNITY PARTICIPATION

The USAF has a public participation program at former HAFB to promote public understanding of the cleanup process and its results, and ensure that the community's concerns are solicited, considered, and thoroughly addressed The backbone of this program is the Community Relations Plan, which assessed the public's level of knowledge, interest, and information needs by conducting community interviews and researching of the local social, demographic, economic, and political information The Community Relations Plan recommended compatible public involvement strategies that include Restoration Advisory Board (RAB), newsletters and fact sheets, Information Repositories, and public meetings at project milestones.

RABs are a joint creation of the DOD and the USEPA and are a vehicle for community input during environmental restoration. A RAB was formed for former HAFB in October 1993 and meets routinely. Community members of the RAB exchange information and discuss restoration issues with the BCT that includes representatives from the USAF, USEPA, and the FDEP. Currently, there are seven community members on the HAFB RAB

RAB meetings provide opportunities for direct public participation. Presentation topics include current investigations, results, plans for the environmental restoration program, and the current issues and decisions facing the BCT. All RAB meetings are open to the public and include a public comment period for the audience members to ask questions and express opinions and concerns.

Newsletters and fact sheets update the community members on the current issues and environmental investigation and/or remediation activities. Newsletters are published four times a year, and fact sheets are published when needed to provide more detail on specific activities and at major milestones in the environmental restoration process at the former HAFB.

The public has access to current and historical information about environmental restoration activities at former HAFB through the Information Repository. Included in the repository are technical documents such as investigation and remedial action reports, work plans, and RAB meeting minutes and handouts. The USAF has kept the public informed of and involved in the decision-making process for environmental restoration activities at OU-9 and OU-11 through the RAB, newsletters, and fact sheets.

2.3.1 Community Participation at OU-9

For the OU-9 RI, an Administrative Record was created to contain all records pertaining to the OU-9 RI, including the Field Report for the Boundary Canal (Geraghty and Miller 1992), the OU-9 RI Work Plan (Geraghty and Miller 1993), the Final Remedial Investigation Report (W-C 1995), and the Supplemental Investigation of the Outfall Canal Report (W-C 1996). The Administrative Record has been available to the public and maintained at Building 736, Air Force Real Property Agency (AFRPA/DA) Homestead, 29050 Coral Sea Boulevard, HAFB, Florida, 33039-1299.

In addition to the Administrative Record, the public and representatives of the media were invited to attend two RAB meetings that were held October 26, 1995 and March 13, 1996. At these RAB meetings, information on the proposed plan for OU-9 was presented. Notice of the meetings, which specifically identified that information concerning OU-9 that would be presented and comment solicited, was publicized in three local newspapers.

The AFRPA also has published a newsletter for the public that summarized the conclusions of the OU-9 RI and of the Military Canal sampling in January 1996. This

newsletter publicized that the USAF has requested a No Remedial Action ROD for OU-9 with continued solicitations of public comments.

Additionally, the Homestead Technical Committee (HTC), which includes representatives of the public, was formed by the Air Force to address issues about OU-9. The HTC held meetings on November 15, 1995, November 28, 1995, and April 10, 1995 to address OU-9. The HTC is composed of representatives from the following agencies:

AFRPA/DA Homestead	Air Force Reserve Command (AFRC)
DERM	Miami-Dade County Aviation Department (DCAD)
Sierra Club	South Florida Water Management District (SFWMD)
Tropical Audubon Society Inc.	U.S. Department of Interior
Biscayne National Park	Everglades National Park

The proposed plan was released to the public on January 16, 1997. The public meeting for OU-9 was also held on January 16, 1997. The public comment period was from January 16, 1997 to February 17, 1997. The results of OU-9 public comments are presented in Section 3 of this document.

2.3.2 Community Participation at OU-11

For the OU-11 RI, an Administrative Record was created to contain all records pertaining to the OU-11 RI, including files, dates. The Administrative Record has been available to the public and maintained at Building 736, AFRPA/DA Homestead, 29050 Coral Sea Boulevard, HAFB, Florida, 33039-1299.

A Proposed Plan was distributed on November 29, 2001 that detailed site investigations and the preferred remedial alternatives for OU-11. Public meeting ads for the OU-11 Proposed Plan were published in the *South Dade News Leader* on November 30, 2001 and *The Miami Herald* (South Dade *Neighbors* Edition) on November 29, 2001. A public meeting was held at the Miami-Dade County Cooperative Extension Service – Agricultural Center on December 12, 2001. The public comment period on the Proposed Plan for OU-11 was from November 29, 2001 through December 28, 2001. A transcript of the December 12, 2001 public meeting is retained in the Information Repository maintained by the Air Force at the Miami-Dade Community College Library, Homestead

Campus. Submitted comments from the Proposed Plan public comment period and public meeting are addressed in the Responsiveness Summary, Section 3 0 of this ROD.

2.4 SCOPE AND ROLE OF RESPONSE ACTIONS

2.4.1 OU-9 Boundary Canal

The Boundary Canal System (OU-9) was identified for investigation as part of the IRP in 1993 after the initial investigation of the Boundary Canal in 1992 (Geraghty and Miller, 1992). Under CERCLA, 29 OUs and 3 AOCs have been designated as PSCs to be investigated, to date. In general, the investigations of the sites have been conducted independently of each other However, the potential impacts of OU-4 (Motor Pool Oil Leak Area), OU-5 (Electroplating Waste Disposal Area), and OU-6 (Aircraft Wash Rack) on the Boundary Canal System were qualitatively evaluated as part of the OU-9 RI.

Based on the results of the RI conducted for OU-9 in 1994 and 1995, no remedial action is recommended for OU-9 based on the findings in the OU-9 BRA. The BRA showed that contaminants detected in the Boundary Canal System do not pose an unacceptable risk to human health or the environment.

2.4.2 OU-11 Military Canal

HAFB was already engaged in the Installation Restoration Program (IRP) developed by the Department of Defense when it was placed on the USEPA National Priorities List on August 30, 1990. The Military Canal was originally investigated as part of the OU-9 Boundary Canal system. It was subsequently combined with the OU-11 former Wastewater Treatment Plant/Incinerator Ash Disposal Area upon discovery of two cleanwater discharge lines that extend from the terrestrial portion of OU-11 to the Military Canal. OU-11 was identified as a PSC. The SERA (Montgomery Watson, 1999) did not indicate significant impacts to surface water as a result of past operations at OU-11. However, the SERA did indicate potential for unacceptable risk to ecological receptors in the Military Canal and ultimately, Biscayne National Park due to potential migration of sediment contamination. The OU-11 RI/BRA (Montgomery Watson,

September 2000) summarized that significant or adverse impact to surface water were not present. However, sediment analytical results indicated the presence of VOCs, Polynuclear Aromatic Hydrocarbon (PAHs), pesticides, and metals at levels that could impact sensitive ecological receptors. Based on these findings, the BCT recommended the development of a FFS (Montgomery Watson, November 2001) to evaluate remedial options for the site.

Remedial action objectives (RAOs) are specific goals for protecting human health and the environment for the media of concern Specific RAOs were developed while considering the long-term goals of protecting human health and the environment, reducing exposure to contaminants, and achieving compliance where possible with applicable or relevant and appropriate requirements (ARARs).

In addition to the specific RAOs for the media of concern and pursuant to the USEPA RI/ FFS Guidance (USEPA, 1988), the following considerations will be satisfied, to the extent possible for specific proposed remedial action alternatives:

- Reduce the potential exposure of chemicals of potential concern (COPC) to sensitive ecological receptors after remedial action construction activities.
- Control and reduction of sediment resuspension during construction activity.
- Control and reduce the potential airborne particulate during and after remedial action construction activities.

Sediment is the only media of concern identified in the FFS. The Remedial Action Objectives for sediment is discussed in detail in Section 2-14 of this ROD.

Surface water has been demonstrated to be of acceptable quality. However, surface water may be a transporter of fine sediment. As part of the remedial design, engineering controls will be administered in the remedy to enhance the settling capacity of the wet detention system and minimize the transport mechanism of entrained sediment in surface water.

2.5 SITE CHARACTERISTICS OF OU-9

2.5.1 Initial OU-9 Boundary Canal Investigation

In 1991 and 1992, sediment and surface water samples were collected at 18 locations from the Boundary Canal (Geraghty and Miller, 1992). Sediment and surface water samples were analyzed for SVOCs, metals, and selected pesticides.

SVOCs, metals, and pesticides were reported in the 18 sediment samples. PAHs detected in sediment samples at concentrations above background levels were acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Non-PAH compounds reported in sediment samples include bis(2-ethylhexyl)phthalate (DEHP) and benzoic acid. Aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, silver, sodium, vanadium, and zinc were also detected in the Boundary Canal sediment samples. 4,4'- dichlorodiphenyldichloroethane (DDD) and 4,4'- dichlorodiphenyltrichloroethane (DDT) were reported in three Boundary Canal sediment samples, and 4'- dichlorodiphenyldichloroethylene (DDE) was reported in five sediment samples. Chloroform was reported in a surface water sample. SVOCs reported in surface water samples were DEHP, di-n-butyl phthalate, benzoic acid, and 2-chlorophenol.

2.5.2 OU-9 Remedial Investigation

The RI Work Plan (Geraghty and Miller 1993a) was implemented for OU-9 by W-C to determine the nature and extent of contamination, evaluate the fate and transport of contamination, and assess the risks to human health and the environment. The results of the RI are presented in the Final OU-9 Remedial Investigation report (W-C, 1995). The following sections summarize the results of the RI.

2.5.2.1 Nature and Extent of Contamination

2.5.2.1.1 Surface Water

Surface water samples were collected at OU-9 Locations 1 through 8, 12 through 20, and 26 through 31. Surface water samples were also collected at the background locations (Locations 22, 23, and 24) and four locations in the Military Canal (Locations 9, 10, 11, and 21). Figure 2-2 shows the OU-9 sampling locations Table A-1, Appendix A of the OU-9 RI summarizes the detected analytical results for the surface water samples. For the surface water samples, Target Compound List (TCL) analytes were analyzed in accordance with the USEPA Contract Laboratory Program, volatile organic compounds (VOCs), and pesticide/polychlorinated biphenyls (PCBs), except for chloroform and endosulfan II, were reported as nondetect. Endosulfan II was detected at a concentration of 0.033 micrograms/liter (µg/L) in one sample, and chloroform was detected in eight samples at concentrations of less than 3 µg/L. TCL SVOCs and cyanide were reported as nondetect for all surface water samples. Twenty Target Analyte List (TAL) metals were detected at least once in the surface water samples.

Surface water samples were also collected for water quality analyses at twelve OU-9 locations are depicted on Figure 2-2. Table A-2, Appendix A of the OU-9 RI summarizes the results for the water quality analyses. Additionally, samples were collected in April 1994 at five OU-9 locations, following a significant rain event, and were analyzed for total suspended solids (TSS) TSS data were reported as nondetect for the surface water locations sampled.

2.5.2.1.2 OU-9 Sediment

Sediment samples were collected at OU-9 Locations 1 through 8, 12 through 20, and 26 through 31. Sediment samples were also collected at the background locations (Locations 22, 23, and 24) and at Location 11 in the Military Canal. Figure 2-2 shows the OU-9 sampling locations. Table A-3, Appendix A of the OU-9 RI summarizes the detected analytical results for the sediment samples. For the TCL Volatile Organic Compound (VOC) analyses, acetone, carbon disulfide, chloromethane, 1,2-

dichloroethene, toluene, and total xylenes were reported at least once in the sediment samples Acetone was reported in samples from 16 locations with concentrations ranging from 330 micrograms per kilogram (µg/kg) to 52,000 µg/kg, and toluene was detected at seven locations with a concentration range of 6 µg/kg to 25 µg/kg. Chloromethane, 1,2-dichloroethene, carbon disulfide, and total xylenes were detected only in one sample with reported concentrations of 21 µg/kg, 37 µg/kg, 8 µg/kg, and 24 µg/kg, respectively. All other TCL VOCs were reported as nondetect for the sediment samples.

TCL pesticides/PCBs were reported as nondetect except for Aroclor-1260, 4,4'-DDE, and gamma-chlordane. 4,4'-DDE was detected in three samples at concentrations of 59 µg/kg, 6.5 µg/kg, and 180 µg/kg Aroclor-1260 and gamma-chlordane were detected once at concentrations of 1,600 µg/kg and 42 µg/kg, respectively

PAHs were detected in samples from 13 locations. Detected PAHs included benzo(a)anthracene, benzo(a)pyrene, anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. All other TCL SVOCs were reported as nondetect Total PAH concentrations ranged from less than 1 [0.6 milligrams per kilogram (mg/kg)] to 239 mg/kg.

Twenty-four metals and cyanide were detected at least once in the sediment samples as summarized in Table A-3, Appendix A of the OU-9 RI.

2.5.2.1.3 Fish Tissue Sampling

Fish samples were collected at OU-9 Locations 13, 15, 18, 20, and 27. Fish samples were also collected at the background Locations 22 and 24 and at Location 11 in the Military Canal. Figure 2-2 shows the OU-9 sampling locations. Fish were collected at eight OU-9 canal locations and were analyzed for TCL and TAL compounds. Table A-5, Appendix A of the OU-9 RI summarizes the detected analytical results for the fish samples. TCL SVOCs were reported as nondetect in the fish samples, and 18 metals and

cyanide were detected at least once in the fish samples as summarized in Table A-5, Appendix A of the OU-9 RI

The following VOCs were reported in at least one of the fish samples:

> Benzene, carbon disulfide, chloroform, ethylbenzene, 2-butanone, tetrachloroethene, 1,1,1-trichloroethane, xylenes (total), bromoform, 1,2-dichloropropane, methylene chloride, trichloroethene, 4-methyl-2-pentanone, bromodichloromethane, carbon tetrachloride, 1,2-dichloroethene, 1,1,2,2-trichloroethane, toluene, and styrene.

The VOCs reported were predominantly at estimated concentrations below the reporting limits. However, toluene, xylenes (total), and methylene chloride were detected above the reporting limits in more than one of the fish samples.

The following pesticides/PCBs were detected at least once in the fish samples:

> Aroclor-1260, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, beta-BHC, cis-nonaroclor, delta-BHC, dieldrin, endosulfan II, gamma-BHC (lindane), methoxychlor, o,p-DDD, o,p-DDE, oxychlordane, and trans-nonaroclor.

Aroclor-1260, 4,4'-DDD, and trans-nonaroclor were detected in fish samples from each of the eight sampling locations.

2.5.2.2 Contaminant Transport

Contaminant fate and transport was evaluated as part of the RI. This evaluation included contaminant migration mechanisms; characteristics of the contaminant; and the relationship between groundwater and surface water in the canal system. Core sediment samples were collected at 33 locations for grain-size distribution, lithologic descriptions, sediment thickness, and depositional profile Additionally, flow measurements and TSS samples were collected from water in the canals following a rain event.

To evaluate the relationship between the groundwater and surface water, electronic transducers and staff gages were installed at 12 locations in the boundary canal system,

the Stormwater Reservoir, and Mystic Lake. Additionally, at four locations, staff gages and transducers were installed in two monitoring wells at each location to monitor water levels. A weather station was installed at the west end of the runway to record rainfall, wind speed, wind direction, and temperature. Data collected during the RI were used for evaluation of the flow of water in the canals, evaluation of sediment transport, erosion, and deposition, and the relationship between groundwater and the canals.

2.5.2.3 Contaminant Migration

Water movement in the canal system is essentially stagnant, and no apparent flow occurs during periods of no precipitation or precipitation less than 1-inch per day. During storm events, a slight hydraulic gradient is induced from the canals to the Stormwater Reservoir and flow occurs for periods of up to 12 hours following the end of the rain event. Estimated maximum mean channel flow velocities during peak flow periods are below 0.3 ft/sec for the Boundary Canal, below 0.5 ft/sec for the Flightline Canal, and below 0.8 ft/sec for drainage canals.

Erosion of the sediment bed or sediment transport due to movement of the water was determined to be unlikely. Sediment bed erosion, transport, and deposition are controlled by shear stresses applied by flowing water, and erosion will commence when the shear stress from water flowing over the sediment is greater than the shear strength of the bed. The potential for sediment bed erosion was evaluated using the storm hydrograph data by estimating the bed-shear stresses and flow velocities as noted below:

- Hydrographs were used to estimate water level gradients and channel hydraulic characteristics for normal flow conditions and at times when storm runoff is most significant.
- Depth-average flow velocities and bed-shear stress in the canal were estimated for normal periods and storm events.
- Bed-shear velocities and depth average velocities were compared to literature values to evaluate the potential for sediment erosion and transport during storm events.

The estimated sediment bed shear stresses for observed or hypothetical worst-case storm events were significantly below the sheer stresses and bed shear strengths required to commence erosion.

An evaluation was also made of the potential for migration of sediment into the canal. TSS samples were collected following a rain event indicating the low annual sediment input rates into the canal. The site topography, the nature of ground cover, and measured sediment thickness support the low potential for sediment runoff into the canals. The ground cover around the canals is highly vegetated or is paved.

2.5.2.4 Relationship Between Groundwater and Surface Water

The relationship between groundwater and the canals was also evaluated by the hydrograph data. The annual average flow behavior is a discharge of surrounding groundwater into the canals; however, some localized reversal of flow can occur in response to significant runoff events for short periods of time (from 1 to 6 hours)

The potential for migration of contaminants from the surface water and sediment to the groundwater is insignificant In the surface water, migration was determined to be insignificant due to the concentrations of contaminants detected in surface water. In the sediments, COPCs detected (including PAHs, PCBs, and pesticides) have high K_d (Distribution Coefficient) values. Based on the fraction of organic carbon in canal sediments and the K_d values, contaminants sorbed to canal sediments would not favor partitioning into the aqueous phase, a condition necessary for migration to groundwater. This low potential for partitioning from the absorbed to aqueous phase is supported by the fact that no PAHs, DDE, or aroclors were detected in canal surface water under conditions of stagnant water flow, where maximum partitioning and minimal dispersion would be expected to occur.

2.5.3 OU-9 Voluntary Custodial Actions

Voluntary custodial actions (VCAs) were completed in the drainage swales, ditches and canals associated with the former OWS Numbers 792, 795, 779, 4787, and 723 (OU6),

OU4, and OU5. Figure 2-3 shows the locations of the VCAs. Each of the former OWSs discharged directly to a drainage swale or canal. The areas of the discharge were sampled during the closure of the OWS. Results from these samples exceeded site-specific or FDEP soil cleanup-goals for various target analytes. Based on the exceedances of the goals, VCAs were performed at the request of FDEP and DERM to remove the soil and/or sediment from the areas. After the excavation of materials, confirmation sampling of the excavation sidewall and floors was conducted to verify that this contamination had been removed. The VCAs done in the canal system at former OWSs are summarized as follows:

Former OWS No.	Analyte of Concern	OWS Discharge Point	Approximate Tons Removed
792	TRPH & PAHs	Canal S-SW of Bldg. 792	27
795	TRPH & Arsenic	Drainage ditch NE of Bldg 795	44
779	Arsenic, Chromium, PCBs, & TRPH	Drainage swale N-NE of Bldg 779	56
4787	TRPH	Drainage swale NE of OWS #4787	41
723 (OU-6)	Chromium, Lead, & TRPH	Adjacent drainage canal	225

S = South N= North W = Southwest NE = Northeast
TRPH (Total Recoverable Petroleum Hydrocarbons)

At the request of the U.S. Air Force Center of Environmental Excellence (AFCEE) and AFRPA, VCAs were also done in the drainage ditches associated with OU-4 (Motor Pool Oil Lead Area), based on the arsenic and lead detected at OU-4, and OU-5 (the Electroplating Waste Disposal Area), based on the arsenic detected at OU-5. Approximately, 45 tons and 25 cubic yards of soil/sediment were excavated at OU-5 and OU-4, respectively.

2.5.4 OU-9 Maintenance Activities

In addition to the VCAs described above, general housekeeping activities were conducted in the Boundary Canal by DCAD from May 8, 1995 through June 30, 1995 to remove debris material associated with Hurricane Andrew, vegetative overgrowth, and associated materials. Approximately 930 cubic yards of debris and vegetation were removed from the canals. The vegetative materials were deposited on Base at the Construction Disposal

Landfill (OU18). The debris was placed in the Miami-Dade County Construction Landfill.

2.6 SITE CHARACTERISTICS OF OU-11 MILITARY CANAL

The following sections describe the Remedial Investigation and Baseline Risk Assessment performed at the OU-11 Military Canal.

2.6.1 Investigation and Remedial Action Summary

Previously in this report, Section 2.2 discussed the Site Investigation History. This section presents a brief overview of the nature and extent of potential contaminants in the site media that were sampled and evaluated during the RI. Included is a description of potential sources of impact to the environment by surface water and sediment. Analytical results discussed in this section are provided in detail in Section 4 of the Final OU-11 Remedial Investigation and Baseline Risk Assessment (Montgomery Watson, 2001).

2.6.1.1 Surface Water Sample Results

Surface water samples were analyzed for VOCs, Base Neutral/ Acid (BNAs), Organochlorine Pesticides/ PCBs, metals, and cyanide. Biscayne Bay Surface Water Quality Program water quality data from 1998 have been included for Stations MI03 and MI04 (Miami-Dade County DERM, undated). Station MI03 is located in the Military Canal at the 107th Street Bridge. Station MI04 is located in the Military Canal adjacent to the stormwater reservoir.

The analytical data were evaluated against applicable Federal Ambient Water Quality Criteria (AWQC), Florida Surface Water Quality Criteria (SWQC) Class III: Fresh, and USEPA Region 4 Chronic screening values. Refer to Tables 5-3 and 5-4 from the OU-11 RI/BRA Investigation (Montgomery Watson, 2001) for a summary of surface water criteria and sample results.

2.6.1.2 Volatile Organic Compounds

VOCs were present at detectable concentrations in 10 of the 21 surface water samples collected from 1993 through 1998. None of the detected concentrations exceed Federal or State SWQC.

In 1993 four surface water samples designated OU9-SW-0009 through OU9-SW-0011 and OU9-SW-0021 were collected from stations in the Military Canal (Woodward-Clyde, 1995). No VOCs were detected in these samples.

In 1995, four surface water samples designated SW-001 through SW-004 were collected from the Military Canal (Montgomery Watson, 1995). Chloroform was the only VOC detected at concentrations ranging from 0.55J to 1.1J µg/L (J indicating estimated values). The samples were collected upstream and downstream of the outfall area located east of Building 785 and upstream and downstream of the 107th Street Bridge.

In 1996, six surface water samples designated OTFL-SW-0001 through OTFL-SW-0006 were collected from stations along the Military Canal (W-C, 1996). Four VOCs were detected in sample OTFL-SW-0005 including benzene (1J µg/L), toluene (8 µg/L), ethylbenzene (3 µg/L), and total xylenes (18 µg/L). The sample was collected at the mouth of the Military Canal near Biscayne Bay. Ethylbenzene and total xylenes were present in four of the remaining samples at individual concentrations of 1 and 1J µg/L.

In 1998 the USEPA collected two surface water samples designated SW-101 and SW-500 (USEPA, 1997). No VOCs were detected in these samples. In addition, no VOCs were detected in the 1998 samples collected from Stations MI03 or MI04.

2.6.1.3 Base Neutral/Acid Extractable Compounds

Minor concentrations of BNAs, as PAHs, were present in one surface water sample. Naphthalene (2J µg/L) and 2-methylnaphthalene (1J µg/L) were detected in the OTFL-

2.6.1.4 Organochlorine Pesticide/Polychlorinated Biphenyl Compounds

Heptachlor was detected in samples OTFL-SW-0002 through OTFL-SW-0006 at concentrations ranging from 0.012J to 0.016J µg/L. These concentrations exceed the USEPA Region 4 chronic screening value of 0 0038 µg/L. No other pesticides or PCBs were detected in the Military Canal surface water samples.

2.6.1.5 Metals and Cyanide

Cyanide was not detected in the surface water samples and is, therefore, excluded from discussion below.

The metals analyzed in the 19 surface water samples included aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, strontium, uranium, vanadium, and zinc. The samples exceeded applicable surface water standards for barium (3.9 µg/L, AWQC), beryllium (0.13 µg/L, SWQC), cadmium (0.66 µg/L, USEPA Region 4 chronic), and lead (1.32 µg/L, USEPA Region 4 chronic). Barium and lead were reported in the samples below their range of concentrations in the Biscayne Aquifer (Causaras, 1987). The following table summarizes the range and arithmetic mean of metals in the surface water samples from the Military Canal:

Metal	Minimum – Maximum Concentration (µg/L)	Mean Value (µg/L)	Number of Samples	Concentration in Biscayne Aquifer [1]	
				Range (µg/L)	Mean (µg/L)
Aluminum	22 6 – 110	31.1	3	--	--
Antimony	0 12 – 25 6	21 9	3	--	--
Arsenic	0 8 – 1 6	1 1	10	<1 – 2	1 2
Barium	8 6 – 12	9 8	19	<100 – 100	100
Beryllium	0.1 – 0.24	0 21	5	--	--
Cadmium	2 9 – 3 5	2 9	3	<1 – 3	1 0
Calcium	51,000 – 230,000	118,325	16	55,000 – 140,000	90,000
Copper	2 2 – 3 1	2.6	3	--	--
Iron	4.7 – 15.7	7 8	5	<10 – 1900	560
Lead	0 1 – 1 7	1 0	3	<1 – 6	1 9
Magnesium	3,200 – 664,000	169,353	15	1,700 – 19,000	5600
Manganese	0.86 – 5 6	2 5	14	<10 – 30	9.7
Nickel	6 2 – 10 7	7 9	3	--	--
Potassium	5,200 – 196,000	55,200	16	200 – 6,500	2400
Selenium	0 4 – 5	0 45	2	--	--
Sodium	2,200 – 5,160,000	1,339,992	16	7,400 – 77,000	26,600
Strontium	800 – 1,800	1,190	6	--	--
Uranium	2 2 – 2 6	2 4	2	--	--
Vanadium	1 8 – 6	4 4	7	--	--
Zinc	3 1 – 9 4	5 8	7	<10 – 30	7 5

1 Source: Causaras, 1987

2.6.1.6 Sediment Sample Results

Due to the size of the OU-11 sediment quality database, the data will be discussed by site area. The sediment samples were analyzed for VOCs, BNAs, organochlorine (OC) Pest/PCBs, metals, and cyanide. Tables 2-1 through 2-4 (excerpted from the RI/BRA Investigation Montgomery Watson, 2000) provide a summary of sediment sample results.

The most comprehensive sediment quality database for the Military Canal was compiled by the USEPA in the Military Canal Special Study Report (USEPA, 1997). The Military Canal was divided into an upstream reach (22 samples from 21 stations between the stormwater discharge area and the 107th Street Bridge), bridge reach (5 samples from three stations immediately downstream of the 107th Street Bridge), downstream reach (18 samples from 14 stations between 107th Avenue Bridge and water control structure S20G), and tidewater channel (23 samples from 14 stations between S20G and the mouth of the Military Canal at Biscayne Bay).

The sediment dataset consists of 155 samples, including 10 duplicates, obtained between 1989 and 1998. It should be noted that virtually all of the 62 VOCs analyzed for were reported in 45 of the USEPA samples as estimated values (i.e., 0 0035UJ mg/kg). The USEPA (1997) provided no explanation nor did it discuss the apparent presence of the entire suite of VOCs reported in the majority of the samples. Analytes with estimated concentrations that were qualified as "UJ" are not discussed in this data summary The reported UJ qualifiers were listed in the USEPA study as "U indicates the material was analyzed for but not detected. The number is the minimum quantitation limit and J is the "estimated value."

Carbon disulfide, 1,4-dichlorobenzene, and toluene were the most prevalent VOCs detected in the 1997 USEPA sediment samples collected from the Military Canal. It should be noted that toluene and 1,4-dichlorobenzene were reported in field, equipment rinsate, and trip blanks suggesting possible cross-contamination of environmental samples or a possible laboratory artifact.

2.6.1.6.1 Tidewater Channel

The VOCs detected in the tidewater channel samples included primarily toluene, carbon disulfide, and 1,4-dichlorobenzene Toluene was the most prevalent analyte detected ranging from 1.2J to 21J µg/kg in 12 samples. Carbon disulfide was detected in eight of the samples ranging from 1.2J to 55J µg/kg. The VOC 1,4-dichlorobenzene was present in seven samples at 2J to 8.3J µg/kg.

PAHs were the primary analytes detected in the BNA scan of the 36 tidewater channel samples. The most frequently occurring PAHs included benzo(a)anthracene (13J to 81J µg/kg in 23 samples), benzo(a)pyrene (11J to 160J µg/kg in 23 samples), benzo(b)fluoranthene (16J to 210J µg/kg in 29 samples), benzo(k)fluoranthene (10J to 92J µg/kg in 23 samples), benzo(g,h,i)perylene (15J to 98J µg/kg in 28 samples), chrysene (12J to 87J µg/kg in 23 samples), dibenz(a,h)anthracene (17 to 24 µg/kg in three samples), fluoranthene (17J to 320J µg/kg in 28 samples), indeno(1,2,3-cd)pyrene (11J to

83J µg/kg in 27 samples), phenanthrene (12 to 69 µg/kg in 16 samples), and pyrene (13J to 200J µg/kg in 28 samples)

Aroclor 1254 was detected in 23 of the 36 tidewater channel samples at 20 to 310 µg/kg The Aroclor 1254 concentrations in the tidewater channel samples were approximately one-half of the Aroclor 1254 concentrations detected in the downstream reach, bridge reach, and upstream reach samples. No other PCBs were reported in the samples. Chlordene and 4,4'-DDE were the most prevalent pesticides detected with maximum concentrations of 85 µg/kg (chlordene) and 200 µg/kg (4,4'-DDE) in the tidewater channel samples.

The metals detected in the tidewater channel are consistent with those found throughout the Military Canal but they appear to represent the lower range of reported concentrations. Each of the primary metals of concern were detected in the sediments collected from the tidewater channel including arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc. Maximum detected concentrations of these metals in the tidewater channel were 6.7 mg/kg arsenic, 7 mg/kg cadmium, 30 mg/kg chromium, 160 mg/kg copper. 160 mg/kg lead, 1.4 mg/kg mercury, 25 mg/kg nickel, 31 mg/kg silver, and 280 mg/kg zinc

2.6.1.6.2 Downstream Reach

The most commonly occurring VOCs in the downstream reach samples included carbon disulfide and toluene Carbon disulfide was detected in 13 samples at 1.6J to 83J µg/kg. Toluene was detected in 10 samples at 1.8 to 63J µg/kg

An array of PAH compounds similar in concentration to the PAHs detected in the tidal channel samples were present in the 26 sediment samples collected from the downstream reach.

Aroclor 1254 was detected in 25 of the downstream reach samples at 41 to 780 µg/kg. No other PCBs were reported in the samples. Chlordene and 4,4'-DDE were the most

common pesticides detected in the downstream reach samples at maximum concentrations of 92 and 400 µg/kg, respectively.

Concentrations of metals along the downstream reach appear to be evenly distributed throughout this section of canal. In general, maximum metal concentrations are an order of magnitude higher than those reported in the tidewater channel. Maximum detected concentrations of the primary metals of concern in the downstream reach were 50 mg/kg arsenic, 13 mg/kg cadmium, 54 mg/kg chromium, 300 mg/kg copper, 100 mg/kg lead, 12 mg/kg mercury, 9.7 mg/kg nickel, 74 mg/kg silver, and 590 mg/kg zinc

2.6.1.6.3 Bridge Reach

Carbon disulfide, toluene, and bromoform were reported in the bridge reach samples. Carbon disulfide and toluene were detected in two samples each at maximum concentrations of 11J µg/kg (carbon disulfide) and 6 7J µg/kg (toluene). Bromoform was detected in one sample at 3.1J µg/kg.

The BNA dibutyl tin was present in two of the five bridge reach samples at a maximum concentration of 540 µg/kg. Tributyl tin was detected in five samples at concentrations of 860 to 1,500 µg/kg. PAHs similar to those analyzed in the downstream reach and tidal channel samples were detected in the bridge reach samples. Analyte concentrations in the bridge reach samples, however, were generally higher than downstream PAH concentrations.

Aroclor 1254 was reported in the five bridge reach samples at concentrations of 270J to 600 µg/kg. No other PCBs were detected. Chlordene and 4,4'-DDE was the most common pesticides detected at maximum concentrations of 37 and 330 µg/kg, respectively.

Concentrations of metals in the bridge reach are consistent with those observed in the downstream reach. Maximum detected concentrations of the primary metals of concern

in the bridge reach were 39 mg/kg arsenic, 16 mg/kg cadmium, 49 mg/kg chromium, 270 mg/kg copper, 110 mg/kg lead, 4.6 mg/kg mercury, 11 mg/kg nickel, 92 mg/kg silver, and 560 mg/kg zinc.

2.6.1.6.4 Upstream Reach

Carbon disulfide and p-isopropyltoluene were the most prevalent VOCs detected in the upstream reach samples. Carbon disulfide was reported in 15 samples at 3.5J to 48J µg/kg. The VOC, p-isopropyltoluene, was analyzed in nine samples at 2.4J to 130J µg/kg.

PAHs were detected at elevated concentrations throughout the entire length of the upstream reach. As a means of comparison, benzo(a)pyrene was reported from 11J to 160J µg/kg in the tidewater channel samples and increased in concentration from 62J to 2400 µg/kg in the upstream reach samples Fluoranthene was detected in the upstream reach samples at 180J to 5,400 µg/kg and decreased in concentration from 57J to 310J µg/kg in the tidewater channel samples. In general, the maximum observed PAH concentrations were reported in sample SD425 and diminished eastward.

Aroclor 1254 was detected in the 27 upstream reach samples at concentrations of 26J to 760 µg/kg. No other PCBs were detected in the samples. Chlordene and 4,4'-DDE were the most commonly detected pesticides in the upstream reach samples. Both pesticides were detected in each of the 27 samples at maximum concentrations of 120 µg/kg (chlordene) and 440 µg/kg (4,4'-DDE).

Metals concentrations reported within the bridge reach are consistent with levels reported in the bridge and downstream reaches. Maximum detected concentrations of the primary metals of concern in the upstream reach were 24 mg/kg arsenic, 15 mg/kg cadmium, 45 mg/kg chromium, 360 mg/kg copper, 120 mg/kg lead, 6.9 mg/kg mercury, 6.4 mg/kg nickel, 110 mg/kg silver, and 670 mg/kg zinc.

2.6.2 OU-9 and OU-11 Contaminant Fate and Transport

2.6.2.1 Site Contaminant Migration Pathways

Potential release mechanisms evaluated for contaminated soil include surface runoff, percolation to groundwater, and fugitive dust. Surface runoff and groundwater discharge within HAFB is collected in the Boundary Canal system. Contaminants are potentially released from sites within the former HAFB watershed via the above mechanisms to the Boundary Canal system, where they represent a secondary contaminant source. However, it should be noted that surface soil contamination above state, federal, or risk based target levels at sites with the boundaries of HAFB have typically been eliminated via removal actions. Furthermore, more than 950 groundwater monitoring wells have been installed throughout the former HAFB to monitor groundwater concentrations and migration. As sites are approved for NFA, wells have been systematically abandoned. There are presently more than 500 active monitoring wells that have been used at sites to monitor/measure migration and attenuation of site contaminants.

Surface runoff and discharge from groundwater are release mechanisms that potentially result in subsequent surface water and sediment contamination within the Boundary Canal system have been evaluated in the FFS When the water control structure is closed and pumps are not operating, the transport mechanism for contaminants derived from soils to migrate into Military Canal from the Boundary Canal system is interrupted. Episodic discharge does occur when the Boundary Canal system retention pond is actively pumped into the Military Canal to control water level elevations to support agricultural and storm water management objectives. Pumping from the stormwater reservoir presents a potential transport mechanism of contaminated sediment.

From the mid 1950s to early 1983, the former base wastewater treatment plant treated all domestic and industrial wastewater generated by former HAFB. The former sewage treatment plant was located at the southeast corner of the Base, near the storm water reservoir. The Sewage Treatment Plant utilized primary clarification, trickling filters, secondary clarification, anaerobic sludge digestion, and sludge drying beds to treat the

wastewater The treated wastewater was discharged into the Military Canal and Stormwater Reservoir, while sludges were removed from the digester and spread in the sludge drying beds. According to base personnel, the sludge was ultimately disposed of at a local solid waste landfill.

Percolation of rainfall through contaminated soils presents a potential release directly to the Military Canal, and Boundary Canal system, via groundwater discharge to surface water. Because there are no access restrictions to the Military Canal, illicit dumping occurs frequently and represent an added source of contamination not related to site activities or functions. Evidence of this has been previously observed during several of the sampling efforts and includes the presence of an asphalt shingle pile, tires, automobiles, and automobile parts. During the sediment treatability study effort, divers observed two submerged cars during their survey of the stormwater reservoir.

Because the Military Canal discharges directly to Biscayne National Park, the active chemical transport and migration pathways described above may contaminate the bay via stormwater discharge and groundwater migration.

Fugitive dust, however, is considered an unlikely release mechanism due to the prevalence of paved surfaces and vegetative cover throughout the site, in both maintained and rural areas. No large areas of bare, unvegetated soil are found within HAFB that would be a significant source of fugitive dust.

2.6.2.2 Site Specific Transport Processes

In conjunction with the sediment treatability study, Montgomery Watson collected three additional sediment samples from various locations within the reservoir for the purpose of measuring sediment transport mechanisms coming from former HAFB into the Stormwater Reservoir and ultimately into the Military Canal. Furthermore, this section addresses the ability of the stormwater management system in former HAFB to retain sediments and suspended solids within base boundaries and explores options to improve

its sediment retention ability. This evaluation was conducted in response to questions raised about the origin of sediments in the Military Canal One hypothesis is that they may have originated in former HAFB and overflowed the reservoir during storm events. The concern is to evaluate and control this potential source of sediments to reduce the future risk of sediment loads from former HAFB

2.6.2.2.1 Analysis Methodology

The sediment treatibility evaluation utilized a methodology developed by the USEPA (USEPA, 1986) to establish the wet detention treatment capacity of the pump house reservoir and perimeter canal system. Sediment samples were obtained from the reservoir and canal, and column-settling tests conducted to establish the settling velocities of sediments commonly found in former HAFB.

2.6.2.2.2 Wet Detention Systems

Wet detention systems are devices that hold water in permanent storage. They are equivalent to lakes and/or canals with a permanent pool below the elevation of the overflow structure. Since they hold water most of the time, they are able to maintain a population of aquatic organisms that can remove significant amounts of soluble nutrients from stormwater. These systems are used extensively throughout south Florida and represent the most effective "best management practice" for stormwater treatment. The pump house reservoir and perimeter canal function as a wet detention system for the treatment of stormwater originating within the former HAFB.

Wet detention relies almost exclusively on reducing pollutant concentrations in outflows as a means to reduce pollutant loads to receiving water bodies. Wet ponds are designed with sufficient capacity to capture the runoff volumes from the most frequently occurring storms. During a storm event, the incoming stormwater volume is captured within the reservoir, displacing downstream the same volume of "old", higher quality, reservoir water. The captured stormwater undergoes sedimentation and biological uptake during

the relatively long times between storm events. Pollutants removed from the water column ultimately become buried in the sediments.

2.6.2.2.3 Suspended Solids Removal

Removal of TSS by the reservoir and perimeter canal was calculated using a statistical method developed by the USEPA (1986). The method estimates particle settling during both quiescent and flow-through conditions, depending on the magnitude of the storm event. Settling during flow-through conditions occur when the storm volume exceeds the effective storage volume of the reservoir/canal, and is a function of the overflow rate and the length of time during which overflow occurs.

Settling during quiescent conditions occurs on the volume captured within the pond and occurs during periods of no flow. The method accounts for the reduced quiescent settling that occurs during short periods between storm events when storms occur in quick succession. Overall treatment effectiveness is estimated by combining quiescent and flow-through treatment. Treatment effectiveness is expressed as a percentage reduction of the annual average load of suspended sediments.

The USEPA methodology was validated against national data on wet detention pond performance from the National Urban Runoff Program (NURP) studies (USEPA, 1986). Predicted values were within 10 to 15 percent of observed removal rates. For a predicted removal value of 65 percent, for example, the actual value may range between 55 to 75 percent, assuming an average predictive error of 10 percent.

2.6.2.2.4 Data Requirements

Data input required for the application of this method included the following:

1. Detention system capacity
    - Surface area
    - Depth
    - Degree of short-circuiting

2. Storm runoff event characteristics
   - Average storm runoff volume
     - Coefficient of variation (Cv) of storm runoff volumes
     - Average storm runoff flow
     - Cv of storm runoff flows
     - Average storm duration
     - Average time interval between storms
     - Particle settling velocities

2.6.2.2.5 Sources of Data

Following is a summary of the sources of data used to assess the sediment retention capacity of the reservoir and perimeter canal system.

2.6.2.2.5.1 Detention System Capacity

The method used herein conducts the analyses for a range of detention system sizes (surface areas) and depths to illustrate the effect of geometry on treatment efficiency, and to provide a means for determining if changes in capacity (area and depth) are warranted to improve sediment retention effectiveness.

Data on the perimeter canal were obtained from existing studies. For the reservoir, a survey was conducted to determine the depth and geometry of the reservoir. Following is a summary of the dimensions and capacities of the perimeter canal and reservoir

Detention Component	Length (ft)	Width (ft)	Area (acre)	Volume (acre ft)	Average Depth (ft)
Reservoir	1000	260	5 63	46 3	8 22
West-South Canal	25,000	25	14.35	57 4	4 00
North-East Canal	15,400	25	8 84	35 4	4.00
Total			28 82	139 05	4 83

The capacity of the detention system is typically normalized relative to the impervious area of the drainage area. This is accomplished by calculating the ratio of the area of the wet detention system to the impervious area of the basin.

The portion of former HAFB that drains into the Military Canal consists of approximately 2,600 acres of 37 % impervious area, including buildings, pavement, and water. On that basis, the wet detention to impervious area ratio is 3.0 %. In other words, the area of the wet detention system is 3.0 % of the impervious area of the basin.

2.6.2.2.5.2 Military Canal Flow Records

Historical surface water records for the Military Canal were obtained for the S20G structure and the reservoir pump house. Data at S20G were obtained from the SFWMD Hydrologic and Water Quality database (DBHYDRO). These online records consisted of daily flows and stages for the period May 1985 to April 2000.

Pump records at the reservoir pump house were obtained from DCAD. The pump records consisted of pump operation logs for the period 1996, 1997, and 1999. The logs indicated the pump number, and startup and stop time There are 3 pumps with a maximum pumping discharge capacity of 100,000 gpm each. The surface water discharge point for the former HAFB site consists of the 3 pumps and a gate that discharge from the reservoir to the Military Canal. The pumps were designed to begin pumping at an elevation of 3 0 feet NGVD and shut down at an elevation of 2.5 feet NGVD. A gated culvert between the reservoir and Military Canal is normally open and provides for passive flow between the canal and the reservoir, but is closed during pumping operations.

Daily rainfall data at the S20G structure for the period January 1991 to February 2000 were also obtained on-line from the SFWMD DBHYDRO database. The rainfall data were summarized and graphed to compare with flow records at the reservoir pump house and the S20G structure are depicted in Figure 2-4 Annual average rainfall for that period amounted to 56 inches.

For periods where data was available at both the pump house and the S20G structure, Figure 2-4, shows that the S20G structure discharges more frequently and for longer

periods of time than the pump house. To estimate the difference, MWH calculated the total volume of flows at both locations for water year 1997 (10/1/96 to 9/30/97). Total discharges from the pump house amounted to 3,220 acre-ft compared to S20G that discharged 17,000 acre-ft or about 5.3 times more volume. Rainfall in water year 1997 amounted to 48 inches which when applied to the 2,600 acre basin area, indicates that approximately 31% of the rainfall volume was pumped into the Military Canal, a percentage close to the 37% impervious area in former HAFB.

Because of the short flow record at the pump house and the higher flows at S20G, neither record can be used to estimate the storm runoff event characteristics of former HAFB. Instead, an alternate approach based on rainfall data was used.

2.6.2.2.5.3 Storm Runoff Event Characteristics

In lieu of site-specific runoff data, rainfall storm characteristics from a nearby rainfall station may be converted to runoff characteristics using the runoff coefficient method. This method is recommended by the USEPA as a reasonable approximation of actual runoff storm characteristics (USEPA, 1986).

For its application, the runoff coefficient and basin area is used to convert average storm rainfall intensity and volume, respectively, to average runoff flow and volume. The Cv of rainfall intensity and volume, the average rainstorm duration, and the average interval between rainstorms are used as representative of storm runoff characteristics.

The median value of the runoff coefficient, defined as the fraction of rainfall that appears as surface runoff, is best estimated by the percent impervious surface of the drainage area (USEPA, 1986 and 1983). For former HAFB, the runoff coefficient used was 0.37, reflecting the 37% impervious area.

Rainstorm event statistics were obtained for the purpose of estimating runoff storm events at HAFB in the absence of long-term runoff records. The following data were

obtained for NOAA's gage 5663 in Miami, Florida (Woodward-Clyde, 1989), the nearest station for which these data were readily available

RAINFALL STORM CHARACTERISTICS MIAMI INTERNATIONAL AIRPORT NWS STATION 85663 (78 Storms per Year) (55. 2 inches Average Annual Rainfall)		
PARAMETER	MEAN	Coefficient of variation
VOLUME (in)	0.710	1.330
AVERAGE INTENSITY (in/hr)	0.163	1.020
EVENT DURATION (hours)	6.000	1.060
INTER-EVENT DURATION (hours)	115.000	1.560

2.6.2.2.6 Particle Settling Velocities

Settling velocities of sediment samples were determined in order to estimate the rate at which re-suspended sediments will be captured by the reservoir and perimeter canal. Settling column tests were performed for three samples obtained from the pump house reservoir and the two inflow canals. Appendix D (Flow Science Memo) of the FFS describes the laboratory procedures and results.

Figure 2-5 summarizes the results of the column settling tests and compares the site-specific data with literature data As part of the NURP, USEPA, 1986 studies, settling velocity measurements were also conducted on 50 runoff samples at seven urban sites. The figure shows that the settling properties of the sediments at former HAFB compare well with literature data in the low range of particulate settling velocities. In the high end of the range, former HAFB sediments have a greater mass of sediments with high settling velocities than NURP data.

2.6.2.2.7 Results and Conclusions of the Settling Test

Figure 2-6 shows TSS removal curves for wet detention systems at HAFB. Treatment efficiency is related to average detention system depth and size, with size expressed as a percentage of the ratio of surface area to basin impervious area (Ab/Ai). Figure 2-6 also

shows that the particulate removal curves are exponential, reaching a point of diminishing returns beyond which any further increases in wet detention capacity (area or depth) result in very small gains in removal effectiveness.

The combined capacity of the existing reservoir and perimeter canal system have an average depth of 4.8 feet and an Ab/Ai value of 3.0%. Therefore, the existing system provides a suspended solid removal of 95% on an annual average basis. This is the highest expected removal that may be achieved using a wet detention system, given the combination of local storm event characteristics and particulate settling velocities. The figure shows that additional wet detention capacity (depth or area) will not provide any measurable benefits in terms of sediment control.

The effectiveness of the wet detention system was tested on October 3 - 4, 2000, when the base received a 10-inch rain over a 24-hour period, nearly a 100-year storm event. Surface water samples were obtained after the pumps had been in operation for approximately 10 hours. TSS analytical results during this storm event were all below the method detection limit (MDL) of 5 milligrams per liter (mg/L). Sample locations covered the full extent of the Boundary Canal, Reservoir, and the pump station discharge (IT Corp, 2000).

Additionally, the effectiveness of the existing reservoir/canal system is confirmed by previous monitoring studies showing that runoff discharges from former HAFB meet Florida Class III surface water quality standards. Of 3,960 water quality tests performed on the Military Canal from 1989 to 1998, exceedances of Class III standards have been limited to 111 instances of dissolved oxygen (DO), 233 of specific conductance, and 3 of total coliform (DERM, 1999). These exceedances are normal and are not indicative of a water quality problem. Low DO is typical of a canal system that is fed by low DO groundwater; high conductance is expected because the canal is very close to Biscayne Bay and located east of the saltwater intrusion line; and the 3 coliform exceedances are normal in runoff discharges.

With the existing wet detention system and sediment control structure, it is estimated that 95 to 100 % of sediment will be retained in the reservoir. The results above do not account for the potential sediment re-suspension and transport to the Military Canal due to the potential migration of fines along the bottom of the reservoir and localized turbulence in the vicinity of the pump intake structure. To address this potential concern, the FFS recommended that a sheet pile dam be constructed around the pump intake structure to isolate that area from the rest of the reservoir. It was also recommended in the FFS that flow entering the reservoir from the northeast arm of the Boundary Canal be redirected to a point farther away from the pump intakes.

2.6.2.3 Sediment Treatability/Leachability Testing

A sediment treatability study was performed to provide information on the physical characteristics of the sediment such as specific gravity, density, percent solids, and total organic carbon. In addition to the physical characteristics, chemical analysis was performed on sediments collected from the Military Canal to explore appropriate disposal options and evaluate the leachability potential to groundwater and surface water Sediment leachability results provide a basis for comparison of in-situ encapsulation versus source removal alternatives.

2.6.2.3.1 Sample Location

For the sediment study, MWH collected six sediment samples from select locations along the Military Canal. Sample locations were determined based on the sediment sampling stations established in the USEPA Region 4 Military Canal Special Study, HAFB, Florida (USEPA, 1998).

A total of six sediment samples were collected from the following strata along the Military Canal: Upstream Reach; Bridge Reach; Downstream Reach; and Tidewater Channel. Sediment samples stations include:

- Two locations in the Upstream Reach SD-421 and SD-401
- One location in the Bridge Reach SD-301
- Two locations in the Downstream Reach SD-211A and SD-205
- One Location in the Tidewater channel SD-118

Sample locations are depicted in Figure 2-7. MWH sediment sampling locations were determined using sample coordinates provided in the USEPA Special Study Report and plotted by Arc Surveying and Mapping, who are located in Jacksonville, Florida.

Each sediment sample was analyzed for the physical parameters of specific gravity, density, percent solids, and total organic carbon The sediment samples were also analyzed for SVOCs (USEPA Method 8270B), pesticides/PCBs (USEPA Method 8081 / 8082), PAHs (USEPA Method 8310), total metals (USEPA Methods (6000/7000) and synthetic precipitation leaching procedure (SPLP) (USEPA Method 1312).

2.6.2.3.2 Study Methodology

Sediment samples were collected by divers using dedicated plastic sleeves and driving them into the underlying sediment. This technique allows for the collection of discrete samples, with the option of compositing samples in the field or laboratory.

2.6.2.3.3 Summary of Sediment Analytical Results

Chemical analysis of the sediments indicated total SVOC, primarily PAHs and phthalates DEHP and di-n-butylphthalate), present in each of the samples. Concentrations of PAHs detected were consistent with those from previous investigations. As with previous investigations, concentrations of PAHs increase westward towards the pumphouse. Total SVOC concentrations ranged from 99 µg/kg to 4,700 µg/kg. Sediments were additionally analyzed for PAHs by Method 8310 to achieve a lower practical quantitation limit. Total maximum PAH concentrations reported using Method 8310 ranged were 55 µg/kg phenanthrene, 20 µg/kg anthracene, 220 µg/kg fluoranthene, 220 µg/kg pyrene, 90 µg/kg benzo(a)anthracene, 55 µg/kg chrysene, 400 µg/kg benzo(k)fluoranthene, 380 µg/kg benzo(a)pyrene, 340 µg/kg benzo(g,h,i)perylene, and 410 µg/kg indeno(1,2,3-

cd)pyrene. SPLP results for SVOC and PAH analysis indicated one reported concentration of DEHP at 12 μg/l.

Total pesticide and PCB results indicated concentrations of primarily the DDT isomers 4,4'-DDE and 4,4'-DDD at concentrations ranging from 7.4 μg/kg to 360 μg/kg. PCBs were not reported above the MDL in any of the sediments. SPLP pesticide/PCB results were each reported below the MDL.

Each of the metals analyzed was reported in one or more of the sediment samples. As noted in the OU-11 RI/BRA, the chemical makeup of the soil/bedrock consists of aluminum, barium, calcium, iron, magnesium, potassium, sodium, and zinc. Total metals results were consistent with previous investigations SPLP metals analysis indicated the following 11 metals were not reported above the laboratory MDL: beryllium, cadmium, chromium, cobalt, lead, manganese, molybdenum, nickel, selenium, silver, and thallium. Mercury SPLP results exceed the state of Florida Surface Water Quality Criteria.. Mercury is below the groundwater Maximum Contaminant Level (MCL) of 2.0 μg/l in each of the samples with the exception of MW-SD118. The exceedance of mercury in this sample is considered suspect when compared to other results. For example, the total mercury concentration found in sample MW-SD401 was 2.7 mg/kg and a SPLP concentration of 0.30 μg/l; while sample MW-SD118 has a total mercury concentration of 0.32 mg/kg and a SPLP concentration of 3.2 μg/l. A summary of the sediment analytical results is provided in Table 2-5.

A summary of physical test results, including bulk density, moisture content, dry density, and specific gravity, is provided in Table 2-6.

2.6.2.4 Surface Water and Sediment

Stormwater at former HAFB is managed primarily through the Boundary Canal, Reservoir, and Military Canal. Stormwater runoff from the installation enters one of the tributary canals, which ultimately discharges into Boundary Canal. Sediment entering

the Boundary Canal is primarily associated with the stormwater runoff from with the installation. Stormwater flow carries sediment until it is settled out in the Stormwater Reservoir or Military Canal. As demonstrated by Montgomery Watson previously in the sediment settling column testing completed, the wet detention capacity of the Stormwater Reservoir and the Boundary Canal provides 95 percent suspended solid removal. Given that the intakes for the pumps are at the base of the reservoir, turbid flow may result from the reservoir when pumps are activated at the pump house. This turbid flow can be minimized by placing a sediment control structure in an area directly in front of the pump intakes, as was proposed in this FFS. The sediment control structure will induce flow from the upper portion of the reservoir and minimize the uptake of sediments that have settled or are suspended in the lower portion of the water column. Scouring of the reservoir bottom can be further minimized by lining in front of the pump intakes.

2.7 CURRENT AND FUTURE LAND USE (OU-9 and OU-11)

2.7.1 Land Use (OU-9 and OU-11)

Several sources serve as the basis of the current and future land used at sites: Historical Reports by MWH and others, The Supplemental Environmental Impact Statement, December 2000, and information supplied by the Air Force Real Property Agency (AFRPA). Current land use within the boundary of the former HAFB includes flight operations, "industrial" shops that support flying missions of the Air Reserves, office space within the Cantonment Area, flightline, and runways. Prior to Hurricane Andrew, the Base also had single and multi-unit residential housing facilities, commercial facilities, and recreational areas. The ultimate disposition and future use of areas outside of the Cantonment Area (approximately two-thirds of the Base) will be for redevelopment as an unspecified industrial/commercial reuse. To date several parcels have been transferred to outside entities such as the Department of Labor and Department of Social Services for a Job Corps Training Center and Homeless Trust, respectively. Other parcels are scheduled for transfer.

Land use adjacent to the northern and western borders of the Base includes residential and commercial facilities within the city limits of Homestead. The area within a 0.5-mile radius to the west, east, and south of Boundary Canal is used principally for farming and by commercial nurseries.

The OU-11 Military Canal flows eastward from former HAFB for approximately 2 miles and discharges into Biscayne Bay, which is a part of the Biscayne National Park. Land use adjacent to Military Canal, from the boundary of former HAFB east to SW 107th Street, is principally farmland, nurseries, and woodland. Woodlands continuously border the canal from approximately 0.5 mile east of the Base to the eastern side of the water control structure S20G. Marsh and mangroves border Military Canal adjacent to Biscayne Bay in the Mangrove County Preserve and Biscayne National Park.

As described above, Military Canal drains into Biscayne Bay, which is a part of the Biscayne National Park. In 1999, the Park hosted 523,000 visitors. This number does not include the thousands of visitors who entered the Park by boat and do not go through the visitor center. Biscayne National Park is primarily an underwater park offering snorkeling, glass-bottom boat rides, canoeing, and other recreational activities. Swimming is permissible in the Park but is not common since there is no designated swimming area or lifeguard on duty.

South and east of Leisure City and former HAFB, Mowry Canal receives runoff from nurseries and farmland until it reaches South Allapattah Road. Then woodlands predominate the areas adjacent to the canal eastward until the vegetation changes to marsh and mangrove adjacent to Biscayne Bay.

The coastal wetlands east of the former HAFB and canal discharges into south Biscayne Bay has been evaluated by USACE in conjunction with the Comprehensive Everglades Restoration Plan (CERP). DERM has also developed a plan for Stormwater Treatment and Distribution Area (STDA) Demonstration Project in disturbed wetlands immediately north of the Military Canal. These programs will evaluate the redistribution of surface water flow from the canals, including the Military Canal, through coastal wetlands to

simulate natural sheet flow and discharge to the Bay. Based on these comprehensive programs, the ultimate configuration of the Military Canal and other canals in the area may be altered to restore or enhance quantity, quality, and timing of freshwater discharge to Biscayne Bay without compromising flood protection.

2.7.2 Groundwater Use (OU-9 and OU-11)

Although the shallow aquifer at former HAFB is not currently used and is not planned for use as a source of potable water due to salt water intrusion, groundwater in the vicinity of former HAFB, specifically the Biscayne Aquifer, is classified as a sole source of drinking water (Class G-1)

At HAFB, shallow groundwater is not likely to be used in the future as a drinking water source because of the problems associated with saltwater intrusion.

2.7.3 Surface Water Use (OU-9 and OU-11)

Stormwater at former HAFB is managed primarily through the Boundary Canal, Reservoir, and Military Canal Runoff from the interior of the Installation is conveyed to the Boundary Canal by diversion canals. The Boundary Canal is divided into two major segments which are referred to as the West-South and North-East correspond to the drainage divide across the site and segments. The West-South segment is approximately 25,000 feet (4.9 miles) and feeds into the reservoir from the West. The North-East segment is approximately 15,400 feet (2.9 miles) and enters the reservoir at the North-East corner. The Boundary Canal empties into the storm water reservoir at the southeast corner of the Base. Flow from the stormwater reservoir gravity feeds through a 6-ft diameter inactive pump intake into the Military Canal and ultimately discharges into BNP. During extreme rain events, water is pumped from the stormwater reservoir to the Military Canal.

Extensive retrofitting of the Air Force Reserve Stormwater Conveyance Structures has been completed to isolate the Cantonment area drainage from the County area drainage.

The primary conveyance system consisting of the canals remain unchanged since the retrofitting. The secondary conveyance system, consisting of open swales and ditches were modified as follows:

1. Portions of the existing ditches and/or pipelines were converted into French drains,
2. Filled existing ditches (with invert elevations below 3.5 feet) to 3.5 feet,
3. Replaced existing ditches with pipes where the ditches cross environmentally contaminated sites.

The project site and facilities, which consist of roads, parking and other impervious areas (buildings, etc.) were redesigned to meet Miami-Dade County's requirements. The project site and facilities contain the first one (1) inch of runoff. Runoff from parking lots either sheet flows directly into dry retention areas, or is collected in catch basins, provided with baffle prior to discharge into dry retention facilities. In areas having greater potential for fuel spills, the runoff is routed through an oil water separator, prior to discharge into a dry retention facility. Drainage for facilities located within contaminated sites is not allowed to infiltrate into the contaminated soils. Runoff from paved areas, buildings, and other impervious areas is directed into inlets located within the paved areas and piped outside of the contaminated sites. Existing ditches and swales located in these areas are either be filled and replaced with a pipe conveyance system, or the ditches or swales are paved with an impervious surface to prohibit infiltration within the contamination site. These changes to the Stormwater conveyance system were implemented to reduce the amount of sediment transported to the Boundary Canal system and to manage stormwater under County regulations and best management practices.

2.8 SUMMARY OF SITE RISKS

The response actions selected in this ROD are necessary to protect public health, welfare, and the environment from actual or threatened releases of hazardous substances into the environment, as well as, actual or threatened releases of pollutants or contaminants from this site which may present an imminent and substantial endangerment to public health or

welfare. The Risk Assessment Activities conducted at OU-9 and OU-11 are discussed in detail in Sections 2.9 and 2.10, respectively.

2.9 OU-9 BASELINE RISK ASSESSMENT

A BRA was completed to assess the potential impacts to human health and the environment associated with current or future exposures to COPCs present at OU-9. The results of the risk assessment were used to:

- Estimate the magnitude of potential human health and environmental risk associated with site-related chemicals,
- Identify the primary contaminants contributing to the risk,
- Assess whether corrective action was warranted at the site,
- To help support the decision whether to remediate and, if necessary, the selection of a remedial alternative.

2.9.1 OU-9 Human Health Risk Assessment

2.9.1.1 Selection of Contaminants of Potential Concern

COPCs identified during the BRA were chemicals described as those that may have been released from waste sources; were detected in sediments, surface water, or biota in the canals; and may be significant contributors to human health or ecological risks. Selection of COPCs was based on the following screening criteria:

- Detection frequency: Chemicals that were detected infrequently (e.g., approximately 5 percent) and below concentrations of concern (i.e., that would cause a risk) were not considered COPCs.
- Essential nutrients: Chemicals that are essential nutrients (i.e., calcium, iron, magnesium, potassium, and sodium) were not considered COPCs.
- Background: Chemicals that were detected at concentrations within background levels were not considered COPCs. In accordance with USEPA Region 4 guidance (USEPA, 1994b), site chemicals (i.e., inorganic chemicals in all media and pesticides in fish tissue) were considered to be significantly above background if the maximum

concentration detected at the site exceeded two times the mean of the background concentrations.

- Risk-based concentrations (RBCs): Chemicals that were detected at concentrations below USEPA Region III RBCs (USEPA, 1994a) for residential exposures at target risk levels of 1 x 10^{-6} for carcinogens and 0.1 for noncarcinogens were not considered COPCs in accordance with USEPA Region 4 guidance (USEPA, 1994b)
- Laboratory and field contaminants: Chemicals that can be attributed to laboratory or field contamination were not considered COPCs

Chemicals that do not have USEPA established toxicity factors, but that could potentially contribute to risks (e g , lead) were considered COPCs. These chemicals could not be evaluated quantitatively in the risk assessment; however, their potential impacts to site risks were evaluated qualitatively. The COPCs identified for the human health risk assessment were as follows:

Sediment	Surface Water	Fish (Fillet)
Benzo(a)anthracene	Chloroform	4,4'-DDD
Benzo(a)pyrene	Antimony	4,4'-DDE
Benzo(b)fluoranthene	Arsenic	o,p-DDD* (2,4'-DDD)
Benzo(g,h,i)perylene*	Lead*	4,4'-DDT
Benzo(k)fluoranthene		Aroclor-1260
Dibenzo(a,h)anthracene		Arsenic
Indeno(1,2,3-cd)pyrene		Beryllium
Phenanthrene*		Mercury
Aroclor-1260		
Antimony		
Arsenic		
Beryllium		
Cadmium		
Chromium		
Lead*		

Note: Chemicals denoted with an asterisk do not have USEPA-established toxicity factors

2.9.1.2 Exposure Assessment

The objectives of the exposure assessment were to:

- Characterize the exposure setting including the populations that may be potentially exposed to site-related constituents

- Identify and evaluate the complete pathways by which exposure may occur by developing a conceptual site model of exposure pathways
- Estimate the frequency, duration, and magnitude of potential exposures

For this risk assessment, the exposure assessment involved determining intake factors for each respective receptor that resulted in estimates of both average and the reasonable maximum exposure (RME).

Exposure Populations

Potential health risks were evaluated for all present and potential future receptors at the canals based on present and reasonable future land uses. Present receptors evaluated were base workers and recreational receptors (i.e., fishermen), and potential future receptors evaluated were base workers, recreational receptors, construction workers, and adult and child residents.

Exposure Point Concentrations

For each COPC detected in sediment, surface water, and fish fillet samples, the arithmetic mean and 95 percent upper confidence limit (UCL) of the mean concentrations (based on assumed lognormal distribution) were calculated using chemical analytical results. The 95 percent UCL concentration was calculated in order to account for the uncertainty associated with the estimation of the mean and was used to represent the RME exposure point concentration. However, in accordance with USEPA guidance (USEPA, 1989), if the calculated 95 percent UCL concentration exceeded the maximum detected concentration, the maximum detected concentration was used for the RME concentration.

In calculating exposure point concentrations in the risk assessment, one-half the sample reporting limits were used to represent the concentration of COPCs that were not detected in a particular sample (USEPA, 1989), but that were detected in at least one other sample in the set. If using one-half the reporting level (RLs) of nondetect samples caused the calculated average concentrations to exceed the maximum detected concentration, those nondetect samples were excluded from the data set.

In accordance with USEPA Region 4 guidance (USEPA, 1994b), the exposure point concentrations for benzo(a)pyrene were adjusted by its respective toxicity equivalency factors. To assess potential risks from the other carcinogenic PAHs, their concentrations were converted to equivalent concentrations of benzo(a)pyrene.

Air emissions and dispersion models (USEPA, 1988) were used to estimate exposure point concentrations of volatile emissions of COPCs from surface water and sediment. The air modeling approach was conservative because it uses default values recommended by USEPA for establishing preliminary remediation goals (PRGs) at hazardous waste sites. It assumed that potential receptors are consistently exposed to air concentrations predicted immediately at the source (i.e., it did not account for dilution in the air during transport from the source to potential receptors).

Estimating Chemical Intakes

Using the exposure point concentrations of COPCs in sediment, surface water, air, and fish, the potential human intake of those chemicals via each exposure pathway was estimated. Intakes are expressed in terms of milligrams of chemical per kilogram of body weight per day (mg/kg-day). Intakes were estimated using reasonable estimates of body size, inhalation rates, ingestion rates, dermal absorption rates, soil matrix effects, and frequency and duration of exposure.

The general equation for calculating intake in terms of mg/(kg-day) is (USEPA 1989):

$$\text{intake} = \frac{\text{chemicalconc.*contactrate*exposurefrequency*exposureduration}}{\text{bodyweight*averagingtime}}$$

2.9.1.3 Toxicity Assessment

USEPA toxicity factors were used to assess potential health risks resulting from the estimated chemical intakes from OU-9. Toxicity factors are expressed either as a reference dose (RfD) or a slope factor. A RfD is the daily dose of a noncarcinogen that is unlikely to result in toxic effects to humans over a lifetime of exposure. Slope factors

and the USEPA weight-of-evidence classification are used to estimate potential carcinogenic risks. The slope factor is used to estimate the upper-bound probability of an individual developing cancer as a result of exposure to a potential carcinogen. The weight-of-evidence classification is an evaluation of the quality and quantity of carcinogenic potency data for a given chemical.

2.9.1.4 Risk Characterization

Risk characterization combines the outputs of the exposure and toxicity assessments to develop quantitative estimates of risks associated with assumed exposures to noncarcinogenic and carcinogenic COPCs released from the site.

<u>Noncarcinogenic Risks</u>

The potential for noncarcinogenic effects was characterized by comparing estimated chemical intakes with chemical-specific RfDs. Chemical intake is the chemical concentration in the exposure medium multiplied by the pathway-specific intake factor. The ratio of the estimated intake to the RfD is called a hazard quotient (HQ), which was calculated as follows (USEPA 1989):

$$Noncancer\ Hazard\ Quotient = \frac{Chemical\ Intake\ (mg\ /\ kg - day)}{RfD\ (mg\ /\ kg - day)}$$

For each receptor category (i.e, occupational receptors, hypothetical construction workers, hypothetical future adult and child residents, nonresident recreational receptors), HQs were summed for all chemical intakes and all relevant exposure pathways to yield a hazard index (HI). A HI equal to or less than 1 indicates that adverse noncarcinogenic health effects are not expected to occur even to sensitive individuals over a lifetime of exposure. A HI above 1 indicates a potential cause for concern for noncarcinogenic health effects and the need for further evaluation of assumptions about exposure and toxicity.

Carcinogenic Risks

Potential carcinogenic effects are characterized in terms of the excess probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. Excess lifetime cancer risks (ELCR) were calculated by multiplying the average daily chemical intake by the cancer slope factor (USEPA 1989), which is the risk per unit chemical intake:

$$\text{Risk} = \text{chemical intake (mg/kg - day)} * \text{SF (mg/kg - day)}^{-1}$$

For each receptor category (occupational receptors, hypothetical construction workers, hypothetical future adult and child residents, and nonresident recreational receptors), cancer risks were calculated separately for each carcinogen and each exposure pathway, and then summed to yield a total upper-bound estimate of cancer risk due to multiple exposures.

Summary of Human Health Risks

Noncarcinogenic hazards and carcinogenic risks for occupational workers, hypothetical future construction workers, adult resident, child resident, and nonresident adult recreational users were estimated for all relevant exposure pathways and COPCs. A summary of the results of the risk assessment is given below.

- The noncarcinogenic HIs for all current or future receptors were well below 1.0, indicating that no noncarcinogenic health effects are expected from exposures at OU-9, even with respect to sensitive individuals.
- The highest calculated ELCR for all likely current or future receptors was 6×10^{-6}. This was the RME estimate for both the adult resident and the nonresident recreational receptor. This risk was primarily a result of calculations based on assumptions of the consumption of fish containing PCBs. The highest average (most likely) risk estimate for these receptors was 2×10^{-7}. The RME risk estimates are well within (averages are below) the USEPA target risk range of 1×10^{-6} to 1×10^{-4} indicating that exposures at this site pose no unacceptable risks to human health.

- The highest calculated health risks for the hypothetical resident subsistence fisherman (considered to be a highly unlikely exposure scenario) were a HI of 0.6 (for the child) and a cancer risk of 6×10^{-5} (for the adult). These are below or within USEPA 's target risk ranges.

The results of the human health risk assessment show that there are no unacceptable health risks from exposures at OU-9

Qualitative Assessment of Exposures to Lead

Lead exposures were not addressed in the quantitative risk assessment because USEPA withdrew the RfD for lead in 1989, primarily due to the lack of a discernible threshold dose and the numerous sources of lead in the environment. Current USEPA guidance (USEPA, 1994b) recommends an interim soil lead concentration of 400 mg/kg for sites characterized as residential. The maximum lead concentration measured in sediment in OU-9 was 380 mg/kg. This concentration is well below the range recommended by USEPA for residential exposures; therefore, it is concluded that existing lead concentrations in sediment do not pose a threat to human health.

2.9.2 OU-9 Ecological Risk Assessment

The objective of the ecological risk assessment component of the BRA was to estimate the potential ecological risk associated with the exposure of identified receptor populations and communities to COPCs at OU-9. The ecological component of the BRA focused on potential risks due to exposure to site-related COPCs measured in surface water, sediment, and fish and estimated in benthos and other aquatic organisms to terrestrial and aquatic receptors under the baseline (i.e., no-action) scenario.
The scope of the ecological risk assessment includes:

- Identification of the chemicals of potential ecological concern and existing exposure pathways
- Identification of receptor species including any rare, threatened or endangered species or critical habitats which may be affected, estimation of the receptor's exposure to site contaminants

- Estimation of the ecological effects (i.e., toxicity) of the COPCs, quantitative and qualitative characterization of the nature and extent of ecological risk or threat

2.9.2.1 Ecological Habitat Review

OU-9 aquatic habitat was initially characterized in the Ecological Inventory (Geraghty and Miller, 1993b), which assessed the physical characteristics (i.e., water depths in OU-9, width of canal locations, sediment profiles), water quality parameters (dissolved oxygen, salinity, etc.), benthic macroinvertebrates, fish, amphibians, reptiles, birds, and mammals that may frequent OU-9. The vegetation for HAFB was detailed in the Ecological Inventory (Geraghty and Miller, 1993b) and in the Ecological Survey (Hilsenbeck 1993)

However, the scope of the OU-9 ecological risk assessment was limited to the aquatic and immediate shoreline habitats of OU-9 that involve riverine (i.e, major canals including Boundary Canal and Flightline Canal) and lacustrine (i.e., reservoir) communities.

<u>Vegetative Survey</u>

The vegetation in OU-9 is primarily milfoil and/or *Chara*. This vegetation forms a thick mat from the bottom that reaches several feet above the canal bottom. Attached green algae are found in some areas. The majority of the canal bottom is covered with vegetation when the canal depth is such that sunlight can penetrate to the canal floor. However, water depth in the lower reaches becomes a limiting factor for vegetative growth Some canal sections have barren areas, but these reaches are limited.

The bank vegetation is a mixture of vegetative types, from lawns to dense cane or forest growth. Several marshes comprised of cattails and other grasses are located adjacent to the canal system. Additionally, the Australian pine (*Casuarina equisetifolia*), which is an exotic species, was found along the canal.

Terrestrial Vertebrate Species

OU-9 is utilized by several terrestrial vertebrate species that take food directly from the canal and by others that are indirectly influenced by the canal. Piscivorous, insectivorous, and water birds were noted at former HAFB as listed below. Piscivorous birds feed directly from the canal. Insectivorous birds feed in the fields along the canal and in the air, and water birds feed on insects, vegetation, and some fish.

There are five special status bird species at the former HAFB. These are the great egret (*Casmerodius albus*), the little blue heron (*Egretta caerulea*), the snowy egret (*Egretta thula*), the tricolored heron (*Egretta tricolor*), and the yellow-crowned night heron (*Nyctanassa violacea*) The great egret and snowy egret were identified in specific locations in Hilsenbeck (1993). Little blue herons and tricolored herons were observed during field activities feeding in OU-9. The following table lists the birds observed during the field activities.

	Common Name	Scientific Name
Piscivorous Birds	Great blue herons	*Ardea Herodias*
	Great egrets	*Casmerodius albus*
	Snowy egrets	*Egretta thula*
	Little blue herons	*Egretta caerulea*
	Belted Kingfishers	*Ceryle alcyon*
	Black-Crowned night herons	*Nicticorax nicticorax*
	Louisiana herons	*Egretta tricolor*
	Green heron	*Botirus stratus*
	Ospreys	*Pandion haliaetus*
Water Birds:	Coot	*Fulica americana*
	Moorhen	*Gallinula chloropus*
Insectivorous Birds:	Cattle egrets	*Butorides ibis*
	Nighthawks	*Chlordeiles minor*
	Swifts	*Chaetura* sp

Additionally, the raccoon (*Procyon lotor*) favors the habitats found along OU-9. While some evidence of raccoon activity was present, a large population of raccoons did not seem to be present in the area

Benthic Macroinvertebrates

Benthic macroinvertebrates sediment samples were collected from 12 designated locations to evaluate benthic macroinvertebrates populations. The results indicated a

diverse, rich benthic community. Rare, threatened, or endangered benthic species have not been identified in the Boundary Canal system.

Aquatic Vertebrate Species

The canal system at HAFB is home to many species of fish, both fresh and saltwater. The following fish were observed during sampling activities:

Common Name	Scientific Name
Florida gar	*Lepisosteus platyrhincus*
Gizzard shad	*Corosoma cepedianum*
Walking catfish	*Clarias batrachus*
Sailfin catfish	*Pterygoplichthys multiradiatus*
Mosquitofish	*Gambusia* sp
Sailfin molly	*Poecilia latipinna*
Bluegill	*Lepomis macrochirus*
Largemouth bass	*Micropterus salmoides*
Oscar	*Astronotus ocellatus*
Midas cichlid	*Chchlasoma citrinellum*
Spotted tilapia	*Tilapia mariae*

The most commonly seen reptiles in the OU-9 system are aquatic turtles. Several species of cooters, painted turtles and sliders (all *Chrysemys* sp.), the Florida soft-shell (*Apalone ferox*), and the American alligator (*Alligator mississippiensis*) were also observed.

Additional Species of Special Concern in the former HAFB Area

Several species that are listed as rare, threatened, or endangered by the State of Florida are present in the HAFB area. Some (including the American kestrel (*Falco spaverius*) and burrowing owl (*Athene cunicularia*)), while present, are not affected by OU-9, due to their food habits. One species of fish, the common snook, is listed by the State of Florida as a Species of Special Concern, and is one species that is abundant in the lower segment of the canals and the Stormwater Reservoir.

2.9.2.2 Selection of Chemicals of Potential Concern

The selection of chemicals of potential ecological concern utilized a five-phased screening process for each potential exposure medium (i.e., surface water, sediment, fish,

and related media) to focus the ecological risk assessment on the key COPCs to selected biota.

The five phases of the COPC screening process employed in this risk assessment were.

- Detection frequency: constituents detected in samples at less than 5 percent and that are not likely to contribute significantly to site risks were eliminated as COPCs.
- Essential nutrients: calcium, potassium, sodium, iron, and magnesium were eliminated as COPCs.
- The two times (2x) background rule (USEPA, 1994b) (applies to inorganic constituents only): if a maximum concentration of a constituent is below two times the background mean concentration (inorganic constituents), the constituent was eliminated as a COPC.
- Toxicity benchmarks: surface water and sediment 95 percent UCLs were compared to Federal and State of Florida screening criteria. Constituents whose concentrations were below screening levels in these media were eliminated as COPCs.
- Contaminants determined to be laboratory or field artifacts were eliminated as COPCs.

The COPCs identified for the ecological risk assessment were as follows:

Sediment	Surface Water	Fish (whole body)
4,4'-DDE	Mercury	4,4'-DDD
Aroclor 1260		4,4'-DDE
Benzo(a)anthracene		4,4'-DDT
Benzo(a)pyrene		o,p'-DDD
Benzo(b)fluoranthene		o,p'-DDE
Benzo(k)fluoranthene		Aroclor 1260
Chrysene		Benzene
Phenanthrene		beta-BHC
Pyrene		Bromodichloromethane
Antimony		Chloroform
Arsenic		Lindane
Cadmium		Methoxychlor
Mercury		Oxychlordane
Lead		Tetrachloroethene
Zinc		Toluene
		trans-Nonarochlor
		Trichloroethene
		Arsenic

Sediment	Surface Water	Fish (whole body)
		Barium
		Mercury
		Nickel
		Zinc

COPCs for shellfish and crayfish were assumed to be the same as the COPCs in sediment, and the COPCs for herpetiles were assumed to be the same as the COPCs in the fish.

2.9.2.3 Exposure Assessment

The main objective of the exposure assessment was to identify the potential receptor populations of concern and the complete exposure pathways to those receptors from COPC-contaminated media, and to estimate the magnitude of exposure (i.e., chemical intake) of the COPCs to the identified receptors. Outputs from the exposure assessment were used in association with toxicity assessment outputs, uncertainty evaluations, field observations, and professional judgment to estimate or characterize risk to key indicator species.

Habitats exposed to COPCs and receptors that frequent those habitats were the focus of the exposure assessment. Representatives from vegetative, benthic, fish, amphibian, reptilian, avian, and mammalian populations were evaluated in this risk assessment. In addition, an evaluation of rare, threatened, and endangered species that frequent potentially exposed habitats was performed.

Exposure Pathways

Complete exposure pathways to surface water and sediment were identified for aquatic vegetation, benthos, fish, amphibians, birds, mammals, and reptiles. Aquatic biota ingestion pathways were also complete for predatory representatives from fish, amphibian, bird, mammal, and reptile groups. These exposure pathways were evaluated in the risk assessment and are summarized as follows by medium:

Exposed Group (Receptor)	Exposure Medium
Aquatic vegetation	Surface water, sediment
Benthos	Surface water, sediment
Fish and amphibians	Surface water, sediment; aquatic biota
Birds	Surface water, sediment, aquatic biota
Mammals	Surface water; sediment, aquatic biota
Reptiles	Surface water, sediment; aquatic biota

Identification of Receptor Species

Several criteria were used for the selection of indicator species for the ecological risk assessment. These criteria, as outlined in the Wildlife Exposure Factors Handbook (USEPA 1993a), include:

- Exposure potential (e.g., abundance, habitat preference, diet, foraging strategy)
- Sensitivity (e g., egg shell thinning, reproductive effects, sentinels or sensitive indicators of ecological change in an ecosystem)
- Ecological significance (e.g., trophic position; rare, threatened, or endangered species)
- Societal value (e.g., recreational/commercial value)
- Availability of information (e.g., published data on natural history, toxicology information which permits quantitative risk evaluation)

The selection of indicator species, while involving these selection criteria, was heavily influenced by the potential for unique exposures to the OU-9 aquatic habitat. In addition, quantitative assessment potential via ingestion pathways (i.e., availability of species-specific information on intake) was considered in the selection process as well as consideration of trophic guild representation. Taxonomic identification (e g., species name, phyla, etc.) and description of the indicator receptor species selected for risk assessment are shown as follows:

Taxonomic Identification	Description/Comments
1. *Plantae* (king)	Aquatic macrophytes (general)
2 *Hyalella azteca* (sp.)	Freshwater benthic amphipod (crustacean); toxicity test species
3. *Lumbriculidae* (fam)	Freshwater benthic annelid (oligochaete), toxicity test species
4. *Micropterus salmoides* (sp.)	Largemouth bass (representative bony fish); common to OU-9
5. *Alligator mississippiensis* (sp)	American alligator (aquatic reptile); species of special concern

	Taxonomic Identification	Description/Comments
6	*Megaceryle alcyon* (sp)	Belted kingfisher (piscivorous resident avian species); common to OU-9
7.	*Ardea herodias* (sp)	Great blue heron (representative heron species; common piscivorous migratory avian species)
8	*Pandion haliaetus* (sp.)	Osprey (piscivorous avian species); significant exposure potential
9	*Egretta tavia* (sp)	Snowy egret (representative egret species; species of special concern), common to OU-9
10	*Procyon lotor* (sp.)	Raccoon (resident mammalian species)

Quantification of Exposure

Quantification of indicator species exposure to COPCs involved selection of relevant exposure media and dietary preferences for each species, estimation of exposure point concentrations in each exposure medium, estimation of the chemical intake for each exposure pathway, and summing the intakes to estimate the magnitude of dietary exposures. Potential dietary intakes were subsequently compared with reference toxicity values obtained from the literature to characterize risk to those species for which intake was quantified.

Quantitative assessment of intake was determined for those species for which literature information for assessment of quantitative data was readily available and for those species for which meaningful comparisons of dietary exposure to reference toxicity values could be made. These species include:

- Snowy egret
- Osprey
- Belted kingfisher
- Great blue heron
- Raccoon

Potential Exposure Media for Specific Indicator Species

Potential exposure media, which were relevant to the OU-9 assessment, for COPC exposure to selected indicator species included surface water, sediment, fish, "herpetiles" (amphibians and small aquatic reptiles), and "shellfish/crayfish". The Potential Dietary

Exposures for the five quantitatively evaluated species were calculated using the following equation (USEPA 1993a):

$$PDE = [\sum P_1 x T_1 + P_2 x T_2 + P_n x T_n] x AUF x \frac{IR}{BW}$$

where:

PDE	=	Potential Dietary Exposure (mg/kg-bw/day)
P_n	=	Percent of forage/prey item in the diet
T	=	Tissue concentration or concentration in exposure medium 95 percent UCL of the arithmetic mean or equivalent (mg/kg); calculated by multiplying the concentration in an exposure medium by a bioaccumulation factor, or by using tissue data
AUF	=	Area Use Factor; calculated by dividing the usable portion of OU-9 (from receptor's perspective) by the receptor's normal foraging range (often assumed to be equivalent to home range)
IR	=	Ingestion Rate (kg/day)
BW	=	Body Weight (kg)

Exposure Point Concentrations

Exposure point concentrations for surface water and sediment were the 95 percent UCL of the arithmetic mean, assuming a lognormal distribution. Likewise, fish (i.e., largemouth bass) whole body 95 percent UCLs of the arithmetic mean (lognormal) were used for exposure point concentrations for each COPC. Bioconcentration values specified to either bass or bluegill were obtained from the AQUIRE database and/or the USEPA water quality criteria document (W-C, 1995). The "herpetile" exposure medium exposure point concentrations used the same value that applied to fish medium.

However, direct analytical data for the shellfish/crayfish exposure medium were not available for the site. Therefore, exposure point concentrations in shellfish/crayfish were estimated by modeling potential uptake of COPCs from the sediment. This bio-uptake modeling was based on the 95 percent UCLs for the OU-9 sediment. For metals, exposure point concentrations in shellfish/crayfish were estimated using the following equations (USEPA 1993b):

$$\frac{95\%\ \text{UCL in sediment (mg/kg)}}{K_p(\text{L/kg})} = \text{Pore water concentration (mg/L)}$$

$$\text{Pore water concentration (mg/L)} * \text{BCF (L/kg)} = \text{Crayfish/shellfish concentration (mg/L)}$$

where:

K_p = Water/sediment partition coefficient

BCF = Bioconcentration factor (from literature)

Bioconcentration values were obtained from the AQUIRE database and/or the USEPA water quality criteria document (WWC, 1995).

2.9.2.4 Toxicity Assessment

The toxicity of COPCs to the identified indicator species was assessed in the ecological risk assessment by the following methods:

- Direct measurement or testing (i.e., sediment toxicity testing, benthic macroinvertebrate analyses)
- Comparison of media concentrations to published toxicity screening benchmarks such as surface water quality criteria (SWQC)
- Comparison of potential dietary intakes of selected receptors to reference toxicity values (RTVs) obtained from the literature
- Qualitative assessment including field observations.

The toxicity assessment focused on ecological endpoints that were expressions of potential chronic toxicity including effects on growth and reproduction that are ultimately related to the diversity, abundance and general well-being of populations and communities within OU-9. The toxicity assessment examined the potential impact of COPCs to vegetation, benthos, fish, amphibians and aquatic reptiles, birds, and mammals following the ecological endpoint evaluation process.

Sediment Toxicology Test Results

Lethality Results

Hyalella azteca. No statistically significant differences regarding survival between the control groups and the test groups exposed to the OU-9 and reference sediments were noted with the *H. azteca*. Mortality did not exceed 50 percent when corrected for the background control mortality and as such, sediment Lethal Concentration (LC_{50})'s could not be calculated. Therefore, the no-observed-effect concentration based on survival for all of the sediments tested was 100 percent.

Lumbriculus variegatus. Control survival was in certain samples greater than 100 percent, suggesting reproduction was occurring in the control sediments. Four sediment samples elicited a toxic response in the test organisms at a level at which an LC_{50} could be calculated. The resultant LC_{50}'s ranged from 63.7 to 45.7 percent for OU-9 sediments. Two of the samples, which elicited the toxic response, were collected from the background locations in Mowry Canal. *L. variegatus* was notably more sensitive to the OU-9 and reference sediments than *H. azteca*.

Sublethal Results

For the *H azteca*, there were no sediment samples that produced a statistically significant decrease in dry body weight compared to controls. For the *L variegatus*, four samples produced a statistically significant reduction in the dry body weight of the worms exposed to them. The reductions in dry body weight for *L. variegatus* exposed to two of the sediment samples were judged not related to the exposure concentrations due potentially to an interaction between the test sediments and dilution sediment during the test.

Benthic Macroinvertebrate Results

Benthic macroinvertebrates were sampled at 12 locations and analyzed statistically. Based on the field observations that reported the presence of excess aquatic plants, *Chara* beds and the benthic fauna most often dominated by low-DO-tolerant species, plant

growth is probably controlling the diurnal water quality at most locations. Based on taxa and numbers of organisms present at each sampled location, toxicity due to COPCs at each location is probably not a limiting factor to the benthic ecology in OU-9. This point is further demonstrated by the Sigtree and cluster results that showed a lack of significant association between the reference and potentially impacted locations. In addition, the canals have vertical sides, which provide no littoral zone; therefore, the benthic community is limited to species that do not require a littoral habitat. That is physical characteristics of the canals, rather than contamination, are the factors that control the benthic macroinvertebrate communities in OU-9.

Fish Sampling Results: Condition Factors

Condition factors which measure the general "well-being" or health of fish were calculated for the fish collected at HAFB The condition factors were within the expected range for largemouth bass. A normal condition factor for an "average" fish (body shape like a rainbow trout) is 1.0. Additionally, all fish collected for analysis appeared robust, healthy, and free of any visually apparent diseases, and fish collected from reference areas and the Boundary Canal exhibited very similar condition factors.

2.9.2.5 Risk Characterization

Risk characterization combines the outputs of the exposure and toxicity assessments to develop quantitative estimates of risks associated with assumed exposures to COPCs.

Vegetation

Potential risk impacts to vegetative communities associated with OU-9 at HAFB were assessed based on field observations and a review of the COPC-specific toxicity values obtained from the literature. Reports by Hilsenbeck (1993) and more recent field observations in December 1993 by W-C biologists revealed that impacts to vegetation are likely due to physical anthropogenic stress instead of being COPC-related.

This observation is further supported by literature surveys on COPCs. Comparing measured media concentrations of COPCs in surface water to reported toxic concentrations indicated that OU-9 concentrations of COPCs were well below concentrations considered toxic to plants.

Benthos

Risk characterization to benthic organisms was performed by comparison of the 95 percent UCLs of mean chemical concentrations in sediment to literature screening values, and by performing site-specific toxicology tests and benthic macroinvertebrate sampling. Preliminary screening of candidate COPC 95 percent UCLs in sediment produced a COPC list in sediment for those constituents that did not "pass" screening comparisons to USEPA Region 4 screening levels or calculated values. However, results from the sediment toxicology tests and benthic macroinvertebrate analysis indicated that the presence of COPCs in OU-9 were not having a significant toxicological effect on the benthos. In general, the results of the toxicity tests with *L. variegatus* and *H. azteca* indicated very low or no toxicity to OU-9 sediments, especially in comparison to the reference sediments.

Fish and Herpetiles

Risk characterization to fish and herpetiles was performed by the following steps.

- Comparison of surface water 95 percent UCLs of candidate COPCs to published SWQC for the protection of aquatic life (chronic)
- Comparison of estimated condition factors of largemouth bass (e g , the "surrogate fish species") between potentially impacted locations and reference areas
- Evaluating potential effects of detected tissue concentrations in fish

The risk characterization of fish and herpetiles showed that impacts to these groups due to exposure to OU-9 media are expected to be low or nonexistent. Although direct impact to herpetiles was not assessed, the literature indicates that comparative COPC toxicity to both fish and herpetiles, especially amphibians are expected to be of similar magnitude. These results (i.e., low toxicity or low impact) were supported by field

observations that indicate highly diversified and rich fish and herpetile populations in OU-9.

Additionally, marine species have limited access to the Boundary Canal system due to the canal structure at the Stormwater Reservoir that keeps aquatic species from entering the Boundary Canal. While some fish may be pumped from the Boundary Canal to the Outfall, Canal, there is no mechanism for marine fish to migrate upstream through the pumps into the Boundary Canal System. Therefore, any potential impact to aquatic marine species in OU-9 could not occur.

Birds and Mammals

Risk characterization of avian and mammalian receptors were performed quantitatively using the HQ method. Reference toxicity values for each COPC were selected from the literature and were based primarily on reproductive endpoints. Species-specific dietary intakes were computed for each COPC and compared to the respective reference toxicity value to produce a HQ. All HQs calculated for each receptor (belted kingfisher, great blue heron, snowy egret, osprey, and raccoon) and each COPC were below 1.0, which indicated that the adverse effects are not expected for the individual species evaluated Further, adverse effects on populations of birds and mammals due to exposure to OU-9 media are not expected. This expectation is strengthened by the fact that reference toxicity values are based on individual toxicity endpoints and were conservatively selected so that risk or potential threat to the indicator species would not be underestimated.

American Alligator

The American alligator is a federally regulated species whose presence has been documented at several OU-9 locations. Therefore, individual risk characterization of this species was warranted. Quantitative information on toxicity of COPCs to the alligator is sparse or nonexistent. Therefore, quantitative assessment of risk could only be inferred by significant extrapolation with considerable uncertainty.

Risk characterization for the American alligator was based on field observations on the apparent reproductive success and general well-being of this species in OU-9. The alligator populations are thriving in OU-9 as evidenced by their widespread presence throughout OU-9 and the indication of the presence of successful breeding populations within OU-9. Therefore, from a strictly qualitative standpoint, exposure to OU-9 media, even over the course of significant time periods does not seem to have resulted in adverse effects to this species.

Summary of the Ecological Risk Assessment

The ecological risk assessment consists of an evaluation of analytical data, sediment toxicity test, benthic macroinvertebrate analyses, fish body burden evaluations, and potential impacts via uptake of contaminants through the food chain. Based on the results of the multiple tests conducted in the risk assessment, there is no evidence of significant ecological impacts in OU-9.

2.10 OU-11 HUMAN HEALTH RISK ASSESSMENT

In general, the analytical results for surface water do not indicate significant or otherwise adverse impact to the Military Canal as a result of past operations at OU-11 Sediment analytical results indicate the presence of VOCs, PAHs, pesticides, and metals.

Historically, the migration of sediments into the Military Canal existed via discharge from the wastewater treatment plant Samples collected at Military Canal indicate that surface water, sediment, and fish tissue contain VOCs, BNAs, and concentrations of metals. The full results and methodology of the risk assessment for OU-11 is presented in the OU-11 RI/BRA (Montgomery Watson, Inc. 1998a)

2.10.1 OU-11 Screening Criteria Selection

The following sections present the analysis of the site data and screening criteria selection to determine which detected chemicals present at OU-11 are responsible for potential risks at the site. The compounds which pass each screening criteria were

designated as COPCs in the Risk Assessment. The selection of COPCs allowed the Risk Assessment to focus on a manageable list of the most important chemicals, which in turn permits concise analysis and presentation of information collected during the risk assessment.

2.10.1.1 Human Health Screening Criteria Selection

The process of selecting the COPCs involves four criteria. The first criterion involves determining whether a chemical is present within its range of natural background concentrations. Inorganics present at less than twice background levels were not selected as COPCs.

The second criterion is whether the maximum concentration of a chemical exceeds a risk-based benchmark. USEPA Region IX Preliminary Remediation Goals (PRGs) are utilized as the benchmark. Chemicals present at concentrations less than the appropriate risk-based benchmark is not selected as COPCs. In accordance with USEPA Region IV guidance, carcinogens are not considered COPCs unless they are present at concentrations greater than the appropriate Region IX PRG, and non-carcinogens are not considered COPCs unless present at concentrations greater than one-tenth the appropriate PRG.

The third criterion is whether a chemical is an essential human nutrient that is only toxic at very high doses (i.e., at doses that are both much higher than beneficial levels and much higher than could be associated with contact at the site). Chemicals typically considered under this criterion include calcium, magnesium, potassium, and sodium.

The fourth criterion is to determine frequency of detection in a given medium When chemicals are detected in less than five percent of the site samples for a given medium, they were not selected as COPCs. This criterion is only used when at least 20 site samples had been collected for a particular medium

2.10.1.2 Human Health Risk Assessment Results

Potential current and hypothetical future risks at the site were evaluated for the following exposure scenarios: surface water exposure for an occupational worker, surface water and sediment exposure for a construction worker, surface water and fish exposure for an adult and child resident, surface water and fish exposure for an adult recreational fisherman, and surface water and fish exposure for an adult and child subsistence fisherman.

Physical access to the sediments in the canal is very limited due to the steep banks, levees, and deep water. Therefore, direct contact with canal sediment contamination by people fishing is unlikely. These conditions also preclude the possibility of persons swimming and wading in the canal However, people have frequently been observed fishing from the canal banks and bridges. Thus, for the purposes of the human health risk assessment, the risks via fishing in the Military Canal were quantitatively assessed.

Current and probable future risks for an occupational worker exposed to surface water at the site are below the USEPA remediation-based benchmarks (ELCR within the range of 10^{-4} to 10^{-6}; HI less than or equal to 1) and the FDEP benchmark of 10^{-6}. The calculated ELCR and HI for a worker who accesses the site for work activities are 2E-08 and 0.003, respectively, (Table 2-7).

Hypothetical future risk for construction workers exposure to surface water and sediment is below the USEPA remediation-based cancer risk benchmark range of 10^{-4} to 10^{-6}, and below the FDEP benchmark of 10^{-6}. The hazard indices for construction worker exposure to surface water and sediment are less than the USEPA noncarcinogenic benchmark of 1.0. The cancer risk estimate is 6E-08 and the HI is 0.2 (Table 2-8).

The ELCR (2E-06) for an adult resident exposed to surface water and fish from the canal is within the USEPA remediation-based risk benchmark and slightly above the FDEP benchmark of 1E-06. The HI for an adult resident exposure to surface water and fish (0.1) is also below the USEPA and FDEP benchmark of 1.0 (Table 2-9).

The ELCR (5E-07) for a child resident exposed to surface water and fish from the canal is below the USEPA and FDEP benchmarks The HI for a child resident exposure to surface water and fish (0.2) is also below the USEPA and FDEP benchmark of 1.0 (Table 2-10).

The cancer and noncancer risk estimates for an adult recreational fisherman are 2E-06 and 0 1, respectively. These risk estimates are below the USEPA and only slightly above the FDEP remediation-based risk benchmarks for carcinogens. The HI is also below the USEPA and FDEP benchmark of 1.0 (Table 2-11).

The ELCR for an adult and child subsistence fisherman are 1E-05 and 4E-06, respectively (Table 2-12 and 2-13). These risk estimates are within the USEPA and above the FDEP benchmarks for carcinogens The Hazard Indices for both the adult (0.8) and the child (1.0) are at or below the USEPA and FDEP benchmark of 1.0 (Tables 2-12 and 2-13).

Please refer to the OU-11 Remedial Investigation and Baseline Risk Assessment, (MWH, 2001) for more detailed discussion of the risk assessment process and calculations for OU-11. A Summary Table of Hazard Indices and Cancer Risks For all Scenarios is presented in the following table:

Scenario	Cancer Effects	Hazard Index
Surface Water Exposure for Occupational Worker	2E-08	0.003
Surface Water and Sediment Exposure for Construction Worker	6E-08	0.2
Surface Water and Fish Exposure for Adult Resident	2E-06	0.1
Surface Water and Fish Exposure for Child Resident	5E-07	0.2
Surface Water and Fish Exposure for Adult Recreational Fisherman	2E-06	0 1
Surface Water and Fish Exposure for Adult Subsistence Fisherman	1E-05	0.8
Surface Water and Fish Exposure for Child Subsistence Fisherman	4E-06	1.0

Note: All risk estimates are rounded to one significant figure.

2.10.2 OU-11 Ecological Risk Assessment

A SERA was performed to evaluate the potential for risk to sensitive receptors as a result of past operations at the former HAFB. This is the first step in the USEPA Process for Designing and Conducting Ecological Risk Assessments (USEPA, 1997) for HAFB. The SERA evaluated a compilation of analytical surface water and sediment data collected during previous investigations of the Military Canal and Boundary Canal (OU-11/OU-9), respectively (Montgomery Watson, 1999).

A Technical Advisory Group (TAG) was formed prior to beginning the SERA. The TAG membership consists of representatives of the USEPA, FDEP, DERM, Air Force, including AFCEE, National Park Service, and Montgomery Watson. One purpose of the TAG was to determine which of the data sets from previous investigations of OU-11/OU-9 to include in a database. The OU-11/OU-9 Ecological Risk Assessment database was then used to determine the maximum surface water and sediment concentrations of each detected analyte and the maximum reporting limit for the analytes not detected.

The other function of the TAG was to provide the screening values used in determining ecological risk. The TAG agreed that the most conservative screening values would be used in screening level risk calculations to ensure that potential ecological threats were not overlooked. If a detected analyte had a calculated hazard quotient (HQ) greater than 1, it was retained as a COPC. Compounds that did not have threshold values or criteria available were considered to be COPCs by default Also, compounds that were not detected, but for which the analytical quantitation limit was higher than the applicable criteria, were considered COPCs for the screening level assessment.

Potential receptors in Military Canal were identified from reports of previous investigations, regional inventories, and from direct observation during field visits. The following list presents potential receptors and is not intended as a categorical or comprehensive listing of resident species.

Common Name	Genus and Species	Source
Freshwater Fish		
Armored catfish	*Pterygoplichthys multiradiatus*	WC
Walking catfish	*Clarius batrachus*	WC
Largemouth bass	*Micropterus salmoides*	Obs.
Alligator gar	*Lepisosteus spatula*	
Benthic Invertebrates		
Pink Shrimp	*Penaeus durarum*	DERM
Spiny Lobster	*Panulirus argus*	DERM
Marine Fish		
Mangrove rivulus	*Rivulus marmoratus*	FNAI
Mangrove gambusia	*Gambusia rhizophorae*	FNAI
Mullet	*Mugil cephalus*	
Common snook	*Centropomis unidecimalis*	FNAI
Mammals		
Southern mink	*Mustela vison*	FNAI
Round-tailed muskrat	*Neofiber alleni*	FNAI
West Indian Manatee	*Trichechus manatus*	DERM
Birds		
Great egret	*Ardea alba*	FNAI
Yellow-crowned night heron	*Nyctanassa violacea*	USEPA
Little blue heron	*Egretta caerulea*	Obs.
Osprey	*Pandion haliaetus*	Obs
Amphibians		
Gopher frog	*Rana capito*	FNAI
Reptiles		
American alligator	*Alligator mississippiensis*	Obs.
American crocodile	*Crocodylus acutus*	DERM
Spiny softshell turtle	*Trionyx spiniferus*	FNAI

Notes:

WC: Woodward-Clyde Supplemental Outfall Canal Investigation, 1996

Obs. Direct observation noted during site visit February 1999.

FNAI: Florida Natural Areas Inventory, December 1997

DERM: Miami-Dade Environmental Resources Management, July 1999

This information was then incorporated into a conceptual site model to identify potential migration and exposure pathways for the ecological receptors

2.10.2.1 Sediment Screening and Results

For those compounds that were detected and had screening values, all of the HQs calculated exceeded 1. Therefore, all of these compounds were kept for further analysis. The compounds detected that did not have screening values available were also retained. Based on these results, none of the compounds detected in the sediment samples were eliminated from further evaluation Lists of recently and not recently detected compounds for sediments, the maximum detected concentration, the screening value, and the HQ are presented in Tables 2-14 and 2-15. If multiple sampling events have occurred, only the most recently collected analytical results were used and characterized as "Recent" data. No sediment screening values were available for the non-detect chemicals, however they were also retained for further analysis.

2.10.2.2 Surface Water Screening and Results

Some compounds detected in surface water samples had hazard quotients less then 1 when they were compared to freshwater screening values. These compounds were eliminated from further investigation. The analytes that were retained for additional analysis were bis(2-ethylhexyl)phthalate, phenanthrene, 4,4'-DDD, heptachlor, barium, beryllium, cadmium, lead, and mercury. Those analytes without screening values were also retained for further evaluation. Tables 2-16 and 2-17 present lists of recently and not recently detected surface water analytes, the maximum detected concentration, the screening value, and the HQ If multiple sampling events have occurred, only the most recently collected analytical results were used and are characterized as Recent data. No surface water screening values were available for the non-detect chemicals; however these compounds were retained for further analysis. A comparative analysis of detects and non-detects of the single sample collected from the marine water station is provided in Appendix C.1 and C.2 of the SERA (Montgomery Watson, Inc., 1999).

2.10.2.3 Conclusions

To ensure that potential ecological threats were not overlooked, the screening level risk calculations performed for the SERA were conservative estimates. However, there are significant uncertainties with the process. The screening level HQ is intended to be used to document a decision by risk managers about whether or not there are potential ecological impacts. The SERA indicated that there is potential risk to sensitive receptors at the Military Canal and the Boundary Canal.

In summary, the SERA (Montgomery Watson, 1999) did not indicate significant impacts to surface water as a result of past operations at OU-11. However, the screening assessment did indicate potential for unacceptable risk to sensitive receptors in the Military Canal and ultimately, Biscayne National Park due to detected concentrations in the sediment. The RAOs for sediment are discussed in detail in Section 2.11.2.1 of this ROD.

2.11 DISCUSSION OF REMEDIAL ACTION OBJECTIVES

This section discussed RAOs for both OU-9 and OU-11.

2.11.1 OU-9 Remedial Action Objectives

A No Remedial Action response was selected for OU-9 based on the extensive evaluation of the data collected during the RI.

2.11.1.1 Basis and Rational for OU-9 Remedial Action Objectives

A detailed analysis of the potential for sediment transport showed that any significant movement of sediment via the Boundary Canal into the Stormwater Reservoir is unlikely, and an evaluation of the results of the BRA determined that the sediment and surface water in the Boundary Canal do not pose an unacceptable risk to human health or the environment. As part of the No Remedial Action alternative, the Military Canal, will be removed from consideration as part of OU-9 and will be further evaluated as part of the

aquatic portion of OU-11. The removal of the Military Canal has been requested by the BCT in consideration of the property transfer and public concerns

Potential sources which discharge contaminants to the Boundary Canal surface water and sediment will be assessed and monitored in conjunction with respective site investigations. Sources of contamination potentially impacting the Boundary Canal identified in the future may also be subject to monitoring. For sites outside of the cantonment area, monitoring of the canals will be conducted until the property transfer to Dade County is completed, and for sites inside of the cantonment area, monitoring of the canals will be conducted until a comprehensive stormwater management plan is approved.

2.11.1.2 How OU-9 Remedial Action Objectives Address Risk

An evaluation of the results of the BRA determined that the sediment and surface water in the Boundary Canal do not pose an unacceptable risk to human health or the environment.

2.11.2 OU-11 Discussion of Remedial Action Objectives

RAOs are specific goals for protecting human health and the environment for each of the media of concern. Specific RAOs were developed while considering the long-term goals of protecting human health and the environment, reducing exposure to contaminants, and achieving compliance with ARARs where possible.

2.11.2.1 OU-11 Sediment Remedial Action Objectives

The RAOs for sediment at OU-11 are as follows:

1. Minimize the transport of sediment being discharged into Biscayne Bay
2. Minimize the potential for ecological risk.
3. Minimize the potential exposure pathways between ecological receptors and contaminated sediments in the Military Canal.

2.11.2.2 Considerations

In addition to the specific RAOs for the media of concern and pursuant to the USEPA Remedial Investigation Feasibility Study (RI/FS) guidance (USEPA, 1988), the following considerations should be satisfied, to the extent possible, for specific proposed remedial action alternatives:

- Reduce the potential exposure of COPCs to sensitive ecological receptors after remedial action construction activities.
- Control and reduce sediment resuspension during construction activity.
- Control and reduce the potential airborne particulates during and after remedial action construction activities.

2.11.2.3 Basis and Rationale

The process for developing RAOs for the former HAFB site included:

- A review of federal and state environmental regulations and standards to help refine remediation criteria that address human health and environmental risks posed by site contamination.
- Calculation of PRGs for contaminants and media of interest where established regulations and standards do not exist or where site-specific, risk-related factors should be considered to protect human health or the environment.

2.11.2.4 How OU-11 Remedial Action Objectives Address Risk

The RAOs listed above are consistent with the goals of the BCT and the USEPA to protect human health and the environment for all contaminated media to the target risk levels of:

- ELCR of 1 x 10-4 to 1 x 10-6 for carcinogens
- HI equal to or less than 1 for noncarcinogens

The remedial action will minimize future transport of sediment from OU-9 (Boundary Canal) to OU-11 and eliminate exposure by human and ecological receptors to contaminated sediments in the Military Canal.

2.12 DESCRIPTION OF OU-11 ALTERNATIVES

This section presents a brief explanation of the remedial alternatives for the site. A broad range of remedial technologies was initially developed for sediment remediation. The technologies were further screened based on effectiveness, technical implementability, and cost. The outcome of this screening process resulted in technologies to be carried forward in the detailed screening and are present in Table 2-18.

In the FFS, the list of remedial technologies was narrowed to a list of potential alternatives that were evaluated in the detailed analysis. The remedial action alternatives that remained included portions or all of the process options that remain following the screening process options. A description of each alternative considered in the detailed analysis is provided in the following discussion. Following the description of all alternatives evaluated for the site, by media, the results of the detailed analysis are summarized with the recommendation for the preferred alternative. Three remedial action alternatives were assembled for sediment including:

- Alternative 1 – No Action (required by NCP)
- Alternative 2 – Sediment Transport Control Structure, support of DERMs Pilot Wetland Project, and dredging the entire Military Canal.
- Alternative 3 – Sediment Transport Control Structure, support of DERMs Pilot Wetland Project and Encapsulating the Entire Military Canal.

These remedial action alternatives were assembled and included due to their ability to satisfy the remedial action objectives presented in Section 2.11.2. The no action alternative (Alternative 1) was included as a requirement of the NCP. Alternatives 2 and 3 include a portion of stormwater discharge to enter the DERM Constructed Wetland Project. These two action alternatives were agreed upon by the USEPA, FDEP, DERM, and USAF as the best alternatives to evaluate that would meet the RAOs.

These treatment technologies entail sediment encapsulation, minimization of sediment transport and diversion of flow into a constructed wetland. The principal containment component of the remedy is encapsulation by a concrete filled fabric This encapsulation will address the low concentration contaminated sediment within the bottom of the Military Canal. The remedy does not include institutional controls. There is no property transfer at the site. The easement for the Military Canal will be retained by the USAF (Air Force Reserve Command). The lead agency responsible for implementation of the remedy is the USAF. The Operations and Maintenance of the encapsulation system is negligible since the encapsulation materials have a life expectancy of over 50 years and it is expected that the Military Canal will be filled in before that time.

2.13 DETAILED DESCRIPTION OF OU-11 ALTERNATIVES

2.13.1 Alternative 1: No Further Action

2.13.1.1 Description of Alternative

Alternative 1 consists of performing no remedial action for OU-11. This alternative is the baseline condition assuming that no further remedial measures would be implemented at OU-11. This alternative is required to be carried forward to the detailed analysis by the NCP.

2.13.1.2 Assessment of Alternative

Alternative 1 – No Action fails to meet the remedial action objectives. OU-11 will still pose a possible risk to the potential receptors and the contaminants of concern and the exposure pathways discussed in the BRA will remain unchanged.

A detailed discussion of Alternative 1 – No Action, with respect to each of the nine criteria, is presented in Table 2-19. In addition, Table 2-19 provides a summary of the detailed analysis of alternatives.

2.13.2 Alternative 2 – Sediment Transport Control Structure, Support DERMs Wetland Project and Dredge Entire OU-11 Canal

2.13.2.1 Description of Alternative

Alternative 2 consists of three parts: 1) Placing a sediment control structure in the reservoir before stormwater enters the Military Canal and redirecting flow into the reservoir from the northeast arm of the Boundary Canal, and 2) Removal of contaminated sediment from the Military Canal by hydraulic dredging. Part one will be implemented to eliminate potential future transport of contaminated sediment from into the Military Canal via surface water. Part two consists of removing contaminated sediment from the entire Military Canal thus reducing the potential for transport and exposure of contaminated sediment to the Bay. 3) In addition to the remedial actions, the Air Force will provide support for the DERM pilot wetland project planned for construction adjacent to the Military Canal. The support to Miami-Dade County consists of funding of the following activities, not to exceed $800,000:

1. Installation of two 80 cubic feet per second (cfs) submersible electric axial flow pumps with control panel.
2. Provide required power services to the site for operation of the pump system.
3. Construct well housing and install pump.
4. Install intake box with manatee exclusion grate/trash rack.
5. Install two intake culverts.
6. Install two discharge culverts with stabilized headwall.
7. Construct a fill pad for pump station.
8. Construct culverts connecting the Pilot Project with the L31E Canal.

Other components of Alternative 2 included the following:

- Performing remedial design activities including preparation of a Design Report, Quality Assurance Project Plan, Site-Specific Safety and Health Plan, and Contractor Quality Control Plan, as required.

- Eliminating the potential exposure pathway from the former Sewage Treatment Plant to the Military Canal.

- Installing temporary sediment controls around the removal area during dredging activities at OU-11.

- Performing health and safety monitoring requirements during construction activities of the workers.
- Constructing a debris staging area to stockpile debris from the canal.
- Removing debris from the canal prior to dredging. Debris will be disposed at a RCRA Subtitle D disposal facility.
- Constructing a temporary sediment spoil area near OU-11 for dredged and dewatered sediment from OU-11.
- Constructing the sediment control structure in the reservoir to reduce transport of contaminated sediment from OU-9 and the reservoir to OU-11.
- Redirect flow into the reservoir from the northeast arm of the Boundary Canal.
- Installation of a liner in the scour area between the pump intakes and the sediment control structure.
- Dredging contaminated sediment from the entire Military Canal. Sediment will be loaded onto dump trucks from the stockpile spoil area and disposed at a RCRA Subtitle D landfill.
- Installing temporary silt curtains in the canals during construction activities to minimize downstream transport of resuspended sediment.
- Providing treatment to water from dewatering operations prior to returning it to the Bay.
- Monitoring turbidity during dredging activities at the downgradient end of the Canal, prior to discharge to the Bay.
- Sampling water before discharging back into the canal.
- Sampling of sediment prior to disposal.
- Removing temporary spoil areas for OU-11.
- Performing confirmatory sampling of spoil areas.

2.13.2.2 Assessment of Alternative

Alternative 2 – Dredging Entire OU-11 Canal, and Sediment Control Structure at Base Reservoir satisfies the remedial action objectives. Dredging the entire Military Canal will be protective of human health and the environment in the long-term by removing the contaminated sediment. The sediment control structure will greatly reduce the transport of contaminated sediment into the Military Canal. Redirecting the flow into the reservoir from the northeast arm of the Boundary Canal will enhance the settling capacity of the wet detention system, by redirecting it further away from the pump intakes. These preventative and remedial activities will reduce the transport of contaminated sediment to as near zero discharge to Biscayne Bay as deemed possible by this remedial activity Hydraulic dredging can remove approximately 60 to 90 percent of the contaminated sediment.

The limited effectiveness of this alternative due to resuspension of sediment during dredging and possible future erosion of the potential 10 to 40 percent of the existing sediment remaining after dredging. The sediment entrained in the water during dredging activities will be controlled by sediment control measures, i.e. silt curtains. Short-term effects during construction will be mitigated by using engineering controls, personal protective equipment, and performing dredging activities during Florida's dry season. It is anticipated the Military Canal will be backfilled in the next 10 to 20 years as part of the Comprehensive Everglades Restoration Program (CERP) (April 1999). Therefore, sediment not removed by dredging will be permanently buried posing no risk.

A detailed discussion of Alternative 2 with respect to each of the nine criteria is presented in Table 2-19. In addition, Table 2-19 provides a summary of the detailed analysis of alternatives.

2.13.3 Alternative 3 – Sediment Transport Control Structure, Support of DERMs Pilot Wetland Project, and Encapsulating the Entire OU-11 Canal

2.13.3.1 Description of Alternative

Alternative 3 consists of three parts:

1) Placing a sediment control structure in the reservoir before stormwater enters the Military Canal and redirecting flow into the reservoir from the northeast arm of the Boundary Canal.

2) Encapsulation of contaminated sediment in the Military Canal. Part one will be implemented to eliminate future transport of contaminated sediment into the Military Canal via surface water. Part two consist of encapsulating the contaminated sediment to prevent it from migrating to BNP and protecting the marine and fresh water environment from potential ecological risks.

3) In addition to the remedial actions, the USAF proposes to support a DERM pilot wetland project planned for construction adjacent to the Military Canal. The support to Miami-Dade County consists of funding of the following activities, not to exceed $800,000:

1. Installation of two 80 cubic feet per second (cfs) submersible electric axial flow pumps with control panel.
2. Provide required power services to the site for operation of the pump system.
3. Construct well housing and install pump.
4. Install intake box with manatee exclusion grate/trash rack.
5. Install two intake culverts.
6. Install two discharge culverts with stabilized headwall.
7. Construct a fill pad for pump station.
8. Construct culverts connecting the Pilot Project with the L31E Canal.

Alternative 3 consisted of the following:

- Performing remedial design activities including preparation of a Design Report, Quality Assurance Project Plan, Site-Specific Safety and Health Plan, and Contractor Quality Control Plan.

- Eliminating the potential exposure pathway from the former Sewage Treatment Plant to the Military Canal.

- Performing health and safety monitoring requirements during construction activities of the workers.

- Removing debris from the entire Military Canal prior to dredging or encapsulation, as necessary. Debris will be disposed at a RCRA Subtitle D disposal facility.

- Constructing a debris staging area to stockpile debris from the canal.

- Constructing the sediment control structure in the reservoir to reduce transport of contaminated sediment from OU-9 and the reservoir to OU-11.

- Redirect flow into the reservoir from the northeast arm of the Boundary Canal

- Installation of a liner in the scour area between the pump intakes and the sediment control structure.

- Installing temporary silt curtains in the canals during construction activities to minimize downstream transport of resuspended sediment.

- Monitoring turbidity during construction activities at the downgradient end of the canal, prior to discharge to the Bay.

- Installing a non-woven geotextile liner over the contaminated sediments in the Military Canal. This will be used as an underlayment for the fabric formed concrete liner that will be placed on top of the geotextile.

- Installing a 3-inch Uniform Section Lining with 2,000 psi grout injected into the liner until it is pumped to its full thickness.

2.13.3.2 Assessment of Alternative

Alternative 3 – OU-9 Sediment Transport Control Structure, support of the DERM Pilot Wetland, and encapsulate contaminated sediment in the entire OU-11 Canal satisfies the

remedial action objectives. Encapsulating the contaminated sediment in the entire Military Canal will be protective of human health and the environment in the long-term by limiting exposure and migration of the contaminated sediment. The sediment control structure will greatly reduce the transport of contaminated sediment into the Military Canal. Redirecting the flow into the reservoir from the northeast arm of the Boundary Canal will enhance the settling capacity of the wet detention system, by redirecting the flow further away from the pump intakes. These preventive and remedial activities will reduce the transport of contaminated sediment to as near zero discharge to Biscayne Bay as possible. Short-term effects during construction will be mitigated by using engineering controls, personal protective equipment, and performing encapsulation activities during Florida's dry season. It is anticipated the Military Canal will be backfilled in the next 10 to 20 years as part of the CERP (April 1999).

A detailed discussion of Alternative 3 with respect to each of the nine criteria is presented in Table 2-19. In addition, Table 2-19 provides a summary of the detailed analysis of alternatives.

2.14 SUMMARY OF OU-11 REMEDY

The FFS (Montgomery Watson, 2001) evaluated several remedial alternatives using the USEPA evaluation criteria. Based upon consideration of the requirements of CERCLA, the detailed evaluation of the alternatives and public comments, the USAF, in concurrence with the USEPA and the state of Florida, has determined that Alternative 3 – Sediment transport control structure, support of DERMs Pilot Wetland Project, and Encapsulating the Entire Military Canal is the most appropriate course of action for OU-11.

This alternative is protective of human health and the environment based on its ability to meet Remedial Action Objectives, short-term effectiveness, and compliance with ARARs. Alternative 3 is a containment process and not a treatment process; thus Alternative 3 reduces the mobility and toxicity of the contaminated sediments by encapsulation, but does not reduce volume. A sediment-monitoring program will be

implemented to monitor the effectiveness of the alternative. The O&M, if required for the remedy and performance monitoring approach, will be developed as part of the remedial design. After the 5-year monitoring period, USEPA, FDEP, and the USAF will evaluate the effectiveness of the remedy and the need for continued monitoring. The selected remedy has been accepted by the state and community concerns have been addressed in the Responsiveness Summary of this ROD.

2.14.1 Identification of Applicable or Relevant and Appropriate Requirements

ARARs are federal, state, and regional environmental and facility siting requirements with which a remedial action at a Superfund site must comply. The CERCLA of 1980 as amended by the SARA of 1986 (collectively, CERCLA), and the NCP require compliance with ARARs. Only those state requirements that are more stringent than federal ARARs and are legally enforceable and consistently enforced statewide may be ARARs.

Pursuant to Section 121(d) of CERCLA, the on-site portion of a remedial action selected for a Superfund site must comply with all ARARs. Off-site, all requirements legally applicable at the time the action is carried out must be met. In addition to ARARs, guidance and other nonpromulgated criteria can be considered in evaluating remedial alternatives. These nonpromulgated guidance or criteria are referred to as 'to-be-considered' (TBCs).

As part of the FFS process, remedial alternatives, including the no-action alternative, were evaluated to assess the degree to which they attain or exceed ARARs, including federal and state public health and environmental standards. ARAR identification continues throughout the RI/FS as a better understanding is gained of site conditions, site contaminants, exposure pathways, and remedial action alternatives. A preliminary identification and discussion of ARARs for OU 11 is presented below.

Cleanup standards for remedial actions must attain a general standard of cleanup that assures protection of human health and the environment, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, SARA requires that any hazardous substance or pollutant remaining on site meet the level or standard of control established by standards, requirements, criteria, or limitations that have been established under any federal environmental law, or any more stringent standards, requirements, criteria, or limitations promulgated in accordance with a state environmental statute.

A requirement may be applicable or relevant and appropriate to remedial activities at a site, but not necessarily both. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a site.

If a regulation is not applicable, it may still be relevant and appropriate. The basic considerations are whether the requirement (1) regulates or addresses problems or situations sufficiently similar to those encountered at the subject site (i.e., relevance), and (2) is appropriate to the circumstances of the release or threatened release, such that its use is well-suited to the particular site. Determining whether a requirement is relevant and appropriate is site-specific and must be based on best professional judgement. This judgement is based on a number of factors, including the characteristics of the remedial action, the hazardous substances present at the site and the physical circumstances of the site and of the release, as compared to the statutory or regulatory requirement. Compliance with all requirements found to be applicable or relevant and appropriate is mandatory under SARA unless a waiver is obtained from the USEPA.

To-be-considered (TBC) materials are nonpromulgated advisories, proposed rules, criteria, or guidance documents issued by federal or state governments that do not have the status of potential ARARs. However, these advisories and guidance are to be

considered when determining protective cleanup levels where no ARARs exist, or where ARARs are not sufficiently protective of human health and the environment In these circumstances, TBC values are used to establish cleanup targets.

The ARARs presented herein are chemical-specific, location-specific, and action-specific requirements. Although some action-specific requirements are presented, applicability of these ARARs can only be addressed once detailed remedial alternatives are developed for each location.

2.14.1.1 Chemical-Specific ARARs

Chemical-specific requirements are based on health- or RBC limits of discharge limitations in environmental media (i.e., water, soil) for specific hazardous chemicals. These requirements may be used to set cleanup levels for the chemicals of concern in the designated media, or to set a safe level of discharge (e.g., water, air, etc.) that may occur as part of the remedial activity.

Sources for potential target cleanup levels included selected standards, criteria, and guidelines that are typically considered as ARARs for remedial actions conducted under CERCLA, as well as some recently published guidance and proposed action levels provided by state and county agencies that are typically considered as TBCs. A summary of the chemical-specific ARARs is presented in Table 2-20. Each citation in Table 2-20 is described along with an explanation as to whether the citation is applicable or relevant and appropriate.

For groundwater, MCLs established under the Safe Drinking Water Act (SDWA) are often accepted by regulatory agencies as cleanup levels for groundwater remedial activities, especially if the groundwater is or could be a drinking water source. At former HAFB, shallow groundwater is not used now and is not likely to be used in the future as a drinking water source because of the problems associated with saltwater intrusion. Since the saltwater intrusion prohibits shallow groundwater from being used as a drinking water source, MCLs are not applicable as ARARs to shallow groundwater. For this reason,

attainment of MCLs within the shallow groundwater is not necessary to be protective of human health. Nonzero maximum contaminant level goals (MCLGs) are also established under the SDWA. However, MCLGs are not federally enforceable and should only be used if site-specific health risk conditions warrant their use.

Although the shallow aquifer (Biscayne Aquifer) at the former HAFB is not used and is not planned for use as a source of potable water due to salt water intrusion, groundwater in the vicinity of HAFB, specifically the Biscayne Aquifer, is classified as a sole source of drinking water (Class G-1). Therefore, the identification of potential target cleanup levels for groundwater at former HAFB includes standards, criteria and guidelines primarily for drinking water. These standards include MCLs and MCLGs, as well as the Florida drinking water standards. Also included are hazardous constituent concentration limits under RCRA Subpart F, which are applicable to releases from RCRA-regulated units.

State and federal standards and criteria for surface water quality are considered applicable or relevant and appropriate as long as there is the possibility of remedial activities impacting surface water bodies. The former HAFB canal system was considered as site surface waters. Should any remedial activities at former HAFB impact these surface waters, compliance with both state and federal surface water quality standards and criteria may be required. A summary of ARARs is presented in Table 2-20.

2.14.1.2 Location-Specific ARARs

Location-specific ARARs are restrictions placed on the types of activities that may occur in particular locations. The location of a site may be an important characteristic in determining its impact on human health and the environment; therefore, individual states may establish location-specific ARARs. These ARARs may restrict or preclude certain remedial actions or may apply only to certain portions of a site. Examples of location-specific ARARs include federal and state requirements for preservation of historic

landmarks, endangered species and wetlands protection, and the restrictions on management of hazardous waste in floodplain areas.

Potential location-specific ARARs for HAFB are presented in Table 2-20. Each citation in Table 2-20 is described along with an explanation as to whether the citation is applicable or relevant and appropriate. Although the universe of location-specific ARARs is identified in Table 2-20, only those regulations that are deemed ARARs for the Homestead site are discussed below.

Due to possible presence of both federal- and state-listed threatened/endangered (T/E) species at the site, the federal and state Endangered Species Act are both considered "potentially" applicable. If T/E species are found at the site, these acts would be applicable. In addition, the Migratory Bird Treaty Act is considered applicable if any migratory bird species (i.e., waterfowl) protected by this Act or their habitat is impacted by remedial actions.

The former HAFB does have waters at the southwest end of the runways that fall under the current definition of wetland areas under federal wetland delineation guidance. The federal regulations governing wetlands, however, are not considered ARARs as long as the project does not impact the wetland areas. If remedial activities impact these wetland areas southwest of the runway at HAFB, then the regulations concerning protection and preservation of wetlands will be considered applicable or relevant and appropriate and coordination with the U.S. Fish and Wildlife Service will need to be initiated prior to any remedial activity. The State of Florida also has its own wetlands regulations, and any remediation activity impacting these wetlands will require prior coordination with the state agency.

Other site-specific requirements to be fulfilled include adhering to the standards of Florida Outstanding Waters in the Biscayne Bay. Biscayne Bay water standards include the highest levels of protection in regard to state laws for water quality.

2.14.1.3 Action-Specific ARARs

Action-specific ARARs are usually technology- or activity-based requirements or limitations on remediation actions with respect to hazardous and nonhazardous wastes. These action-specific requirements do not in themselves determine the remedial alternative; rather, they indicate how a selected remedial alternative must be achieved.

The action-specific ARARs are intended to cover the potential remedial alternatives that may be applied. A summary of the ARARs is presented in Table 2-20. Each citation in Table 2-20 is described along with an explanation as to whether the citation is applicable or relevant and appropriate. Compliance with action-specific ARARs was evaluated for each alternative that was analyzed in detail.

2.14.2 Expected Outcomes of Each Alternative

The selected remedy will achieve RAOs by minimizing the transport of sediment being discharged into Biscayne Bay through the installation of the sediment control structure, minimize the potential for ecological risk and minimize the potential exposure pathways between ecological receptors and contaminated sediments in the Military Canal by encapsulating the contaminated sediments. It is anticipated that the entire Military Canal will be infilled as part of the CERP within the next 10 to 20 years. The aquatic portion of OU-9 and OU-11 remedy does not involve the cleanup of groundwater or the use of institutional controls. The expected time frame of the remedial construction is one year and three months.

2.14.2.1 Identification of Remedial Action Objectives

RAOs are specific goals for protecting human health and the environment for each of the media of concern. Specific RAOs were developed while considering the long-term goals of protecting human health and the environment, reducing exposure to contaminants, and achieving compliance where possible with ARAR

2.14.3 Sediment Remedial Action Objectives

The RAOs for sediment at OU-11 are as follows:

- Develop a solution that minimizes the transport of sediment being discharged into Biscayne Bay.

- As stated in the SERA (Montgomery Watson, 1999), there are no promulgated sediment screening cleanup values, therefore sediment results are compared to the lower of the Florida Sediment Quality Assessment Guidelines (SQAG) Threshold Effects Limit (TEL), derived for the Assessment of Sediment Quality in Florida Coastal Waters (MacDonald, 1996) or the USEPA Region 4 Sediment Screening Values (USEPA Region 4, 1999). The conclusion of the SERA was that the potential for risk to ecological receptors exists in the OU-11 Military Canal. Therefore, the remedial action must minimize the potential for ecological risk.

- Minimize the potential exposure pathways between ecological receptors and contaminated sediments in the Military Canal.

2.14.4 General Considerations

In addition to the specific RAOs for the media of concern and pursuant to the USEPA RI/FS guidance (USEPA, 1988), the following general considerations should be satisfied, to the extent possible, for specific proposed remedial action alternatives:

1. Reduce the potential exposure of COPCs to sensitive ecological receptors after remedial action construction activities.
2. Control and reduce the potential erosion of soils during and after remedial action construction activities.

3. Control and reduce sediment resuspension during construction activity.
4. Control and reduce the potential airborne particulates during and after remedial action construction activities.
5. Manage perched water present in excavated materials, or that may accumulate in an excavation, in an appropriate manner so that it does not result in risks to human health and the environment.

The first, third, and fourth consideration listed above are representative of OU-11 and are taken into account with the RAOs. The other two general considerations do not represent the media of concern for OU-11; therefore, general considerations will not be discussed as part of the development of remedial action alternatives.

The RAOs listed above are consistent with the goals of the BCT and the USEPA to protect human health and the environment for all contaminated media to the target risk levels of:

- ELCR of 1 x 10-4 to 1 x 10^{-6} for carcinogens
- HI equal to or less than 1 for noncarcinogens

2.15 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Alternatives for OU-11 were developed in the FFS by assembling combinations of representative process options that survived the technology screening. The alternatives were assembled to provide a range from NFA to alternatives that use treatment to reduce toxicity, mobility, or volume (TMV).

Table 2-18 provides a summary of remedial technologies evaluated. The remedial technologies and process options are screened at this point based on their technical implementability. Remedial technologies and process options that are applicable are carried forward for further evaluation. Those not technically implementable are dropped. This process is shown schematically on Table 2-21. As shown on Table 2-21, several remedial technologies may be identified for each general response action, and numerous process options may exist within each technology type. Table 2-21 also provides a description of each process option and includes the reason for carrying forward or dropping individual process options for each media of concern. Table 2-21 portrays the

identification and screening of remedial technologies as they relate to sediment. Twelve separate remedial technologies were identified for the six general response actions.

After the broad screening of technologies based solely on technical implementability, the remedial technologies considered to be technically implementable were analyzed in greater detail to select the process options that will represent each technology type. The purpose of this task is to select a limited number of promising process options for consideration in developing remedial action alternatives Process options are evaluated considering.

- Effectiveness
- Implementability
- Cost

2.15.1 Effectiveness

The primary criterion used to screen process options at this point in the process. Effectiveness focuses on:

- The potential effectiveness of the process options in handling the estimated areas and volumes of the media of concern.
- The ability of the process options in meeting the remediation goals identified in the RAOs
- The potential impacts to human health and the environment during the remedial action.
- The reliability of the process options with respect to the contaminants of concern and the site conditions.

Effectiveness is evaluated considering the relative effectiveness of a process option compared to the other process options in the same technology type. For example, the ability of the process option to meet the RAO and the ability of the process option to

adequately accommodate the relevant waste type and quantities compared to the other process options is critical for a process option to be retained.

2.15.2 Implementability

Focuses on the technical feasibility and availability of the technologies each process option would employ, and the administrative feasibility of implementing the process option. Technical implementability considers a range of factors relevant to obtaining, installing, and using a particular technology. Some remedial technologies are proven and readily available, while others are in the research and development stages. Insufficiently developed technologies are generally screened out. Site conditions must be compatible with the feasible range of a given technology's capabilities, considering for example, depth to bedrock, depth to groundwater, space requirements, ability of the technology to treat contaminants identified, etc. Administrative implementability considers a range of factors relevant to the testing; review; approval; availability of services, workers, and equipment; or permitting of a particular technology. Because technologies were initially screened based on their technical implementability, this subsequent, more detailed evaluation of process options, places greater emphasis on the administrative aspects of implementability.

2.15.3 Cost

Costs are evaluated relative to construction (capital) costs and any long-term O&M costs required to operation and maintenance the process option. Cost plays a limited role in the screening of process options at this stage. However, remedial technologies that are grossly expensive but also equally or only marginally more effective than much lower cost technologies are not carried forward.

The process options are evaluated at this point based on their relative effectiveness, implementability, and cost for this site. This evaluation is documented on Table 2-19.

Table 2-19 includes the evaluation of each process option retained from Table 2-18 for the above three criteria.

Subsequent to the alternatives screening process, the alternatives that were carried forward were evaluated in the detailed analysis of alternatives. A description of the criteria used for the detailed analysis is as follows:

2.15.4 Detailed Analysis Criteria

The USEPA has developed nine criteria that encompass evaluation of statutory requirements and technical, cost, and institutional considerations (USEPA, 1998). These nine criteria are:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction of TMV through treatment
- Short-term effectiveness
- Implementability
- Cost
- State acceptance
- Community acceptance

The last two criteria are evaluated in the ROD following a review of the public comments received on the RI/FS reports and the proposed plan. State acceptance by FDEP will indicate whether the State agrees with the preferred alternative in the proposed plan. Following is a brief description of each of the remaining seven criteria.

2.15.4.1 Overall Protection of Human Health and the Environment

This evaluation criterion assesses whether an alternative provides adequate protection of human health and the environment from the short-term and long-term risks posed by hazardous substances, pollutants, or contaminants present at the site. This protection can be accomplished by eliminating, reducing, or controlling exposures to contaminants to levels established during the development of remedial action objectives. Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.

2.15.4.2 Compliance with ARARs

This criterion is used to determine whether each alternative will meet federal and state ARARs. A description of ARARs is provided in Section 2.14 and presented in Table 2-20. If an identified ARAR is not met by an alternative, then an evaluation on the appropriateness of a waiver should be made. Waivers could be applied in any of six circumstances identified by CERCLA (USEPA, 1998).

2.15.4.3 Long-Term Effectiveness and Permanence

This evaluation criterion assesses the long-term effectiveness and permanence an alternative affords, along with the degree of certainty that the alternative will prove successful. Specifically, this criterion evaluates the long-term effectiveness in maintaining protection of human health and the environment after the remedial action objectives are met. Factors that are considered, as appropriate, include:

- Magnitude of residual risk remaining from untreated waste, or treatment residuals remaining at the conclusion of the remedial activities. The characteristics of the residuals should be considered to the degree that they remain hazardous, taking into account their volume, toxicity, mobility, and propensity to bioaccumulate.

- Adequacy and reliability of controls, such as containment systems and Institutional Controls (ICs), that is necessary to manage treatment residuals and untreated waste. This factor addresses in particular the uncertainties associated with land disposal for providing long-term protection from residuals, an assessment of the potential need to replace technical components of the alternative, and the potential exposure pathways and risks posed should the remedial action need replacement.

2.15.4.4 Reduction of TMV Through Treatment

This evaluation criterion assesses the degree to which an alternative employs recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site. In addition, this criteria evaluates the anticipated performance of the specific treatment technologies in each alternative. Factors that are considered, as appropriate, include:

- Treatment or recycling processes the alternative employs and the materials that are treated.
- Amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled
- Degree of expected reduction in TMV of the waste due to treatment or recycling, and the specifications of which reduction(s) are occurring.
- Degree to which the treatment is irreversible.
- Type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous substances and their constituents.
- Degree to which treatment reduces the inherent hazards posed by the principal threats at the site.

2.15.4.5 Short-Term Effectiveness

This evaluation criterion evaluates the effectiveness of alternatives in maintaining protection of human health and the environment until the remedial action objectives are

met. Specifically, this evaluation criterion assesses the short-term impacts of alternatives including:

- Short-term risks that might be posed to the community during implementation of an alternative.
- Potential impacts on workers during remedial action, and the effectiveness and reliability of protective measures.
- Potential environmental impacts of the remedial action, and the effectiveness and reliability of mitigative measures during implementation.
- Time until remedial action objectives are achieved.

2.15.4.6 Implementability

This evaluation criterion assesses the ease or difficulty of implementing the alternative by considering the following types of factors, as appropriate:

- Technical feasibility, including technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy.
- Administrative feasibility, including activities needed to coordinate with other offices and agencies, and the ability and time required obtaining any necessary approvals and permits from other agencies (for off-site actions).
- Availability of services and materials necessary for implementing the alternative, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to provide any necessary additional resources; and availability of prospective technologies.

2.15.4.7 Cost

This evaluation criterion assesses various types of costs, including:

- Capital costs
- Annual O&M costs
- Present net worth of capital and O&M costs

Cost figures obtained from readily available sources (e.g., Means Site Work Cost Data, costs for other similar project, and local suppliers) are used to estimate costs for each of the alternatives for comparison purposes. These cost estimates should not be considered the actual cost of designing and implementing a remedial action, but rather relative costs among the alternatives using consistent assumptions and estimating methods According to the USEPA manual "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (October 1988), cost estimates provided in the FFS are expected to provide a level of accuracy of +50 to -30 percent. A more detailed cost estimate will be prepared during the Remedial Design.

The presented Capital costs included allowances for administration, engineering, and contingency. There are no O&M costs associated with the remedies presented in the FFS.

As a result of these factors, the final project cost is likely to vary from the estimates provided in the FFS. Funding needs should be carefully reviewed before final remedial action budgets are established. The selected alternative and corresponding cost estimates should be refined further in the remedial design stage.

2.15.4.8 State Acceptance

This evaluation criterion assesses the technical and administrative issues and concerns that the State of Florida may have about each alternative. The State of Florida concurs the remedy selected in the OU-11 FFS.

2.15.4.9 Community Acceptance

This evaluation criterion evaluates the issues and concerns that the public may have regarding each of the alternatives. The analysis will address those alternatives that the community supports, has reservations about, or opposes. Community input regarding the FFS would be solicited during the public comment period, during which time this FFS report will be available for public review. The responsiveness summary is provided in Section 8 of this ROD.

2.16 COMPARISON OF ALTERNATIVES

The three alternatives were individually assessed against the nine evaluation criteria. The purpose of this comparative analysis was to identify the advantages and disadvantages of each alternative relative to one another, so the relative strengths can be identified. These strengths, combined with risk management decisions, serve as the rationale for selecting a preferred alternative and provide a transition between the RI/FFS and the ROD This comparative analysis is presented in Table 2-22

2.16.1 Comparative Analysis

To perform a comparative analysis of the three alternatives presented, a comparative analysis decision matrix was used (Table 2-22). A comparative analysis decision matrix is a tool that compares each alternative to each of the analysis criteria. A value is assigned to each alternative rating based on how the alternative compares to the other alternatives when considering a particular analysis criteria. Therefore, more than one alternative may receive the same rating value for particular criteria, if each of the alternatives is equivalent The numeric rating system is based on a 1 to 9 rating, in which a rating of 9 reflects the highest benefit of the alternative and a rating of 1 reflects the most limitation of the alternative. The numerical ratings were divided into three categories based on the following:

- Numeric Rating 1 to 3 – Alternative does not meet the requirements of the criteria.

- Numeric Rating 4 to 6 – Alternative partially meets the requirements of the criteria.
- Numeric Rating 7 to 9 – Alternative meets the requirements of the criteria.

The ratings of each alternative are totaled and the alternatives with the highest total may be considered the preferred alternatives that emerge based on the detailed analysis and comparative analysis assessment

2.16.2 Comparison of Nine Criteria

2.16.2.1 Overall Protection of Human Health and the Environment

This criterion addresses the adequacy with which the alternative can provide protection of human health and the environment by controlling exposures to contaminants Alternatives 2 and 3 are protective of human health and the environment based on their ability to meet Remedial Action Objectives, short-term effectiveness, and compliance with ARARs. Alternative is more protective to human health and the environment based on the sediment being capped in place. Alternative 2 will disturb and displace some sediment during dredging activities. Dredging will not remove all the sediment in OU-11 and the remaining sediment will pose an ecological risk. Alternative 3 received the highest rating for this criterion with a rating of 8. Details of the comparison analysis with the other Alternatives are presented in Table 2-22.

2.16.2.2 Compliance with ARARs

This criterion considers factors such as compliance with chemical-specific, location-specific, and action-specific ARARs. Alternative 1 can comply with all ARARs and Guidances since no action will occur. Alternatives 2 and 3 can also comply with all ARARs and Guidances. However, Alternative 3 will have less short-term sediment disturbance than Alternative 2 since no dredging will occur in the Military Canal. Alternative 3 received the highest rating for this criterion with a score of 8.

2.16.2.3 Long-Term Effectiveness and Permanence

This criterion describes factors such as residual risks remaining following implementation of the remedy, and the adequacy and reliability of controls. This latter factor considers the long-term management of treatment residuals, long-term reliability of engineering and ICs, and the potential need for replacement of the alternative. Alternative 2 relies on removal of contaminated sediment however the dredging technology is not 100% effective, whereas Alternative 3 relies on containment of the contaminated sediment. Alternative 3 has much less residual risk associated with placing a cap over the contaminated sediment. Alternative 3 received the highest rating for this criterion with a rating of 8. Details of the comparison analysis with the other Alternatives are presented in Table 2-22.

2.16.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion considers factors such as the treatment process used and the material treated; the amount of hazardous material destroyed or treated; the reduction TMV through treatment; the irreversibility of the treatment; the type and quantity of treatment residuals; and the reduction of inherent hazards. These factors are considered where appropriate. Alternative 2 will reduce the toxicity, volume, and mobility of the contaminated sediment by removal with hydraulic dredging. However some sediment will remain in OU-11. Alternative 3 is a containment process and not a treatment process. Thus, Alternative 3 reduces the mobility and the toxicity of the contaminated sediment by encapsulation but does not reduce the volume. In both alternatives, sediment control structures will prevent future migration of contaminated sediment to the Military Canal. Alternative 3 received the highest rating for this criterion with a rating of 7. Details of the comparison analysis with the other Alternatives are presented in Table 2-22.

2.16.2.5 Short-Term Effectiveness

This criterion considers factors such as additional risks, which may be posed to the community, workers, and the environment during implementation of the remedy. In

addition, the time required to achieve remedial action objectives is discussed. Alternative 1 is not as effective as Alternatives 2 or 3, because it does not meet the Remedial Action Objectives. Alternative 3 is more effective in protecting the community and workers during remedial activities because it does not involve removing the contaminated sediment. Although environmental impacts are not anticipated during remedial activities, Alternative 3 will involve less environmental impacts because the contaminated sediment will not be disturbed in the Military Canal. Alternative 3 received the highest rating for this criterion with a rating of 9. Details of the comparison analysis with the other Alternatives are presented in Table 2-22.

2.16.2.6 Implementability

This criterion considers factors, where appropriate, such as technical feasibility, administrative feasibility, and availability of materials and services. While all Alternatives are implementable, Alternative 1 would not likely receive regulatory and community acceptance. For all Alternatives, the technologies are considered reliable and services and materials are available. Alternative 2 seems easier to implement additional remedial actions if necessary than Alternative 3. Alternative 3 is easier to monitor the effectiveness of the encapsulation than Alternative 2, which would have to define the efficiency and removal of contaminated sediment. Alternative 3 does not require off-site disposal of contaminated sediment because the sediment will not be removed from the Military Canal Alternative 2 will have to dewater and dispose of the contaminated sediment from dredging operations. Additionally, if deemed necessary, the potentially large volume of water from dewatering activities may need to be treated on-site prior to discharge or be disposed of off-site at a disposal facility. Alternative 3 received the highest rating for this criterion with a rating of 8. Details of the comparison analysis with the other Alternatives are presented in Table 2-22

2.16.2.7 Cost

This criterion considers factors such as capital costs, annual O&M costs, and present net worth costs. Cost estimates were completed for alternatives 1 through 3. No O&M or

Net Present Worth costs were performed since the final disposition of Military Canal is uncertain but may ultimately be turned over to SFWMD or DERM after remedial activities are completed. Thus, no present worth costs were completed.

Alternative 1 received the highest rating for this criterion with a rating of 9; however, this alternative did not meet remedial action objectives. Alternative 3 received the next highest rating for this criterion with a score of 4.

2.16.2.8 State and Community Acceptance

The state has accepted the proposed plan for OU-11 as presented in the FFS and Proposed Plan. A FDEP concurrence/acceptance letter will be added to this ROD upon approval. Concerns expressed by the community are presented in Section 3.2.

2.17 SELECTED REMEDY

The FFS (Montgomery Watson, 2001) evaluated several remedial alternatives using the USEPA evaluation criteria. Based upon consideration of the requirements of CERCLA, the detailed evaluation of the alternatives and public comments, the USAF, in concurrence with the USEPA and the state of Florida, has determined that Alternative 3 – Sediment Transport Control Structure, support of DERMs Pilot Wetland Project, and Encapsulating the Entire Military Canal is the most appropriate course of action for OU-11. This remedy consist of three major elements: 1) Implementing mechanisms to reduce sediment transport, 2) Eliminating exposure pathways, and 3) System Evaluation. The components for each major element are listed as bulleted items. See section 1.4 for the full list of remedy components.

1) Implementing mechanisms to reduce sediment transport.

- Constructing the sediment control structure in the reservoir to reduce transport of sediment from the Stormwater Reservoir to the Military Canal (OU-11).

- Redirect flow into the reservoir from the northeast arm of the Boundary Canal.

2) Eliminating exposure pathways.

- Eliminating the potential exposure pathway from the former Wastewater Treatment Plant to the Military Canal by abandoning manholes and culverts associated with former treated water outfalls.

- Installation of a liner in the scour area between the pump intakes and the sediment control structure

- Removing coarse debris from the entire Military Canal, prior to encapsulation, which would interfere with installation of the encapsulation liner.

- Installing a non-woven geotextile over the contaminated sediment in the Military Canal.

- Installing a 3-inch Uniform Section Lining over the contaminated sediment. A 2,000 psi grout will be injected into the liner until it is pumped to its full thickness.

3) System Evaluation.

- System Performance Monitoring will be implemented by the Air Force annually to evaluate system performance. Annual monitoring will include the collection of sediment samples from two locations. One sample will be collected within the Military Canal in an area of laminar flow, as determined in the remedial design, and the other sample collected from the west-side of the sediment control structure. Sediment samples will be analyzed for PAHs (USEPA Method 8310), DDT and its metabolites, PCB 1254 (USEPA Method 8081/8082), and the 13 Priority Pollutant Metals (USEPA Method 6010/7471).

  In order to achieve appropriate reporting limits, a minimum sample volume of 200 grams of sediment is needed for the analysis. Analysis will not be completed unless adequate volumes of sediment are obtained from each

location. In addition, co-located sediment/soil samples will be collected from the levee sidewalls during the initial round of sampling and analyzed for the parameters specified above.

The sediment data obtained from the system performance monitoring will be evaluated against the sidewall samples. Parameters not found in the sidewall samples will then be evaluated against the Florida Sediment Quality Assessment Guidelines (SQAGs) to determine if COPCs are present at concentrations that could potentially affect ecological receptors at BNP. If SQAGs are exceeded, the subsequent sampling effort will be expanded to include a minimum of five sample locations in order to calculate a 95 percent UCL on the mean concentrations. The mean concentration for each COPC will then be evaluated against the SQAGs to determine if a risk analysis of the sediment data is necessary.

Sediment performance monitoring will be re-evaluated after two consecutive years of sampling to determine if further evaluation is warranted.

The three major elements comprising the overall remedy strategy serve to eliminate the exposure pathway to contaminated sediment and to protect sensitive downgradient receptors.

This alternative is protective of human health and the environment based on its ability to meet Remedial Action Objectives, short-term effectiveness, and compliance with ARARs. Alternative 3 is a containment process and not a treatment process; thus Alternative 3 reduces the mobility and toxicity of the contaminated sediments by encapsulation, but does not reduce volume. A sediment-monitoring program will be implemented to monitor the effectiveness of the alternative. The O&M, if required for the remedy and performance monitoring approach, is part of the remedial design. After the 5-year monitoring period, USEPA, FDEP, and the USAF will evaluate the effectiveness of the remedy and assess the need for continued monitoring. The selected

remedy has been accepted by the state and community concerns have been addressed in the Responsiveness Summary of this ROD.

The cost associated for implementation of the selected remedy are summarized in Table 2-23.

2.18 STATUTORY DETERMINATIONS

The selected remedy reduces and controls the existing risk to human health by relying on capping to prevent exposure to sediments. The selected remedy is protective of the environment by providing capping of the contaminated sediments in the Military Canal and reducing future sediment transport from the former HAFB boundary canal to the Military Canal by constructing a sediment control structure. The Statutory Determination specifies how the remedy satisfies the requirements of the NCP 40 CFR 300.430(f)(5)(ii).

Since contaminated materials will remain on site, CERCLA Five-Year reviews will be conducted to determine whether the remedy remains protective of human health and the environment. NCP 40 CFR 300.430(f)(4)(ii) requires a five-year review if the remedial action results in hazardous substances, pollutants or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure.

2.18.1 Protection of Human Health and the Environment

The remedy satisfies the overall protection of human health and the environment by capping the potentially contaminated sediments, thereby eliminating the exposure pathway. The selected remedy meets ARARs through the elimination of the exposure pathway. The selected remedy has been determined to be cost-effective as compared to other remedial technologies. The remedy does not provide for treatment of the sediments, but rather reduces the mobility and the toxicity of the potentially contaminated sediments by encapsulation and thereby eliminates the pathway to these sediments.

2.18.2 Compliance with ARARs

The USAF has determined that the selected remedy represents the maximum extent which permanent solutions and treatment technologies can be utilized in a practicable manner at the former HAFB. Of the alternatives that are protective of human health and the environment and comply with ARARs, the USAF has determined that the selected remedy provides the best balance in terms of the five balancing criteria, while also considering the preference for treatment as a principal element and bias against off-site treatment and disposal and considering FDEP, USEPA, and community acceptance. A summary of the ARARs applicable to the selected remedy are summarized in Table 2-20. This ROD will implement the State and Federal Standards presented in Table 2-20.

2.18.3 Cost-Effectiveness

The selected remedy is cost-effective and presents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP §300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of the alternatives that satisfied the threshold criteria (i.e., protective of human health and the environment, and compliance with ARARs). "Overall effectiveness" was evaluated by assessing three of the five balancing criteria in combination (i.e., long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). "Overall effectiveness" was then compared to cost to determine cost-effectiveness.

The estimated total cost of the Selected Remedy is approximately $4.5M, which provides an overall level of protection comparable or superior to alternative remedies at a competitive cost.

2.18.4 Permanent Solutions and Alternative Treatment Technologies

The USAF has determined that the selected remedy represents the maximum extent which permanent solutions and treatment technologies can be utilized in a practicable manner at the Former HAFB. For the alternatives that are protective of human health and the environment and comply with ARARs, the USAF has determined that the Selected Remedy provides the best balance in terms of the five balancing criteria, while also considering the preference for treatment as a principal element and bias against off-site treatment and disposal and considering U.S. EPA, FDEP, and community acceptance. The selected remedy offers permanent solutions and alternative treatment technologies (encapsulation) by the following:

- The sediment control structure will provide long-term effectiveness by minimizing future transport of contaminated sediment into the Military Canal.
- The risk exposure to OU-11 contaminated sediments will be removed by installing an engineered liner underwater to encapsulate contaminated sediments.
- The sediment control structure at the opening of the Military Canal is adequate in preventing future migration of contaminated sediments to the Biscayne National Park and preventing future harm to ecological receptors.

2.18.5 Preference for Treatment as a Principal Element

Treatment technologies were considered impractical for in situ treatment because it does not reduce the mobility of the sediment to BNP during the treatment process and non-effective for ex-situ treatment given that removal efficiency is below 100 percent. The exposure pathway associated with the canal sediments can be removed by encapsulation and prevent the future migration of sediment. Therefore, the statutory preference for treatment was not met.

2.18.6 Five-Year Review Requirements

Since contaminated materials will remain on site above levels that would allow for unlimited use and unrestricted exposure, a 5-year review will be conducted to determine whether the remedy remains protective of human health and the environment. CERCLA § 121 NCP 40 CFR 300.430(f)(4)(ii) requires a five-year review if the remedial action

results in hazardous substances, pollutants or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure.

3.0 RESPONSIVENESS SUMMARY

3.1 OU-9 RESPONSIVENESS SUMMARY

3.1.1 Overview

In the Proposed Plan for OU-9, as presented in the public meeting, a No Remedial Action response or No Further Action has been selected for OU-9, the Boundary Canal system, based on evaluation of the extensive chemical, ecological, toxicological and hydrological data collected during the RI. These data and supporting studies indicate that the sediment and surface water in the Boundary Canal system do not pose an unacceptable risk to human health or the environment.

Representatives of the community have expressed concern about the inclusion of the Military Canal in OU-9 and the contamination of the Boundary Canal system by sites that are located adjacent to the canal. Because of these concerns, the BCT has agreed that as part of the NFA alternative selection the Military Canal will be further addressed in conjunction with OU-11 and removed from consideration as part of OU-9. Additionally, areas or sites that are identified as representing a potential source of contaminants to the Boundary Canal system will be monitored appropriately within each respective site program.

3.1.2 Background Of Community Involvement

The community has been actively involved in the RI of the Boundary Canal system. It has taken an active role due to the apparent hydrological connection to Biscayne Bay and more specifically Biscayne National Park. The HAFB Technical Committee was formed by the Base to address issue concerning OU-9. The HTC held meetings on November 15, 1995, November 28, 1995, and April 10, 1995 to discuss issues regarding OU-9 and is composed of representatives from the following agencies:

AFRPA/DA Homestead	Air Force Reserve Command (AFRC)
DERM	Miami-Dade County Aviation Department (DCAD)
Sierra Club	South Florida Water Management District (SFWMD)
Tropical Audubon Society Inc.	U.S. Department of Interior
Biscayne National Park	Everglades National Park

The proposed plan was released to the public on January 16, 1997. The public meeting for OU-9 was also held on January 16, 1997. The public comment period was from January 16, 1997 to February 17, 1997.

For the OU-9 RI an Administrative Record was created to contain all records pertaining to the OU-9 investigation. The Administrative Record has been available to the public and maintained at Homestead AFB. An information repository, which contains the OU-9 records, has also been made available to the public.

In addition to the Administrative Record, the public and representatives of the media were invited to attend two Restoration Advisory Board (RAB) meetings in conjunction with OU-9, which were held October 26, 1995 and March 13, 1996 and the public meeting, which was held January 16, 1997. At these meetings, information regarding OU-9 was presented. Notice of the meetings, which specifically identified that information concerning OU-9 would be presented, was publicized in three local newspapers. Additionally, the AFBCA also has published a newsletter for the public, which summarized the conclusions of the OU-9 RI, and of the Military Canal sampling in January 1996. This newsletter and a subsequent Restoration Update published in February 1997 emphasized the importance of public involvement and comment.

3.1.3 Summary of Comments From the Public Comment Period and Responses

The public comment period on the Proposed Plan for OU-9 was held from January 16, 1997 through February 17, 1997. Verbal comments were received from Mr. Bremen of the Biscayne National Park Service during the public meeting held on January 16, 1997. Subsequently, written comments were received from Mr. Mark L. Krause, Ph.D. of the National Audubon Society (NAS) and Mr. David Lefianka, a resident of Homestead,

Florida during the comment period The specific comment and respective responses are provided below.

Mr. Bremen: "Biscayne National Park, service has several concerns which prevent us from supporting the No Further Action recommendation for OU-9, Our concerns are not for the Boundary Canal per se but were rather for the reservoir."

Comment 1. " As for the sampling techniques used we feel that dredge sampling is unacceptable and would suggest core sampling to get a more accurate picture of historic deposition."

Response:

As part of the OU-9 RI, different sediment sampling techniques were used dependent upon the type of sample needed and its intended purpose. For the purpose of evaluating sediment transport, which included an evaluation of historical deposition, core samples of the sediment were collected in the Boundary Canal system where possible. These included two core locations within the reservoir and one location immediately west of the reservoir. The results indicated that the sediment in the reservoir which was found to be uniform within the core was a dark to light brown organic silt with some medium to fine grained sands with a thickness of less than 0.25 feet. Sediment at a location immediately west of the reservoir was n light brown organic silt with n trace of medium to fine grained sand approximately 0.3 feet (3.5 inches) thick.

The petite ponar dredge was used to obtain sediment for chemical and toxicity studies and was consistent with the USEPA and FDEP sampling protocol as described in the approved Work Plan for OU-9. It should be pointed out that due to the nature of the canal system within the limestone setting, typical sediment deposition was not observed. This was due in part to extensive vegetation which serves to minimize runoff as well as very low flow conditions which was not

conducive to erosion. Therefore typical processes for the accumulation of competent sediment are very limited in the Boundary Canal system.

Comment 2. "We also have concerns over the level of contaminants, particularly within the sediments, and for the potential mobilization of these sediments."

Response.

As part of the RI, a Baseline Risk Assessment and a detailed analysis of contaminant fate and transport was completed. The BRA found that there are no significant human health or ecological risk associated with the Boundary Canal System, including the reservoir. The contaminant fate and transport analysis found that the flow in the canal even at its highest flow is not of sufficient velocity to cause erosion of the sediment bed leading to any appreciable sediment transport. Electronic transducers equipped with data loggers were set up along the Boundary Canal System, including one station within the reservoir. for the purpose of monitoring water levels during low rainfall periods, as wells during significant storm events. These data combined with flow measurements, which included observations made while reservoir pumps were in maximum operation, were included as part of the sediment transport evaluation.

Comment 3. "Due to these concerns, we recommend that the reservoir be placed into Operable Unit 11. "

Response:

The inclusion of the Stormwater reservoir in the remedial investigation of OU-9 is based upon its unimpeded hydraulic relationship as part of the Boundary Canal System receiving inflow from the two major Boundary Canal segments at each end. Based upon the results of the RI, the reservoir does not pose a significant risk to human health and the environment, and the contaminant fate and transport analysis indicated that sediment is not transported from the reservoir. The reservoir

was therefore maintained as part of OU-9 and included in this No Further Action ROD.

The following two comments 10 the OU-9 Proposed Plan were received by Dr Mark L. Krause, of the NAS.

Comment 1. There are several contaminants with the storm water reservoir that meet or exceed published standard for sediment quality (Table 1). Therefore, NAS feels that the Stormwater reservoir should remain in OU-11 for further study.

Table 1: Contaminants found in sediments of the stormwater reservoir adjacent to Military Canal that meet or exceed published threshold values. Data are from a Technical Memorandum submitted by Woodward-Clyde on 11/4/96 to the U.S. Army Corps of Engineers. Data are reported in ppm.

Compound	N	Mean	High	Low	TEL	PEL	ER-L	ER-M
Sb	3	17.77	21.9	15.7	*N/A*	*N/A*	2.00	27.0
As	4	5.18	7.40	3.70	7.24	41 6	8.20	70 0
Cd	3	1.77	2.00	1.40	0.68	4.21	1.20	9.60
Cu	4	31.95	49.4	11 0	18.7	107 0	34.0	270.0
Hg	3	0.55	0 64	0.45	0 13	0.7	0.15	0.71
Ag	3	5.60	7.60	3.40	0.73	1.77	1.00	3.70
Zn	4	92.56	138.0	31.9	124.0	221.0	150.0	410.0
4,4-DDE	3	5.17	6.90	3.80	2.07	347.0	2.20	27.0

TEL- Threshold Effect Level (MacDonald et. al. 1996)

PEL -Probable Effects Level (MacDonaonald et al 1996)

ER-L -Effecls Range -Low (Long et al 1995)

ER-M- Effects Range -Median (Long et al. 1995)

Response:

The "standards" referred to in the comment were in fact benchmarks established by the State of Florida and NOAA as sediment quality guidelines and should not be

used as standards. Benchmarks were established as guidelines and as such are not deterministic value for established risk. Benchmarks were, however, considered in the BRA as a screening tool for retaining chemicals of potential concern or COPCs. In general, chemicals having sediment concentrations above a benchmark are evaluated further in toxicity tests. The concentrations of metals identified in the table above as exceeding benchmarks were further evaluated in toxicity tests and did not exhibit toxicity in the OU-9 or Outfall Canal sediments.

It should also be noted that the Florida sediment benchmarks were intended for more sensitive marine environments, and since the Boundary Canal System, including the reservoir, is fresh, water, these benchmarks may be very conservative. Further, the TEL and ER-L representing only 5% to 10% probability or having an effect due to exposure to the sediment, whereas the PEL and ER-M represent approximately a 50% probability for having an effect. Therefore, value above the PEL and ER-M are more representative of indicators of potential risk and are more appropriate than the TEL and ER-Ls.

Although benchmarks are used to screen sediment concentrations which could be potentially a risk to the environment, as was done in the RI, collection of biota tissue is a better approach to determine the ecological risks because the sediment benchmarks do not account for the bioavailability of the chemicals and the properties of the sediment. A comprehensive evaluation of the chemicals in the surface water, sediment, and fish tissue, as well as sediment toxicity tests indicated that there was no significant human health or ecological risk associated with the Boundary Canal System, inclusive of the stormwater reservoir.

Comment 2. Although the consultants for the project have concluded that the above listed compounds, which exceed published thresholds present no risk, NAS believes that due to the fact that the downstream receiving area is designated at Outstanding Florida Waters and is part of the Biscayne National Park, that the conclusion is incorrect.

Response:

As part the RI, an extensive contaminant fate and transport analysis was completed. Based on the evaluation of the surface water and groundwater movement and the properties of the sediment, surface water movement in the canals does not reach a high enough velocity to cause erosion of the sediment bed which is necessary for sediment transport. This was confirmed by now measurements taken during periods of high rainfall as well as the measurement or suspended solids.

The following comment for the Proposed Plan of OU-9 was received from Mr. David Lefianka of Homestead, Florida.

Comment: "Have the man in charge give a 10 minute talk to the public at Homestead City Hall".

Response:

The Air Force has contracted representatives of Homestead City Hall through their ongoing community relations program. Representatives of Homestead AFB are available to assist with community relations efforts.

3.2 OU-11 RESPONSIVENESS SUMMARY

3.2.1 Overview

In the Proposed Plan for OU-11, as presented in the public meeting, a remedy was selected for the Military Canal based on the evaluation of chemical, ecological, toxicological and hydrological data collected during the RI/BRA, SERA, and FFS. The screening assessment did indicate potential for risk to sensitive receptors in the Military Canal and ultimately, Biscayne National Park due to detected concentrations in the sediment. In accordance with the current ROD guidance, this section is reserved for community comments and the appropriate responses by the BCT in regard to the selected

remedial alternative at OU-11. The following sections discuss the elements of community comments on the OU-11 portion of this ROD.

The Responsiveness Survey serves three purposes. First, it provides regulators with information about the community preferences regarding both the remedial alternatives and general concerns about OU-11. Second, the Responsiveness Summary documents how public comments have been considered and integrated into the decision-making process. Third, it provides the USEPA with the opportunity to respond on the Record to each comment submitted by the public.

3.2.2 Background of Community Involvement

The Proposed Plan for OU-11 was released to the public on November 29, 2001 in both the Administrative Record and in the Information Repository maintained by the Air Force at the AFBCA, Homestead Air Reserve Base (ARB). Public meeting ads for the OU-11 Proposed Plan were published in *The Miami Herald* (South Dade *Neighbors* edition) on November 29, 2001 and the *South Dade News Leader* on November 30, 2001.

3.2.3 Summary of Comments From the Public Comment Period and Responses

A public meeting was held at the Miami-Dade County Cooperative Extension Service-Agricultural Center on December 12, 2001. The public comment period on the Proposed Plan for OU-11 was from November 29, 2001 through December 28, 2001. A transcript of the December 12, 2001 public meeting is retained in the Information Repository maintained by the Air Force at the AFBCA/DD, Building 736, Homestead ARB, Florida 33039. Three public comments were received. Each comment is transcribed below followed by the Air Force's response.

Comment by B. Dodson: I understand why this idea is favored. Why can't the Army Corps tell you or come to a decision now so that a solution can be decided? It comes down to the right hand knowing what the left hand is doing.

Response: Restoration programs associated with the Central Everglades Restoration Project (CERP) provided provisions for the L-31E Flowway Redistribution, which includes the Outfall Canal, was initially on the US Army Corps of Engineers Critical Project list; but were recently removed. These programs have been prioritized to address the much larger program and goals of Everglades Restoration. The Air Force and the Homestead Air Force Base Closure Team have determined that capping of the OU-11 Sediments is the most appropriate and cost effective action for potentially impacted canal sediments and fulfill the requirements of CERCLA.

Comment by Linda Canzanelli, Superintendent of the National Park Service: Please find below comments from the National Park Service, Biscayne National Park regarding the proposed plan for OU-11 at the former HAFB, Florida. Our comments are as follows:

1 After our review of the proposal plan we find all of the proposed alternatives do not prevent or eliminate the potential for contaminated reservoir sediments from eventually migrating into the park through the outfall canal. Furthermore, we are concerned about the impact of encapsulating canal sediments might have on the flow of shallow groundwater and how the plan fails to address the chronic arsenic problem within these two units and the AFB as a whole. Questions from our perspective that have yet to be adequately addressed within the plan are 1) What safeguards will be incorporated into the design of the project to assure sediment and contaminants will be kept in place while project work to apply the encapsulating "blanket" is being undertaken and during the interim period until vegetation becomes established and; 2) What is the demonstrated success rate for the type of encapsulation being contemplated for this AFB project, where has this method been successfully used and what is the overall longevity or life expectancy of using encapsulations as a permanent solution to the problem?

Response: The installation of the encapsulating blanket will be thoroughly described in the remedial design. One safeguard to minimize sediment disturbance

during installation includes the placement of a geomembrane fabric along the bottom of the canal that will help reduce sediment disturbance. Given the setting of the canal, it is also anticipated that the canal will re-vegetate quickly. Also, as stated in the FFS, the sediment control structure will minimize future sediment transport from the reservoir to the Outfall Canal. Encapsulation is a proven technology. This particular technology has been used as a stabilizing technology for canals and harbors for more than 15 years.

2. Additionally, for purposes of background and concern to the park we note the proposed remedial plan for OU 9 and 11 recognizes that the sediments in the Outfall canal (Military Canal) are "...a potential risk to sensitive ecological receptors in the Outfall Canal and Biscayne National Park due to concentrations detected in canal sediments..." Our understanding is the sediments found in the canal are contaminated sediments re-suspended and flushed out of the reservoir located just west of the outfall canal. The outfall canal has always been isolated from the reservoir by the "pump house", with water only being moved from the reservoir to the outfall canal by large pumps. Only a small portion of the contamination material flushed into the outfall canal actually settles as sediment, the rest being quickly transported and deposited in Biscayne Bay With this in mind the real threat to the marine and coastal resources of Biscayne National Park is not so much the outfall canal and the few sediments it contains, but rather the reservoir and the boundary canal feeding into it. While we recognize the preferred alternative of encapsulating the sediments in the canal will prevent existing contaminated sediments from migrating into the park, it does not solve the problem. As outlined above, both the preferred and the dredging alternatives only serve to prevent existing sediment from entering the park but do nothing to correct long-term transport of reservoir sediments into Biscayne Bay/ Biscayne National Park.

Response: The Air Force believes that the preferred alternative will satisfy the major objectives of this effort, i.e., remediation and source control of contaminated sediments currently existing within the Outfall Canal and minimizing the transport of potentially contaminated sediments into Biscayne Bay. The selected remedy is not

concerned with resuspension or transport of sediments in and of themselves. The original source of sediment contamination from the years of use of the Wastewater Treatment Plant and incinerator have been eliminated and are no longer a source of contamination. Encapsulating the Outfall Canal will eliminate the exposure pathway to any remaining contaminated sediment within the Outfall Canal. The sediment control structures will minimize any additional transport of unimpacted sediments. The wet detention system of the stormwater retention pond and canal are already effective at minimizing sediment transport. This is based on the following. A 95 percent total suspended solids removal was estimated on the basis of particulate settling velocities from samples obtained from the bottom sediments of the Boundary Canal and reservoir. Since bottom sediments represent an accumulation of sediment spanning many decades, they may not be representative of the current sediment loads. Sampling of recent suspended material indicated that sediment removal is exceeding 95 percent during large storm events, with TSS levels below detection limits throughout the Boundary Canal, reservoir, and pump station discharges to the Outfall Canal.

3. Another disadvantage to encapsulation is impermeability will redirect the groundwater flowing above the semi confining Q4 boundary (15-20 ft below the surface) from its normal southeastward direction to a more easterly direction. The consequence of this action is totally unknown and not even considered in either the proposed plan or the FFS. Although we do not know how important groundwater migration into Biscayne Bay is to the ecology of the Bay's near shore environment, we have a strong suspicion that it is critical to maintaining estuarine conditions in the Bay and as a result, critical to the entire ecology and function of the Bay.

Response: Flow records from the Outfall Canal indicate that a significant contribution to flow is received from groundwater from the adjacent properties. Encapsulation will be designed so that this interaction is retained. This information will be further discussed during the remedial design phase.

4 Also, the proposed plan acknowledges that arsenic is a problem in the groundwater within OU 9 and OU 11, but dismisses the problem by saying that "the likely source of arsenic contamination in groundwater was eliminated during the 1999 interim Removal Action (IRA)." Presentations at recent Base Closure Team (BCT) meetings clearly substantiate that arsenic is problematic in groundwater throughout the base and probably still within the boundaries of OU 9 and OU 11. The plan does not discuss the resolution of the arsenic problem any further and offers no evidence that the problem has been resolved. If it has not been resolved by removal of the "likely source" then the encapsulation alternative may potentially focus the transport of arsenic contaminated groundwater to the park

Response: Reference to arsenic in groundwater at OU-11 is associated with the terrestrial portion of the site, i.e., the former sewage treatment plant area. The source for the arsenic here and throughout the Base has been linked to concentrations in the shallow surface soils. The Air Force has implemented a program that excavated and removed these sources of contamination at operable units throughout the Base. Groundwater remedial efforts have been unsuccessful and must rely on source removal and natural attenuation process. It is also noted that concentrations of arsenic in surface water are within acceptable levels.

5. Finally, while the construction of a sediment transport control is conceptually positive, it will likely be ineffective. Regardless of how designed it will be most effective when least needed and least effective when most needed. To elaborate, as with all engineered structures of this type in South Florida a bypass would need to be built to account for periods of excessive rainfall, again not solving the problem and further reducing the effectiveness of the project. A better solution to assure contaminated reservoir sediments don't reach Biscayne Bay/ Biscayne National Park would be to backfill the outfall canal and retaining, as well as treating stormwater on site within the AFB complex. The National Park Service preferred alternative therefore, is to fill the canal and permanently break the linkage between the Base and Biscayne Bay.

Also, at the December 11, 2001 public meeting for the project the exotic "walking catfish" (Clarias barachus) was identified as occurring within AFB canals. What preventative measures are being taken to minimize the probability of this exotic species entering Biscayne Bay?

We look forward to your response to our comments. Should you have any questions about the content of our comments or need any additional information about our position concerning the proposed plan, please contact me by calling 305-230-1144, x3002, Science Coordinator Richard Curry at x3010, or Rick Clark, Chief, Resource Management at x3007. Thank you.

Response: The design of the sediment control structure will likely not require a bypass. The objective of the structure would be to direct flow away from the pump intakes, increase the settling/retention time for sediments, and provide for passive flow during non-pumping events. This will be accomplished by constructing a barrier/dam in the reservoir in front of the pumps, thereby directing flow from the surface as opposed to the bottom of the reservoir where the sediments reside. The second component will include redirecting flow from the northeast arm of the Boundary Canal to increase the settling capacity of the system.

The evidence of Clarias barachus within the canal waters is anecdotal. Since occurrence of the fish has not been documented, no scientific management decisions have been made to minimize the probability of this species entering Biscayne Bay.

Comment by Stuart D. Strahl, Ph.D., President/CEO, Audubon of Florida (AOF) and Mary Munson, JD, Director, South FL and Marine Programs, National Parks Conservation Association (NPCA): the AOF and the NPCA have reviewed the document entitled *Proposed Plan Operable Unit No. 11, IRP Homestead Air Force Base, Florida.* We offer the following comments:

1. AOF and NPCA have continued concerns with the contaminants present in Military (Outfall) Canal. There is also concern regarding the movement of these contaminants

into Biscayne Bay and Biscayne National Park. We do not believe that the Preferred Alternative (Alternative 3) adequately addresses these concerns. Encapsulating the contaminants in Military (Outfall) Canal, and ignoring the contaminants at the mouth of Military (Outfall) and into Biscayne Bay does not rectify the problem.

2. The preferred Alternative (Alternative 3) disregards any additional contaminants upstream of Military (Outfall) Canal that are present or may be present in the future, that may be transported into Biscayne Bay and Biscayne National Park via Military (Outfall) Canal.

3. Based on the above concerns, AOF and NPCA believe that none of the alternatives (Alternatives 1-3) presented in the document adequately address the contamination in Military (Outfall) Canal. Nor do they address contamination present in Biscayne Bay and Biscayne National Park that was deposited by discharges from Military (Outfall) Canal. Further, none of these alternatives address future potential contamination problems associated with continued use of Military (Outfall) Canal.

Due to the above concerns, AOF and NPCA make the following recommendations.

1. Dredge Military (Outfall) Canal its entire length to ensure removal of all contaminants.

2. Backfill Military (Outfall) Canal with clean fill for its entire length to prevent the use of it for stormwater discharges.

3. Require that all stormwater present on Homestead Air Force Base be managed onsite.

4. Conduct further studies in Biscayne Bay adjacent to the mouth of Military (Outfall) Canal to ascertain the level of contamination present.

5. Based on the results of the above (#5) studies, develop a remediation plan for the site. Include an ecological restoration component to the remediation plan.

Thank you for providing us with the opportunity to comment. If you have questions regarding this matter please do not hesitate to contact us

Response: Maintenance activities and cleanups within the boundary of the former HAFB will continue to eliminate future sources of contamination. Future transport will be monitored and testing will be completed to evaluate the effectiveness of the sediment capping remedy. Further, as stated in the ROD, the remedial action

objectives will be achieved by capping sediments in OU-11 by eliminating the exposure pathway by humans and ecological receptors. The mobility of the Outfall canal sediments will be eliminated to prevent future transport into BNP. The sediments control structure will be designed to minimize the potential for future sedimentation from the reservoir into the Outfall Canal and ultimately into BNP.

The US Air Force appreciates the AOF and NPCA recommendations for restoration. Many of these alternatives were evaluated in the FFS to determine the viability, but were screened out in accordance with CERCLA. Through the screening of these technologies, alternative 3, Encapsulation of the Outfall Canal, has been determined to be the most appropriate remedy and complies with CERCLA.

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TABLE 2-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD101R 11/19/97		SD104 11/16/97		SD104R 11/19/97		SD107 11/16/97		SD107R 11/19/97		SD110A 11/19/97		SD110B 11/19/97		SD110BDP 11/19/97		SD113R 11/19/97		SD116R 11/19/97		SD120A 11/19/97	
VOCs (mg/kg)																						
1,2,4-Trichlorobenzene			0.0025	J																		
1,3,5-trimethylbenzene																						
1,3-Dichlorobenzene																					0.0037	J
1,4-Dichlorobenzene			0.0029	J																		
1,6,7-Trimethylnaphthalene																						
2-Butanone																						
Acetone																						
Benzene																						
Bromoform																						
Carbon Disulfide			0.034	J	0.0023	J			0.0012	J	0.016		0.018		0.013						0.046	J
Chloroform																						
Dimethyl disulfide																						
Dimethylocene																						
Ethylbenzene																						
Limonene																						
Menthene																						
Methylene chloride																						
Pinene																						
p-Isopropyltoluene																						
Toluene			0.0021	J			0.0012	J													0.0077	J
Trichlorofluoromethane							0.00077	J														
Xylenes,Total																						

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
B = Analyte is present in the associated method blank as well as in sample
mg/kg - milligrams per kilogram

TABLE 2-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD120B 11/19/97		SD122R 11/19/97		SD123 11/15/97		SD123DUP 11/15/97		SD124 11/15/97		SD125 11/15/97		SD125R 11/19/97		SD126 11/15/97		SD127 11/15/97		SD128 11/16/97		SD128R 11/19/97	
VOCs (mg/kg)																						
1,2,4-Trichlorobenzene	0.0043	J																				
1,3,5-trimethylbenzene																						
1,3-Dichlorobenzene	0.021	J																				
1,4-Dichlorobenzene	0.0026	J			0.003	J	0.002	J	0.0083	J					0.0042	J	0.0056	J				
1,6,7-Trimethylnaphthalene																						
2-Butanone																						
Acetone																						
Benzene																						
Bromoform																						
Carbon Disulfide	0.055	J																				
Chloroform																						
Dimethyl disulfide																						
Dimethyloctene																						
Ethylbenzene																						
Limonene																						
Menthene																						
Methylene chloride																						
Pinene																						
p-Isopropyltoluene													0.00057	J								
Toluene	0.0035	J			0.011	J	0.021	J	0.018	J	0.0064	J			0.017	J	0.0077	J	0.002	J		
Trichlorofluoromethane													0.00067	J								
Xylenes,Total																						

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
B = Analyte is present in the associated method blank as well as in sample
mg/kg - milligrams per kilogram

TABLE 2-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD202R 11/19/97		SD205R 11/19/97		SD208R 11/19/97		SD211R 11/19/97	SD211RR 11/19/97		SD213 11/15/97		SD214R 11/19/97		SD215 11/15/97		SD215DUP 11/15/97		SD216 11/15/97		SD217 11/15/97	
VOCs (mg/kg)																					
1,2,4-Trichlorobenzene																					
1,3,5-trimethylbenzene																					
1,3-Dichlorobenzene					0.00091	J		0.0027													
1,4-Dichlorobenzene								0.00059	J					0.0024	J						
1,6,7-Trimethylnaphthalene																					
2-Butanone																					
Acetone																					
Benzene																					
Bromoform														0.0047	J						
Carbon Disulfide	0.0033	J	0.0087	J	0.011	J	0.0073	0.01				0.0016	J	0.0045	J					0.015	J
Chloroform																					
Dimethyl disulfide										0.02	JN										
Dimethyloctene																					
Ethylbenzene																					
Limonene																					
Menthene																					
Methylene chloride																					
Pinene																					
p-Isopropyltoluene																					
Toluene										0.034	J			0.018	J	0.063	J	0.0053	J	0.0068	J
Trichlorofluoromethane																					
Xylenes,Total																					

Notes.
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
B = Analyte is present in the associated method blank as well as in sample
mg/kg milligrams per kilogram

TABLE 2-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD217R 11/19/97		SD218 11/15/97		SD219 11/15/97		SD220 11/15/97		SD220R 11/19/97		SD221 11/16/97		SD222 11/16/97		SD301 11/16/97		SD301R 11/19/97		SD302 11/16/97		SD302DUP 11/16/97	
VOCs (mg/kg)																						
1,2,4-Trichlorobenzene																						
1,3,5-trimethylbenzene					0.0029	J																
1,3-Dichlorobenzene					0.013	J			0.00866	J												
1,4-Dichlorobenzene					0.007	J																
1,6,7-Trimethylnaphthalene																						
2-Butanone																						
Acetone																						
Benzene																						
Bromoform																					0.0031	J
Carbon Disulfide	0.0081	J	0.02	J	0.083	J			0.0076	J			0.012	J			0.011	J				
Chloroform																						
Dimethyl disulfide																						
Dimethyloctene																						
Ethylbenzene																						
Limonene																						
Menthene																						
Methylene chloride																						
Pinene																						
p-Isopropyltoluene											0.012	J										
Toluene			0.0047	J	0.0047	J	0.0018	J			0.019	J	0.012	J					0.0055	J	0.0067	J
Trichlorofluoromethane																						
Xylenes, Total																						

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
B = Analyte is present in the associated method blank as well as in sample
mg/kg - milligrams per kilogram

TABLE 2-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD404 11/19/97		SD401R 11/19/97		SD404R 11/19/97		SD407 11/18/97		SD408 11/18/97		SD409 11/18/97		SD410 11/18/97		SD411 11/18/97		SD412 11/18/97		SD413 11/18/97		SD414 11/18/97	
VOCs (mg/kg)																						
1,2,4-Trichlorobenzene																						
1,3,5-trimethylbenzene																						
1,3-Dichlorobenzene																						
1,4-Dichlorobenzene							0.013	J	0.032		0.018											
1,6,7-Trimethylnaphthalene																						
2-Butanone																						
Acetone																	0.24 U	J				
Benzene																						
Bromoform																						
Carbon Disulfide	0.0076	J	0.0069	J					0.032	J	0.0096	J			0.041	J	0.0084	J			0.0039	J
Chloroform																						
Dimethyl disulfide																						
Dimethylocene																						
Ethylbenzene																						
Limonene																						
Menthene																						
Methylene chloride																						
Pinene																						
p-Isopropyltoluene									0.018		0.026										0.003	J
Toluene											0.0021	J										
Trichlorofluoromethane																						
Xylenes,Total																						

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
B = Analyte is present in the associated method blank as well as in sample
mg/kg - milligrams per kilogram

TABLE 2-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD415 11/18/97		SD416 11/18/97		SD417 11/18/97		SD417DUP 11/18/97		SD418 11/18/97		SD419 11/18/97		SD420 11/18/97		SD421 11/18/97		SD422 11/18/97		SD423 11/18/97		SD424 11/19/97	
VOCs (mg/kg)																						
1,2,4-Trichlorobenzene																						
1,3,5-trimethylbenzene																						
1,3-Dichlorobenzene																						
1,4-Dichlorobenzene																						
1,6,7-Trimethylnaphthalene																						
2-Butanone																						
Acetone																						
Benzene																						
Bromoform																						
Carbon Disulfide	0.022				0.023	J	0.048	J	0.0035	J			0.0052	J			0.012	J	0.0076	J	0.023	
Chloroform																						
Dimethyl disulfide																						
Dimethyloctene																						
Ethylbenzene																						
Limonene							0.04	JN									0.02	JN				
Menthene											0.2	JN										
Methylene chloride																						
Pinene																	0.02	JN				
p-Isopropyltoluene									0.0081	J	0.034	J	0.0024	J	0.13	J	0.0052	J			0.0026	J
Toluene																	0.0018	J				
Trichlorofluoromethane																						
Xylenes,Total																						

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
B = Analyte is present in the associated method blank as well as in sample
mg/kg - milligrams per kilogram

TABLE 2-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SEDIMENT
OUTL SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD425 11/19/97		SD001000 10/15/98		SD002000 10/15/98		SD003000 10/15/98		SD004000 10/15/98		SD005000 10/15/98		206		207		208	
VOCs (mg/kg)																		
1,2,4-Trichlorobenzene																		
1,3,5-trimethylbenzene																		
1,3-Dichlorobenzene																		
1,4-Dichlorobenzene																		
1,6,7-Trimethylnaphthalene													0.0017	J	0.0009	J	0.0018	J
2-Butanone																		
Acetone					0.085	J												
Benzene					0.0041	J					0.0015	J						
Bromoform																		
Carbon Disulfide	0.01	J	0.015	J	0.0067	J												
Chloroform									0.037	J								
Dimethyl disulfide																		
Dimethyloctene					0.07	JN												
Ethylbenzene																		
Limonene																		
Menthene					0.1	JN												
Methylene chloride																		
Pinene									0.7	JN								
p-Isopropyltoluene			0.027		1	J			0.0076	J								
Toluene					0.0064						0.0023	J						
Trichlorofluoromethane																		
Xylenes, Total																		

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
B = Analyte is present in the associated method blank as well as in sample
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Analyte / Sample Identification / Sample Date	OU9-SD-0011 12/09/93		SD-001 4/1/1995		LF19-SD-0001 12/1/1995		WP23-SD-0001 12/1/1995		WP23-SD-9001 12/1/1995 Duplicate		OTFL-SD-0001 1/8/96		OTFL-SD-0002 1/8/96	
BNAs (mg/kg)														
(Butyloctyl)benzene														
(dimethylhexenyl)benzene														
(dimethylhexyl)benzene														
(Pentylheptyl)benzene														
1,2,4-Trichlorobenzene														
1-Methylnaphthalene														
1-methylphenanthrene														
2,3,5-trimethylnaphthalene														
2,4,6-Trichlorophenol														
2,4-Dichlorophenol														
2,4-Dimethylphenol														
2,4-Dinitrotoluene														
2,6-dimethylnaphthalene														
2,6-Dinitrotoluene														
2-Chloronaphthalene														
2-Chlorophenol														
2-Methylnaphthalene														
4-Methylphenol														
Acenaphthene														
Acenaphthylene														
Anthracene	0.53	J												
Benzo(a)anthracene	4.3													
Benzo(a)pyrene	3.5													
Benzo(b)fluoranthene	4.4													
Benzo(g,h,i)perylene	1.6													
Benzo(k)fluoranthene	3.5													
benzo[e]pyrene														
Benzofluoranene														
biphenyl, 1,1														
bis(2-ethylhexyl)phthalate													0.23	J
bis(Dimethylethyl)phenanthrene														
C1-Chrysenes														
C1-Dibenzothiophenes														
C1-Fluoranthenes/pyrenes														
C1-Fluorenes														
C1-Naphthalenes														
C1-Phenanthrenes/anthracenes														
C2-Chrysenes														
C2-Dibenzothiophenes														
C2-Fluorenes														
C2-Naphthalenes														
C2-Phenanthrenes/anthracenes														
C3-Chrysenes														
C3-Dibenzothiophenes														
C3-Fluorenes														
C3-Naphthalenes														
C3-Phenanthrenes/anthracenes														
C4-Chrysenes														
C4-Naphthalenes														
C4-Phenanthrenes/anthracenes														
Chrysene	6.3													
Destupene														
Dibenz(a,h)anthracene	0.5	J												
Dibenzothiophene														
Dibutyl Tin														
Di-n-butyl phthalate											0.99	J	7.7	
Dodecanoic Acid														
Fluoranthene	9.5				0.014	J	0.1	J	0.021	J				
Fluorene														
Hexachlorobenzene														
Hexadecanoic Acid														
Indeno(1,2,3-cd)pyrene	1.5													
Naphthalene														
Octadecenoic Acid														
perylene														
Phenanthrene	3.2						0.041	J						
Pyrene	7.9				0.012	J	0.085	J	0.018	J				
Tetradecanoic Acid														
Tetrahydrodiethyl(methyl)naphthalene			50	J										
Tetrahydronaphthalene														
Tributyl tin														
Trimethylbicycloheptane			50	J										

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg = milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11 SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Analyte / Sample Identification / Sample Date	OTFL-SD-0003 1/8/96		OTFL-SD-0004 1/9/96		OTFL-SD-0005 1/9/96		OTFL-SD-0006 1/9/96		SD101 11/16/97		SD102 11/13/97		SD102 11/13/97 Duplicate		SD103 11/13/97	
BNAs (mg/kg)																
(Butylocetyl)benzene																
(dimethylhexenyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene																
1 2 4-Trichlorobenzene																
1 Methylnaphthalene																
1 methylphenanthrene																
2 3 5-trimethylnaphthalene																
2,3,6 Trichlorophenol																
2 4-Dinitrophenol																
2 4-Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2 6-Dinitrotoluene																
2-Chloronaphthalene																
2-Chlorophenol																
2 Methylnaphthalene																
4 Methylphenol																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benzo(a)anthracene															0.043	J
Benzo(a)pyrene											0.038	J	0.045	J	0.065	J
Benzo(b)fluoranthene											0.05	J	0.052	J	0.083	J
Benzo(g,h,i)perylene											0.05	J	0.049	J	0.069	J
Benzo(k)fluoranthene											0.092	J	0.091	J	0.01	J
benzo[e]pyrene																
Benzofluorenone																
biphenyl (1,1)																
bis(2 ethylhexyl)phthalate					0.4	J										
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1 Dibenzothiophenes																
C1 Fluoranthenes/pyrenes																
C1-Fluorenes																
C1-Naphthalenes																
C1 Phenanthrenes/anthracenes																
C2-Chrysenes																
C2 Dibenzothiophenes																
C2 Fluorenes																
C2 Naphthalenes																
C2 Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4 Chrysenes																
C4 Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene											0.061	J	0.07	J	0.087	J
Desitupene																
Dibenz(a,h)anthracene																
Dibenzothiophene																
Dibutyl Tin									0.043	J						
Di n-butyl phthalate	0.75	J	0.93	J	7.5	J	6.4									
Dodecanoic Acid																
Fluoranthene											0.11	J	0.13	J	0.15	J
Fluorene																
Hexachlorobenzene																
Hexadecanoic Acid									2	JN						
Indeno(1,2,3-cd)pyrene											0.038	J	0.038	J	0.051	J
Naphthalene																
Octadecanoic Acid																
perylene																
Phenanthrene											0.069	J	0.042	J	0.043	J
Pyrene											0.057	J	0.08	J	0.12	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene																
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11 SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD104 11/16/97		SD105 11/13/97		SD106 11/14/97		SD107 11/16/97		SD108 11/14/97		SD109 11/15/97		SD110 11/15/97		SD110A 11/19/97	
BNAs (mg/kg)																
(Butyloctyl)benzene																
(dimethylhexenyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene																
1,2,4 Trichlorobenzene																
1-Methylnaphthalene																
1 methylphenanthrene																
2 3 5-trimethylnaphthalene																
2 4 6-Trichlorophenol																
2 4-Dichlorophenol																
2 4 Dimethylphenol																
2,4 Dinitrotoluene																
2 6-dimethylnaphthalene																
2 6 Dinitrotoluene																
2 Chloronaphthalene																
2 Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene																
Anthracene			0.016	J												
Benzo(a)anthracene			0.023	J	0.024	J	0.02	J							0.019	J
Benzo(a)pyrene			0.031	J	0.03	J	0.013	J							0.014	J
Benzo(b)fluoranthene	0.053	J	0.037	J	0.04	J	0.035	J			0.016	J	0.024	J	0.04	J
Benzo(g,h,i)perylene	0.03	J	0.026	J	0.038	J	0.023	J					0.024	J	0.019	J
Benzo(k)fluoranthene			0.057	J	0.083	J	0.02	J			0.02	J	0.024	J	0.015	J
benzo(e)pyrene																
Benzofluorenone																
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1 Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1 Fluorenes																
C1-Naphthalenes																
C1 Phenanthrenes/anthracenes																
C2-Chrysenes																
C2-Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2 Phenanthrenes/anthracenes																
C3-Chrysenes																
C3 Dibenzothiophenes																
C3-Fluorenes																
C3 Naphthalenes																
C3 Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene			0.03	J	0.05	J	0.015	J								
Desulpene																
Dibenz(a,h)anthracene																
Dibenzothiophene																
Dibutyl Tin																
Di-n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene	0.079	J	0.095	J	0.061	J	0.028	J			0.017	J	0.044	J	0.023	J
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid																
Indeno(1,2,3-cd)pyrene	0.025	J	0.022	J	0.02	J	0.019	J					0.017	J	0.016	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene	0.03	J	0.031	J	0.026	J	0.013	J								
Pyrene	0.046	J	0.097	J	0.07	J	0.034	J			0.014	J	0.044	J	0.025	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphtalene																
Tetrahydronaphthalene																
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD110B 11/19/97		SD110BDP 11/19/97		SD111 11/15/97		SD112 11/15/97		SD112 11/15/97 Duplicate		SD113 11/15/97		SD114 11/14/97		SD115 11/14/97	
BNAs (mg/kg)																
(Butylocyl)benzene																
(dimethylheptyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene																
1 2 4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2 3 5-trimethylnaphthalene																
2 4 6-Trichlorophenol																
2 4-Dichlorophenol																
2 4 Dimethylphenol																
2,4 Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2-Chloronaphthalene																
2 Chlorophenol																
2 Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benzo(a)anthracene							0.017	J			0.013	J			0.041	J
Benzo(a)pyrene											0.011	J			0.024	J
Benzo(b)fluoranthene							0.024	J	0.022	J	0.018	J			0.059	J
Benzo(g,h,i)perylene							0.018	J	0.015	J	0.016	J			0.045	J
Benzo(k)fluoranthene															0.05	J
benzo[e]pyrene																
Benzofluorerone																
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1-Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1 Fluorenes																
C1-Naphthalenes																
C1 Phenanthrenes/anthracenes																
C2 Chrysenes																
C2 Dibenzothiophenes																
C2 Fluorenes																
C2-Naphthalenes																
C2 Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene							0.012	J							0.021	J
Dethupene																
Dibenz(a,h)anthracene															0.017	J
Dibenzothiophene																
Dibutyl Tin									0.079	J						
Di-n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene							0.026	J	0.019	J	0.025	J			0.091	J
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid																
Indeno(1 2 3-cd)pyrene							0.013	J			0.011	J			0.022	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene											0.012	J				
Pyrene									0.013	J	0.018	J			0.036	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphtalene																
Tetrahydronaphthalene																
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD116 11/15/97		SD117 11/15/97		SD118 11/15/97		SD119 11/15/97		SD120 11/15/97		SD120A 11/19/97		SD120B 11/19/97		SD121 11/15/97	
BNAs (mg/kg)																
(Butylocyl)benzene																
(dimethylhexenyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene																
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2 3,5 trimethylnaphthalene																
2 4 6-Trichlorophenol																
2 4-Dichlorophenol																
2,4-Dimethylphenol																
2 4 Dinitrotoluene																
2,6-dimethylnaphthalene																
2 6-Dinitrotoluene																
2 Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benzo(a)anthracene			0.061	J	0.039	J	0.053	J	0.061	J	0.039	J	0.042	J	0.037	J
Benzo(a)pyrene			0.075	J			0.074	J	0.16	J	0.033	J	0.031	J	0.035	J
Benzo(b)fluoranthene			0.14	J	0.057	J	0.11	J	0.21	J	0.087	J	0.12	J	0.054	J
Benzo(g,h,i)perylene			0.086	J	0.074	J	0.091	J	0.085	J	0.057	J	0.049	J	0.039	J
Benzo(k)fluoranthene			0.037	J			0.064	J	0.045	J	0.045	J	0.03	J	0.024	J
benzo(e)pyrene																
Benzofluorenone																
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1 Dibenzothiophenes																
C1 Fluoranthenes/pyrenes																
C1 Fluorenes																
C1 Naphthalenes																
C1 Phenanthrenes/anthracenes																
C2-Chrysenes																
C2-Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2 Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3 Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene			0.055	J	0.05	J	0.062	J	0.077	J	0.03	J	0.031	J	0.035	J
Dehydropyrene																
Dibenz(a,h)anthracene			0.024	J												
Dibenzothiophene																
Dibutyl Tin															0.036	J
Di-n butyl phthalate																
Dodecanoic Acid																
Fluoranthene			0.17	J	0.32	J	0.17	J	0.3	J	0.06	J	0.08	J	0.065	J
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid											4	JN			2	JN
Indeno(1,2,3-cd)pyrene			0.089	J	0.06	J	0.077	J	0.077	J	0.051	J	0.045	J	0.03	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene			0.022	J	0.06	J	0.032	J	0.04	J						
Pyrene			0.36	J	0.082	J	0.17	J	0.2	J	0.046	J	0.066	J	0.046	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene																
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD122 11/15/97		SD123 11/15/97		SD123 11/15/97 Duplicate		SD124 11/15/97		SD125 11/15/97		SD126 11/15/97		SD127 11/15/97		SD128 11/16/97	
BNAs (mg/kg)																
(Butylocyl)benzene																
(dimethylhexenyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene																
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2,3,5-trimethylnaphthalene																
2,4,6-Trichlorophenol																
2,4-Dichlorophenol																
2,4-Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2-Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene																
Anthracene																
Benzo(a)anthracene	0.042	J	0.031	J	0.026	J	0.081	J	0.042	J	0.064	J	0.052	J	0.046	J
Benzo(a)pyrene	0.046	J	0.042	J	0.03	J	0.063	J	0.046	J	0.083	J	0.052	J	0.056	J
Benzo(b)fluoranthene	0.091	J	0.058	J	0.046	J	0.1	J	0.067	J	0.12	J	0.07	J	0.094	J
Benzo(g,h,i)perylene	0.07	J	0.053	J	0.039	J	0.076	J	0.074	J	0.098	J	0.052	J	0.063	J
Benzo(k)fluoranthene	0.039	J			0.024	J	0.047	J	0.035	J	0.056	J	0.041	J	0.058	J
benzo(e)pyrene																
Benzofluorenone																
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1-Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1-Fluorenes																
C1-Naphthalenes																
C1 Phenanthrenes/anthracenes																
C2 Chrysenes																
C2 Dibenzothiophenes																
C2 Fluorenes																
C2 Naphthalenes																
C2 Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3 Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene	0.042	J	0.031	J	0.02	J	0.05	J	0.039	J	0.064	J	0.034	J	0.043	J
Destrypene																
Dibenz(a,h)anthracene															0.024	J
Dibenzothiophene																
Dibutyl Tin			0.092	J												
Di n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene			0.069	J	0.057	J	0.11	J	0.088	J	0.31	J	0.09	J	0.13	J
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid	5	JN			4	JN	4	JN	5	JN						
Indeno(1,2,3-cd)pyrene	0.053	J	0.044	J	0.031	J	0.063	J	0.056	J	0.083	J	0.041	J	0.048	J
Naphthalene																
Octadecenoic Acid					2	JN	3	JN	6	JN						
perylene																
Phenanthrene							0.076	J			0.049	J	0.022	J	0.031	J
Pyrene	0.063	J	0.053	J	0.041	J	0.08	J	0.06	J	0.12	J	0.054	J	0.084	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphtalene																
Tetrahydronaphthalene																
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD202 11/14/97		SD203 11/13/97		SD204 11/13/97		SD205 11/14/97		SD205 11/15/97		SD206 11/14/97		SD206 11/14/97 Duplicate		SD207 11/14/97	
BNAs (mg/kg)																
[Butyloctyl]benzene																
(dimethylheptyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene																
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2,3,5-trimethylnaphthalene																
2,4,6-Trichlorophenol																
2,4-Dichlorophenol																
2,4-Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2-Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene																
Anthracene							0.024	J			0.04	J	0.04	J		
Benzo(a)anthracene	0.059	J	0.074	J	0.078	J	0.059	J	0.065	J	0.08	J	0.074	J		
Benzo(a)pyrene	0.049	J	0.071	J	0.066	J	0.067	J	0.091	J	0.086	J	0.079	J	0.15	J
Benzo(b)fluoranthene	0.089	J	0.074	J	0.14	J	0.083	J	0.13	J	0.15	J	0.11	J	0.22	J
Benzo(g,h,i)perylene	0.087	J	0.12	J	0.084	J	0.078	J	0.096	J	0.13	J	0.12	J	0.19	J
Benzo(k)fluoranthene	0.087	J	0.08	J	0.11	J	0.15	J	0.037	J	0.13	J	0.22	J	0.14	J
benzo(e)pyrene																
Benzofluorenone			6	JN												
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene															10	JN
C1-Chrysenes																
C1-Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1-Fluorenes																
C1-Naphthalenes																
C1-Phenanthrenes/anthracenes																
C2-Chrysenes																
C2-Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2-Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene	0.042	J	0.044	J	0.042	J	0.093	J	0.059	J	0.15	J	0.15	J		
Desiupene															10	JN
Dibenz(a,h)anthracene	0.036	J	0.041	J	0.033	J	0.03	J			0.043	J	0.045	J	0.06	J
Dibenzothiophene																
Dibutyl Tin																
Di-n-butyl phthalate																
Dodecanoic Acid							1	JN					3			
Fluoranthene	0.16	J	0.24	J	0.22	J	0.21	J	0.25	J	0.28	J	0.26	J	0.32	J
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid																
Indeno(1,2,3-cd)pyrene	0.062	J	0.092	J	0.072	J	0.057	J	0.082	J	0.11	J	0.1	J	0.15	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene							0.025	J	0.04	J	0.055	J	0.057	J	0.046	J
Pyrene	0.1	J	0.14	J	0.14	J	0.14	J	0.14	J	0.16	J	0.14	J	0.34	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene																
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg = milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD208 11/15/97		SD209 11/15/97		SD210 11/15/97		SD211 11/15/97		SD211A 11/19/97		SD211B 11/19/97		SD212 11/15/97		SD213 11/15/97	
BNAs (mg/kg)																
(Butyloctyl)benzene																
(dimethylheptenyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene																
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2,3,5-trimethylnaphthalene																
2,4,5-Trichlorophenol																
2,4-Dichlorophenol																
2,4-Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2-Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene																
Anthracene							0.045	J	0.052	J	0.05	J				
Benzo(a)anthracene	0.078	J	0.081	J	0.13	J	0.11	J	0.14	J	0.13	J	0.099	J	0.068	J
Benzo(a)pyrene	0.054	J	0.07	J	0.073	J	0.071	J	0.11	J	0.11	J	0.094	J	0.1	J
Benzo(b)fluoranthene	0.12	J	0.15	J	0.13	J	0.16	J	0.3	J	0.3	J	0.21	J	0.19	J
Benzo(g,h,i)perylene	0.14	J	0.14	J	0.14	J	0.15	J	0.15	J	0.16	J	0.17	J	0.16	J
Benzo(k)fluoranthene	0.078	J	0.05	J	0.052	J	0.09	J	0.092	J	0.16	J	0.073	J	0.063	J
benzo(e)pyrene																
Benzofluorenone																
biphenyl 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1-Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1-Fluorenes																
C1-Naphthalenes																
C1-Phenanthrenes/anthracenes																
C2-Chrysenes																
C2-Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2-Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene	0.074	J	0.081	J	0.11	J	0.12	J	0.13	J	0.14	J	0.087	J	0.079	J
Destupene																
Dibenz(a,h)anthracene					0.041	J	0.045	J	0.049	J	0.054	J	0.05	J	0.039	J
Dibenzothiophene																
Dibutyl Tin											0.076	J				
Di-n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene	0.38	J	0.22	J	0.3	J	0.52	J	0.56	J	0.48		0.22	J	0.16	J
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid																
Indeno(1,2,3-cd)pyrene	0.1	J	0.1	J	0.11	J	0.13	J	0.13	J	0.15	J	0.14	J	0.11	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene			0.045	J	0.11	J	0.093	J	0.052	J	0.066	J	0.041	J	0.036	J
Pyrene	0.16	J	0.15	J	0.22	J	0.24	J	0.29	J	0.34	J	0.16	J	0.12	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene																
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD214 11/15/97		SD215 11/15/97		SD215 11/15/97 Duplicate		SD216 11/15/97		SD217 11/15/97		SD218 11/15/97		SD219 11/15/97		SD220 11/15/97	
BNAs (mg/kg)																
(Butylocyl)benzene																
(dimethylhexenyl)benzene																
(dimethylhexyl)benzene																
(Pentylhepryl)benzene																
1,2,4 Trichlorobenzene																
1-Methylnaphthalene																
1 methylphenanthrene																
2 3,5-trimethylnaphthalene																
2 4 6-Trichlorophenol																
2 4-Dichlorophenol																
2 4 Dimethylphenol																
2 4 Dinitrotoluene																
2,6-dimethylnaphthalene																
2 6-Dinitrotoluene																
2 Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4 Methylphenol													1 4			
Acenaphthene																
Acenaphthylene			0 024	J	0 024	J							0 054	J		
Anthracene																
Benzo(a)anthracene	0 13	J	0 11	J	0 088	J	0 12	J	0 09	J	0 08	J	0 13	J	0 092	J
Benzo(a)pyrene	0 17	J	0 08	J	0 071	J	0 14	J	0 16	J	0 13	J	0 092	J	0 1	J
Benzo(b)fluoranthene	0 22	J	0 23	J	0 17	J	0 3	J	0 23	J	0 25	J	0 23	J	0 32	J
Benzo(g,h,i)perylene	0 22	J	0 13	J	0 14	J	0 24	J	0 17	J	0 14	J	0 2	J	0 18	J
Benzo(k)fluoranthene	0 042	J	0 11	J	0 091	J	0 12	J	0 13	J	0 075	J	0 14	J	0 073	J
benzo(e)pyrene																
Benzofluorenone																
biphenyl 1,1																
bis(2 ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1 Dibenzothiophenes																
C1 Fluoranthenes/pyrenes																
C1-Fluorenes																
C1 Naphthalenes																
C1 Phenanthrenes/anthracenes																
C2 Chrysenes																
C2 Dibenzothiophenes																
C2 Fluorenes																
C2-Naphthalenes																
C2 Phenanthrenes/anthracenes																
C3 Chrysenes																
C3-Dibenzothiophenes																
C3 Fluorenes																
C3 Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4 Phenanthrenes/anthracenes																
Chrysene	0 1	J	0 12	J	0 076	J	0 11	J	0 095	J	0 08	J	0 11	J	0 092	J
Desluorene																
Dibenz(a,h)anthracene	0 067	J					0 077	J			0 05	J	0 069	J	0 063	J
Dibenzothiophene																
Dibutyl Tin																
Di-n butyl phthalate																
Dodecanoic Acid																
Fluoranthene	0 42	J	0 53	J	0 41	J	0 44	J	0 47	J	0 25	J	0 98		0 25	J
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid																
Indeno(1 2 3-cd)pyrene	0 18	J	0 15	J	0 12	J	0 18	J	0 13	J	0 12	J	0 18	J	0 16	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene	0 067	J	0 055	J	0 046	J	0 066	J	0 077	J	0 05	J	0 096	J	0 055	J
Pyrene	0 23	J	0 24	J	0 18	J	0 24	J	0 18	J	0 16	J	0 28	J	0 2	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene			4	JN			3	JN	10	JN	6	JN	6	JN		
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD221 11/16/97		SD222 11/16/97		SD301 11/16/97		SD302 11/16/97		SD302 11/16/97 Duplicate		SD303 11/16/97		SD304 11/16/97		SD401 11/16/97	
BNAs (mg/kg)																
(Butyloctyl)benzene							7	JN	3	JN						
(dimethylhexenyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene							8	JN	5	JN			4	JN		
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2,3,5-trimethylnaphthalene																
2,4,6-Trichlorophenol																
2,4-Dichlorophenol																
2,4-Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2-Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene			0.053	J	0.058	J	0.056	J	0.039	J						
Anthracene					0.053	J									0.036	J
Benzo(a)anthracene	0.081	J	0.17	J	0.37	J	0.22	J	0.18	J	0.14	J	0.18	J	0.15	J
Benzo(a)pyrene	0.1	J	0.23	J	0.24	J	0.15	J	0.14	J	0.15	J	0.16	J	0.18	J
Benzo(b)fluoranthene	0.13	J	0.44	J	0.45	J	0.52	J	0.32	J	0.38	J	0.32	J	0.4	J
Benzo(g,h,i)perylene	0.13	J	0.25	J	0.37	J	0.37	J	0.24	J	0.29	J	0.25	J	0.26	J
Benzo(k)fluoranthene	0.083	J	0.12	J	0.2	J	0.18	J	0.18	J	0.15	J	0.28	J	0.24	J
Benzo(e)pyrene																
Benzofluoranene																
biphenyl																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1-Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1-Fluorenes																
C1-Naphthalenes																
C1-Phenanthrenes/anthracenes																
C2-Chrysenes																
C2-Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2-Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene	0.069	J	0.15	J	0.29	J	0.21	J	0.15	J	0.15	J	0.17	J	0.28	J
Desiupene																
Dibenz(a,h)anthracene	0.045	J	0.087	J	0.13	J	0.13	J	0.088	J	0.096	J	0.11	J	0.096	J
Dibenzothiophene																
Dibutyl Tin	0.078	J	0.33	J	0.54		0.28	J								
Di-n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene	0.34	J	0.8	J	1.8		1.7		1.3		0.63	J	0.9		0.65	
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid																
Indeno(1,2,3-cd)pyrene	0.11	J	0.19	J	0.31	J	0.32	J	0.22	J	0.24	J	0.23	J	0.24	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene	0.048	J	0.092	J	0.24	J	0.14	J	0.092	J	0.077	J	0.085	J	0.076	J
Pyrene	0.15	J	0.35	J	0.61	J	0.51	J	0.39	J	0.35	J	0.61	J	0.54	
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphtalene																
Tetrahydronaphthalene					7	JN					10	JN	10	JN		
Tributyl tin					0.86		1.2		1		1.5		1.2			
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD402 11/16/97		SD403 11/16/97		SD403 11/16/97 Duplicate		SD404 11/16/97		SD405 11/16/97		SD406 11/16/97		SD407 11/18/97		SD408 11/18/97	
BNAs (mg/kg)																
(Butylbutyl)benzene									4	JN						
(dimethylhexenyl)benzene																
(dimethylhexyl)benzene																
(Pentylhepryl)benzene									5	JN					4	JN
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2,3,5 trimethylnaphthalene																
2,4,6-Trichlorophenol																
2,4 Dichlorophenol																
2,4 Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2 Chloronaphthalene																
2 Chlorophenol																
2 Methylnaphthalene																
4-Methylphenol																
Acenaphthene			0.11	J	0.05	J										
Acenaphthylene			0.024	J											0.046	J
Anthracene			0.031	J									0.045	J		
Benzo(a)anthracene	0.055	J	0.17	J	0.16	J	0.13	J	0.2	J	0.16	J	0.25	J	0.17	J
Benzo(a)pyrene	0.13	J	0.16	J	0.15	J	0.16	J	0.24	J	0.15	J	0.2	J	0.2	J
Benzo(b)fluoranthene	0.19	J	0.55	J	0.37	J	0.28	J	0.55	J	0.33	J	0.41	J	0.78	J
Benzo(g,h,i)perylene	0.11	J	0.22	J	0.28	J	0.23	J	0.33	J	0.19	J	0.24	J	0.26	J
Benzo(k)fluoranthene	0.068	J	0.12	J	0.14	J	0.19	J	0.19	J	0.12	J	0.23	J	0.11	J
benzo(e)pyrene																
Benzofluoronone																
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1 Dibenzothiophenes																
C1 Fluoranthenes/pyrenes																
C1 Fluorenes																
C1-Naphthalenes																
C1 Phenanthrenes/anthracenes																
C2 Chrysenes																
C2 Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2-Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3 Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene	0.079	J	0.15	J	0.16	J	0.13	J	0.2	J	0.14	J	0.2	J	0.17	J
Desluopene																
Dibenz(a,h)anthracene	0.035	J	0.072	J	0.078	J	0.069	J	0.1	J	0.068	J	0.075	J	0.089	J
Dibenzothiophene																
Dibutyl Tin																
Di-n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene	0.18	J	1.3		0.98		0.59	J	0.68	J	0.45	J	1.2		1	
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid																
Indeno(1,2,3-cd)pyrene	0.098	J	0.17	J	0.22	J	0.19	J	0.29	J	0.17	J	0.21	J	0.23	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene	0.035	J	0.074	J	0.055	J	0.056	J	0.099	J	0.14	J	0.075	J	0.042	J
Pyrene	0.12	J	0.86		0.68		0.33	J	0.51	J	0.33	J	0.6	J	0.48	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene					5	JN	10	JN					4	JN	7	JN
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD409 11/18/97		SD410 11/18/97		SD411 11/18/97		SD412 11/18/97		SD413 11/18/97		SD414 11/18/97		SD415 11/18/97		SD416 11/18/97	
BNAs (mg/kg)																
(Butyloctyl)benzene																
(dimethylbutenyl)benzene																
(dimethylhexyl)benzene																
(Pentylheptyl)benzene							3	JN								
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2,3,5-trimethylnaphthalene																
2,4,6-Trichlorophenol																
2,4-Dichlorophenol																
2,4-Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2-Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene																
Acenaphthylene									0.036	J					0.04	J
Anthracene																
Benzo(a)anthracene	0.13	J	0.17	J	0.16	J	0.17	J	0.21	J	0.14	J	0.1	J	0.18	J
Benzo(a)pyrene	0.25	J	0.062	J	0.2	J	0.25	J	0.23	J	0.16	J	0.1	J	0.15	J
Benzo(b)fluoranthene	0.7		0.47	J	0.75		0.94		0.68		0.52		0.21	J	0.37	J
Benzo(g,h,i)perylene	0.33	J	0.18	J	0.28	J	0.38	J	0.32	J	0.22	J	0.17	J	0.29	J
Benzo(k)fluoranthene	0.66		0.18	J	0.48		0.72		0.17	J	0.15	J	0.12	J	0.19	J
benzo(e)pyrene																
Benzofluorenone																
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1-Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1-Fluorenes																
C1-Naphthalenes																
C1-Phenanthrenes/anthracenes																
C2-Chrysenes																
C2-Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2-Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene	0.11	J	0.13	J	0.12	J	0.14	J	0.21	J	0.12	J	0.087	J	0.16	J
Desiupene																
Dibenz(a,h)anthracene	0.11	J	0.067	J	0.096	J	0.13	J	0.095	J	0.069	J	0.052	J	0.097	J
Dibenzothiophene																
Dibutyl Tin																
Di-n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene	0.34	J	0.36	J	0.43		0.6	J	0.88		0.43	J	0.34	J	1.3	
Fluorene																
Hexachlorobenzene																
Hexadecenoic Acid			3	JN												
Indeno(1,2,3-cd)pyrene	0.3	J	0.17	J	0.25	J	0.33	J	0.26	J	0.19	J	0.14	J	0.24	J
Naphthalene																
Octadecenoic Acid																
perylene																
Phenanthrene	0.043	J	0.039	J	0.078	J	0.047	J	0.052	J	0.052	J	0.034	J	0.043	J
Pyrene	0.28	J	0.35	J	0.37		0.34	J	0.43	J	0.32	J	0.28	J	0.46	J
Tetradecanoic Acid			5	JN												
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene									6	JN						
Tributyl tin																
Trimethylbicycloheptane																

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11 SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD417 11/18/97		SD417 11/18/97 Duplicate		SD418 11/18/97		SD419 11/18/97		SD420 11/18/97		SD421 11/18/97		SD422 11/18/97		SD423 11/18/97	
BNAs (mg/kg)																
(Butylbutyl)benzene																
(dimethylhexenyl)benzene											5	JN				
(dimethylhexyl)benzene					3	JN										
(Pentylheptyl)benzene			3	JN												
1,2,4-Trichlorobenzene																
1-Methylnaphthalene																
1-methylphenanthrene																
2,3,5-trimethylnaphthalene																
2,4,6-Trichlorophenol																
2,4-Dichlorophenol																
2,4-Dimethylphenol																
2,4-Dinitrotoluene																
2,6-dimethylnaphthalene																
2,6-Dinitrotoluene																
2-Chloronaphthalene																
2-Chlorophenol																
2-Methylnaphthalene																
4-Methylphenol																
Acenaphthene											0.1	J				
Acenaphthylene							0.079	J	0.014	J	0.047	J	0.04	J		
Anthracene							0.21	J	0.02	J	0.15	J	0.081	J	0.029	J
Benzo(a)anthracene	0.15	J	0.19	J	0.14	J	2.1		0.15	J	1		0.54		0.19	J
Benzo(a)pyrene	0.13	J	0.17	J	0.12	J	1.4		0.16	J	0.82		0.56		0.18	J
Benzo(b)fluoranthene	0.28	J	0.31	J	0.27	J	2.2		0.38		1.2		0.96		0.43	J
Benzo(g,h,i)perylene	0.22	J	0.28	J	0.19	J	0.99		0.22	J	0.63		0.49		0.24	J
Benzo(k)fluoranthene	0.13	J	0.18	J	0.11	J	1.4		0.1	J	0.66		0.37		0.15	J
benzo(c)pyrene																
Benzofluoronone																
biphenyl, 1,1																
bis(2-ethylhexyl)phthalate																
bis(Dimethylethyl)phenanthrene																
C1-Chrysenes																
C1-Dibenzothiophenes																
C1-Fluoranthenes/pyrenes																
C1-Fluorenes																
C1-Naphthalenes																
C1-Phenanthrenes/anthracenes																
C2-Chrysenes																
C2-Dibenzothiophenes																
C2-Fluorenes																
C2-Naphthalenes																
C2-Phenanthrenes/anthracenes																
C3-Chrysenes																
C3-Dibenzothiophenes																
C3-Fluorenes																
C3-Naphthalenes																
C3-Phenanthrenes/anthracenes																
C4-Chrysenes																
C4-Naphthalenes																
C4-Phenanthrenes/anthracenes																
Chrysene	0.12	J	0.14	J	0.1	J	0.99		0.13	J	0.67		0.69		0.17	J
Desulfurene																
Dibenz(a,h)anthracene	0.071	J	0.092	J	0.063	J	0.44	J	0.073	J	0.27	J	0.2	J	0.078	J
Dibenzothiophene																
Dibutyl Tin																
Di-n-butyl phthalate																
Dodecanoic Acid																
Fluoranthene	0.99		1.1		0.41	J	1.4		0.34		2.3		0.94		0.54	
Fluorene											0.077	J				
Hexachlorobenzene																
Hexadecanoic Acid																
Indeno(1,2,3-cd)pyrene	0.18	J	0.23	J	0.16	J	0.8		0.19	J	0.54	J	0.48		0.2	J
Naphthalene																
Octadecanoic Acid																
perylene																
Phenanthrene	0.039	J	0.052	J	0.046	J	0.22	J	0.053	J	0.6		0.17	J	0.15	J
Pyrene	0.3	J	0.51	J	0.35	J	1.4		0.31		1.7		0.66		0.36	J
Tetradecanoic Acid																
Tetrahydrodiethyl(methyl)naphthalene																
Tetrahydronaphthalene	4	JN			4	JN	3	JN			3	JN				
Tributyl tin																
Trimethylbicycloheptane																

Notes:
Qualifier
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU-11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD424 11/19/97		SD425 11/19/97		SD001000 10/15/98		SD002000 10/15/98		SD003000 10/15/98		SD004000 10/15/98		SD005000 10/15/98	
BNAs (mg/kg)														
(Butyloctyl)benzene														
(dimethylhexenyl)benzene			4	JN										
(dimethylhexyl)benzene														
(Pentylheptyl)benzene														
1 2 4-Trichlorobenzene														
1 Methylnaphthalene														
1-methylphenanthrene														
2,3 5-trimethylnaphthalene														
2,4 6-Trichlorophenol														
2,4-Dichlorophenol														
2,4-Dimethylphenol														
2,4-Dinitrotoluene														
2 6-dimethylnaphthalene														
2,6-Dinitrotoluene														
2-Chloronaphthalene														
2 Chlor[illegible]														
2 Me[illegible]														
4 Methylphenol														
Acenaphthene	0 031	J	0 048	J										
Acenaphthylene	0 11	J	0 2	J										
Anthracene	0 15	J	0 27	J										
Benzo(a)anthracene	1 5		3 4		0 024	J	0 008	J			0 04	J	0 011	J
Benzo(a)pyrene			2 4		0 07	J	0 012	J			0 19	J	0 058	J
Benzo(b)fluoranthene			6 2		0 048	J	0 015	J			0 096	J	0 029	J
Benzo(g,h,i)perylene			1 8		0 049	J					0 055	J	0 071	J
Benzo(k)fluoranthene	0 82		1 3		0 034	J	0 01	J			0 078	J	0 018	J
benzo(e)pyrene														
Benzofluorenone														
biphenyl 1 1														
bis(2 ethylhexyl)phthalate														
bis(Dimethylethyl)phenanthrene														
C1-Chrysenes														
C1-Dibenzothiophenes														
C1-Fluoranthenes/pyrenes														
C1-Fluorenes														
C1-Naphthalenes														
C1 Phenanthrenes/anthracenes														
C2 Chrysenes														
C2-Dibenzothiophenes														
C2-Fluorenes														
C2-Naphthalenes														
C2 Phenanthrenes/anthracenes														
C3 Chrysenes														
C3-Dibenzothiophenes														
C3 Fluorenes														
C3-Naphthalenes														
C3-Phenanthrenes/anthracenes														
C4-Chrysenes														
C4-Naphthalenes														
C4 Phenanthrenes/anthracenes														
Chrysene	1 2		2 1		0 05	J	0 013	J			0 084	J	0 02	J
Desitepene														
Dibenz(a,h)anthracene	0 39	J	0 55	J	0 019	J					0 04	J	0 02	J
Dibenzothiophene														
Dibutyl Tin			0 16	J										
Di-n-butyl phthalate														
Dodecanoic Acid			6	JN										
Fluoranthene	3 1		5 4		0 032	J	0 014	J			0 051	J	0 013	J
Fluorene	0 031	J	0 051	J										
Hexachlorobenzene														
Hexadecenoic Acid													0 9	JN
Indeno(1,2,3-cd)pyrene	0 9		1 7		0 034	J					0 05	J	0 018	J
Naphthalene														
Octadecenoic Acid														
perylene														
Phenanthrene	0 22	J	0 25	J							0 025	J	0 014	J
Pyrene	2 4		4 5		0 078	J	0 022	J			0 12	J	0 04	J
Tetradecanoic Acid														
Tetrahydrodiethyl(methyl)naphthalene														
Tetrahydronaphthalene			5	JN										
Tributyl tin														
Trimethylbicycloheptane														

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-2

SUMMARY OF BASE NEUTRAL/ACID EXTRACTABLE COMPOUNDS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	206		207		208		M10102	M10103
BNAs (mg/kg)								
[Butyloctyl]benzene								
[dimethyl[hexenyl]benzene								
[dimethylhexyl]benzene								
[Pentylheptyl]benzene								
1,2,4-Trichlorobenzene								
1-Methylnaphthalene	0.0046	J	0.0021	J	0.0027	J		0.2399946
1-methylphenanthrene	0.0047		0.0026		0.0032			
2,3,5-trimethylnaphthalene								0.0327314
2,4,6-Trichlorophenol								
2,4-Dichlorophenol								
2,4-Dimethylphenol								
2,4-Dinitrotoluene								
2,6-dimethylnaphthalene	0.0283		0.0067		0.0228			0.1501047
2,6-Dinitrotoluene								
2-Chloronaphthalene								
2-Chlorophenol								
2-Methylnaphthalene	0.0057	J	0.0029	J	0.0032	J		0.6179155
4-Methylphenol								
Acenaphthene	0.0044		0.0028		0.0023	J		0.5707976
Acenaphthylene	0.0046		0.0038		0.0048			0.042755
Anthracene	0.007		0.0058		0.0089			0.2463941
Benzo(a)anthracene	0.041		0.0363		0.0461		0.0523	
Benzo(a)pyrene	0.0811		0.0634		0.1005		0.04077	0.0441853
Benzo(b)fluoranthene	0.19		0.1619		0.2001		0.12074	0.375726
Benzo(g,h,i)perylene	0.0947		0.0659		0.1086			
Benzo(k)fluoranthene	0.0666		0.0469		0.1151		0.05556	0.0474563
benzo[c]pyrene	0.0839		0.0717		0.1045		0.10747	0.0517747
Benzofluoronone								
biphenyl 1,1	0.0025		0.0016		0.0028			0.1183268
bis(2-ethylhexyl)phthalate								
bis(Dimethylethyl)phenanthrene								
C1-Chrysenes	0.0569		0.0349		0.0546			
C1-Dibenzothiophenes	0.0052		0.0037		0.0078			
C1-Fluoranthenes/pyrenes	0.0524		0.06		0.0654			
C1-Fluorenes	0.0035	J	0.0029	J	0.0051	J		
C1-Naphthalenes	0.0102	J	0.005	J	0.0059	J		
C1-Phenanthrenes/anthracenes	0.0176		0.0108		0.0182			
C2-Chrysenes	0.0907		0.0248		0.0429			
C2-Dibenzothiophenes	0.0125		0.0121		0.0113			
C2-Fluorenes	0.0199		0.0148		0.0193			
C2-Naphthalenes	0.0226		0.0106		0.0193			
C2-Phenanthrenes/anthracenes	0.0383		0.0269		0.0617			
C3-Chrysenes	0.0099		0.0172					
C3-Dibenzothiophenes	0.0347		0.024		0.0262			
C3-Fluorenes	0.0233		0.0393		0.0423			
C3-Naphthalenes	0.0214		0.0104		0.0212			
C3-Phenanthrenes/anthracenes	0.0358		0.0359		0.0476			
C4-Chrysenes	0.0312				0.0303			
C4-Naphthalenes	0.0105		0.0081		0.0122			
C4-Phenanthrenes/anthracenes	0.0525		0.0428		0.0582			
Chrysene	0.0635		0.0464		0.0849		0.04559	
Desluperne								
Dibenz(a,h)anthracene	0.0198		0.0134		0.0236			
Dibenzothiophene	0.0022		0.0012		0.0028			
Dibutyl Tin								
Di-n-butyl phthalate								
Dodecanoic Acid								
Fluoranthene	0.0874		0.0743		0.1394		0.13604	1.4379632
Fluorene	0.0025	J	0.0022		0.0023			0.6062794
Hexachlorobenzene			0.00013	J				
Hexadecenoic Acid								
Indeno(1,2,3-cd)pyrene	0.0974		0.0738		0.1153			
Naphthalene	0.0146		0.0111		0.0119			0.2016074
Octadecenoic Acid								
perylene	0.0171		0.0127		0.0222			
Phenanthrene	0.0145		0.0145		0.0171		0.00575	1.5379585
Pyrene	0.0751		0.0776		0.1046		0.05212	0.5259345
Tetradecanoic Acid								
Tetrahydrodethyl(methyl)naphtalene								
Tetrahydronaphthalene								
Tributyl tin								
Trimethylbicycloheptane								

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	OU9-SD-0011 12/09/93		SD-001 4/1/95		SD-002 5/24/95		SD-003 5/24/95		SD-004 5/24/95		LF19-SD-0001 12/1/95		WP23-SD-0001 12/1/95		WP23-SD-9001 12/1/95	
OC Pest/PCBs (mg/kg)																
Aldrin																
alpha endosulfan (Endosulfan I)																
alpha-BHC																
alpha-Chlordane									0.05	N	0.0073					
alpha-Chlordene									0.07							
Aroclor 1254																
Aroclors (Total PCBs)																
beta Endosulfan (Endosulfan II)																
beta-BHC																
beta-Chlordene									0.011	J						
carbophenothion									0.92							
Chlordane									0.039							
Chlordene																
cis-Nonachlor																
Dieldrin																
gamma-BHC																
gamma-Chlordane									0.18		0.0056					
gamma-Chlordene									0.012	J						
HCH-technical																
Heptachlor																
Heptachlor epoxide																
Mirex																
o,p-DDE																
Oxychlordane									0.011	N						
4,4'-DDD											0.0018	JP	0.002	J	0.00059	JP
4,4'-DDE					0.13		0.062	J	0.173		0.0081		0.0021	JP	0.0011	JP
4,4'-DDT			0.035	J							0.0035	J	0.003	J	0.001	JP
Toxaphene																
Trans Nonachlor									0.057							
Herbicides (mg/kg)																
2,4,5-Trichlorophenoxyacetic acid																
Dicamba																
Silvex																

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	OTFL-SD-0001 1/8/96		OTFL-SD-0002 1/8/96		OTFL-SD-0003 1/8/96		OTFL-SD-0004 1/9/96		OTFL-SD-0005 1/9/96		OTFL-SD-0006 1/9/96		SD101 11/16/97		SD102 11/13/97	
OC Pest/PCBs (mg/kg)																
Aldrin	0.0071	J														
alpha endosulfan (Endosulfan I)																
alpha-BHC																
alpha Chlordane																
alpha-Chlordene																
Aroclor 1254													0.02	J	0.07	J
Aroclors (Total PCBs)																
beta Endosulfan (Endosulfan II)																
beta-BHC																
beta-Chlordene																
carbophenothion																
Chlordane																
Chlordene													0.00048	N	0.00079	J
cis-Nonachlor																
Dieldrin																
gamma-BHC																
gamma-Chlordane																
gamma-Chlordene																
HCH technical																
Heptachlor																
Heptachlor epoxide	0.0068	J														
Mirex																
o,p-DDE																
Oxychlordane																
4,4'-DDD																
4,4'-DDE	0.014	J	0.02	J	0.017	J	0.0061	J					0.00085		0.0052	
4,4'-DDT	0.033	J	0.021	J												
Toxaphene																
Trans Nonachlor																
Herbicides (mg/kg)																
2,4,5-Trichlorophenoxyacetic acid																
Dicamba																
Silvex													0.011	JN		

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD102 11/13/97		SD103 11/13/97		SD104 11/16/97		SD105 11/13/97	SD106 11/14/97		SD107 11/16/97		SD108 11/14/97	SD109 11/15/97	
OC Pest/PCBs (mg/kg)														
Aldrin														
alpha endosulfan (Endosulfan I)														
alpha-BHC														
alpha-Chlordane														
alpha-Chlordene														
Aroclor 1254	0.087		0.056	J	0.13		0.031	0.057		0.031				
Aroclors (Total PCBs)														
beta Endosulfan (Endosulfan II)														
beta-BHC														
beta Chlordene														
carbophenothion														
Chlordane														
Chlordene	0.0025	J	0.0011	J	0.0074		0.0024	0.0074		0.0038		0.001	0.0012	
cis-Nonachlor														
Dieldrin														
gamma-BHC														
gamma-Chlordane														
gamma-Chlordene														
HCH-technical														
Heptachlor														
Heptachlor epoxide														
Mirex														
o,p-DDE														
Oxychlordane														
4,4'-DDD												0.0038	0.0014	JN
4,4'-DDE	0.012		0.0088		0.026		0.015	0.026		0.018		0.003	0.0085	
4,4'-DDT												0.022		
Toxaphene														
Trans Nonachlor														
Herbicides (mg/kg)														
2,4,5-Trichlorophenoxyacetic acid														
Dicamba														
Silvex	0.018	JN	0.035	JN	0.008	JN		0.0049	JN	0.011	JN		0.0086	JN

Notes
Qualifiers
J = Estimated value
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mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD110 11/15/97		SD110A 11/19/97		SD110B 11/19/97		SD110BDP 11/19/97		SD111 11/15/97		SD112 11/15/97		SD112 11/15/97		SD113 11/15/97
OC Pest/PCBs (mg/kg)															
Aldrin															
alpha endosulfan (Endosulfan I)															
alpha-BHC															
alpha-Chlordane															
alpha-Chlordene															
Aroclor 1254															
Aroclors (Total PCBs)															
beta Endosulfan (Endosulfan II)															
beta-BHC															
beta-Chlordene															
carbophenothion															
Chlordane															
Chlordene	0.0018		0.002	J	0.0013		0.0012	J	0.0011		0.0018		0.0015		
cis-Nonachlor															
Dieldrin															
gamma-BHC															
gamma-Chlordane															
gamma-Chlordene															
HCB-technical															
Heptachlor															
Heptoachlor epoxide															
Mirex															
o,p-DDE			0.022	N	0.011	N	0.012	N							
Oxychlordane															
4,4'-DDD	0.0021	JN	0.0033		0.0024	J	0.002	J	0.0013	J	0.0021	J	0.0017	J	
4,4'-DDE	0.019		0.022		0.0061		0.0087		0.0051		0.015		0.012		0.0042
4,4'-DDT			0.0037								0.0027	J	0.0021	J	
Toxaphene															
Trans Nonachlor															
Herbicides (mg/kg)															
2,4,5-Trichlorophenoxyacetic acid															
Dicamba															
Silvex	0.0037	JN	0.0084	JN											

Notes:
Qualifiers
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mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD114 11/14/97		SD115 11/14/97		SD116 11/15/97	SD117 11/15/97	SD118 11/15/97	SD119 11/15/97	SD120 11/15/97	SD120A 11/19/97	
OC Pest/PCBs (mg/kg)											
Aldrin											
alpha-endosulfan (Endosulfan I)											
alpha-BHC											
alpha-Chlordane											
alpha-Chlordene											
Aroclor 1254						0.11	0.26	0.091	0.17	0.046	J
Aroclors (Total PCBs)											
beta-Endosulfan (Endosulfan II)											
beta-BHC											
beta-Chlordene											
carbophenothion											
Chlordane											
Chlordene	0.0013		0.0017			0.015	0.017	0.039	0.085	0.0025	J
cis-Nonachlor											
Dieldrin											
gamma-BHC											
gamma-Chlordane											
gamma-Chlordene											
HCH-technical											
Heptachlor											
Heptachlor epoxide											
Mirex											
o,p-DDE										0.0032	JN
Oxychlordane											
4,4'-DDD	0.0025	N	0.0021	JN						0.0043	JN
4,4'-DDE	0.012		0.014		0.0048	0.15	0.1	0.099	0.2	0.022	J
4,4'-DDT											
Toxaphene											
Trans Nonachlor											
Herbicides (mg/kg)											
2,4,5-Trichlorophenoxyacetic acid											
Dicamba											
Silvex	0.004	JN	0.0057	JN						0.032	JN

Notes:
Qualifiers.
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD120B 11/19/97	SD121 11/15/97		SD122 11/15/97		SD123 11/15/97		SD123 11/15/97		SD124 11/15/97		SD125 11/15/97		SD126 11/15/97
OC Pest/PCBs (mg/kg)														
Aldrin														
alpha endosulfan (Endosulfan I)														
alpha-BHC														
alpha-Chlordane														
alpha-Chlordene														
Aroclor 1254	0.16	0.028	J	0.05	J	0.036	J	0.055		0.07		0.048	J	0.31
Aroclors (Total PCBs)														
beta Endosulfan (Endosulfan II)														
beta-BHC														
beta-Chlordene														
carbophenothion														
Chlordane														
Chlordene	0.015					0.002		0.0058		0.0039		0.0045		0.021
cis-Nonachlor														
Dieldrin														
gamma-BHC														
gamma-Chlordane														
gamma-Chlordene														
HCH-technical														
Heptachlor														
Heptoachlor epoxide														
Mirex														
o,p-DDE														
Oxychlordane														
4,4'-DDD										0.012	N			
4,4'-DDE	0.065	0.01		0.015		0.02		0.044		0.06		0.036		0.14
4,4'-DDT						0.0057	JN	0.0052	N	0.011	N			
Toxaphene												0.57		
Trans Nonachlor														
Herbicides (mg/kg)														
2,4,5-Trichlorophenoxyacetic acid														
Dicamba														
Silvex														

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg = milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD127 11/15/97		SD128 11/16/97		SD202 11/14/97		SD203 11/13/97		SD204 11/13/97		SD205 11/14/97	SD205 11/15/97	SD206 11/14/97	
OC Pest/PCBs (mg/kg)														
Aldrin														
alpha endosulfan (Endosulfan I)														
alpha-BHC														
alpha-Chlordane														
alpha-Chlordene														
Aroclor 1254	0.076		0.065				0.067		0.074		0.041	0.099	0.066	
Aroclors (Total PCBs)														
beta Endosulfan (Endosulfan II)														
beta-BHC														
beta-Chlordene														
carbophenothion														
Chlordane														
Chlordene	0.004		0.0024		0.0007	J	0.0024		0.0055		0.0024	0.013	0.0026	
cis-Nonachlor														
Dieldrin														
gamma-BHC														
gamma-Chlordane														
gamma-Chlordene														
HCH-technical														
Heptachlor														
Heptoachlor epoxide														
Mirex														
o,p-DDE														
Oxychlordane														
4,4'-DDD							0.0022	JN	0.0022	JN				
4,4'-DDE	0.038		0.016		0.01		0.029		0.036		0.025	0.074	0.03	
4,4'-DDT									0.0021	JN				
Toxaphene														
Trans Nonachlor														
Herbicides (mg/kg)														
2,4,5-Trichlorophenoxyacetic acid														
Dicamba														
Silvex			0.021	JN	0.015	JN	0.11	JN	0.027	JN			0.044	JN

Notes:
Qualifiers
J = Estimated value
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mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD206 11/14/97		SD207 11/14/97		SD208 11/15/97	SD209 11/15/97		SD210 11/15/97	SD211 11/15/97	SD211A 11/19/97	SD211B 11/19/97	
OC Pest/PCBs (mg/kg)												
Aldrin												
alpha endosulfan (Endosulfan I)												
alpha-BHC												
alpha-Chlordane												
alpha-Chlordene												
Aroclor 1254	0.066		0.081		0.46	0.067		0.15	0.73	0.78	0.0073	
Aroclors (Total PCBs)											0.42	
beta Endosulfan (Endosulfan II)												
beta-BHC												
beta-Chlordene												
carbophenothion												
Chlordane												
Chlordene	0.0024		0.0036		0.049	0.005	J	0.011	0.061	0.092	0.092	
cis-Nonachlor												
Dieldrin												
gamma-BHC												
gamma-Chlordane												
gamma-Chlordene												
HCH-technical												
Heptachlor												
Heptachlor epoxide												
Mirex											0.025	
o,p-DDE												
Oxychlordane												
4,4'-DDD												
4,4'-DDE	0.029		0.044		0.29	0.059		0.11	0.29	0.27	0.33	
4,4'-DDT											0.0031	J
Toxaphene												
Trans Nonachlor												
Herbicides (mg/kg)												
2,4,5-Trichlorophenoxyacetic acid												
Dicamba												
Silvex	0.078	JN	0.036	JN								

Notes:
Qualifiers
J = Estimated value
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P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD212 11/15/97		SD213 11/15/97		SD214 11/15/97		SD215 11/15/97		SD215 11/15/97		SD216 11/15/97		SD217 11/15/97		SD218 11/15/97	
OC Pest/PCBs (mg/kg)																
Aldrin																
alpha endosulfan (Endosulfan I)																
alpha-BHC																
alpha-Chlordane																
alpha-Chlordene							0.001	J	0.0025	J			0.009	J	0.004	J
Aroclor 1254	0.19		0.31		0.29		0.36		0.29		0.2		0.46		0.2	
Aroclors (Total PCBs)																
beta Endosulfan (Endosulfan II)																
beta-BHC																
beta-Chlordene																
carbophenothion																
Chlordane																
Chlordene	0.016		0.011		0.011		0.03		0.022		0.0095	N	0.06		0.061	
cis-Nonachlor																
Dieldrin																
gamma-BHC																
gamma-Chlordane																
gamma-Chlordene																
HCH-technical																
Heptachlor																
Heptoachlor epoxide																
Mirex																
o,p-DDE																
Oxychlordane																
4,4'-DDD																
4,4'-DDE	0.25		0.1		0.11		0.018		0.15		0.096		0.21		0.13	
4,4'-DDT	0.087	N														
Toxaphene																
Trans Nonachlor																
Herbicides (mg/kg)																
2,4,5-Trichlorophenoxyacetic acid																
Dicamba																
Silvex			0.033	JN	0.02	JN	0.015	JN	0.023	JN	0.073	JN	0.087	JN	0.022	JN

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD219 11/15/97		SD220 11/15/97		SD221 11/16/97		SD222 11/16/97		SD301 11/16/97		SD302 11/16/97		SD302 11/16/97		SD303 11/16/97	
OC Pest/PCBs (mg/kg)																
Aldrin																
alpha endosulfan (Endosulfan I)																
alpha-BHC																
alpha-Chlordane																
alpha-Chlordene	0.0095								0.0043	J*			0.0044	J		
Aroclor 1254	0.36		0.25		0.4		0.38		0.49		0.27	J	0.6		0.33	
Aroclors (Total PCBs)																
beta Endosulfan (Endosulfan II)																
beta-BHC																
beta-Chlordene																
carbophenothion																
Chlordane																
Chlordene	0.075		0.024		0.034		0.022		0.028		0.012	J	0.037		0.0097	
cis-Nonachlor																
Dieldrin																
gamma-BHC																
gamma-Chlordane																
gamma-Chlordene																
HCH-technical																
Heptachlor																
Heptoachlor epoxide																
Mirex																
o,p-DDE																
Oxychlordane																
4,4'-DDD											0.0071	JN				
4,4'-DDE	0.15		0.4		0.18		0.16		0.23		0.13	J	0.28		0.1	
4,4'-DDT																
Toxaphene																
Trans Nonachlor																
Herbicides (mg/kg)																
2,4,5-Trichlorophenoxyacetic acid																
Dicamba																
Silvex	0.14	JN	0.028	JN	0.052	JN	0.024	JN	0.056	JN	0.074	JN	0.045	JN	0.075	JN

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD304 11/16/97		SD401 11/16/97		SD402 11/16/97	SD403 11/16/97	SD403 11/16/97	SD404 11/16/97	SD405 11/16/97		SD406 11/16/97	
OC Pest/PCBs (mg/kg)												
Aldrin												
alpha endosulfan (Endosulfan I)												
alpha-BHC												
alpha-Chlordane												
alpha-Chlordene												
Aroclor 1254	0 6		0 58		0 26	0 12	0 075	0 25	0 5		0 52	
Aroclors (Total PCBs)												
beta Endosulfan (Endosulfan II)												
beta-BHC												
beta-Chlordene												
carbophenothion												
Chlordane												
Chlordene	0 0096		0 12		0 022	0 004	0 0092	0 019	0 077		0 034	
cis-Nonachlor												
Dieldrin												
gamma-BHC												
gamma-Chlordane												
gamma Chlordene												
HCH-technical												
Heptachlor												
Heptoachlor epoxide												
Mirex												
o,p-DDE												
Oxychlordane												
4,4'-DDD												
4,4'-DDE	0 33		0 37		0 17	0 15	0 067	0 1	0 22		0 29	
4,4'-DDT									0 009	N	0 0069	N
Toxaphene												
Trans Nonachlor												
Herbicides (mg/kg)												
2,4,5-Trichlorophenoxyacetic acid			0 0043	JN								
Dicamba												
Silvex	0 13	JN										

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns The lower value reported
mg/kg = milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD407 11/18/97	SD408 11/18/97	SD409 11/18/97	SD410 11/18/97	SD411 11/18/97	SD412 11/18/97	SD413 11/18/97	SD414 11/18/97
OC Pest/PCBs (mg/kg)								
Aldrin								
alpha endosulfan (Endosulfan I)								
alpha-BHC								
alpha-Chlordane								
alpha-Chlordene								
Aroclor 1254	0.38	0.68	0.18	0.073	0.18	0.62	0.33	0.21
Aroclors (Total PCBs)								
beta Endosulfan (Endosulfan II)								
beta-BHC								
beta-Chlordene								
carbophenothion								
Chlordane								
Chlordene	0.015	0.038	0.01	0.0029 J	0.013	0.047	0.018	0.032
cis-Nonachlor								
Dieldrin								
gamma-BHC								
gamma Chlordane								
gamma Chlordene								
HCH-technical								
Heptachlor		0.0036 J						
Heptachlor epoxide								
Mirex								
o,p-DDE								
Oxychlordane								
4,4'-DDD								
4,4'-DDE	0.13	0.2	0.22	0.056	0.3	0.29	0.13	0.17
4,4'-DDT					0.033			
Toxaphene								
Trans Nonachlor								
Herbicides (mg/kg)								
2,4,5-Trichlorophenoxyacetic acid								
Dicamba								
Silvex								

Notes:
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

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TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, FORMER SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD415 11/18/97	SD416 11/18/97	SD417 11/18/97		SD417 11/18/97	SD418 11/18/97		SD419 11/18/97		SD420 11/18/97		SD421 11/18/97	
OC Pest/PCBs (mg/kg)													
Aldrin													
alpha endosulfan (Endosulfan I)													
alpha-BHC													
alpha-Chlordane													
alpha-Chlordene						0.0059							
Aroclor 1254	0.21	0.32	0.76		0.66	0.42		0.29		0.22		0.2	
Aroclors (Total PCBs)													
beta Endosulfan (Endosulfan II)													
beta-BHC													
beta-Chlordene													
carbophenothion													
Chlordane													
Chlordene	0.039	0.022	0.057		0.047	0.034		0.013		0.024		0.012	
cis-Nonachlor													
Dieldrin													
gamma-BHC													
gamma-Chlordane													
gamma-Chlordene													
HCH-technical													
Heptachlor													
Heptoachlor epoxide													
Mirex													
o,p-DDE													
Oxychlordane													
4,4'-DDD						0.0072	J	0.022	N	0.017	N	0.022	N
4,4'-DDE	0.44	0.1	0.32		0.24	0.41		0.19		0.44		0.16	
4,4'-DDT		0.085	0.74	N								0.022	N
Toxaphene													
Trans Nonachlor													
Herbicides (mg/kg)													
2,4,5-Trichlorophenoxyacetic acid			0.0072	JN		0.0048	JN						
Dicamba													
Silvex								0.032	JN	0.0052	JN	0.061	JN

Notes.

Qualifiers

J = Estimated value

N = Presumptive evidence of presence of material

P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported

mg/kg = milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD422 11/18/97		SD423 11/18/97		SD424 11/19/97		SD425 11/19/97		SD00100 10/15/98		SD00200 10/15/98		SD00300 10/15/98		SD00400 10/15/98	
OC Pest/PCBs																
Aldrin																
alpha endosulfan (Endosulfan I)																
alpha-BHC																
alpha-Chlordane															0.016	
alpha-Chlordene									0.0012	J						
Aroclor 1254	0.18		0.11		0.081		0.026	J	0.092	J						
Aroclors (Total PCBs)																
beta Endosulfan (Endosulfan II)																
beta-BHC																
beta-Chlordene																
carbophenothion																
Chlordane																
Chlordene	0.021		0.012		0.0072		0.0023	J	0.013		0.0026	J	0.00076	JN	0.0025	JN
cis-Nonachlor									0.0035	N	0.00082	J			0.012	
Dieldrin																
gamma-BHC																
gamma-Chlordane															0.015	N
gamma-Chlordene																
HCH-technical																
Heptachlor																
Heptoachlor epoxide																
Mirex																
o,p-DDE																
Oxychlordane																
4,4'-DDD	0.017	N	0.016	N	0.0034	N	0.0049	JN					0.0085		0.0036	J
4,4'-DDE	0.37		0.19		0.044		0.0099	J	0.12		0.011		0.022		0.041	
4,4'-DDT																
Toxaphene																
Trans Nonachlor											0.00085	J	0.00075	JN	0.03	
Herbicides (mg/kg)																
2,4,5-Trichlorophenoxyacetic acid																
Dicamba									0.011		0.0086		0.0032	J	0.0067	J
Silvex	0.0099	JN	0.044	JN												

Notes
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-3
SUMMARY OF ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS DETECTED IN SEDIMENT OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL FORMER HOMESTEAD AIR FORCE BASE, FLORIDA
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Sample Identification / Sample Date / Analyte	SD00500 10/15/98	206	207	208	M10101	M10102	M10103
OC Pest/PCBs (mg/kg)							
Aldrin		0.00077	0.00045 J				
alpha endosulfan (Endosulfan I)							
alpha-BHC				0.0001 J			
alpha-Chlordane		0.00107	0.00073	0.00133			
alpha-Chlordene							
Aroclor 1254							
Aroclors (Total PCBs)		0.02337	0.019	0.02837	0.340598	0.047007	0.229499
beta Endosulfan (Endosulfan II)		0.00043	0.00051	0.0008			
beta-BHC		0.00024 J					
beta-Chlordene							
carbophenothion							
Chlordane		0.00311	0.0054246	0.003547			
Chlordene							
cis-Nonachlor	0.0028	0.00062	0.00064	0.00087			
Dieldrin		0.00035	0.00064	0.00049			
gamma-BHC				0.00106			
gamma-Chlordane			0.00356	0.00065 J			
gamma Chlordene							
HCH-technical		0.0005913	0.0001523	0.001277			
Heptachlor		0.0009		0.00011 J			
Heptoachlor epoxide							
Mirex		0.00033 J	0.00021 J				
o,p-DDE							
Oxychlordane		0.00012 J	0.00017 J	0.00004 J			
4,4'-DDD		0.00056 J	0.00255	0.00069 J			
4,4'-DDE	0.0063	0.00042 J	0.00158	0.00048			
4,4'-DDT		0.00003 J		0.00022 J			
Toxaphene							
Trans Nonachlor	0.0088	0.00041 J	0.00033 J	0.00055			
Herbicides (mg/kg)							
2,4,5-Trichlorophenoxyacetic acid							
Dicamba							
Silvex							

Notes.
Qualifiers
J = Estimated value
N = Presumptive evidence of presence of material
P = Greater than 25% difference of concentrations detected between the GC columns. The lower value reported
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	BMI01-1 3/08/89	BMI01-2 3/08/89	BMI01-3 3/08/89	MI01-1 3/08/89	MI01-2 3/08/89	MI01-3 3/08/89	MI02-1 3/08/89	MI02-2 3/08/89
Metals (mg/kg)								
Aluminum	2060	2760	2450	3440	3160	2530	3770	3400
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium	5	3.5	60	5	4.5	4.5	11.5	9
Calcium								
Chromium (Total)								
Cobalt								
Copper	13	18	5	30	44	25	106	72
Cyanide								
Iron								
Lead	39	27	40	41	47	40	73	61
Lithium								
Magnesium								
Manganese								
Mercury								
Molybdenum								
Nickel								
Phosphorous								
Potassium								
Selenium								
Silver								
Sodium								
Strontium								
Sulfide								
Tellurium								
Thallium								
Tin								
Titanium								
Vanadium								
Yttrium								
Zinc	230	240	17	55	71	60	20	27

Notes:
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	M102-3 3/08/89	M103-1 5/12/89	M103-2 5/12/89	M103-3 5/12/89	M102-1 11/09/89	M102-2 11/09/89	M102-3 11/09/89	M102A-1 8/15/90
Metals (mg/kg)								
Aluminum	2031	3260	8570	14				
Antimony								
Arsenic					7 8	10	9 5	7
Barium								
Beryllium								
Cadmium	14	17	17	11				0 9
Calcium								
Chromium (Total)								3 6
Cobalt								
Copper	60	200	230	140				9 5
Cyanide								
Iron								
Lead	140	180	180	120				0 8
Lithium								
Magnesium								
Manganese								
Mercury					4 3	2	2	0 8
Molybdenum								
Nickel								
Phosphorous								
Potassium								
Selenium								2 7
Silver								
Sodium								
Strontium								
Sulfide								
Tellurium								
Thallium								
Tin								
Titanium								
Vanadium								
Yttrium								
Zinc	160	1910	500	360				60

Notes:
Qualifiers
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N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

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TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	M102A-2 8/15/90	M102A-3 8/15/90	M102B-1 8/15/90	M102B-2 8/15/90	M102B-3 8/15/90	M103-1 8/15/90	M103-2 8/15/90	M103-3 8/15/90
Metals (mg/kg)								
Aluminum								
Antimony								
Arsenic	7.9	5.9	7.8	6.8	2.8	9	5.8	
Barium								
Beryllium								
Cadmium	1.1	1.3	3.1	2.2	1.3	3.3	1.4	1.9
Calcium								
Chromium (Total)	4.3	4.4	5.5	4.9	2.9	5.2	3.4	3.4
Cobalt								
Copper	9.4	10	10	9.1	9.7	9	9.2	9.7
Cyanide								
Iron								
Lead	1.3		3.6		1	1		
Lithium								
Magnesium								
Manganese								
Mercury	1	1	3.2	1.8	1.5	8.3	2.8	2.9
Molybdenum								
Nickel								
Phosphorous								
Potassium								
Selenium	3.2	2.7	3.1	3.1	1.8		2.1	0.6
Silver								
Sodium								
Strontium								
Sulfide								
Tellurium								
Thallium								
Tin								
Titanium								
Vanadium								
Yttrium								
Zinc	62	48	120	88	39	250	70	80

Notes.
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

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TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	MI04-1 8/15/90	MI04-2 8/15/90	MI04-3 8/15/90	OU9-SD-0011 12/09/93	SD-001 4/1/95	SD-002 5/24/95	SD-003 5/24/95	SD-004 5/24/95
Metals (mg/kg)								
Aluminum				1460	1,800	2,200	3,600	4,200
Antimony				19				
Arsenic	6 7		4 6	2 8				
Barium				13				
Beryllium				0 08				
Cadmium	4 7	2 9	1 4	0 94				
Calcium				4260	290,000	340,000	310,000	360,000
Chromium (Total)	5 3	4 8	3 8	11 7				
Cobalt								
Copper	9 7	9	5 5	48 6	38		210	32
Cyanide				4 7 J				
Iron				2140				
Lead	4 6			22 1	48		66	
Lithium					1,400	1,500	1,900	1,800
Magnesium				1440	32	34	39	36
Manganese				16 7	0 29		4 3	0 52
Mercury	10 6	11 6	3 9	0 43				
Molybdenum								
Nickel				4 3				
Phosphorous								
Potassium								
Selenium			2 5	1 J				
Silver				8 8			95	
Sodium				2550				
Strontium					1,900	2,800	2,700	3,900
Sulfide								
Tellurium								
Thallium								
Tin							77	
Titanium							46	51
Vanadium				7 6	46		30	
Yttrium								
Zinc	410	340	75	96 1	130	35	420	75

Notes.
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

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TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	LF19-SD-0001 12/1/95		WP23-SD-0001 12/1/95		WP23-SD-9001 12/1/95 Duplicate		SD-0001 1996	SD-0002 1996	SD-0003 1996	SD-0004 1996	SD-0005 1996
Metals (mg/kg)											
Aluminum	621		252		784		3790	2080	3640	3700	2740
Antimony											
Arsenic	1.4	C			2		5.7	7.5	5.8	4.7	3.6
Barium							27.8	26.2	16.8	12.2	8.2
Beryllium							0.25	0.14	0.19	0.3	0.2
Cadmium									2.5	1.6	
Calcium	330,000		406,000		455,000						
Chromium (Total)	4.9	N	3.8	N	5.2	N	18.3	12	17.6	18.2	10.5
Cobalt	0.43	C			0.28	C					
Copper	2.6	C	1	C	1.3	C	53.6	56	66.3	58.1	32.9
Cyanide											
Iron	1640		293		735						
Lead	5.8		0.53	C	0.82		38.8	32.5	29.1	22.6	28.9
Lithium											
Magnesium	1230		1030		946	C					
Manganese	31.4	E	7.2	E	8.3	E	42.6	38.5	35.7	28.6	28.8
Mercury									0.73		
Molybdenum											
Nickel	1.3	C	0.51	C	1.4	C			3.5	4.2	
Phosphorous											
Potassium	74.9	C	70.4	C	83.5	C					
Selenium											
Silver							4.4	7.5	11.3	8.2	
Sodium	401	C	506	C	475	C					
Strontium											
Sulfide											
Tellurium											
Thallium											
Tin											
Titanium											
Vanadium	3.6	C	3.4	C	4.2	C					
Yttrium											
Zinc	14.8		3.6	C	4.1		140	154	188	142	65

Notes:
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD-0006 1996	MI0101 1996	MI0102 1996	MI0103 1996	OTFL-SD-0001 1/8/96	OTFL-SD-0002 1/8/96	OTFL-SD-0003 1/8/96	OTFL-SD-0004 1/9/96	OTFL-SD-0005 1/9/96
Metals (mg/kg)									
Aluminum	4960	10600	3300	6000	3790	2080	3640	3700	2740
Antimony					26 6			22	
Arsenic	6 1	27 3	8 5	12 9	5 7	7 5	5 8	4 7	3 6
Barium	14 4				27 8	26 2	16 8	12 2	8 2
Beryllium	0 24				0 25	0 14	0 19	0 3	0 2
Cadmium		33 97	4 05	12 94			2 5	1 6	
Calcium					52,800	39,000	35,800	30,300	21,800
Chromium (Total)	16 8	83 9	17 3	47 6	18 3	12	17 6	18 2	10 5
Cobalt							1 9		
Copper	34 9	507	81 6	269	53 6 J	56 J	66 3 J	58 1 J	32 9 J
Cyanide									
Iron		8500	4300	6200	3580	2940	4320	3750	3450
Lead	17 1	257	45 2	101 2	38 8	32 5	29 1	22 6	28 9
Lithium		7 3	4 2	8 4					
Magnesium					1910	1900	3160	4220	10600
Manganese	65 1	37 4	24	41 5	42 6	38 5	35 7	28 6	28 8
Mercury		5 7	0 95	2 6			0 73		
Molybdenum									
Nickel		21 7	6 4	14 3			3 5	4.2	
Phosphorous		8072	1594	3458					
Potassium									
Selenium					1100	392	927	1370	2770
Silver					3 9	2 5	2 2		2
Sodium		34 61	16 87	35 72	4 4	7 5	11 3	8 2	
Strontium					1070	601	2490	35000	52000
Sulfide									
Tellurium									
Thallium									
Tin									
Titanium									
Vanadium		18 5	13 4	18 6	15 3	11 1	14 4	24 1	11 3
Yttrium									
Zinc	45 7	881 9	239 3	567	140	154	188	142	65

Notes:
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	OTFL-SD-0006 1/9/96		SD101 11/13/97	SD101 11/16/97	SD102 11/13/97	SD102DUP 11/13/97	SD103 11/13/97	SD104 11/13/97	SD104 11/16/97
Metals (mg/kg)									
Aluminum	4960		510	650	2800	2500	3200	3400	4400
Antimony	15.5								
Arsenic	6.1		1.3	0.59	2	1.9	2.9	2.6	2.3
Barium	14.4		6.6	8.8	7.1	9.1	8.8	11	16
Beryllium	0.24				0.2				
Cadmium			0.24	0.2	0.66	1.1	1.5	2.4	1.2
Calcium	60,900		360,000	350,000	140,000	150,000	160,000	180,000	250,000
Chromium (Total)	16.8		2.3	2.4	12	13	16	19	15
Cobalt				4.7			0.54	0.54	
Copper	34.9	J	37	12	28	37	53	69	49
Cyanide									
Iron	5640		300	710	2700	2800	3300	3400	3800
Lead	17.1		12	8.9	17	18	26	29	18
Lithium									
Magnesium	13900		3600	2900	8000	8500	11000	6900	7600
Manganese	65.1		12	11	31	31	33	35	38
Mercury			0.017	0.031	0.19	0.33	0.37	0.6	0.62
Molybdenum			1.2	1.7	5.9	7.5	9.8	8.3	6.3
Nickel			1.2	5.2	3.2	3.2	3.7	3.9	3
Phosphorous									
Potassium	1990								
Selenium	1.7		0.81	0.65					0.55
Silver			0.25	0.43	2.7	4.5	6.1	9.6	5.2
Sodium	30800		12000	12000	40000	43000	61000	28000	26000
Strontium			2000	1800	1200	1200	1400	1500	1900
Sulfide									
Tellurium									
Thallium									
Tin			1.2	1.8	5.3	10	14	18	8.6
Titanium			3.3	3.6	27	25	32	33	32
Vanadium	13.6		1.8	1.7	8.6	12	13	12	9.7
Yttrium									
Zinc	45.7		21	12	46	64	87	120	63

Notes
Qualifiers
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J = Estimated value
mg/kg - milligrams per kilogram

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TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD105 11/13/97	SD106 11/14/97	SD107 11/14/97	SD107 11/16/97	SD108 11/14/97	SD109 11/15/97	SD110 11/15/97	SD110A 11/19/97
Metals (mg/kg)								
Aluminum	4700	3800	5300	5200	3400	3800	5200	1700
Antimony								
Arsenic	2.5	1.8	2.7	3.4	1.8	2.4	2.8	3.1
Barium	14	12	15	13	8.2	9.4	11	12
Beryllium								
Cadmium	0.55	0.6	0.57	0.24	0.052	0.23	0.43	0.24
Calcium	260,000	220,000	290,000	320,000	340,000	310,000	270,000	320,000
Chromium (Total)	16	14	18	18	14	15	17	18
Cobalt				0.63				
Copper	20	22	19	11	2.2	8.5	13	7.7
Cyanide								
Iron	3500	3300	4100	4200	2300	2700	3600	1400
Lead	9.5	10	9.4	360	1.8	5.1	8.4	5.3
Lithium								
Magnesium	4700	4600	4500	3200	2400	3300	4100	1000
Manganese	36	36	40	36	22	25	37	34
Mercury	0.21	0.21	0.23	0.13	0.022	0.074	0.058	0.068
Molybdenum	2.6	2.8	2.6	2	1.3	2.3	2.6	1.7
Nickel	2.3	2.3	2.6	3.1	2	1.4	1.9	2.7
Phosphorous								
Potassium								
Selenium	0.5			0.6		0.52		0.59
Silver	5	7.1	8.7	2.9	0.12	1.1	3.1	1.8
Sodium	15000	14000	12000	8900	8500	13000	12000	
Strontium	2600	2100	2800	3400	4200	3400	2600	3000
Sulfide								
Tellurium								
Thallium								
Tin	5.1	6.4	5.3	30		1.2	1.8	0.83
Titanium	44	37	48	49	29	34	50	50
Vanadium	8.2	7.1	8.3	8.7	7.2	8.1	8.8	9.7
Yttrium								
Zinc	39	43	50	18	2.7	13	24	13

Notes.
Qualifiers
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mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD110B 11/19/97	SD110BDUP 11/19/97	SD111 11/15/97	SD112 11/15/97	SD112DUP 11/15/97	SD113 11/15/97	SD114 11/14/97	SD115 11/14/97
Metals (mg/kg)								
Aluminum	4200	4600	4500	4500	4700	3400	4500	4000
Antimony								
Arsenic	2.2	2.2	2.7	2.8	3.1	3.1	3.4	3.7
Barium	9.9	10	9.5	10	10	8.7	9.8	11
Beryllium								
Cadmium	0.051	0.044	0.07	0.19	0.17	0.28	0.23	0.48
Calcium	340,000	330,000	330,000	320,000	320,000	280,000	320,000	270,000
Chromium (Total)	16	17	16	15	16	14	16	17
Cobalt					0.51		0.51	0.62
Copper	2.4	2.6	3.1	7.7	6.3	10	9	16
Cyanide								
Iron	2800	2900	3000	3100	3300	2500	1500	3300
Lead	2	2.3	2.7	4	3.6	5.4	4.8	8.2
Lithium								
Magnesium	2600	2600	2600	2800	2600	3000	3100	3300
Manganese	26	27	26	25	26	23	27	28
Mercury	0.019	0.023	0.027	0.05	0.092	0.058	0.037	0.12
Molybdenum	1.1	1.1	0.99	1.4	1.2	3	2	2.6
Nickel	2.2	2.3	1.5	1.7	1.7	6.2	1.7	2
Phosphorous								
Potassium								
Selenium	0.71	0.73	0.59					0.5
Silver	0.16	0.12	0.21	2.3	1.9	1.2	1.4	2.5
Sodium	7900	7600	8600	10000	8700	12000	12000	12000
Strontium	3800	3700	3300	3600	3500	2900	3300	2700
Sulfide								
Tellurium								
Thallium								
Tin		5.7		1.5	1.3	1.9	1.3	2.9
Titanium	36	42	47	42	46	34	44	46
Vanadium	9	9.3	8.2	8.6	8.4	19	10	10
Yttrium								
Zinc	3.3	3.4	4.3	12	11	56	34	32

Notes:
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mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD116 11/15/97	SD117 11/15/97	SD118 11/15/97	SD119 11/15/97	SD120 11/15/97	SD120A 11/19/97	SD120B 11/19/97	SD121 11/15/97
Metals (mg/kg)								
Aluminum	2900	4200	5700	3800	3800	3900	4600	3100
Antimony			0.64				1.4	
Arsenic	3.4	2.4	5.5	4.1	4.7	5.3	6.7	3.3
Barium	6.9	41	82	17	28	13	26	10
Beryllium								
Cadmium	0.16	1.4	7	1.7	1.9	1.6	1.4	0.86
Calcium	310,000	300,000	240,000	260,000	270,000	240,000	300,000	280,000
Chromium (Total)	13	19	30	18	20	20	26	14
Cobalt			0.84	0.67	0.54		1.3	
Copper	5.7	50	160	57	75	58	88	28
Cyanide								
Iron	3000	3300	4800	3300	3300	3600	8200	2500
Lead	2.9	18	54	23	24	25	18	17
Lithium								
Magnesium	2900	3600	5000	5500	5600	5600	3100	3200
Manganese	14	30	40	29	32	30	42	25
Mercury	0.074	0.72	1.4	0.66	1.1	0.65	0.86	0.2
Molybdenum	1.3	2.3	5.5	4.2	3.4	5.3	7.5	4.5
Nickel		2	5.3	3.3	3.2	4.8	25	2.1
Phosphorous								
Potassium								
Selenium				0.57	0.57	0.54	0.6	0.66
Silver	0.51	31	28	14	28	14	23	4.9
Sodium	12000	12000	21000	25000	23000	28000	7200	12000
Strontium	2900	2800	2100	2200	2400	2000	3000	2200
Sulfide								
Tellurium								
Thallium								
Tin	0.68	15	51	12	22	11	22	4.7
Titanium	32	39	50	36	38	38	45	30
Vanadium	32	7.4	12	11	11	27	23	28
Yttrium								
Zinc	8.6	92	280	120	140	110	100	54

Notes:
Qualifiers
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J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD122 11/15/97	SD123 11/15/97	SD123DUP 11/15/97	SD124 11/15/97	SD125 11/15/97	SD126 11/15/97	SD127 11/15/97	SD128 11/16/97
Metals (mg/kg)								
Aluminum	3700	3400	3600	4200	3800	4000	3000	2900
Antimony								
Arsenic	3 7	3 4	3	4	4 4	4 2	4 5	3 2
Barium	12	11	15	11	13	16	9	9
Beryllium								
Cadmium	1 3	1	0 75	0 94	1 3	4 5	1 4	1
Calcium	230,000	260,000	300,000	270,000	230,000	250,000	270,000	250,000
Chromium (Total)	17	15	15	16	17	22	15	13
Cobalt					0 52			
Copper	47	37	28	38	47	100	41	38
Cyanide								
Iron	3100	3000	3100	3400	5100	3600	2800	2700
Lead	17	15	12	14	26	39	16	15
Lithium								
Magnesium	4500	4000	3100	3200	3400	3000	2000	4600
Manganese	30	32	26	30	34	31	22	24
Mercury	0 28	0 22	0 28	0 21	0 25	1 1	0 34	0 27
Molybdenum	5 5	5 4	2 1	3 7	4 9	4 7	4 2	6 2
Nickel	3 1	2 4	1 4	2 3	3	3	1 2	2 4
Phosphorous								
Potassium								
Selenium	0 55	0 59	0 66	0 59	0 6	0 6	0 59	0 64
Silver	5 6	5 1	9 2	7 1	6 2	16	6 9	4 6
Sodium	20000	11000	9600	11000	14000	12000	4700	20000
Strontium	1900	2100	2800	2400	1900	2100	2200	1800
Sulfide								
Tellurium								
Thallium								
Tin	6 6	6 3	6 4	5 9	8	29	10	7 7
Titanium	39	32	35	41	38	37	31	26
Vanadium	13	13	8 9	14	15	12	30	18
Yttrium								
Zinc	88	74	56	67	100	200	82	79

Notes:
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TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD202 11/14/97	SD203 11/13/97	SD204 11/13/97	SD205 11/14/97	SD205 11/15/97	SD206 11/14/97	SD206DUP 11/14/97	SD207 11/14/97
Metals (mg/kg)								
Aluminum	2000	2400	3800	4100	3400	3200	3000	3800
Antimony								
Arsenic	3.4	3.8	5.8	5.1	4.9	5.4	5.1	8.2
Barium	11	21	14	20	18	21	20	18
Beryllium								
Cadmium	0.93	2.3	2.6	2.5	2.9	2.6	2.6	3.8
Calcium	210,000	210,000	250,000	330,000	210,000	270,000	270,000	250,000
Chromium (Total)	10	14	20	19	19	18	17	24
Cobalt		0.71	0.69	0.8	0.72	0.87	0.88	1.6
Copper	29	59	75	68	79	71	70	99
Cyanide								1.6 J
Iron	2100	2700	3700	4200	3400	3300	3200	4400
Lead	13	26	29	26	29	28	26	39
Lithium								
Magnesium	3000	3100	3700	3100	3100	3600	3300	3000
Manganese	19	22	30	29	29	28	28	31
Mercury	0.3	0.59	0.9	0.76	0.73	0.74	0.65	1.2
Molybdenum	1.6	1.7	5	2.6	3.6	2.2	2.1	3.5
Nickel	1	1.9	3	2.9	3.1	2.7	3.9	3.9
Phosphorous								
Potassium								
Selenium				0.64		0.62	0.67	0.56
Silver	5	11	15	16	16	14	14	20
Sodium	14000	12000	11000	8000	8400	15000	12000	9100
Strontium	1600	1600	2100	2900	1900	2300	2200	2200
Sulfide								
Tellurium								
Thallium								
Tin	6.4	18	24	20	24	19	19	33
Titanium	22	23	36	32	33	30	28	34
Vanadium	5.7	7.1	20	11	13	11	10	20
Yttrium								
Zinc	87	130	150	140	160	150	140	200

Notes:
Qualifiers
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J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Sample Identification / Sample Date / Analyte	SD208 11/15/97	SD209 11/15/97	SD210 11/15/97	SD211 11/15/97	SD211A 11/19/97	SD211B 11/19/97	SD212 11/15/97	SD213 11/15/97
Metals (mg/kg)								
Aluminum	4500	2500	4000	4600	4400	4400	3800	3200
Antimony	1.3			1.3	1.4	0.7	0.54	0.51
Arsenic	13	4.6	5.7	14	17	10	6	5.9
Barium	26	24	23	100	130	65	25	20
Beryllium								
Cadmium	10	2.3	3.1	9.2	8.5	3.6	3.6	2.8
Calcium	260,000	260,000	280,000	240,000	270,000	310,000	290,000	280,000
Chromium (Total)	37	15	22	41	41	26	24	20
Cobalt	1.3	0.83	0.91	1.3			0.96	0.74
Copper	220	58	74	240	300	120	94	77
Cyanide								
Iron	4800	2900	3800	5100	4800	3800	3700	3200
Lead	68	23	31	70	79	37	36	28
Lithium								
Magnesium	2200	2400	2300	2600	2200	2100	2000	1800
Manganese	38	26	40	42	39	35	37	30
Mercury	3.4	0.55	0.86	3.4	12	3.2	1.3	0.89
Molybdenum	3.7	2.1	3.7	5	3.5	1.9	2	2.7
Nickel	7.4	1.9	4.2	8.2	8.4	2.7	4	3.3
Phosphorous								
Potassium								
Selenium	0.7		0.68	0.77	0.63	0.6	0.59	0.69
Silver	49	15	19	48	74	64	40	17
Sodium	4600	6000	3000	2600	2300	1900	1600	2400
Strontium	2600	2000	2400	2400	2700	3300	2900	2500
Sulfide								
Tellurium								
Thallium								
Tin	76	18	22	87	73	43	35	23
Titanium	40	25	37	43	31	45	38	32
Vanadium	19	8.8	12	17	15	9.4	9.4	17
Yttrium								
Zinc	410	130	150	430	590	260	180	150

Notes:
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mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD214 11/15/97	SD215 11/15/97	SD215DUP 11/15/97	SD216 11/15/97	SD217 11/15/97	SD218 11/15/97	SD219 11/15/97	SD220 11/15/97
Metals (mg/kg)								
Aluminum	*4100*	*3400*	*3300*	*2700*	*4500*	*3100*	*4700*	*3200*
Antimony	2.1	0.91	0.93	0.57	1.5	0.71	1.7	0.52
Arsenic	8.9	9.5	9.5	6.5	18	8	15	6.6
Barium	31	32	31	20	22	22	87	32
Beryllium								
Cadmium	7	5.5	5.8	3.3	10	4.4	11	3.4
Calcium	260,000	290,000	290,000	290,000	230,000	280,000	200,000	310,000
Chromium (Total)	*32*	*28*	*28*	*20*	*42*	*23*	*42*	*23*
Cobalt	1.1	0.96	0.97	0.79	1.5	0.73	1.4	1.1
Copper	140	140	150	86	240	110	240	110
Cyanide								
Iron	4400	3700	3700	3500	6000	3600	5600	3500
Lead	70	46	49	31	74	44	84	36
Lithium								
Magnesium	*1800*	*1800*	*1700*	*1700*	*1800*	*1100*	*2100*	*1600*
Manganese	32	30	30	26	31	23	30	34
Mercury	1.8	2.1	2.2	1.1	3.5	1.1	3	1.9
Molybdenum	3.3	2.5	2.5	2	6.6	2.8	3.7	1.3
Nickel	5.5	5.3	5.1	3.5	8.3	3.6	8.8	9.7
Phosphorous								
Potassium								
Selenium	0.64	0.67	0.74	0.71	0.69	0.68	0.89	0.67
Silver	34	37	37	20	47	26	41	64
Sodium	1600	1400	1700	1400	1300	1400	2000	1500
Strontium	2400	3000	2800	2600	2200	2200	1900	3300
Sulfide								
Tellurium								
Thallium								
Tin	53	54	54	31	92	41	88	44
Titanium	32	33	31	25	34	24	32	35
Vanadium	13	12	12	11	28	12	15	6.9
Yttrium								
Zinc	270	270	280	200	470	220	470	200

Notes:
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg = milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD221 11/16/97	SD222 11/16/97	SD301 11/16/97	SD302 11/16/97	SD302DUP 11/16/97	SD303 11/16/97	SD304 11/16/97	SD401 11/16/97
Metals (mg/kg)								
Aluminum	3100	5300	4800	3700	4200	3300	4900	4000
Antimony	0.67	2.2	2	1.9	1.6	1.3	2.4	1.8
Arsenic	7.8	50	22	15	13	12	39	19
Barium	88	54	160	140	130	25	30	36
Beryllium								
Cadmium	3.8	13	16	14	12	5.9	13	6.5
Calcium	310,000	240,000	270,000	280,000	280,000	240,000	220,000	300,000
Chromium (Total)	23	54	42	44	43	23	49	33
Cobalt	1.1	2.1	1.7	1.5	1.4	1.7	2	1.9
Copper	130	270	270	260	220	120	270	210
Cyanide								
Iron	3600	8600	6600	5000	4900	5200	12,000	4400
Lead	39	100	110	81	73	50	93	64
Lithium								
Magnesium	1700	1800	1700	2000	2100	1700	1800	1400
Manganese	28	34	31	31	33	25	38	35
Mercury	2	3.6	2.2	3.3	3.3	1.8	4.6	4.6
Molybdenum	2.1	7.6	5.3	5.1	4.6	4	10	5.2
Nickel	3.1	9.1	8.6	6.8	6.3	4.6	11	5.5
Phosphorous								
Potassium								
Selenium	0.73						0.55	0.8
Silver	33	56	49	60	63	27	92	110
Sodium	1600	1700	1700	3200	3300		1300	1100
Strontium	2800	1900	2100	2400	2700	1900	2100	3100
Sulfide								
Tellurium								
Thallium								
Tin	45	100	110	100	94	58	0.5	0.5
Titanium	29	27	31	38	42	25	130	97
Vanadium	8.3	16	12	12	12	17	33	40
Yttrium							20	17
Zinc	220	480	550	470	420	270	560	390

Notes
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C =
N = Spiked sample recovery not within control limits
R = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg = milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD402 11/16/97	SD403 11/16/97	SD403DUP 11/16/97	SD404 11/16/97	SD405 11/16/97	SD406 11/16/97	SD407 11/18/97	SD408 11/18/97
Metals (mg/kg)								
Aluminum	2400	3200	3400	3400	4100	3200	4800	4000
Antimony	1.4	1.3	1.2	1.6	2.1	2.9	2.4	3.1
Arsenic	14	6.7	7	11	17	15	18	24
Barium	27		21	24	27	29	37	29
Beryllium								
Cadmium	4.2	2.3	2.5	6.4	6.6	7	15	15
Calcium	310,000	290,000	320,000	250,000	260,000	270,000	250,000	240,000
Chromium (Total)	20	18	19	27	32	35	44	44
Cobalt	1.5	1.6	1.7	2.4	2.5	4.4	3.3	3.8
Copper	120	54	56	140	170	220	240	290
Cyanide								
Iron	3100	3400	3400	4400	4500	4100	5000	5000
Lead	37	22	25	47	55	69	100	110
Lithium								
Magnesium	1200	1300	1400	1600	1500	1400	1400	1200
Manganese	23	24	26	27	30	29	32	26
Mercury	1.9	1.1	0.9	0.97	2.3	3.6	3.3	3.9
Molybdenum	3.8	2.2	2.3	5	6.3	7.7	6.8	8.5
Nickel	2.8	2.4	2.4	4.3	5.3	5.8	6.4	6.4
Phosphorous								
Potassium								
Selenium	0.71						0.67	0.78
Silver	50	24	26	31	43	76	39	47
Sodium	1100			1100				1200
Strontium	2400	2600	3000	2200	2400	2300	1900	1800
Sulfide								
Tellurium								
Thallium						0.51	0.69	0.6
Tin	50	29	24	54	67	96	68	62
Titanium	24	28	31	31	36	32	22	14
Vanadium	12	14	16	20	22	31	21	29
Yttrium								
Zinc	230	110	120	270	300	390	510	570

Notes
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD409 11/18/97	SD410 11/18/97	SD411 11/18/97	SD412 11/18/97	SD413 11/18/97	SD414 11/18/97	SD415 11/18/97	SD416 11/18/97
Metals (mg/kg)								
Aluminum	3400	2900	3400	3900	3500	2900	3600	4400
Antimony	1.1	1.5	1.3	3	2.5	0.86	J	2.1
Arsenic	13	9.4	14	20	15	6.7	8.3	15
Barium	22	21	20	26	25	29	27	33
Beryllium								
Cadmium	3.4	2.9	3.6	10	11	3.6	3.5	12
Calcium	300,000	290,000	310,000	250,000	240,000	300,000	320,000	250,000
Chromium (Total)	24	18	25	43	35	21	24	38
Cobalt	3.3	2.9	2.9	5.4	4.9	2.2	1.7	2.8
Copper	110	78	150	300	210	110	130	230
Cyanide								
Iron	3400	3400	3400	5800	4500	3000	5800	4600
Lead	44	40	52	120	88	54	60	99
Lithium								
Magnesium	1300	1200	1200	1200	1200	1000	1200	1400
Manganese	30	26	31	28	24	24	33	28
Mercury	2.2	1.6	3.6	5	2.7	2.1	2.9	2.9
Molybdenum	3.2	3	3.6	6.7	6	1.8	2.4	5
Nickel	2.5	1.7	2.5	7.8	4.8	1.7	1.8	4.7
Phosphorous								
Potassium								
Selenium	0.64	0.7	0.74	0.83	0.67	0.7	0.62	0.67
Silver	56	17	89	72	42	47	68	36
Sodium	1000						1000	
Strontium	3000	2100	3300	2300	2000	2600	3500	2200
Sulfide								
Tellurium								
Thallium		0.55		0.86	0.75			0.56
Tin	34	22	52	89	58	36	60	30
Titanium	33	28	37	26	19	29	32	9.7
Vanadium	27	22	24	71	39	18	11	21
Yttrium								
Zinc	190	160	270	570	460	190	300	450

Notes:
Qualifiers
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J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD417 11/18/97	SD417DUP 11/18/97	SD418 11/18/97	SD419 11/18/97	SD420 11/18/97	SD421 11/18/97	SD422 11/18/97	SD423 11/18/97
Metals (mg/kg)								
Aluminum	3200	3300	3100	3000	3300	2500	2500	2000
Antimony	2.2	2.3	1.2	1.5	0.88	0.92	0.62	0.71
Arsenic	18	17	9.4	11	7.8	7.1	4.1	5.8
Barium	27	26	28	20	21	20	24	24
Beryllium								
Cadmium	10	10	3.8	3.5	3.1	2.4	1.9	1.1
Calcium	270,000	260,000	310,000	270,000	320,000	300,000	320,000	330,000
Chromium (Total)	45	45	24	22	26	17	17	15
Cobalt	2.6	2.7	1.5	2.7	1.4	1.6	1.3	1.3
Copper	360	360	140	110	110	88	68	47
Cyanide								
Iron	4600	4600	3100	3700	3000	3300	2800	2800
Lead	120	110	58	50	48	32	28	62
Lithium								
Magnesium	1200	1200	1100	1100	1100	1200	1200	1200
Manganese	29	29	30	25	31	22	24	20
Mercury	6.9	6.4	3.9	1.7	2.2	1.4	1.6	0.62
Molybdenum	5	5.1	2.7	3.9	2	2.4	1.3	1.7
Nickel	6	5.9	2	2.4	1.5	2		1.3
Phosphorous								
Potassium								
Selenium	0.68	0.79	0.66	0.72	0.68	0.91	0.81	0.93
Silver	24	90	82	48	42	22	45	24
Sodium	1100	1100	1200					
Strontium	2500	2400	3000	2500	3300	2300	3000	2400
Sulfide								
Tellurium								
Thallium	0.59	0.6		0.54				
Tin	69	110	54	34	37	28	30	15
Titanium	13	26	31	30	26	22	24	18
Vanadium	21	22	12	21	13	21	12	15
Yttrium								
Zinc	670	660	300	260	250	180	140	120

Notes:
Qualifiers
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E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	SD424 11/19/97	SD425 11/19/97	SD00100 10/15/98	SD00200 10/15/98	SD00300 10/15/98	SD00400 10/15/98	SD00500 10/15/98	206
Metals (mg/kg)								
Aluminum	2100	1800	6000	4100	2500	7200	6100	3900
Antimony	1 1	0 79	0 72	0 26	0 38	1 2	0 2	0 73
Arsenic	12	7 9	14	3 6	3 3	3 1	2 9	5 14
Barium	17	19	30	18	18	110	33	
Beryllium			0 32	0 14		0 21	0 22	
Cadmium	2 3	0 88	2 5	0 16	0 74	7	0 47	0 751
Calcium	290,000	280,000	280,000	330,000	320,000	190,000	290,000	
Chromium (Total)	14	12	27	14	11	31	18	13
Cobalt								
Copper	65	38	97	19	20	100	23	34 8
Cyanide								
Iron	3100	2700	4800	2500	1600	3500	3500	3090
Lead	28	22	35	8 3	15	66	13	13 9
Lithium								
Magnesium	980	1100	1200	1100	980	1200	1400	
Manganese	19	20	51	38	16	49	60	33 3
Mercury	0 68	0 35	1 48	0 096	0 42	1 4	0 18	0 259
Molybdenum	3	2 2	1 3	0 5		2 2		
Nickel			5 4	2 1	1 4	8 2	3	5 56
Phosphorous								
Potassium			160	120	110	300	140	
Selenium	0 64	0 74	1 9	0 5		1 4		1 04
Silver	12	3 9	25	0 32	1 4	8 8	1 6	1 73
Sodium			460	340	430	380	320	
Strontium	2100	2000	2100	1900	2300	1600	1700	
Sulfide								
Tellurium								
Thallium								0 188
Tin	17	5 5	30			26		2 58
Titanium	17	17	120	51	31	73	97	
Vanadium	13	12	20	8 4	6 2	30	17	
Yttrium			4 8	3 6	2 8	4 5	4 7	
Zinc	160	120	530	15	49	210	47	79 5

Notes.
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

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TABLE 2-4
SUMMARY OF METALS DETECTED IN SEDIMENT
OU11, SEWAGE TREATMENT PLANT SLUDGE/INCINERATOR ASH DISPOSAL AREA AND MILITARY CANAL
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Analyte / Sample Identification / Sample Date	207	208
Metals (mg/kg)		
Aluminum	4100	3900
Antimony	0.56	0.51
Arsenic	3.47	5.42
Barium		
Beryllium		
Cadmium	0.675	1.3
Calcium		
Chromium (Total)	14.6	15.7
Cobalt		
Copper	23.7	48.5
Cyanide		
Iron	3380	3330
Lead	11.5	16.5
Lithium		
Magnesium		
Manganese	41.8	32.3
Mercury	0.231	0.383
Molybdenum		
Nickel	5.29	5.39
Phosphorous		
Potassium		
Selenium	0.856	1.38
Silver	2.89	2.14
Sodium		
Strontium		
Sulfide		
Tellurium		
Thallium	0.136	0.251
Tin	2.98	5.31
Titanium		
Vanadium		
Yttrium		
Zinc	55.1	116

Notes
Qualifiers
C =
N = Spiked sample recovery not within control limits
E = Reported value is estimated because of the presence of interference
J = Estimated value
mg/kg - milligrams per kilogram

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	HS-SS-01 5/25/00 Total ug/kg	HS-SS-01 5/25/00 SPLP ug/l	HS-SS-02 5/25/00 Total ug/kg	HS-SS-02 5/25/00 SPLP ug/l
PESTICIDES [a]					
alpha-BHC		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
beta-BHC		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
delta-BHC		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
gamma-BHC (Lindane)		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
heptachlor		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
Aldrin		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
Heptachlor epoxide		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
Endosulfan I		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
Dieldrin		7 5 (U)	1 0 (U)	6 4 (U)	1 0 (U)
4,4' -DDE		71	1 0 (U)	130	1 0 (U)
Endrin		7 5 (U)	1 0 (U)	6 4 (U)	1 0 (U)
Endosulfan II		7 5 (U)	1 0 (U)	6 4 (U)	1 0 (U)
4,4' DDD		7 5 (U)	1 0 (U)	7 4	1 0 (U)
Endosulfan sulfate		7 5 (U)	1 0 (U)	6 4 (U)	1 0 (U)
4,4' -DDT		7 5 (U)	1 0 (U)	6 4 (U)	1 0 (U)
Methoxychlor		38 (U)	5 0 (U)	33 (U)	5 0 (U)
Endrin ketone		7 5 (U)	1 0 (U)	6 4 (U)	1 0 (U)
Endrin aldehyde		7 5 (U)	1 0 (U)	6 4 (U)	1 0 (U)
alpha-Chlordane		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
gamma-Chlordane		3 8 (U)	0 50 (U)	3 3 (U)	0 50 (U)
Toxaphene		380 (U)	50 (U)	330 (U)	50 (U)
POLYCHLORINATED BIPHENYLS [b]					
Aroclor-1016		75 (U)	10 (U)	64 (U)	10 (U)
Aroclor-1221		150 (U)	20 (U)	130 (U)	20 (U)
Aroclor-1232		75 (U)	10 (U)	64 (U)	10 (U)
Aroclor-1242		75 (U)	10 (U)	64 (U)	10 (U)
Aroclor-1248		75 (U)	10 (U)	64 (U)	10 (U)
Aroclor-1254		75 (U)	10 (U)	64 (U)	10 (U)
Aroclor-1260		75 (U)	10 (U)	64 (U)	10 (U)

Notes,
[a] USEPA SW- 846 Method 8081
[b] USEPA SW- 846 Method 8082
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
DDD - dichlorodiphenyl-dichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
Data Qualifiers (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD118 5/25/00 Total ug/kg	MW-SD118 5/25/00 SPLP ug/l	MW-SD205 5/25/00 Total ug/kg	MW-SD205 5/25/00 SPLP ug/l
PESTICIDES [a]					
alpha-BHC		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
beta-BHC		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
delta-BHC		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
gamma-BHC (Lindane)		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
heptachlor		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
Aldrin		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
Heptachlor epoxide		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
Endosulfan I		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
Dieldrin		7 3 (U)	1 0 (U)	12 (U)	1.0 (U)
4,4' -DDE		33	1 0 (U)	110	1 0 (U)
Endrin		7 3 (U)	1 0 (U)	12 (U)	1.0 (U)
Endosulfan II		7 3 (U)	1 0 (U)	12 (U)	1 0 (U)
4,4' DDD		7 3 (U)	1 0 (U)	12 (U)	1 0 (U)
Endosulfan sulfate		7 3 (U)	1 0 (U)	12 (U)	1 0 (U)
4,4' -DDT		7 3 (U)	1 0 (U)	12 (U)	1 0 (U)
Methoxychlor		38 (U)	5 0 (U)	64 (U)	5 0 (U)
Endrin ketone		7 3 (U)	1 0 (U)	12 (U)	1 0 (U)
Endrin aldehyde		7 3 (U)	1 0 (U)	12 (U)	1 0 (U)
alpha-Chlordane		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
gamma-Chlordane		3 8 (U)	0 50 (U)	6 4 (U)	0 50 (U)
Toxaphene		380 (U)	50 (U)	640 (U)	50 (U)
POLYCHLORINATED BIPHENYLS [b]					
Aroclor-1016		73 (U)	10 (U)	120 (U)	10 (U)
Aroclor-1221		15 (U)	20 (U)	260 (U)	20 (U)
Aroclor-1232		73 (U)	10 (U)	120 (U)	10 (U)
Aroclor-1242		73 (U)	10 (U)	120 (U)	10 (U)
Aroclor-1248		73 (U)	10 (U)	120 (U)	10 (U)
Aroclor-1254		73 (U)	10 (U)	120 (U)	10 (U)
Aroclor-1260		73 (U)	10 (U)	120 (U)	10 (U)

Notes:
[a] USEPA SW- 846 Method 8081
[b] USEPA SW- 846 Method 8082
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
DDD - dichlorodiphenyl-dichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
Data Qualifiers. (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD211 5/25/00 Total ug/kg	MW-SD211 5/25/00 SPLP ug/l	MW-SD301 5/25/00 Total ug/kg	MW-SD301 5/25/00 SPLP ug/l
PESTICIDES [a]					
alpha-BHC		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
beta-BHC		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
delta-BHC		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
gamma-BHC (Lindane)		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
heptachlor		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
Aldrin		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
Heptachlor epoxide		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
Endosulfan I		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
Dieldrin		16 (U)	1 0 (U)	19 (U)	1 0 (U)
4,4' -DDE		360	1 0 (U)	75	1 0 (U)
Endrin		16 (U)	1 0 (U)	19 (U)	1 0 (U)
Endosulfan II		16 (U)	1 0 (U)	19 (U)	1 0 (U)
4,4' DDD		19	1 0 (U)	19 (U)	1 0 (U)
Endosulfan sulfate		16 (U)	1 0 (U)	19 (U)	1 0 (U)
4,4' -DDT		16 (U)	1 0 (U)	19 (U)	1 0 (U)
Methoxychlor		80 (U)	5 0 (U)	99 (U)	5 0 (U)
Endrin ketone		16 (U)	1 0 (U)	19 (U)	1 0 (U)
Endrin aldehyde		16 (U)	1 0 (U)	19 (U)	1 0 (U)
alpha-Chlordane		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
gamma-Chlordane		8 0 (U)	0 50 (U)	9 9 (U)	0 50 (U)
Toxaphene		800 (U)	50 (U)	990 (U)	50 (U)
POLYCHLORINATED BIPHENYLS [b]					
Aroclor-1016		160 (U)	10 (U)	190 (U)	10 (U)
Aroclor-1221		320 (U)	20 (U)	390 (U)	20 (U)
Aroclor-1232		160 (U)	10 (U)	190 (U)	10 (U)
Aroclor-1242		160 (U)	10 (U)	190 (U)	10 (U)
Aroclor-1248		160 (U)	10 (U)	190 (U)	10 (U)
Aroclor-1254		160 (U)	10 (U)	190 (U)	10 (U)
Aroclor-1260		160 (U)	10 (U)	190 (U)	10 (U)

Notes:
[a] USEPA SW- 846 Method 8081
[b] USEPA SW- 846 Method 8082
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
DDD - dichlorodiphenyl-dichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
Data Qualifiers (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit.

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Units	MW-SD401 5/25/00 Total ug/kg	MW-SD401 5/25/00 SPLP ug/l	MW-SD421 5/25/00 Total ug/kg	MW-SD421 5/25/00 SPLP ug/l
PESTICIDES [a]					
alpha-BHC		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
beta-BHC		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
delta-BHC		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
gamma-BHC (Lindane)		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
heptachlor		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
Aldrin		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
Heptachlor epoxide		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
Endosulfan I		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
Dieldrin		14 (U)	1 0 (U)	9.6 (U)	1 0 (U)
4,4' -DDE		210	1 0 (U)	66	1 0 (U)
Endrin		14 (U)	1 0 (U)	9 6 (U)	1 0 (U)
Endosulfan II		14 (U)	1 0 (U)	9 6 (U)	1 0 (U)
4,4' DDD		14 (U)	1 0 (U)	9 6 (U)	1 0 (U)
Endosulfan sulfate		14 (U)	1 0 (U)	9 6 (U)	1 0 (U)
4,4' -DDT		23 (P)	1 0 (U)	9 6 (U)	1 0 (U)
Methoxychlor		73 (U)	5 0 (U)	50 (U)	5 0 (U)
Endrin ketone		14 (U)	1 0 (U)	9 6 (U)	1 0 (U)
Endrin aldehyde		14 (U)	1 0 (U)	9 6 (U)	1 0 (U)
alpha-Chlordane		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
gamma-Chlordane		7 3 (U)	0 50 (U)	5 0 (U)	0 50 (U)
Toxaphene		730 (U)	50 (U)	500 (U)	50 (U)
POLYCHLORINATED BIPHENYLS [b]					
Aroclor-1016		140 (U)	10 (U)	95 (U)	10 (U)
Aroclor-1221		290 (U)	20 (U)	190 (U)	20 (U)
Aroclor-1232		140 (U)	10 (U)	95 (U)	10 (U)
Aroclor-1242		140 (U)	10 (U)	95 (U)	10 (U)
Aroclor-1248		140 (U)	10 (U)	95 (U)	10 (U)
Aroclor-1254		140 (U)	10 (U)	95 (U)	10 (U)
Aroclor-1260		140 (U)	10 (U)	95 (U)	10 (U)

Notes:
[a] USEPA SW- 846 Method 8081
[b] USEPA SW- 846 Method 8082
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
DDD - dichlorodiphenyl-dichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
Data Qualifiers (U) Compound not detected above method detection limit.
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	HS-SS-01 5/25/00 Total ug/kg	HS-SS-01 5/25/00 SPLP ug/l	HS-SS-02 5/25/00 Total ug/kg	HS-SS-02 5/25/00 SPLP ug/l
SEMIVOLATILE ORGANIC COMPOUNDS [c]					
Acenaphthene		360 (U)	50 (U)	310 (U)	50 (U)
Acenaphthylene		360 (U)	50 (U)	310 (U)	50 (U)
Anthracene		360 (U)	50 (U)	310 (U)	50 (U)
Azobenzene		360 (U)	50 (U)	310 (U)	50 (U)
Benzo(a)anthracene		360 (U)	50 (U)	310 (U)	50 (U)
Benzo(b)fluoranthene		87 (J)	50 (U)	160 (J)	50 (U)
Benzo(k)fluoranthene		360 (U)	50 (U)	110 (J)	50 (U)
Benzo(g,h,i)perylene		360 (U)	50 (U)	310 (U)	50 (U)
Benzo(a)pyrene		360 (U)	50 (U)	310 (U)	50 (U)
Bis (2-Chloroethoxy) Methane		360 (U)	50 (U)	310 (U)	50 (U)
Bis (2-Chloroethyl) ether		360 (U)	50 (U)	310 (U)	50 (U)
bis (2-Ethylhexyl) phthalate		360 (U)	50 (U)	110 (J)	50 (U)
4-Bromophenyl-phenylether		360 (U)	50 (U)	310 (U)	50 (U)
Butylbenzylphthalate		360 (U)	50 (U)	310 (U)	50 (U)
Carbazole		360 (U)	50 (U)	310 (U)	50 (U)
4 -Chloroaniline		360 (U)	50 (U)	310 (U)	50 (U)
2 -Chloronaphthalene		360 (U)	50 (U)	310 (U)	50 (U)
2 -Chlorophenol		360 (U)	50 (U)	310 (U)	50 (U)
4 -Chlorophenyl-phenyl ether		360 (U)	50 (U)	310 (U)	50 (U)
Chrysene		360 (U)	50 (U)	89 (J)	50 (U)
2-Methylphenol		360 (U)	50 (U)	310 (U)	50 (U)
4-Methylphenol		360 (U)	50 (U)	310 (U)	50 (U)
Di-n-butylphthalate		310 (J)	50 (U)	120 (J)	50 (U)
Dibenzo (a,h) anthracene		360 (U)	50 (U)	310 (U)	50 (U)
Dibenzofuran		360 (U)	50 (U)	310 (U)	50 (U)
1,4 -Dichlorobenzene		360 (U)	50 (U)	310 (U)	50 (U)
3,3 -Dichlorobenzidine		360 (U)	50 (U)	310 (U)	50 (U)
2,4 -Dichlorophenol		360 (U)	50 (U)	310 (U)	50 (U)
Diethylphthalate		360 (U)	50 (U)	310 (U)	50 (U)
2,4 -Dimethylphenol		360 (U)	50 (U)	310 (U)	50 (U)
Dimethylphthalate		360 (U)	50 (U)	310 (U)	50 (U)
2,4 -Dinitrophenol		750 (U)	100 (U)	640 (U)	100 (U)
2,4 -Dinitrotoluene		360 (U)	50 (U)	310 (U)	50 (U)
2,6 -Dinitrotoluene		360 (U)	50 (U)	310 (U)	50 (U)
Di-n-octylphthalate		360 (U)	50 (U)	310 (U)	50 (U)
Fluoranthene		83 (J)	50 (U)	160 (J)	50 (U)
Fluorene		360 (U)	50 (U)	310 (U)	50 (U)
Hexachlorobenzene		360 (U)	50 (U)	310 (U)	50 (U)
Hexachlorocyclopentadiene		360 (U)	50 (U)	310 (U)	50 (U)

Notes.
[c] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L - micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit.
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD118 5/25/00 Total ug/kg	MW-SD118 5/25/00 SPLP ug/l	MW-SD205 5/25/00 Total ug/kg	MW-SD205 5/25/00 SPLP ug/l
SEMIVOLATILE ORGANIC COMPOUNDS [1]					
Acenaphthene		350 (U)	50 (U)	610 (U)	50 (U)
Acenaphthylene		350 (U)	50 (U)	610 (U)	50 (U)
Anthracene		350 (U)	50 (U)	610 (U)	50 (U)
Azobenzene		350 (U)	50 (U)	610 (U)	50 (U)
Benzo(a)anthracene		350 (U)	50 (U)	610 (U)	50 (U)
Benzo(b)fluoranthene		350 (U)	50 (U)	610 (U)	50 (U)
Benzo(k)fluoranthene		350 (U)	50 (U)	610 (U)	50 (U)
Benzo(g,h,i)perylene		350 (U)	50 (U)	610 (U)	50 (U)
Benzo(a)pyrene		350 (U)	50 (U)	610 (U)	50 (U)
Bis (2-Chloroethoxy) Methane		350 (U)	50 (U)	610 (U)	50 (U)
Bis (2-Chloroethyl) ether		350 (U)	50 (U)	610 (U)	50 (U)
bis (2-Ethylhexyl) phthalate		130 (J)	50 (U)	220 (J)	50 (U)
4-Bromophenyl-phenylether		350 (U)	50 (U)	610 (U)	50 (U)
Butylbenzylphthalate		350 (U)	50 (U)	610 (U)	50 (U)
Carbazole		350 (U)	50 (U)	610 (U)	50 (U)
4 -Chloroaniline		350 (U)	50 (U)	610 (U)	50 (U)
2 -Chloronaphthalene		350 (U)	50 (U)	610 (U)	50 (U)
2 -Chlorophenol		350 (U)	50 (U)	610 (U)	50 (U)
4 -Chlorophenyl-phenyl ether		350 (U)	50 (U)	610 (U)	50 (U)
Chrysene		350 (U)	50 (U)	610 (U)	50 (U)
2-Methylphenol		350 (U)	50 (U)	610 (U)	50 (U)
4-Methylphenol		350 (U)	50 (U)	610 (U)	50 (U)
Di-n-butylphthalate		99 (J)	50 (U)	170 (J)	50 (U)
Dibenzo (a,h) anthracene		350 (U)	50 (U)	610 (U)	50 (U)
Dibenzofuran		350 (U)	50 (U)	610 (U)	50 (U)
1,4 -Dichlorobenzene		350 (U)	50 (U)	610 (U)	50 (U)
3,3 -Dichlorobenzidine		350 (U)	50 (U)	610 (U)	50 (U)
2,4 -Dichlorophenol		350 (U)	50 (U)	610 (U)	50 (U)
Diethylphthalate		350 (U)	50 (U)	610 (U)	50 (U)
2,4 -Dimethylphenol		350 (U)	50 (U)	610 (U)	50 (U)
Dimethylphthalate		350 (U)	50 (U)	610 (U)	50 (U)
2,4 -Dinitrophenol		730 (U)	100 (U)	1300 (U)	100 (U)
2,4 -Dinitrotoluene		350 (U)	50 (U)	610 (U)	50 (U)
2,6 -Dinitrotoluene		350 (U)	50 (U)	610 (U)	50 (U)
Di-n-octylphthalate		350 (U)	50 (U)	610 (U)	50 (U)
Fluoranthene		350 (U)	50 (U)	150 (J)	50 (U)
Fluorene		350 (U)	50 (U)	610 (U)	50 (U)
Hexachlorobenzene		350 (U)	50 (U)	610 (U)	50 (U)
Hexachlorocyclopentadiene		350 (U)	50 (U)	610 (U)	50 (U)

Notes:
[1] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers: (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD211 5/25/00 Total ug/kg	MW-SD211 5/25/00 SPLP ug/l	MW-SD301 5/25/00 Total ug/kg	MW-SD301 5/25/00 SPLP ug/l
SEMIVOLATILE ORGANIC COMPOUNDS [c]					
Acenaphthene		760 (U)	50 (U)	940 (U)	50 (U)
Acenaphthylene		760 (U)	50 (U)	940 (U)	50 (U)
Anthracene		760 (U)	50 (U)	940 (U)	50 (U)
Azobenzene		350 (U)	50 (U)	940 (U)	100 (U)
Benzo(a)anthracene		760 (U)	50 (U)	940 (U)	50 (U)
Benzo(b)fluoranthene		290 (J)	50 (U)	260 (J)	50 (U)
Benzo(k)fluoranthene		190 (J)	50 (U)	940 (U)	50 (U)
Benzo(g,h,i)perylene		760 (U)	50 (U)	940 (U)	50 (U)
Benzo(a)pyrene		760 (U)	50 (U)	940 (U)	50 (U)
Bis (2-Chloroethoxy) Methane		760 (U)	50 (U)	940 (U)	50 (U)
Bis (2-Chloroethyl) ether		760 (U)	50 (U)	940 (U)	50 (U)
bis (2-Ethylhexyl) phthalate		4700	12 (J)	340 (J)	50 (U)
4-Bromophenyl-phenylether		760 (U)	50 (U)	940 (U)	50 (U)
Butylbenzylphthalate		760 (U)	50 (U)	940 (U)	50 (U)
Carbazole		350 (U)	50 (U)	940 (U)	50 (U)
4-Chloroaniline		760 (U)	50 (U)	940 (U)	50 (U)
2-Chloronaphthalene		760 (U)	50 (U)	940 (U)	50 (U)
2-Chlorophenol		760 (U)	50 (U)	940 (U)	50 (U)
4-Chlorophenyl-phenyl ether		760 (U)	50 (U)	940 (U)	50 (U)
Chrysene		760 (U)	50 (U)	940 (U)	50 (U)
2-Methylphenol		760 (U)	50 (U)	940 (U)	50 (U)
4-Methylphenol		760 (U)	50 (U)	940 (U)	50 (U)
Di-n-butylphthalate		230 (J)	50 (U)	210 (J)	50 (U)
Dibenzo (a,h) anthracene		760 (U)	50 (U)	940 (U)	50 (U)
Dibenzofuran		760 (U)	50 (U)	940 (U)	50 (U)
1,4-Dichlorobenzene		760 (U)	50 (U)	940 (U)	50 (U)
3,3-Dichlorobenzidine		760 (U)	50 (U)	940 (U)	50 (U)
2,4-Dichlorophenol		760 (U)	50 (U)	940 (U)	50 (U)
Diethylphthalate		760 (U)	50 (U)	940 (U)	50 (U)
2,4-Dimethylphenol		760 (U)	50 (U)	940 (U)	50 (U)
Dimethylphthalate		760 (U)	50 (U)	940 (U)	50 (U)
2,4-Dinitrophenol		1600 (U)	100 (U)	1900 (U)	100 (U)
2,4-Dinitrotoluene		760 (U)	50 (U)	940 (U)	50 (U)
2,6-Dinitrotoluene		760 (U)	50 (U)	940 (U)	50 (U)
Di-n-octylphthalate		760 (U)	50 (U)	940 (U)	50 (U)
Fluoranthene		300 (J)	50 (U)	940 (U)	50 (U)
Fluorene		760 (U)	50 (U)	940 (U)	50 (U)
Hexachlorobenzene		760 (U)	50 (U)	940 (U)	50 (U)
Hexachlorocyclopentadiene		760 (U)	50 (U)	940 (U)	50 (U)

Notes:
[c] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit.
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD401 5/25/00 Total ug/kg	MW-SD401 5/25/00 SPLP ug/l	MW-SD421 5/25/00 Total ug/kg	MW-SD421 5/25/00 SPLP ug/l
SEMIVOLATILE ORGANIC COMPOUNDS [c]					
Acenaphthene		3400 (U)	50 (U)	470 (U)	50 (U)
Acenaphthylene		3400 (U)	50 (U)	470 (U)	50 (U)
Anthracene		3400 (U)	50 (U)	470 (U)	50 (U)
Azobenzene		3400 (U)	100 (U)	470 (U)	100 (U)
Benzo(a)anthracene		3400 (U)	50 (U)	110 (J)	50 (U)
Benzo(b)fluoranthene		3400 (U)	50 (U)	290 (J)	50 (U)
Benzo(k)fluoranthene		3400 (U)	50 (U)	210 (J)	50 (U)
Benzo(g,h,i)perylene		3400 (U)	50 (U)	470 (U)	50 (U)
Benzo(a)pyrene		3400 (U)	50 (U)	170 (J)	50 (U)
Bis (2-Chloroethoxy) Methane		3400 (U)	50 (U)	470 (U)	50 (U)
Bis (2-Chloroethyl) ether		3400 (U)	50 (U)	470 (U)	50 (U)
bis (2-Ethylhexyl) phthalate		730 (J)	50 (U)	470 (U)	50 (U)
4-Bromophenyl-phenylether		3400 (U)	50 (U)	470 (U)	50 (U)
Butylbenzylphthalate		3400 (U)	50 (U)	470 (U)	50 (U)
Carbazole		3400 (U)	50 (U)	470 (U)	50 (U)
4 -Chloroaniline		3400 (U)	50 (U)	470 (U)	50 (U)
2 -Chloronaphthalene		3400 (U)	50 (U)	470 (U)	50 (U)
2 -Chlorophenol		3400 (U)	50 (U)	470 (U)	50 (U)
4 -Chlorophenyl-phenyl ether		3400 (U)	50 (U)	470 (U)	50 (U)
Chrysene		3400 (U)	50 (U)	150 (J)	50 (U)
2-Methylphenol		3400 (U)	50 (U)	470 (U)	50 (U)
4-Methylphenol		3400 (U)	50 (U)	470 (U)	50 (U)
Di-n-butylphthalate		3400 (U)	50 (U)	470 (U)	50 (U)
Dibenzo (a,h) anthracene		3400 (U)	50 (U)	470 (U)	50 (U)
Dibenzofuran		3400 (U)	50 (U)	470 (U)	50 (U)
1,4 -Dichlorobenzene		3400 (U)	50 (U)	470 (U)	50 (U)
3,3 -Dichlorobenzidine		3400 (U)	50 (U)	470 (U)	50 (U)
2,4 -Dichlorophenol		3400 (U)	50 (U)	470 (U)	50 (U)
Diethylphthalate		3400 (U)	50 (U)	470 (U)	50 (U)
2,4 -Dimethylphenol		3400 (U)	50 (U)	470 (U)	50 (U)
Dimethylphthalate		3400 (U)	50 (U)	470 (U)	50 (U)
2,4 -Dinitrophenol		7100 (U)	100 (U)	970 (U)	100 (U)
2,4 -Dinitrotoluene		3400 (U)	50 (U)	470 (U)	50 (U)
2,6 -Dinitrotoluene		3400 (U)	50 (U)	470 (U)	50 (U)
Di-n-octylphthalate		3400 (U)	50 (U)	470 (U)	50 (U)
Fluoranthene		3400 (U)	50 (U)	310 (J)	50 (U)
Fluorene		3400 (U)	50 (U)	470 (U)	50 (U)
Hexachlorobenzene		3400 (U)	50 (U)	470 (U)	50 (U)
Hexachlorocyclopentadiene		3400 (U)	50 (U)	470 (U)	50 (U)

Notes:
[c] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers. (U) Compound not detected above method detection limit
(J) Estimated value. Compound detected between the method detection limit and the reporting limit.

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	HS-SS-01 5/25/00 Total ug/kg	HS-SS-01 5/25/00 SPLP ug/l	HS-SS-02 5/25/00 Total ug/kg	HS-SS-02 5/25/00 SPLP ug/l
SEMIVOLATILE ORGANIC COMPOUNDS [c]					
Hexachloroethane		360 (U)	50 (U)	310 (U)	50 (U)
Hexachlorobutadiene		360 (U)	50 (U)	310 (U)	50 (U)
Indeno (1,2,3 -cd) pyrene		360 (U)	50 (U)	83 (J)	50 (U)
Isophorone		360 (U)	50 (U)	310 (U)	50 (U)
2-Methylnaphthalene		360 (U)	50 (U)	310 (U)	50 (U)
2-Methylphenol		360 (U)	50 (U)	310 (U)	50 (U)
Naphthalene		360 (U)	50 (U)	310 (U)	50 (U)
2-Nitroaniline		750 (U)	100 (U)	640 (U)	100 (U)
3-Nitroaniline		750 (U)	100 (U)	640 (U)	100 (U)
4-Nitroaniline		750 (U)	100 (U)	640 (U)	100 (U)
Nitrobenzene		360 (U)	50 (U)	310 (U)	50 (U)
2-Nitrophenol		360 (U)	50 (U)	310 (U)	50 (U)
p-Nitrophenol		750 (U)	100 (U)	640 (U)	100 (U)
N-Nitrosodiphenylamine		360 (U)	50 (U)	310 (U)	50 (U)
N-Nitroso-di-n-propylamine		360 (U)	50 (U)	310 (U)	50 (U)
2,2' -Oxbis (1-chloropropane)		360 (U)	50 (U)	310 (U)	50 (U)
Pentachlorophenol		750 (U)	100 (U)	640 (U)	100 (U)
Phenanthrene		360 (U)	50 (U)	310 (U)	50 (U)
Phenol		360 (U)	50 (U)	310 (U)	50 (U)
Pyrene		360 (U)	50 (U)	120 (J)	50 (U)
Pyridine		360 (U)	50 (U)	310 (U)	50 (U)
1,2,4 -Trichlorobenzene		360 (U)	50 (U)	310 (U)	50 (U)
2,4,5 -Trichlorophenol		750 (U)	100 (U)	640 (U)	100 (U)
2,4,6 -Trichlorophenol		360 (U)	50 (U)	310 (U)	50 (U)
1,3 -Dichlorobenzene		360 (U)	50 (U)	310 (U)	50 (U)
Benzyl alcohol		360 (U)	50 (U)	310 (U)	50 (U)
1,2 -Dichlorobenzene		360 (U)	50 (U)	310 (U)	50 (U)
bis (2-Chloroisopropyl) ether		360 (U)	50 (U)	310 (U)	50 (U)
4-Chloro-3-methylphenol		360 (U)	50 (U)	310 (U)	50 (U)
4,6 -Dinitro-2-methylphenol		750 (U)	100 (U)	640 (U)	100 (U)
Benzoic acid		750 (U)	100 (U)	640 (U)	100 (U)

Notes:
[c] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Units	Sample Identification Date Sampled	MW-SD118 5/25/00 Total	MW-SD118 5/25/00 SPLP	MW-SD205 5/25/00 Total	MW-SD205 5/25/00 SPLP
SEMIVOLATILE ORGANIC COMPOUNDS [c]						
Hexachloroethane			350 (U)	50 (U)	610 (U)	50 (U)
Hexachlorobutadiene			350 (U)	50 (U)	610 (U)	50 (U)
Indeno (1,2,3 -cd) pyrene			350 (U)	50 (U)	610 (U)	50 (U)
Isophorone			350 (U)	50 (U)	610 (U)	50 (U)
2-Methylnaphthalene			350 (U)	50 (U)	610 (U)	50 (U)
2-Methylphenol			350 (U)	50 (U)	610 (U)	50 (U)
Naphthalene			350 (U)	50 (U)	610 (U)	50 (U)
2-Nitroaniline			730 (U)	100 (U)	1300 (U)	100 (U)
3-Nitroaniline			730 (U)	100 (U)	1300 (U)	100 (U)
4-Nitroaniline			730 (U)	100 (U)	1300 (U)	100 (U)
Nitrobenzene			350 (U)	50 (U)	610 (U)	50 (U)
2-Nitrophenol			350 (U)	50 (U)	610 (U)	50 (U)
p-Nitrophenol			730 (U)	100 (U)	1300 (U)	100 (U)
N-Nitrosodiphenylamine			350 (U)	50 (U)	610 (U)	50 (U)
N-Nitroso-di-n-propylamine			350 (U)	50 (U)	610 (U)	50 (U)
2,2' -Oxbis (1-chloropropane)			350 (U)	50 (U)	610 (U)	50 (U)
Pentachlorophenol			730 (U)	100 (U)	1300 (U)	100 (U)
Phenanthrene			350 (U)	50 (U)	610 (U)	50 (U)
Phenol			350 (U)	50 (U)	610 (U)	50 (U)
Pyrene			350 (U)	50 (U)	610 (U)	50 (U)
Pyridine			350 (U)	50 (U)	610 (U)	50 (U)
1,2,4 -Trichlorobenzene			350 (U)	50 (U)	610 (U)	50 (U)
2,4,5 -Trichlorophenol			730 (U)	100 (U)	1300 (U)	100 (U)
2 4,6 -Trichlorophenol			350 (U)	50 (U)	610 (U)	50 (U)
1,3 -Dichlorobenzene			350 (U)	50 (U)	610 (U)	50 (U)
Benzyl alcohol			350 (U)	50 (U)	610 (U)	50 (U)
1,2 -Dichlorobenzene			350 (U)	50 (U)	610 (U)	50 (U)
bis (2-Chloroisopropyl) ether			350 (U)	50 (U)	610 (U)	50 (U)
4-Chloro-3-methylphenol			350 (U)	50 (U)	610 (U)	50 (U)
4,6 -Dinitro-2-methylphenol			730 (U)	100 (U)	1300 (U)	100 (U)
Benzoic acid			730 (U)	100 (U)	1300 (U)	100 (U)

Notes:
[c] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit
(J) Estimated value. Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Units	Sample Identification / Date Sampled	MW-SD211 5/25/00 Total ug/kg	MW-SD211 5/25/00 SPLP ug/l	MW-SD301 5/25/00 Total ug/kg	MW-SD301 5/25/00 SPLP ug/l
SEMIVOLATILE ORGANIC COMPOUNDS [c]						
Hexachloroethane			760 (U)	50 (U)	940 (U)	50 (U)
Hexachlorobutadiene			760 (U)	50 (U)	940 (U)	50 (U)
Indeno (1,2,3 -cd) pyrene			170 (J)	50 (U)	940 (U)	50 (U)
Isophorone			760 (U)	50 (U)	940 (U)	50 (U)
2-Methylnaphthalene			760 (U)	50 (U)	940 (U)	50 (U)
2-Methylphenol			350 (U)	50 (U)	940 (U)	50 (U)
Naphthalene			760 (U)	50 (U)	940 (U)	50 (U)
2-Nitroaniline			1600 (U)	100 (U)	1900 (U)	100 (U)
3-Nitroaniline			1600 (U)	100 (U)	1900 (U)	100 (U)
4-Nitroaniline			1600 (U)	50 (U)	1900 (U)	100 (U)
Nitrobenzene			760 (U)	50 (U)	940 (U)	50 (U)
2-Nitrophenol			760 (U)	50 (U)	940 (U)	50 (U)
p-Nitrophenol			1600 (U)	100 (U)	1900 (U)	100 (U)
N-Nitrosodiphenylamine			760 (U)	50 (U)	940 (U)	50 (U)
N-Nitroso-di-n-propylamine			760 (U)	50 (U)	940 (U)	50 (U)
2,2' -Oxbis (1-chloropropane)			350 (U)	50 (U)	940 (U)	50 (U)
Pentachlorophenol			1600 (U)	100 (U)	1900 (U)	100 (U)
Phenanthrene			760 (U)	50 (U)	940 (U)	50 (U)
Phenol			760 (U)	50 (U)	940 (U)	50 (U)
Pyrene			210 (U)	50 (U)	940 (U)	50 (U)
Pyridine			760 (U)	50 (U)	940 (U)	50 (U)
1,2,4 -Trichlorobenzene			760 (U)	50 (U)	940 (U)	50 (U)
2,4,5 -Trichlorophenol			1600 (U)	100 (U)	1900 (U)	100 (U)
2,4,6 -Trichlorophenol			760 (U)	50 (U)	940 (U)	50 (U)
1,3 -Dichlorobenzene			760 (U)	50 (U)	940 (U)	50 (U)
Benzyl alcohol			760 (U)	50 (U)	940 (U)	50 (U)
1,2 -Dichlorobenzene			760 (U)	50 (U)	940 (U)	50 (U)
bis (2-Chloroisopropyl) ether			760 (U)	50 (U)	940 (U)	50 (U)
4-Chloro-3-methylphenol			760 (U)	50 (U)	940 (U)	50 (U)
4,6 -Dinitro-2-methylphenol			1600 (U)	100 (U)	1900 (U)	100 (U)
Benzoic acid			260 (J)	100 (U)	1900 (U)	100 (U)

Notes:
[c] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L - micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit.
(J) Estimated value. Compound detected between the method detection limit and the reporting limit.

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

	Sample Identification	MW-SD401	MW-SD401	MW-SD421	MW-SD421
	Date Sampled	5/25/00	5/25/00	5/25/00	5/25/00
		Total	SPLP	Total	SPLP
Compound	Units	ug/kg	ug/l	ug/kg	ug/l
SEMIVOLATILE ORGANIC COMPOUNDS [c]					
Hexachloroethane		3400 (U)	50 (U)	470 (U)	50 (U)
Hexachlorobutadiene		3400 (U)	50 (U)	470 (U)	50 (U)
Indeno (1,2,3 -cd) pyrene		3400 (U)	50 (U)	190 (J)	50 (U)
Isophorone		3400 (U)	50 (U)	470 (U)	50 (U)
2-Methylnaphthalene		3400 (U)	50 (U)	470 (U)	50 (U)
2-Methylphenol		3400 (U)	50 (U)	470 (U)	50 (U)
Naphthalene		3400 (U)	50 (U)	470 (U)	50 (U)
2-Nitroaniline		7100 (U)	100 (U)	970 (U)	100 (U)
3-Nitroaniline		7100 (U)	100 (U)	970 (U)	100 (U)
4-Nitroaniline		7100 (U)	100 (U)	970 (U)	100 (U)
Nitrobenzene		3400 (U)	50 (U)	470 (U)	50 (U)
2-Nitrophenol		3400 (U)	50 (U)	470 (U)	50 (U)
p-Nitrophenol		7100 (U)	100 (U)	970 (U)	100 (U)
N-Nitrosodiphenylamine		3400 (U)	50 (U)	470 (U)	50 (U)
N-Nitroso-di-n-propylamine		3400 (U)	50 (U)	470 (U)	50 (U)
2,2' -Oxbis (1-chloropropane)		3400 (U)	50 (U)	470 (U)	50 (U)
Pentachlorophenol		7100 (U)	100 (U)	970 (U)	100 (U)
Phenanthrene		3400 (U)	50 (U)	470 (U)	50 (U)
Phenol		3400 (U)	50 (U)	470 (U)	50 (U)
Pyrene		3400 (U)	50 (U)	260 (J)	50 (U)
Pyridine		3400 (U)	50 (U)	470 (J)	50 (U)
1 2,4 -Trichlorobenzene		3400 (U)	50 (U)	470 (U)	50 (U)
2,4,5 -Trichlorophenol		7100 (U)	100 (U)	970 (U)	100 (U)
2,4,6 -Trichlorophenol		3400 (U)	50 (U)	470 (U)	50 (U)
1,3 -Dichlorobenzene		3400 (U)	50 (U)	470 (U)	50 (U)
Benzyl alcohol		3400 (U)	50 (U)	470 (U)	50 (U)
1,2 -Dichlorobenzene		3400 (U)	50 (U)	470 (U)	50 (U)
bis (2-Chloroisopropyl) ether		3400 (U)	50 (U)	470 (U)	50 (U)
4-Chloro-3-methylphenol		3400 (U)	50 (U)	470 (U)	50 (U)
4,6 -Dinitro-2-methylphenol		3400 (U)	100 (U)	970 (U)	100 (U)
Benzoic acid		7100 (U)	100 (U)	970 (U)	100 (U)

Notes:
[c] USEPA SW-846 Method 8270C
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers. (U) Compound not detected above method detection limit.
(J) Estimated value Compound detected between the method detection limit and the reporting limit.

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	HS-SS-01 5/25/00 Total ug/kg	HS-SS-01 5/25/00 SPLP ug/l	HS-SS-02 5/25/00 Total ug/kg	HS-SS-02 5/25/00 SPLP ug/l
POLYNUCLEAR AROMATIC HYDROCARBONS [d]					
Naphthalene		38 (U)	5 0 (U)	33 (U)	5 0 (U)
Acenaphthylene		75 (U)	10 (U)	65 (U)	10 (U)
1-Methylnapthalene		38 (U)	5 0 (U)	33 (U)	5 0 (U)
2-Methylnapthalene		38 (U)	5 0 (U)	33 (U)	5 0 (U)
Acenaphthalene		38 (U)	5 0 (U)	33 (U)	5 0 (U)
Fluorene		7 5 (U)	1 0 (U)	6 5 (U)	1 0 (U)
Phenanthrene		3 8 (U)	0 50 (U)	26	0 50 (U)
Anthracene		3 8 (U)	0 50 (U)	11	0 50 (U)
Fluoroanthene		86	1 0 (U)	150	1 0 (U)
Pyrene		78	0 50 (U)	190	0 50 (U)
Benzo(a)anthracene		3 8 (U)	0 50 (U)	79	0 50 (U)
Chrysene		18	0 50 (U)	85	0 50 (U)
Benzo(b)fluoranthene		7 5 (U)	1 0 (U)	6 5 (U)	1 0 (U)
Benzo(k)fluoranthene		76	0 50 (U)	3 3 (U)	0 50 (U)
Benzo(a)pyrene		83	0 50 (U)	190	0 50 (U)
Dibenzo(a,h)anthracene		7 5 (U)	1 0 (U)	6 5 (U)	1 0 (U)
Benzo(g,h,i)perylene		7 5 (U)	1 0 (U)	6 5 (U)	1 0 (U)
Indeno(1,2,3-cd)pyrene		130	0 50 (U)	300	0 50 (U)

Notes:
[d] USEPA SW-846-Method 8310
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit
(J) Estimated value. Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD118 5/25/00 Total ug/kg	MW-SD118 5/25/00 SPLP ug/l	MW-SD205 5/25/00 Total ug/kg	MW-SD205 5/25/00 SPLP ug/l
POLYNUCLEAR AROMATIC HYDROCARBONS [d]					
Naphthalene		37 (U)	5 0 (U)	65 (U)	5 0 (U)
Acenaphthylene		74 (U)	10 (U)	130 (U)	10 (U)
1-Methylnapthalene		37 (U)	5 0 (U)	65 (U)	5 0 (U)
2-Methylnapthalene		37 (U)	5 0 (U)	65 (U)	5 0 (U)
Acenaphthalene		37 (U)	5 0 (U)	65 (U)	5 0 (U)
Fluorene		7 4 (U)	1 0 (U)	13 (U)	1 0 (U)
Phenanthrene		3 7 (U)	0 50 (U)	6 5 (U)	0 50 (U)
Anthracene		3 7 (U)	0 50 (U)	6 5 (U)	0 50 (U)
Fluoroanthene		87	1 0 (U)	120	1 0 (U)
Pyrene		54	0 50 (U)	87	0 50 (U)
Benzo(a)anthracene		22	0 50 (U)	32	0 50 (U)
Chrysene		15	0 50 (U)	20	0 50 (U)
Benzo(b)fluoranthene		7 4 (U)	1 0 (U)	13 (U)	1 0 (U)
Benzo(k)fluoranthene		33	0 50 (U)	48	0 50 (U)
Benzo(a)pyrene		45	0 50 (U)	75	0 50 (U)
Dibenzo(a,h)anthracene		7 4 (U)	1 0 (U)	13 (U)	1 0 (U)
Benzo(g,h,i)perylene		7 4 (U)	1 0 (U)	160	1.0 (U)
Indeno(1,2,3-cd)pyrene		69	0 50 (U)	180	0 50 (U)

Notes:
[d] USEPA SW-846-Method 8310
ug/kg - micrograms per kilogram
ug/L - micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD211 5/25/00 Total ug/kg	MW-SD211 5/25/00 SPLP ug/l	MW-SD301 5/25/00 Total ug/kg	MW-SD301 5/25/00 SPLP ug/l
POLYNUCLEAR AROMATIC HYDROCARBONS [4]					
Naphthalene		80 (U)	5.0 (U)	95 (U)	5.0 (U)
Acenaphthylene		160 (U)	10 (U)	190 (U)	10 (U)
1-Methylnapthalene		80 (U)	5.0 (U)	95 (U)	5.0 (U)
2-Methylnapthalene		80 (U)	5.0 (U)	95 (U)	5.0 (U)
Acenaphthalene		80 (U)	5.0 (U)	95 (U)	5.0 (U)
Fluorene		16 (U)	1.0 (U)	19 (U)	1.0 (U)
Phenanthrene		55	0.50 (U)	9.5 (U)	0.50 (U)
Anthracene		20	0.50 (U)	9.5 (U)	0.50 (U)
Fluoroanthene		220	1.0 (U)	180	1.0 (U)
Pyrene		200	0.50 (U)	220	0.50 (U)
Benzo(a)anthracene		88	0.50 (U)	90	0.50 (U)
Chrysene		53	0.50 (U)	55	0.50 (U)
Benzo(b)fluoranthene		16 (U)	1.0 (U)	19 (U)	1.0 (U)
Benzo(k)fluoranthene		170	0.50 (U)	400	0.50 (U)
Benzo(a)pyrene		170	0.50 (U)	380	0.50 (U)
Dibenzo(a,h)anthracene		16 (U)	1.0 (U)	19 (U)	1.0 (U)
Benzo(g,h,i)perylene		16 (U)	1.0 (U)	340	1.0 (U)
Indeno(1,2,3-cd)pyrene		440	0.50 (U)	410	0.50 (U)

Notes:
[4] USEPA SW-846-Method 8310
ug/kg - micrograms per kilogram
ug/L - micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers: (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Units	Sample Identification / Date Sampled	MW-SD401 5/25/00 Total ug/kg	MW-SD401 5/25/00 SPLP ug/l	MW-SD421 5/25/00 Total ug/kg	MW-SD421 5/25/00 SPLP ug/l
POLYNUCLEAR AROMATIC HYDROCARBONS [d]						
Naphthalene			70 (U)	5 0 (U)	49 (U)	5 0 (U)
Acenaphthylene			140 (U)	10 (U)	98 (U)	10 (U)
1-Methylnapthalene			70 (U)	5 0 (U)	49 (U)	5 0 (U)
2-Methylnapthalene			70 (U)	5 0 (U)	49 (U)	5 0 (U)
Acenaphthalene			70 (U)	5 0 (U)	49 (U)	5 0 (U)
Fluorene			14 (U)	1 0 (U)	9 8 (U)	1 0 (U)
Phenanthrene			7 0 (U)	0 50 (U)	29	0 50 (U)
Anthracene			7 0 (U)	0 50 (U)	14	0 50 (U)
Fluoroanthene			57	1 0 (U)	150	1 0 (U)
Pyrene			48	0 50 (U)	190	0 50 (U)
Benzo(a)anthracene			7 0 (U)	0 50 (U)	61	0 50 (U)
Chrysene			7 0 (U)	0 50 (U)	43	0 50 (U)
Benzo(b)fluoranthene			14 (U)	1 0 (U)	9 8 (U)	1 0 (U)
Benzo(k)fluoranthene			7 0 (U)	0 50 (U)	91	0 50 (U)
Benzo(a)pyrene			7 0 (U)	0 50 (U)	96	0 50 (U)
Dibenzo(a,h)anthracene			14 (U)	1 0 (U)	9 8 (U)	1 0 (U)
Benzo(g,h,i)perylene			14 (U)	1 0 (U)	9 8 (U)	1 0 (U)
Indeno(1,2,3-cd)pyrene			120	0 50 (U)	4 9 (U)	0 50 (U)

Notes:
[d] USEPA SW-846-Method 8310
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit
(J) Estimated value Compound detected between the method detection limit and the reporting limit.

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Units	Sample Identification / Date Sampled	HS-SS-01 5/25/00 Total	HS-SS-01 5/25/00 SPLP	HS-SS-02 5/25/00 Total	HS-SS-02 5/25/00 SPLP
			mg/kg	ug/l	mg/kg	ug/l
INORGANIC ANALYSIS [a]						
Aluminum			2710 (B)	200 (B)	4380	274
Antimony			0 42 (U)	3 3 (B)	0 34 (U)	2 3 (B)
Arsenic			3 5 (B)	12 6 (B)	2 7 (B)	11 5 (B)
Barium			17 4 (B)	208	20 5 (B)	178
Beryllium			0 33 (B)	0 48 (U)	0 36 (B)	0 48 (U)
Cadmium			0 71 (B)	0 35 (U)	0 65 (B)	0 35 (U)
Calcium			356000	18300	304000	17600
Chromium			13 9 (B)	6 4 (U)	17 5 (B)	6 4 (U)
Cobalt			1 3 (B)	3 3 (U)	0 72 (B)	3 3 (U)
Copper			22 2 (B)	8 7 (U)	17 6 (B)	8 7 (U)
Iron			2690	84 3 (B)	3290	64 8 (B)
Lead			9 9 (U)	1 8 (U)	9 9 (B)	1 8 (U)
Magnesium			1690 (B)	2530	1750 (B)	4830
Manganese			20 5 (B)	1 8 (U)	27 (B)	1 8 (U)
Mercury			0 59 (B)	0 17 (B)	0 49 (B)	1 7
Molybdanum			2 7 (B)	8 8 (U)	2 3 (B)	8 8 (U)
Nickel			3 7 (B)	7 3 (U)	3 9 (B)	7 3 (U)
Potassium			125 (B)	699	144 (B)	1150
Selenium			0 85 (U)	3 7 (U)	0 69 (U)	3 7 (U)
Silver			8 9 (B)	6 1 (U)	12 5 (B)	6 1 (U)
Sodium			1300 (B)	11500	1270 (B)	18000
Thallium			0 55 (U)	2 4 (U)	0 45 (U)	2 4 (U)
Vanadium			8 5 (B)	35 1	8 7 (B)	53 0
Zinc			56 6 (B)	40 0	45 4 (B)	40 9

Notes:
[a] USEPA SW-846 Method 6000/7000
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers: (U) Compound not detected above method detection limit
(B) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

	Sample Identification	MW-SD118	MW-SD118	MW-SD205	MW-SD205
	Date Sampled	5/25/00	5/25/00	5/25/00	5/25/00
		Total	SPLP	Total	SPLP
Compound	Units	mg/kg	ug/l	mg/kg	ug/l
INORGANIC ANALYSIS [a]					
Aluminum		4660	62 0 (U)	2950 (B)	144 (B)
Antimony		0 36 (U)	1 8 (U)	0 38 (B)	1 8 (U)
Arsenic		3 5 (B)	5 0 (U)	4 2 (B)	13 3 (B)
Barium		11 8 (B)	96 9	17 6 (B)	194
Beryllium		0 44 (B)	0 48 (U)	0.24 (B)	0 48 (U)
Cadmium		0 34 (B)	0 35 (U)	0 97 (B)	0 35 (U)
Calcium		323000	17700	339000	18100
Chromium		16 9 (B)	6 4 (U)	15 4 (B)	6 4 (U)
Cobalt		1 2 (B)	3 3 (U)	1 2 (B)	3 3 (U)
Copper		7 7 (B)	8 7 (U)	28 8 (B)	8 7 (U)
Iron		3710	134 (B)	3020	61 8 (B)
Lead		12 2 (B)	1 8 (U)	11 4 (B)	1 8 (U)
Magnesium		2710 (B)	12900	1850 (B)	2890
Manganese		29 2 (B)	1 8 (U)	25 1 (B)	1 8 (U)
Mercury		0 32 (B)	3 2	0 61 (B)	0 27 (B)
Molybdenum		4 1 (B)	8 8 (U)	3 6 (B)	8 8 (U)
Nickel		4 1 (B)	7 3 (U)	4 3 (B)	7 3 (U)
Potassium		444 (B)	5880	143 (B)	880
Selenium		0 74 (U)	3 7 (U)	0 74 (U)	3 7 (U)
Silver		3 1 (B)	6 1 (U)	12 6 (B)	6 1 (U)
Sodium		6460	115000	1130 (B)	13900
Thallium		0.85 (B)	2 4 (U)	0 48 (U)	2 4 (U)
Vanadium		8 8 (B)	23 4	8 8 (B)	28 8
Zinc		22 2 (B)	25 4	69 6 (B)	41 0

Notes:
[a] USEPA SW-846 Method 6000/7000
ug/kg - micrograms per kilogram
ug/L - micrograms per liter
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers. (U) Compound not detected above method detection limit.
(B) Estimated value Compound detected between the method detection limit and the reporting limit

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD211 5/25/00 Total mg/kg	MW-SD211 5/25/00 SPLP ug/l	MW-SD301 5/25/00 Total mg/kg	MW-SD301 5/25/00 SPLP ug/l
INORGANIC ANALYSIS [a]					
Aluminum		5030	62 0 (U)	1330 (B)	76 5 (B)
Antimony		0 34 (U)	2 9 (B)	0 70 (B)	4 4 (B)
Arsenic		3 8 (B)	12 8 (B)	16 6 (B)	42 1
Barium		18 9 (U)	94 7	18 (B)	189
Beryllium		0 45 (B)	0 48 (U)	0 45 (B)	0 48 (U)
Cadmium		0 57 (B)	0 35 (U)	1 8 (B)	0 35 (U)
Calcium		327000	14700	268000 (B)	16900
Chromium		17 3 (B)	6 4 (U)	11 6 (B)	6 4 (U)
Cobalt		1 1 (B)	3 3 (U)	1 8 (B)	3 3 (U)
Copper		17 7 (B)	8 7 (U)	57 5 (B)	8 7 (U)
Iron		3530	47 0 (U)	3520	47 0 (U)
Lead		8 9 (B)	1 8 (U)	24 2 (B)	1 8 (U)
Magnesium		1780 (B)	3410	1040 (B)	809
Manganese		27 1 (B)	1 8 (U)	15 9 (B)	1 8 (U)
Mercury		0 38 (B)	0 13 (B)	0 79 (B)	0 13 (B)
Molybdanum		3 2 (B)	8 8 (U)	5 6 (B)	8 8 (U)
Nickel		3 9 (B)	7 3 (U)	2 3 (U)	7 3 (U)
Potassium		170 (B)	633	81 7 (U)	683
Selenium		0 97 (B)	3 7 (U)	1 7 (B)	3 7 (U)
Silver		10 5 (B)	6 1 (U)	12 7 (B)	6 1 (U)
Sodium		1270 (B)	9270	774 (B)	7740
Thallium		0 45 (U)	2 4 (U)	0 74 (U)	2 4 (U)
Vanadium		9 1 (B)	20 2	8 4 (B)	13 2
Zinc		41 7 (B)	42 0	126 (B)	62 6

Notes:
[a] USEPA SW-846 Method 6000/7000
ug/kg - micrograms per kilogram
ug/L - micrograms per liter
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit
(B) Estimated value Compound detected between the method detection limit and the reporting limit

Compound	Sample Identification / Date Sampled / Units	HS-SS-01 5/25/00	HS-SS-02 5/25/00	MW-SD118 5/25/00	MW-SD205 5/25/00
TOTAL ORGANIC CARBON	mg/kg*	37800	41400	38300	28100

Notes:
mg/kg - milligrams per kilogram
* Dry weight basis

Table 2-5

Summary of Analytical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Compound	Sample Identification / Date Sampled / Units	MW-SD401 5/25/00 Total mg/kg	MW-SD401 5/25/00 SPLP ug/l	MW-SD421 5/25/00 Total mg/kg	MW-SD421 5/25/00 SPLP ug/l
INORGANIC ANALYSIS [a]					
Aluminum		3170 (B)	62 0 (U)	2170 (B)	62.0 (U)
Antimony		1 1 (B)	6 3 (B)	0 99 (B)	5 5 (B)
Arsenic		27 3 (B)	24 3 (B)	6 9 (B)	21 7 (B)
Barium		17 8 (B)	192	13 7 (B)	228
Beryllium		0 50 (B)	0 48 (U)	0 40 (B)	0 48 (U)
Cadmium		4 6 (B)	0 35 (U)	1 7 (B)	0 35 (U)
Calcium		264000	23300	313000	16300
Chromium		25 4 (B)	6 4 (U)	15 5 (B)	6 4 (U)
Cobalt		3 6 (B)	3 3 (U)	1 6 (B)	3 3 (U)
Copper		150 (B)	8 7 (U)	73 9 (B)	8 8 (B)
Iron		10200	117 (B)	2680	84 6 (B)
Lead		156 (B)	1 8 (U)	28 1 (B)	1 8 (U)
Magnesium		1510 (B)	1680	1280 (B)	1380
Manganese		37 3 (B)	1 8 (U)	19 6 (B)	1 8 (U)
Mercury		2 7 (B)	0 30 (B)	1 7 (B)	0 34 (B)
Molybdenum		13 7 (B)	9 5 (B)	4 4 (B)	8 8 (U)
Nickel		7 6 (B)	7 3 (U)	2 9 (B)	7 3 (U)
Potassium		110 (U)	517	73 7 (U)	591
Selenium		2 8 (B)	3 7 (U)	1 3 (B)	3 7 (U)
Silver		63 6 (B)	6 1 (U)	49 8 (B)	6 1 (U)
Sodium		600 (B)	5120	705 (B)	4650
Thallium		1 0 (B)	2 4 (U)	0 67 (U)	2 4 (U)
Vanadium		16 3 (U)	5 5 (B)	16 2 (B)	48 3
Zinc		576 (B)	68 5	159 (B)	56 5

Notes.
[a] USEPA SW-846 Method 6000/7000
ug/kg - micrograms per kilogram
ug/L- micrograms per liter
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
SPLP - Synthetic Precipitate Leaching Procedure
Data Qualifiers (U) Compound not detected above method detection limit
(B) Estimated value Compound detected between the method detection limit and the reporting limit

Compound	Sample Identification / Date Sampled / Units	MW-SD211 5/25/00	MW-SD301 5/25/00	MW-SD401 5/25/00	MW-SD421 5/25/00
TOTAL ORGANIC CARBON		33800	37700	70200	34800

Notes:
mg/kg - milligrams per kilogram
* Dry weight basis

Table 2-6

Summary of Physical Test Results for Sediment Treatability Study
Operable Unit 11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area
Former Homestead Air Force Base, Florida

Sample Identification	Date	Depth Feet	Classification	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density lb/ft^3	Specific Gravity @ 20^{0}C
HS-SS-01	5/25/00	_	Saturated, light olive brown sandy silt	83 1	158	32 2	2.73
HS-SS-02	5/25/00	_	Saturated, grayish brown sandy silt	83 8	119	38.3	2 73
MW-SD118	5/25/00	_	Saturated, grayish brown silty sand	89 6	132	38.5	2 67
MW-SD205	5/25/00	_	Saturated, grayish brown silty sand	81 2	147	32 9	2 67
MW-SD211	5/25/00	_	Saturated, light yellowish brown sandy silt	96 5	101	48.0	2 75
MW-SD301	5/25/00	_	Saturated, brown silty sand, organics	67 5	506	11 1	2.54
MW-SD401	5/25/00	_	Saturated, dark gray silty sand, organics	72 8	228	22 2	2 52
MW-SD421	5/25/00	_	Saturated, light brown silty sand	73 4	249	21 0	2 68

Notes:

Density determined on undisturbed samples by hand compacting into a container of known volume, measuring mass of soil and calculating.

Specific gravity performed using method B (most Specment of ASTM D 654

TABLE 2-7

SURFACE WATER EXPOSURE DOSES AND
RISK CALCULATIONS FOR AN OCCUPATIONAL WORKER
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	Toxicity Values		Calculated Risk
CANCER EFFECTS				CSFo	CSFd	
VOCs						
Benzene	0 0010	7 0E-09	3 3E-08	2.90E-02	3 6E-02	1 4E-09
Chloroform	0 0011	7.7E-09	1 6E-08	6 10E-03	7 6E-03	1 7E-10
Pesticides/PCBs						
Heptachlor	0 000016	1 1E-10	2 8E-10	4 50E+00	9 0E+00	3 0E-09
Metals						
Arsenic	0 0013	9 1E-09	2.1E-09	1 50E+00	1 6E+00	1 7E-08
Cadmium	0 0035	2 4E-08	5 6E-09	NAP	NAP	NAP
					ELCR =	2E-08
NON-CANCER EFFECTS				RfDo	RfDd	
VOCs						
Benzene	0 0010	2 0E-08	9 4E-08	3 00E-03	2 4E-03	4 6E-05
Chloroform	0.0011	2 2E-08	4 4E-08	1.00E-02	8.0E-03	7 6E-06
BNAs						
2-Methylnaphthalene	0 0010	2 0E-08	3 1E-07	2.00E-02	1.0E-02	3 2E-05
Naphthalene	0 0020	3 9E-08	6.2E-07	2 00E-02	1.0E-02	6.4E-05
Pesticides/PCBs						
Heptachlor	0 000016	3 1E-10	7 9E-10	5 00E-04	2 5E-04	3 8E-06
Metals						
Antimony	0 026	5 1E-07	1.2E-07	4.0E-04	8 0E-05	2 7E-03
Arsenic	0 0013	2 5E-08	5 8E-09	3 0E-04	2 9E-04	1 1E-04
Cadmium	0 0035	6 8E-08	1 6E-08	5.0E-04	1 0E-04	2.9E-04
					HI =	3E-03

BNAs - Base/neutral and acid extractable compounds
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
ELCR - Excess lifetime cancer risk
HI - Hazard index (sum of the hazard quotients)
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated.
NAP - Not applicable. Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion
PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral
RfDd - Reference Dose, Dermal
SWExDo - Surface water exposure dose, oral route
SWExDd - Surface water exposure dose, dermal route
VOCs - Volatile organic compounds

TABLE 2-8

SURFACE WATER AND SEDIMENT EXPOSURE DOSES AND RISK
CALCULATIONS FOR A CONSTRUCTION WORKER
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	Csed (mg/kg)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	SEDExDo (mg/kg-day)	SEDExDd (mg/kg-day)	SEDExDi (mg/kg-day)	Toxicity Values			Calculated Risk
CANCER EFFECTS								CSFo	CSFd	CSFi	
VOCs											
Benzene	0.0010	Not a COPC	2.2E-10	1.9E-08	NC	NC	NC	2.90E-02	3.6E-02	2.70E-02	7.1E-10
Chloroform	0.0011	Not a COPC	2.5E-10	9.1E-09	NC	NC	NC	6.10E-03	7.6E-03	8.10E-02	7.1E-11
BNAs											
Benzo(a)anthracene	Not a COPC	0.25	NC	NC	5.6E-10	2.9E-10	2.4E-14	7.30E-01	1.5E+00	3.1E-01	8.4E-10
Benzo(a)pyrene	Not a COPC	0.22	NC	NC	4.9E-10	2.6E-10	2.1E-14	7.30E+00	1.5E+01	3.1E+00	7.3E-09
Benzo(b)fluoranthene	Not a COPC	0.45	NC	NC	1.0E-09	5.3E-10	4.3E-14	7.30E-01	1.5E+00	3.1E-01	1.5E-09
Benzo(k)fluoranthene	Not a COPC	0.22	NC	NC	4.9E-10	2.6E-10	2.1E-14	7.30E-02	1.5E-01	3.1E-02	7.3E-11
Chrysene	Not a COPC	0.22	NC	NC	4.9E-10	2.6E-10	2.1E-14	7.30E-03	1.5E-02	3.1E-03	7.3E-12
Dibenzo(a,h)anthracene	Not a COPC	0.19	NC	NC	4.2E-10	2.2E-10	1.8E-14	7.30E+00	1.5E+01	3.1E+00	6.3E-09
Indeno(1,2,3-c,d)pyrene	Not a COPC	0.2	NC	NC	4.5E-10	2.3E-10	1.9E-14	7.30E-01	1.5E+00	3.1E-01	6.7E-10
Pesticides/PCBs											
Heptachlor	0.000016	Not a COPC	3.6E-12	1.6E-10	NC	NC	NC	4.50E+00	9.0E+00	4.60E+00	1.5E-09
Metals											
Arsenic	0.0013	9.5	2.9E-10	1.2E-09	2.1E-08	1.1E-09	9.2E-13	1.50E+00	1.6E+00	1.50E+01	3.6E-08
Cadmium	0.0035	Not a COPC	7.8E-10	3.2E-09	NC	NC	NC	NAP	NAP	6.30E+00	NAP
Chromium	Not a COPC	24.3	NC	NC	5.4E-08	2.8E-09	2.3E-12	NAP	NAP	4.10E+01	9.63E-11
										ELCR =	6E-08

BNAs - Base/neutral and acid extractable compounds
COPC - Chemical of potential concern
Csed - Constituent exposure point concentration in sediment (see Table 6-30)
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
ELCR - Excess lifetime cancer risk
HI - Hazard index (sum of the hazard quotients)
mg/kg - milligrams per kilogram
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated
NAP - Not applicable. Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion
NC - Not calculated, not a COPC for the applicable medium
PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral
RfDd - Reference Dose, Dermal
SEDExDo - Sediment exposure dose, oral route
SEDExDd - Sediment exposure dose, dermal route
SEDExDi - Sediment exposure dose, inhalation route
SWExDo - Surface water exposure dose, oral route
SWExDd - Surface water exposure dose, dermal route
VOCs - Volatile organic compounds

TABLE 2-8

SURFACE WATER AND SEDIMENT EXPOSURE DOSES AND RISK
CALCULATIONS FOR A CONSTRUCTION WORKER
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	Csed (mg/kg)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	SEDExDo (mg/kg-day)	SEDExDd (mg/kg-day)	SEDExDi (mg/kg-day)	Toxicity Values			Calculated Risk
NON-CANCER EFFECTS								RfDo	RfDd	RfDi	
VOCs											
Benzene	0.0010	Not a COPC	1.0E-07	8.9E-06	NC	NC	NC	3.00E-03	2.4E-03	1.70E-03	3.7E-03
Chloroform	0.0011	Not a COPC	1.1E-07	4.1E-06	NC	NC	NC	1.00E-02	8.0E-03	8.60E-05	5.3E-04
BNAs											
2-Methylnaphthalene	0.0010	Not a COPC	1.0E-07	2.9E-05	NC	NC	NC	2.00E-02	1.0E-02	8.60E-04	2.9E-03
Benzo(a)anthracene	Not a COPC	0.25	NC	NC	2.6E-07	1.3E-07	1.1E-11	2.00E-02	1.0E-02	8.60E-04	2.6E-05
Benzo(a)pyrene	Not a COPC	0.22	NC	NC	2.2E-07	1.2E-07	9.7E-12	2.00E-02	1.0E-02	8.60E-04	2.3E-05
Benzo(b)fluoranthene	Not a COPC	0.45	NC	NC	4.6E-07	2.4E-07	2.0E-11	2.00E-02	1.0E-02	8.60E-04	4.7E-05
Benzo(k)fluoranthene	Not a COPC	0.22	NC	NC	2.2E-07	1.2E-07	9.7E-12	2.00E-02	1.0E-02	8.60E-04	2.3E-05
Chrysene	Not a COPC	0.22	NC	NC	2.2E-07	1.2E-07	9.7E-12	2.00E-02	1.0E-02	8.60E-04	2.3E-05
Dibenzo(a,h)anthracene	Not a COPC	0.19	NC	NC	1.9E-07	1.0E-07	8.4E-12	2.00E-02	1.0E-02	8.60E-04	2.0E-05
Indeno(1,2,3-c,d)pyrene	Not a COPC	0.2	NC	NC	2.0E-07	1.1E-07	8.8E-12	2.00E-02	1.0E-02	8.60E-04	2.1E-05
Naphthalene	0.0020	Not a COPC	2.0E-07	5.8E-05	NC	NC	NC	2.00E-02	1.0E-02	8.60E-04	5.8E-03
Pesticides/PCBs											
Heptachlor	0.000016	Not a COPC	1.6E-09	7.4E-08	NC	NC	NC	5.00E-04	2.5E-04	5.00E-04	3.0E-04
Metals											
Antimony	0.0260	Not a COPC	2.7E-06	1.1E-05	NC	NC	NC	4.00E-04	8.0E-05	4.00E-04	1.4E-01
Arsenic	0.0013	9.5	1.3E-07	5.5E-07	9.7E-06	5.1E-07	4.2E-10	3.00E-04	2.9E-04	3.00E-04	3.6E-02
Cadmium	0.0035	Not a COPC	3.6E-07	1.5E-06	NC	NC	NC	5.00E-04	1.0E-04	5.70E-05	1.5E-02
Chromium	Not a COPC	24.3	NC	NC	2.5E-05	1.3E-06	1.1E-09	3.00E-03	6.0E-04	3.00E-05	1.0E-02
										HI =	2E-01

BNAs - Base/neutral and acid extractable compounds
COPC - Chemical of potential concern
Csed - Constituent exposure point concentration in sediment (see Table 6-30)
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
ELCR - Excess lifetime cancer risk
HI - Hazard index (sum of the hazard quotients)
mg/kg - milligrams per kilogram
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated
NAP - Not applicable. Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion

PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral
RfDd - Reference Dose, Dermal
SEDExDo - Sediment exposure dose, oral route
SEDExDd - Sediment exposure dose, dermal route
SEDExDi - Sediment exposure dose, inhalation route
SWExDo - Surface water exposure dose, oral route
SWExDd - Surface water exposure dose, dermal route
VOCs - Volatile organic compounds

TABLE 2-9

SURFACE WATER AND FISH EXPOSURE DOSES AND
RISK CALCULATIONS FOR AN ADULT RESIDENT
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	Cff (mg/kg)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	FExD (mg/kg-day)	Toxicity Values		Calculated Risk
CANCER EFFECTS						CSFo	CSFd	
VOCs								
Benzene	0 0010	Not a COPC	1 7E-08	4 4E-07	NC	2 90E-02	3 6E-02	1 6E-08
Chloroform	0 0011	Not a COPC	1 8E-08	2 0E-07	NC	6 10E-03	7.6E-03	1 7E-09
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0 033	NC	NC	6 0E-07	2 00E+00	4 0E+00	1 2E-06
4,4'-DDE	Not a COPC	0 04	NC	NC	7 2E-07	3 40E-01	6 8E-01	2 5E-07
Heptachlor	0 000016	Not a COPC	2 7E-10	3 7E-09	NC	4 50E+00	9 0E+00	3 4E-08
Metals								
Arsenic	0 0013	Not a COPC	2 2E-08	2 8E-08	NC	1 50E+00	1 6E+00	7 7E-08
Cadmium	0 0035	Not a COPC	5 9E-08	7 3E-08	NC	NAP	NAP	NAP
							ELCR =	2E-06
NON-CANCER EFFECTS						RfDo	RfDd	
VOCs								
Benzene	0 0010	Not a COPC	3 9E-08	1 0E-06	NC	3 00E-03	2 4E-03	4 4E-04
Chloroform	0 0011	Not a COPC	4 3E-08	4 8E-07	NC	1 00E-02	8 0E-03	6 4E-05
BNAs								
2-Methylnaphthalene	0 0010	Not a COPC	3 9E-08	3 4E-06	NC	2 00E-02	1 0E-02	3 4E-04
Naphthalene	0 0020	Not a COPC	7 8E-08	6 7E-06	NC	2 00E-02	1 0E-02	6 8E-04
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0 033	NC	NC	1 4E-06	2 00E-05	1 0E-05	7 0E-02
4,4'-DDE	Not a COPC	0 04	NC	NC	1 7E-06	5 00E-04	2 5E-04	3 4E-03
Heptachlor	0 000016	Not a COPC	6 3E-10	8 6E-09	NC	5 00E-04	2 5E-04	3 6E-05
Metals								
Antimony	0 026	Not a COPC	1 0E-06	1 3E-06	NC	4 0E-04	8 0E-05	1 8E-02
Arsenic	0 0013	Not a COPC	5 2E-08	6 4E-08	NC	3 0E-04	2 9E-04	4 0E-04
Cadmium	0 0035	Not a COPC	1 4E-07	1 7E-07	NC	5 0E-04	1 0E-04	2 0E-03
							HI =	1E-01

BNAs - Base/neutral and acid extractable compounds
Cff - Constituent exposure point concentration in fish filets (see Table 6-31)
COPC - Chemical of potential concern
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
ELCR - Excess lifetime cancer risk
FExD - Fish ingestion exposure dose
HI - Hazard index (sum of the hazard quotients)
mg/kg - milligrams per kilogram
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated
NAP - Not applicable Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion
NC - Not calculated, not a COPC for the applicable medium.
PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral
RfDd - Reference Dose, Dermal
SWExDo - Surface water exposure dose, oral route
SWExDd - Surface water exposure dose, dermal route
VOCs - Volatile organic compounds

TABLE 2-10

SURFACE WATER AND FISH EXPOSURE DOSES AND
RISK CALCULATIONS FOR A CHILD RESIDENT
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	Cff (mg/kg)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	FExD (mg/kg-day)	Toxicity Values		Calculated Risk
CANCER EFFECTS						CSFo	CSFd	
VOCs								
Benzene	0 0010	Not a COPC	1 6E-08	2 9E-07	NC	2 90E-02	3 6E-02	1 1E-08
Chloroform	0 0011	Not a COPC	1 7E-08	1 3E-07	NC	6 10E-03	7 6E-03	1 1E-09
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0 033	NC	NC	1 7E-07	2 00E+00	4 0E+00	3 4E-07
4,4'-DDE	Not a COPC	0 04	NC	NC	2 1E-07	3 40E-01	6 8E-01	7 0E-08
Heptachlor	0 000016	Not a COPC	2 5E-10	2 4E-09	NC	4 50E+00	9 0E+00	2 3E-08
Metals								
Arsenic	0 0013	Not a COPC	2 1E-08	1 8E-08	NC	1 50E+00	1 6E+00	6 0E-08
Cadmium	0 0035	Not a COPC	5 5E-08	4 8E-08	NC	NAP	NAP	NAP
							ELCR =	5E-07
NON-CANCER EFFECTS						RfDo	RfDd	
VOCs								
Benzene	0 0010	Not a COPC	1 8E-07	3 4E-06	NC	3 00E-03	2 4E-03	1 5E-03
Chloroform	0 0011	Not a COPC	2 0E-07	1 6E-06	NC	1 00E-02	8 0E-03	2 2E-04
BNAs								
2-Methylnaphthalene	0 0010	Not a COPC	1 8E-07	1 1E-05	NC	2 00E-02	1 0E-02	1 1E-03
Naphthalene	0 0020	Not a COPC	3 7E-07	2 2E-05	NC	2 00E-02	1 0E-02	2 2E-03
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0 033	NC	NC	2 0E-06	2.00E-05	1 0E-05	9 9E-02
4,4'-DDE	Not a COPC	0.04	NC	NC	2 4E-06	5 00E-04	2 5E-04	4 8E-03
Heptachlor	0 000016	Not a COPC	2 9E-09	2 8E-08	NC	5 00E-04	2 5E-04	1 2E-04
Metals								
Antimony	0 026	Not a COPC	4 7E-06	4 2E-06	NC	4 0E-04	8.0E-05	6 4E-02
Arsenic	0 0013	Not a COPC	2 4E-07	2 1E-07	NC	3 0E-04	2 9E-04	1 5E-03
Cadmium	0 0035	Not a COPC	6 4E-07	5 6E-07	NC	5 0E-04	1.0E-04	6 9E-03
							HI =	2E-01

BNAs - Base/neutral and acid extractable compounds
Cff - Constituent exposure point concentration in fish filets (see Table 6-31)
COPC - Chemical of potential concern
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
ELCR - Excess lifetime cancer risk
FExD - Fish ingestion exposure dose
HI - Hazard index (sum of the hazard quotients)
mg/kg - milligrams per kilogram
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated
NAP - Not applicable Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion
NC - Not calculated, not a COPC for the applicable medium
PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral
RfDd - Reference Dose, Dermal
SWExDo - Surface water exposure dose, oral route
SWExDd - Surface water exposure dose, dermal route
VOCs - Volatile organic compounds

TABLE 2-11

SURFACE WATER AND FISH EXPOSURE DOSES AND
RISK CALCULATIONS FOR AN ADULT RECREATIONAL FISHERMAN
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	Cff (mg/kg)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	FExD (mg/kg-day)	Toxicity Values		Calculated Risk
CANCER EFFECTS						CSFo	CSFd	
VOCs								
Benzene	0.0010	Not a COPC	1.7E-08	4.4E-07	NC	2.90E-02	3.6E-02	1.6E-08
Chloroform	0.0011	Not a COPC	1.8E-08	2.0E-07	NC	6.10E-03	7.6E-03	1.7E-09
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0.033	NC	NC	6.0E-07	2.00E+00	4.0E+00	1.2E-06
4,4'-DDE	Not a COPC	0.04	NC	NC	7.2E-07	3.40E-01	6.8E-01	2.5E-07
Heptachlor	0.000016	Not a COPC	2.7E-10	3.7E-09	NC	4.50E+00	9.0E+00	3.4E-08
Metals								
Arsenic	0.0013	Not a COPC	2.2E-08	2.8E-08	NC	1.50E+00	1.6E+00	7.7E-08
Cadmium	0.0035	Not a COPC	5.9E-08	7.3E-08	NC	NAP	NAP	NAP
							ELCR =	2E-06
NON-CANCER EFFECTS						RfDo	RfDd	
VOCs								
Benzene	0.0010	Not a COPC	3.9E-08	1.0E-06	NC	3.00E-03	2.4E-03	4.4E-04
Chloroform	0.0011	Not a COPC	4.3E-08	4.8E-07	NC	1.00E-02	8.0E-03	6.4E-05
BNAs								
2-Methylnaphthalene	0.0010	Not a COPC	3.9E-08	3.4E-06	NC	2.00E-02	1.0E-02	3.4E-04
Naphthalene	0.0020	Not a COPC	7.8E-08	6.7E-06	NC	2.00E-02	1.0E-02	6.8E-04
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0.033	NC	NC	1.4E-06	2.00E-05	1.0E-05	7.0E-02
4,4'-DDE	Not a COPC	0.04	NC	NC	1.7E-06	5.00E-04	2.5E-04	3.4E-03
Heptachlor	0.000016	Not a COPC	6.3E-10	8.6E-09	NC	5.00E-04	2.5E-04	3.6E-05
Metals								
Antimony	0.026	Not a COPC	1.0E-06	1.3E-06	NC	4.0E-04	8.0E-05	1.8E-02
Arsenic	0.0013	Not a COPC	5.2E-08	6.4E-08	NC	3.0E-04	2.9E-04	4.0E-04
Cadmium	0.0035	Not a COPC	1.4E-07	1.7E-07	NC	5.0E-04	1.0E-04	2.0E-03
							HI =	1E-01

BNAs - Base/neutral and acid extractable compounds
Cff - Constituent exposure point concentration in fish fillets (see Table 6-31)
COPC - Chemical of potential concern
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
ELCR - Excess lifetime cancer risk
FExD - Fish ingestion exposure dose
HI - Hazard index (sum of the hazard quotients)
mg/kg - milligrams per kilogram
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated
NAP - Not applicable. Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion
NC - Not calculated, not a COPC for the applicable medium
PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral
RfDd - Reference Dose, Dermal
SWExDo - Surface water exposure dose, oral route
SWExDd - Surface water exposure dose, dermal route
VOCs - Volatile organic compounds

TABLE 2-12

SURFACE WATER AND FISH EXPOSURE DOSES AND
RISK CALCULATIONS FOR AN ADULT SUBSISTENCE FISHERMAN
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	Cff (mg/kg)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	FExD (mg/kg-day)	Toxicity Values		Calculated Risk
CANCER EFFECTS						CSFo	CSFd	
VOCs								
Benzene	0 0010	Not a COPC	3 4E-08	8 8E-07	NC	2 90E-02	3.6E-02	3 3E-08
Chloroform	0 0011	Not a COPC	3 7E-08	4 1E-07	NC	6 10E-03	7 6E-03	3 4E-09
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0.033	NC	NC	6 0E-06	2 00E+00	4 0E+00	1 2E-05
4,4'-DDE	Not a COPC	0 04	NC	NC	7 2E-06	3 40E-01	6 8E-01	2 5E-06
Heptachlor	0 000016	Not a COPC	5 4E-10	7 4E-09	NC	4 50E+00	9 0E+00	6 9E-08
Metals								
Arsenic	0 0013	Not a COPC	4 4E-08	5 5E-08	NC	1 50E+00	1 6E+00	1 5E-07
Cadmium	0 0035	Not a COPC	1 2E-07	1 5E-07	NC	NAP	NAP	NAP
							ELCR =	1E-05
NON-CANCER EFFECTS						RfDo	RfDd	
VOCs								
Benzene	0 0010	Not a COPC	7 8E-08	2 1E-06	NC	3 00E-03	2 4E-03	8 8E-04
Chloroform	0 0011	Not a COPC	8 6E-08	9 6E-07	NC	1 00E-02	8 0E-03	1 3E-04
BNAs								
2-Methylnaphthalene	0 0010	Not a COPC	7 8E-08	6 7E-06	NC	2 00E-02	1 0E-02	6 8E-04
Naphthalene	0 0020	Not a COPC	1 6E-07	1 3E-05	NC	2 00E-02	1 0E-02	1 4E-03
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0 033	NC	NC	1 4E-05	2 00E-05	1 0E-05	7 0E-01
4,4'-DDE	Not a COPC	0 04	NC	NC	1 7E-05	5 00E-04	2.5E-04	3 4E-02
Heptachlor	0 000016	Not a COPC	1 3E-09	1 7E-08	NC	5 00E-04	2 5E-04	7 1E-05
Metals								
Antimony	0 026	Not a COPC	2 0E-06	2 5E-06	NC	4 0E-04	8 0E-05	3 7E-02
Arsenic	0 0013	Not a COPC	1 0E-07	1 3E-07	NC	3 0E-04	2 9E-04	8 0E-04
Cadmium	0 0035	Not a COPC	2 7E-07	3 4E-07	NC	5 0E-04	1 0E-04	4 0E-03
							HI =	8E-01

BNAs - Base/neutral and acid extractable compounds
Cff - Constituent exposure point concentration in fish filets (see Table 6-31)
COPC - Chemical of potential concern
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
ELCR - Excess lifetime cancer risk
FExD - Fish ingestion exposure dose
HI - Hazard index (sum of the hazard quotients)
mg/kg - milligrams per kilogram
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated
NAP - Not applicable Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion
NC - Not calculated, not a COPC for the applicable medium.
PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral

TABLE 2-13

SURFACE WATER AND FISH EXPOSURE DOSES AND
RISK CALCULATIONS FOR A CHILD SUBSISTENCE FISHERMAN
OPERABLE UNIT 11, MILITARY CANAL
Former Homestead Air Force Base, Florida

Constituent	Csw (mg/L)	Cff (mg/kg)	SWExDo (mg/kg-day)	SWExDd (mg/kg-day)	FExD (mg/kg-day)	Toxicity Values		Calculated Risk
CANCER EFFECTS						CSFo	CSFd	
VOCs								
Benzene	0 0010	Not a COPC	3 1E-08	5 8E-07	NC	2 90E-02	3 6E-02	2 2E-08
Chloroform	0 0011	Not a COPC	3 4E-08	2 7E-07	NC	6 10E-03	7 6E-03	2 3E-09
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0 033	NC	NC	1 7E-06	2 00E+00	4 0E+00	3 4E-06
4,4'-DDE	Not a COPC	0 04	NC	NC	2 1E-06	3 40E-01	6 8E-01	7 0E-07
Heptachlor	0 000016	Not a COPC	5 0E-10	4 8E-09	NC	4 50E+00	9 0E+00	4 6E-08
Metals								
Arsenic	0 0013	Not a COPC	4 1E-08	3 6E-08	NC	1 50E+00	1 6E+00	1 2E-07
Cadmium	0 0035	Not a COPC	1 1E-07	9 6E-08	NC	NAP	NAP	NAP
							ELCR =	4E-06
NON-CANCER EFFECTS						RfDo	RfDd	
VOCs								
Benzene	0 0010	Not a COPC	3 7E-07	6 7E-06	NC	3 00E-03	2 4E-03	2 9E-03
Chloroform	0 0011	Not a COPC	4 0E-07	3 1E-06	NC	1 00E-02	8 0E-03	4 3E-04
BNAs								
2-Methylnaphthalene	0 0010	Not a COPC	3 7E-07	2 2E-05	NC	2 00E-02	1 0E-02	2 2E-03
Naphthalene	0 0020	Not a COPC	7 3E-07	4 4E-05	NC	2 00E-02	1 0E-02	4 5E-03
Pesticides/PCBs								
Aroclor 1260	Not a COPC	0 033	NC	NC	2 0E-05	2 00E-05	1 0E-05	9 9E-01
4,4'-DDE	Not a COPC	0 04	NC	NC	2 4E-05	5 00E-04	2 5E-04	4 8E-02
Heptachlor	0 000016	Not a COPC	5 8E-09	5 6E-08	NC	5 00E-04	2 5E-04	2 4E-04
Metals								
Antimony	0 026	Not a COPC	9 5E-06	8 3E-06	NC	4 0E-04	8 0E-05	1 3E-01
Arsenic	0 0013	Not a COPC	4.8E-07	4 2E-07	NC	3 0E-04	2 9E-04	3 1E-03
Cadmium	0 0035	Not a COPC	1 3E-06	1 1E-06	NC	5 0E-04	1 0E-04	1 4E-02
							HI =	1E+00

BNAs - Base/neutral and acid extractable compounds
Cff - Constituent exposure point concentration in fish filets (see Table 6-31)
COPC - Chemical of potential concern
CSFo - Cancer Slope Factor, Oral
CSFd - Cancer Slope Factor, Dermal
Csw - Constituent exposure point concentration in surface water (see Table 6-29)
ELCR - Excess lifetime cancer risk
FExD - Fish ingestion exposure dose
HI - Hazard index (sum of the hazard quotients)
mg/kg - milligrams per kilogram
mg/kg-day - milligrams per kilogram-day
mg/L - milligrams per liter
NA - Toxicity value not available, risks cannot be calculated
NAP - Not applicable Cancer slope factor and/or reference dose applies to inhalation pathway only, not to ingestion
NC - Not calculated, not a COPC for the applicable medium.
PCBs - Polychlorinated biphenyls
RfDo - Reference Dose, Oral

TABLE 2-14

SUMMARY OF SEDIMENT SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS[1]

SCREENING ECOLOGICAL RISK ASSESSMENT

FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Sediment Screening Value	Source of Screening Value	Hazard Quotient
Volatile Organic Compounds					
Acetone	mg/kg	9 7	NA	NA	NC
Benzene	mg/kg	0 64	NA	NA	NC
Bromoform (Tribromomethane) (THM)	mg/kg	0.0047	NA	NA	NC
Butanone, 2- (Methyl ethyl ketone) (MEK)	mg/kg	0 018	NA	NA	NC
Carbon Disulfide	mg/kg	0 083	NA	NA	NC
Chlorobenzene	mg/kg	78	NA	NA	NC
Chloroform (Trichloromethane) (THM)	mg/kg	0 0079	NA	NA	NC
Chloromethane (Methyl chloride)	mg/kg	0 077	NA	NA	NC
Dichlorobenzene, 1,2- (o-)	mg/kg	9 4	NA	NA	NC
Dichlorobenzene, 1,3- (m-)	mg/kg	4 7	NA	NA	NC
Dichlorobenzene, 1,4- (p-)	mg/kg	13	NA	NA	NC
Dichloroethane, 1,2- (EDC)	mg/kg	0 005	NA	NA	NC
Dichlorothene, 1,2- (mixture)	mg/kg	0 006	NA	NA	NC
Dimethyl disulfide	mg/kg	0 02	NA	NA	NC
Ethylbenzene	mg/kg	0 007	NA	NA	NC
Methylene chloride (Dichloromethane)	mg/kg	0 002	NA	NA	NC
n-Butylbenzene	mg/kg	0 002	NA	NA	NC
p-Isopropyltoluene	mg/kg	0 13	NA	NA	NC
Pyridine	mg/kg	61	NA	NA	NC
Tetrachloroethene (PCE)	mg/kg	0 007	NA	NA	NC
Toluene	mg/kg	0 27	NA	NA	NC
Trichlorofluoromethane	mg/kg	0 012	NA	NA	NC
Xylenes (mixed)	mg/kg	0 13	NA	NA	NC
Total Petroleum Hydrocarbons					
TRPH	mg/kg	93	NA	NA	NC
Base, Neutral, and Acid Extractables					
(Butyloctyl)benzene	mg/kg	7	NA	NA	NC
(Dimethylhexenyl)benzene	mg/kg	5	NA	NA	NC
(Dimethylhexyl)benzene	mg/kg	3	NA	NA	NC
(Pentylheptyl)benzene	mg/kg	8	NA	NA	NC
Benzofluorenone	mg/kg	6	NA	NA	NC
bis(2-Chloroisopropyl)ether	mg/kg	0 59	NA	NA	NC
bis(2-Ethylhexyl)adipate	mg/kg	19	NA	NA	NC
bis(2-Ethylhexyl)phthalate (DEHP)	mg/kg	14	0 182	Florida SQAG [1]	76 9
Butyl benzyl phthalate	mg/kg	0 53	NA	NA	NC
C1-Dibenzothiophenes	mg/kg	0.0078	NA	NA	NC
C2-Dibenzothiophenes	mg/kg	0 0125	NA	NA	NC
C3-Dibenzothiophenes	mg/kg	0 0347	NA	NA	NC

TABLE 2-14 (Continued)

SUMMARY OF SEDIMENT SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS[1]

SCREENING ECOLOGICAL RISK ASSESSMENT

FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Sediment Screening Value	Source of Screening Value	Hazard Quotient
Chlorobis(chlorophenyl)ethanone	mg/kg	3	NA	NA	NC
Chlorophenol, 2-	mg/kg	0 014	NA	NA	NC
Deslupene	mg/kg	10	NA	NA	NC
Dibenzothiophene	mg/kg	0 0028	NA	NA	NC
Di-n-butyl phthalate (Dibutyl phthalate)	mg/kg	12	NA	NA	NC
Di-n-octyl phthalate	mg/kg	0 08	NA	NA	NC
Dodecanoic acid, hexadecyl ester	mg/kg	20	NA	NA	NC
Dodecanoic acid, tetradecyl ester	mg/kg	2	NA	NA	NC
Hexachlorobenzene	mg/kg	0 00013	NA	NA	NC
Hexadecanoic acid	mg/kg	6	NA	NA	NC
Hexadecenoic acid	mg/kg	8	NA	NA	NC
Limonene	mg/kg	0 04	NA	NA	NC
Menthene	mg/kg	0 2	NA	NA	NC
Methylphenol, 4- (p cresol)	mg/kg	1 4	NA	NA	NC
Octadecenoic acid	mg/kg	6	NA	NA	NC
Pinene	mg/kg	0 02	NA	NA	NC
Tetradecanoic acid	mg/kg	5	NA	NA	NC
Tetrahydronaphthalene	mg/kg	10	NA	NA	NC
Trichlorobenzene, 1,2,4-	mg/kg	0 0043	NA	NA	NC
Trichlorobenzene, 1,3,5-	mg/kg	0 0029	NA	NA	NC
Polynuclear Aromatic Hydrocarbons (PAHs)					
Low Molecular Weight [2]					
(Phenylmethyl)naphthalene	mg/kg	4	NA	NA	NC
1,6,7-Trimethylnaphthalene	mg/kg	0 0018	NA	NA	NC
1-Methylphenanthrene	mg/kg	0 0032	NA	NA	NC
2,3,5-Trimethylnaphthalene	mg/kg	0 033	NA	NA	NC
2,6-Dimethylnaphthalene	mg/kg	0 15	NA	NA	NC
Acenaphthene	mg/kg	15	0 00671	Florida SQAG [1]	2235
Acenaphthylene	mg/kg	1 8	0 00587	Florida SQAG [1]	307
Anthracene	mg/kg	14	0 0469	Florida SQAG [1]	299
Biphenyl, 1,1- [or diphenyl]	mg/kg	0 12	NA	NA	NC
bis(Dimethylethyl)phenanthrene	mg/kg	10	NA	NA	NC
C1-Fluorenes	mg/kg	0.5	NA	NA	NC
C1-Naphthalenes	mg/kg	0.027	NA	NA	NC
C1-Phenanthrenes/anthracenes	mg/kg	3 5	NA	NA	NC
C2-Fluorenes	mg/kg	0 0199	NA	NA	NC
C2-Naphthalenes	mg/kg	0 36	NA	NA	NC
C2-Phenanthrenes/anthracenes	mg/kg	0.0617	NA	NA	NC
C3-Fluorenes	mg/kg	0 0423	NA	NA	NC
C3-Naphthalenes	mg/kg	0 57	NA	NA	NC
C3-Phenanthrenes/anthracenes	mg/kg	1.2	NA	NA	NC
C4-Naphthalenes	mg/kg	0 23	NA	NA	NC

TABLE 2-14 (Continued)

SUMMARY OF SEDIMENT SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS[2]

SCREENING ECOLOGICAL RISK ASSESSMENT

FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Sediment Screening Value	Source of Screening Value	Hazard Quotient
C4-Phenanthrenes/anthracenes	mg/kg	0 067	NA	NA	NC
Carbazole	mg/kg	10	NA	NA	NC
Dibenzofuran	mg/kg	12	NA	NA	NC
Fluorene	mg/kg	17	0.0212	Florida SQAG [1]	802
Methylnaphthalene, 1-	mg/kg	0 240	NA	NA	NC
Methylnaphthalene, 2-	mg/kg	1 6	0.0202	Florida SQAG [1]	79 2
Naphthalene	mg/kg	1.1	0 0346	Florida SQAG [1]	31 8
Phenanthrene	mg/kg	62	0 0867	Florida SQAG [1]	715
Sum of low molecular weight PAHs	mg/kg	156	0 312	Florida SQAG [1]	499
High Molecular Weight [3]					
Benzo(a)anthracene	mg/kg	62	0 0748	Florida SQAG [1]	829
Benzo(a)pyrene	mg/kg	36	0 0888	Florida SQAG [1]	405
Benzo(b)fluoranthene	mg/kg	34	NA	NA	NC
Benzo(g,h,i)perylene	mg/kg	28	NA	NA	NC
Benzo(k)fluoranthene	mg/kg	38	NA	NA	NC
Benzo[e]pyrene	mg/kg	0 11	NA	NA	NC
C1 Chrysenes/benzanthracenes	mg/kg	1 7	NA	NA	NC
C1-Chrysenes	mg/kg	0 0569	NA	NA	NC
C1-Fluoranthenes/pyrenes	mg/kg	7 1	NA	NA	NC
C2 Chrysenes/benzanthracenes	mg/kg	0 33	NA	NA	NC
C2-Chrysenes	mg/kg	0.0907	NA	NA	NC
C3-Chrysenes	mg/kg	0 0172	NA	NA	NC
C4-Chrysenes	mg/kg	0.0312	NA	NA	NC
Chrysene	mg/kg	47	0.108	Florida SQAG [1]	435
Dibenz(a,h)anthracene	mg/kg	6 7	0 00622	Florida SQAG [1]	1077
Fluoranthene	mg/kg	79	0 113	Florida SQAG [1]	699
Indeno(1,2,3-cd)pyrene	mg/kg	24	NA	NA	NC
Perylene	mg/kg	0 0222	NA	NA	NC
Pyrene	mg/kg	52	0 153	Florida SQAG [1]	340
Sum of high molecular weight PAHs	mg/kg	416	0 655	Florida SQAG [1]	635
Total PAHs [4]	mg/kg	572	1 684	Florida SQAG [1]	340
Pesticides					
(2,4,5-Trichlorophenoxy)propionic acid, 2- (2,4,5-TP) (Silvex)	mg/kg	0.14	NA	NA	NC

TABLE 2-14 (Continued)

SUMMARY OF SEDIMENT SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS[1]

SCREENING ECOLOGICAL RISK ASSESSMENT

FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Sediment Screening Value	Source of Screening Value	Hazard Quotient
Aldrin	mg/kg	0 0071	NA	NA	NC
alpha-Chlordane	mg/kg	0.064	NA	NA	NC
alpha-Chlordene /2	mg/kg	0 04	NA	NA	NC
Chlordane	mg/kg	1.5	0 0017	USEPA Region 4 [5]	882
Chlordane - gamma	mg/kg	0.00356	NA	NA	NC
Chlordene /2	mg/kg	0 12	NA	NA	NC
cis-Nonachlor	mg/kg	0 00087	NA	NA	NC
DDD, 4,4'-	mg/kg	12	0 00122	Florida SQAG [1]	9836
DDE, 4,4'-	mg/kg	1 3	0 00207	Florida SQAG [1]	628
DDT, 4,4'-	mg/kg	0 74	0 00119	Florida SQAG [1]	622
Dicamba	mg/kg	0 0071	NA	NA	NC
Dieldrin	mg/kg	0 11	0 000715	Florida SQAG [1]	154
Endosulfan I (alpha)	mg/kg	0 87	NA	NA	NC
Endosulfan II (beta)	mg/kg	0 35	NA	NA	NC
Endrin	mg/kg	0 24	0 0033	USEPA Region 4 [5]	72 7
HCH, alpha- (BHC, alpha-)	mg/kg	0 0001	NA	NA	NC
HCH, beta- (BHC, beta-)	mg/kg	0 13	NA	NA	NC
HCH, gamma- (BHC, gamma-) (Lindane)	mg/kg	0 072	0 00032	Florida SQAG [1]	225
HCH-technical	mg/kg	0 0013	NA	NA	NC
Heptachlor	mg/kg	0 01	NA	NA	NC
Heptachlor epoxide	mg/kg	0 25	NA	NA	NC
Methoxychlor	mg/kg	0 19	NA	NA	NC
Mirex	mg/kg	0.00033	NA	NA	NC
Oxychlordane	mg/kg	0 00017	NA	NA	NC
Toxaphene	mg/kg	0 57	NA	NA	NC
Trans nonachlor	mg/kg	0 00055	NA	NA	NC
Trichlorophenoxyacetic acid, 2,4,5- (2,4,5-T)	mg/kg	0.0072	NA	NA	NC
Polychlorinated Biphenyls (PCBs) [6]					
BZ#105	mg/kg	0 00094	0 0216	Florida SQAG [1]	0 0435
BZ#138 & BZ#160	mg/kg	0 00471	0 0216	Florida SQAG [1]	0 218
BZ#153 & BZ#132	mg/kg	0 00476	0.0216	Florida SQAG [1]	0 220
BZ#18 & BZ#17	mg/kg	0 00076	0 0216	Florida SQAG [1]	0 0351
BZ#187	mg/kg	0 00156	0 0216	Florida SQAG [1]	0 0722
BZ#208 & BZ#195	mg/kg	0.00047	0.0216	Florida SQAG [1]	0.0218
BZ#5 & BZ#8	mg/kg	0 00196	0.0216	Florida SQAG [1]	0 0907
BZ#66	mg/kg	0.00273	0 0216	Florida SQAG [1]	0.126
PCB-018	mg/kg	0 014	0.0216	Florida SQAG [1]	0.632
PCB-028	mg/kg	0 032	0 0216	Florida SQAG [1]	1.47

TABLE 2-14 (Continued)

SUMMARY OF SEDIMENT SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS[1]

SCREENING ECOLOGICAL RISK ASSESSMENT

FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Sediment Screening Value	Source of Screening Value	Hazard Quotient
PCB-044	mg/kg	0 013	0.0216	Florida SQAG [1]	0 589
PCB-052	mg/kg	0 027	0 0216	Florida SQAG [1]	1 27
PCB-066/095	mg/kg	0 031	0.0216	Florida SQAG [1]	1 43
PCB-087	mg/kg	0 0092	0 0216	Florida SQAG [1]	0.426
PCB-101/090	mg/kg	0 040	0 0216	Florida SQAG [1]	1 86
PCB-105/132	mg/kg	0 0079	0.0216	Florida SQAG [1]	0 367
PCB-118	mg/kg	0 023	0 0216	Florida SQAG [1]	1 04
PCB-1254 (AROCHLOR 1254)	mg/kg	0.78	0 0216	Florida SQAG [1]	36 1
PCB-126	mg/kg	0 0026	0 0216	Florida SQAG [1]	0 120
PCB-128	mg/kg	0 00906	0 0216	Florida SQAG [1]	0 419
PCB-138/163/164	mg/kg	0.026	0 0216	Florida SQAG [1]	1 22
PCB-153	mg/kg	0 044	0 0216	Florida SQAG [1]	2 02
PCB-170/190	mg/kg	0 0139	0 0216	Florida SQAG [1]	0 644
PCB-180	mg/kg	0 026	0 0216	Florida SQAG [1]	1.19
PCB-187/182/159	mg/kg	0 017	0.0216	Florida SQAG [1]	0 768
PCB-195	mg/kg	0 0038	0 0216	Florida SQAG [1]	0 177
PCB-200	mg/kg	0 0047	0 0216	Florida SQAG [1]	0 218
PCB-206	mg/kg	0 0070	0 0216	Florida SQAG [1]	0 325
PCB-209	mg/kg	0 0034	0 0216	Florida SQAG [1]	0 157
Inorganic Compounds					
Aluminum	mg/kg	6470	NA	NA	NC
Ammonia	mg/kg	230	NA	NA	NC
Antimony	mg/kg	26 6	12	USEPA Region 4 [5]	2 22
Arsenic	mg/kg	53 7	7 24	USEPA Region 4 [5]	7 42
Barium	mg/kg	160	NA	NA	NC
Beryllium	mg/kg	0 35	NA	NA	NC
Cadmium	mg/kg	46.6	0 676	Florida SQAG [1]	68 9
Calcium	mg/kg	658000	NA	NA	NC
Chromium (total)	mg/kg	224	52.3	Florida SQAG [1]	4 28
Cobalt	mg/kg	8 3	NA	NA	NC
Copper	mg/kg	507	18 7	Florida SQAG [1]	27 1
Cyanide	mg/kg	1 6	NA	NA	NC
Dibutyl tin	mg/kg	0 54	NA	NA	NC
Iron	mg/kg	12000	NA	NA	NC
Lead	mg/kg	1640	30 2	Florida SQAG [1]	54 3
Lithium	mg/kg	8 4	NA	NA	NC
Magnesium	mg/kg	13900	NA	NA	NC
Manganese	mg/kg	65.1	NA	NA	NC
Mercury	mg/kg	12	0.13	Florida SQAG [1]	92.3

TABLE 2-14 (Continued)

SUMMARY OF SEDIMENT SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS[1]

SCREENING ECOLOGICAL RISK ASSESSMENT

FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Sediment Screening Value	Source of Screening Value	Hazard Quotient
Molybdenum	mg/kg	10	NA	NA	NC
Nickel	mg/kg	36.9	15.9	Florida SQAG [1]	2 32
Nitrate-nitrite nitrogen	mg/kg	122	NA	NA	NC
Phosphorous	mg/kg	8072	NA	NA	NC
Potassium	mg/kg	2770	NA	NA	NC
Selenium	mg/kg	6 4	NA	NA	NC
Silver	mg/kg	110	0 733	Florida SQAG [1]	150
Sodium	mg/kg	61000	NA	NA	NC
Strontium	mg/kg	4200	NA	NA	NC
Thallium	mg/kg	0 86	NA	NA	NC
Tin	mg/kg	130	NA	NA	NC
Titanium	mg/kg	50	NA	NA	NC
Total kjeldahl nitrogen	mg/kg	13000	NA	NA	NC
Total phosphorus	mg/kg	4000	NA	NA	NC
Tributyl tin	mg/kg	1.5	NA	NA	NC
Vanadium	mg/kg	85.5	NA	NA	NC
Zinc	mg/kg	2430	124	Florida SQAG [1]	19 6

Footnotes

BZ - Polychlorinated biphenyl (PCB)
DDD - Dichlorodiphenyldichloroethane
DDE - Dichlorodiphenyldichloroethylene
DDT - Dichlorodiphenyltrichloroethane
mg/kg - Milligrams per kilogram
NA - Not available
NC - Not calculated - no screening value available

[1] Development of an Approach to the Assessment of Sediment Quality in Florida Coastal Waters Volume 1 – Development and Evaluation of Sediment Quality Assessment Guidelines (SQAG) Florida Department of Environmental Protection

[2] National Status and Trends defines low molecular weight PAHs as 2 and 3 ring PAHs, including anthracene, acenaphthalene, acenaphthylene, biphenyl, carbazole, dibenzofuran, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, naphthalene, and phenanthrene

[3] National Status and Trends defines high molecular weight PAHs as 4, 5, and 6 ring PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

[4] The total PAHs result is the sum of the maximum detected concentrations of all PAHs

[5] United States Environmental Protection Agency (USEPA) Ecological Risk Assessment at Military Bases. Process considerations, timing of activities, and inclusion of stakeholders, December 1998

[6] The designation 'Aroclor' is used for PCB congeners The terms 'PCB' and 'BZ' denote PCB compounds 'Total PCBs' is equal to the sum of aroclors only

TABLE 2-15

SEDIMENT SCREENING RESULTS – COMPOUNDS NOT DETECTED RECENTLY[1]
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Sediment Screening Value	Source of Screening Value	Hazard Quotient
Volatile Organic Compounds					
1,1-Dichloropropene	mg/kg	0 015	NA	NA	NC
1,3-Dichloropropane	mg/kg	0 015	NA	NA	NC
2,2-Dichloropropane	mg/kg	0 015	NA	NA	NC
2,2'-oxybis (1- Chloropropane)	mg/kg	82	NA	NA	NC
Bromobenzene	mg/kg	0 015	NA	NA	NC
Bromochloromethane	mg/kg	0 015	NA	NA	NC
Bromodichloromethane (Dichlorobromomethane) (THM)	mg/kg	0 039	NA	NA	NC
Bromomethane (Methyl bromide)	mg/kg	0 039	NA	NA	NC
Carbon Tetrachloride	mg/kg	0 039	NA	NA	NC
Chloroethane (Ethyl chloride)	mg/kg	0 039	NA	NA	NC
Chlorotoluene, o-	mg/kg	0.015	NA	NA	NC
Chlorotoluene, p-	mg/kg	0 015	NA	NA	NC
Dibromo-3-chloropropane, 1,2- [or DBCP]	mg/kg	0.015	NA	NA	NC
Dibromochloromethane (Chlorodibromomethane)	mg/kg	0 039	NA	NA	NC
Dibromoethane, 1,2- (Ethylene Dibromide) (EDB)	mg/kg	0 015	NA	NA	NC
Dichloroethane, 1,1-	mg/kg	0 039	NA	NA	NC
Dichloroethene, 1,1-	mg/kg	0 015	NA	NA	NC
Dichloroethene, cis-1,2-	mg/kg	0 015	NA	NA	NC
Dichloroethene, trans-1,2-	mg/kg	0 015	NA	NA	NC
Dichloropropane, 1,2-	mg/kg	0 039	NA	NA	NC
Dichloropropene, cis-1,3-	mg/kg	0 039	NA	NA	NC
Dichloropropene, trans-1,3-	mg/kg	0.039	NA	NA	NC
Ethylene Dibromide	mg/kg	0 0086	NA	NA	NC
Hexanone, 2-	mg/kg	0 039	NA	NA	NC
Isopropyl benzene [or cumene]	mg/kg	0 015	NA	NA	NC
Methyl butyl ketone [or hexanone, 2-]	mg/kg	0 037	NA	NA	NC
Methyl isobutyl ketone (MIBK) (methyl-2-pentanone, 4-)	mg/kg	0 039	NA	NA	NC
Methyl tert butyl ether (MTBE)	mg/kg	0.086	NA	NA	NC
Methylene bromide (Dibromomethane)	mg/kg	0 015	NA	NA	NC
n-Propylbenzene	mg/kg	0 015	NA	NA	NC
sec-Butylbenzene	mg/kg	0 015	NA	NA	NC
Styrene	mg/kg	0 039	NA	NA	NC
tert-Butylbenzene	mg/kg	0.015	NA	NA	NC
Tetrachloroethane, 1,1,1,2-	mg/kg	0 015	NA	NA	NC
Tetrachloroethane, 1,1,2,2-	mg/kg	0.039	NA	NA	NC
Trichloroethane, 1,1,1-	mg/kg	0.015	NA	NA	NC
Trichloroethane, 1,1,2-	mg/kg	0.039	NA	NA	NC

TABLE 2-15 (Continued)

SEDIMENT SCREENING RESULTS – COMPOUNDS NOT DETECTED RECENTLY[1]
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Sediment Screening Value	Source of Screening Value	Hazard Quotient
Trichloroethene (TCE)	mg/kg	0 039	NA	NA	NC
Trichloropropane, 1,2,3-	mg/kg	0 015	NA	NA	NC
Trimethylbenzene, 1,2,4-	mg/kg	0 015	NA	NA	NC
Vinyl Chloride	mg/kg	0.039	NA	NA	NC
Xylene-o	mg/kg	0 015	NA	NA	NC
Base, Neutral, and Acid Extractables					
Benzoic acid	mg/kg	400	NA	NA	NC
Benzyl alcohol (a-hydroxy toluene)	mg/kg	82	NA	NA	NC
bis(2-Chloroethoxy) methane	mg/kg	82	NA	NA	NC
bis(2-Chloroethyl)ether	mg/kg	82	NA	NA	NC
Bromophenyl phenyl ether, 4-	mg/kg	82	NA	NA	NC
Carbophenothion	mg/kg	0 125	NA	NA	NC
Chloro-3-methylphenol, 4- (p-Chloro-m-cresol)	mg/kg	82	NA	NA	NC
Chloroaniline, 4-	mg/kg	82	NA	NA	NC
Chloronaphthalene, 2- (beta-Chloronaphthalene)	mg/kg	82	NA	NA	NC
Chlorophenyl-phenyl ether, 4-	mg/kg	82	NA	NA	NC
Dichlorobenzidine, 3,3'-	mg/kg	160	NA	NA	NC
Dichlorophenol, 2,4-	mg/kg	82	NA	NA	NC
Diethyl phthalate	mg/kg	82	NA	NA	NC
Dimethyl phthalate	mg/kg	82	NA	NA	NC
Dimethylphenol, 2,4-	mg/kg	82	NA	NA	NC
Dinitro-2-methylphenol, 4,6- (4,6-Dinitro-O-Cresol)	mg/kg	400	NA	NA	NC
Dinitrophenol, 2,4-	mg/kg	400	NA	NA	NC
Dinitrotoluene, 2,4-	mg/kg	82	NA	NA	NC
Dinitrotoluene, 2,6-	mg/kg	82	NA	NA	NC
Hexachlorobutadiene	mg/kg	82	NA	NA	NC
Hexachlorocyclopentadiene	mg/kg	82	NA	NA	NC
Hexachloroethane	mg/kg	82	NA	NA	NC
Isophorone	mg/kg	82	NA	NA	NC
Methylphenol, 2- (o cresol)	mg/kg	82	NA	NA	NC
Nitroaniline, 2- (o-)	mg/kg	400	NA	NA	NC
Nitroaniline, 3- (m-)	mg/kg	400	NA	NA	NC
Nitroaniline, 4- (p-)	mg/kg	400	NA	NA	NC
Nitrobenzene	mg/kg	82	NA	NA	NC
Nitrophenol, 2-	mg/kg	82	NA	NA	NC
Nitrophenol, 4-	mg/kg	400	NA	NA	NC
Nitroso-di-ethylamine, N-	mg/kg	82	NA	NA	NC
N-Nitroso-di-n-propylamine	mg/kg	82	NA	NA	NC
N-Nitrosodiphenylamine/diphenylamine	mg/kg	9.4	NA	NA	NC
Pentachlorophenol	mg/kg	400	NA	NA	NC
Phenol	mg/kg	82	NA	NA	NC

TABLE 2-15 (Continued)

SEDIMENT SCREENING RESULTS – COMPOUNDS NOT DETECTED RECENTLY[1]
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Sediment Screening Value	Source of Screening Value	Hazard Quotient
Tetrachlorophenol, 2,3,4,6-	mg/kg	0 96	NA	NA	NC
Trichlorobenzene, 1,2,3-	mg/kg	0 015	NA	NA	NC
Trichlorophenol, 2,4,5-	mg/kg	400	NA	NA	NC
Trichlorophenol, 2,4,6-	mg/kg	82	NA	NA	NC
Polynuclear Aromatic Hydrocarbons (PAHs)					
High Molecular Weight [1]					
C3 Chrysenes/benzanthracenes	mg/kg	0.96	NA	NA	NC
C4 Chrysenes/benzanthracenes	mg/kg	0 96	NA	NA	NC
Pesticides					
Azinphos Methyl (Guthion)	mg/kg	0 125	NA	NA	NC
Chlorpyrifos	mg/kg	0 125	NA	NA	NC
Diazinon	mg/kg	0 125	NA	NA	NC
Dichlorophenoxyacetic Acid, 2,4- (2,4-D)	mg/kg	0 089	NA	NA	NC
Disulfoton	mg/kg	0 125	NA	NA	NC
Endosulfan sulfate	mg/kg	1	NA	NA	NC
Endrin aldehyde	mg/kg	0 42	NA	NA	NC
Endrin ketone	mg/kg	0 42	NA	NA	NC
Ethion	mg/kg	0 125	NA	NA	NC
Ethoprop	mg/kg	0 125	NA	NA	NC
HCH, delta- (BHC, delta-)	mg/kg	0 22	NA	NA	NC
Parathion Methyl	mg/kg	0.125	NA	NA	NC
Terbufos	mg/kg	0 125	NA	NA	NC
Polychlorinated Biphenyls (PCBs) [2]					
Arochlor 1232	mg/kg	4 2	0 0216	Florida SQAG [3]	194
Arochlor 1242	mg/kg	4 2	0 0216	Florida SQAG [3]	194
Arochlor 1248	mg/kg	4 2	0.0216	Florida SQAG [3]	194
Arochlor 1260	mg/kg	4 2	0 0216	Florida SQAG [3]	194
Aroclor 1016	mg/kg	4 2	0 0216	Florida SQAG [3]	194
Aroclor 1221	mg/kg	8.6	0 0216	Florida SQAG [3]	398
PCB-008	mg/kg	0 00035	0.0216	Florida SQAG [3]	0 0162
PCB-029	mg/kg	0 00035	0.0216	Florida SQAG [3]	0 0162
Inorganic Compounds					
Monobutyl tin	mg/kg	0.47	NA	NA	NC
Tellurium	mg/kg	120	NA	NA	NC
Tributyltin	mg/kg	0.47	NA	NA	NC
Yttrium	mg/kg	25	NA	NA	NC

mg/kg Milligrams per kilogram
NA Not available
NC Not calculated - no screening value available

[1] National Status and Trends defines high molecular weight PAHs as 4, 5, and 6 ring PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene

[2] The designation 'Aroclor' is used for PCB congeners The terms 'PCB' and 'BZ' denote PCB compounds Total PCBs is equal to the sum of aroclors only

[3] Development of an Approach to the Assessment of Sediment Quality in Florida Coastal Waters Volume 1 – Development and Evaluation of Sediment Quality Assessment Guidelines (SQAG) Florida Department of Environmental Protection.

TABLE 2-16

FRESH SURFACE WATER SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
Volatile Organic Compounds					
Acetone	ug/L	10	NA	NA	NC
Benzene	ug/L	1	46	Federal AWQC [1]	0 022
Chlorobenzene	ug/L	6	130	Federal AWQC [1]	0 046
Ethylbenzene	ug/L	3	290	Federal AWQC [1]	0 010
Toluene	ug/L	8	130	Federal AWQC [1]	0 062
Xylenes (mixed)	ug/L	18	NA	NA	NC
Base, Neutral, and Acid Extractables					
bis(2-Ethylhexyl)phthalate (DEHP)	ug/L	0 3	0 3	USEPA Region 4 [6] (Chronic)	1
Di-n-butyl phthalate (Dibutyl phthalate)	ug/L	0 1	3	Florida SWQC [2] (Class III)	0 033
Polynuclear Aromatic Hydrocarbons (PAHs)					
Low Molecular Weight [3]					
Methylnaphthalene, 2-	ug/L	1	NA	NA	NC
Naphthalene	ug/L	2	24	Federal AWQC [1]	0 083
Phenanthrene	ug/L	0 2	0 031	Florida SWQC [2] (Class III)	6.45
Sum of low molecular weight PAHs	ug/L	3 2	NA	NA	NC
High Molecular Weight PAHs [4]					
Fluoranthene	ug/L	0 2	8 1	Federal AWQC [1]	0 025
Pyrene	ug/L	0 1	NA	NA	NC
Sum of high molecular weight PAHs	ug/L	0 3	NA	NA	NC
Total PAHs [5]	ug/L	4	NA	NA	NC
Pesticides					
DDD, 4,4'-	ug/L	0 022	0.0064	USEPA Region 4 [6] (Chronic)	3 44
Heptachlor	ug/L	0 016	0 0038	USEPA Region 4 [6] (Chronic)	4 21
Inorganic Compounds					
Aluminum	ug/L	60 5	87	USEPA Region 4 [6] (Chronic)	0 70
Antimony	ug/L	0.12	160	USEPA Region 4 [6] (Chronic)	0 00075
Arsenic	ug/L	28.3	50	Florida SWQC [2] (Class III)	0.57
Barium	ug/L	18.2	3 9	Federal AWQC [1]	4 67
Beryllium	ug/L	0.16	0.13	Florida SWQC [2] (Class III)	1 23

TABLE 2-16 (Continued)

FRESH SURFACE WATER SCREENING RESULTS – RECENTLY DETECTED COMPOUNDS
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Detected Concentration	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
Cadmium	ug/L	3.5	0 66	USEPA Region 4 [6] (Chronic)	5.30
Calcium	ug/L	230000	NA	NA	NC
Chromium (total)	ug/L	2.1	NA	NA	NC
Copper	ug/L	5 9	6.54	USEPA Region 4 [6] (Chronic)	0.90
Iron	ug/L	114	1000	USEPA Region 4 [6] (Chronic)	0.11
Lead	ug/L	44.7	1 32	USEPA Region 4 [6] (Chronic)	33 9
Magnesium	ug/L	664000	NA	NA	NC
Manganese	ug/L	6 1	NA	NA	NC
Mercury	ug/L	0 17	0 012	Florida SWQC [2] (Class III)	14 2
Nickel	ug/L	10 7	87.71	USEPA Region 4 [6] (Chronic)	0.12
Potassium	ug/L	196000	NA	NA	NC
Sodium	ug/L	5160000	NA	NA	NC
Strontium	ug/L	970	NA	NA	NC
Uranium	ug/L	2.2	NA	NA	NC
Vanadium	ug/L	6	NA	NA	NC
Zinc	ug/L	50 6	58.91	USEPA Region 4 [6] (Chronic)	0 86

Footnotes
DDD- Dichlorodiphenyldichloroethane
NC- Not calculated - no screening value available
ug/L - Micrograms per liter

[1] USEPA Ecotoxicity Threshold (USEPA, 1996c) Includes Ambient Water Quality Criteria (AWQC), freshwater, EPA-derived Final Chronic Values (FCV), and Tier II Great Lakes Water Quality Initiative, Tier II methodology, 40CFR 9 (II) designates Tier II values

[2] *Surface Water Quality Criteria, Florida Administrative Code Chapter 62-302 Section 62-302 530, January 15, 1996*

[3] National Status and Trends defines low molecular weight PAHs as 2 and 3 ring PAHs, including anthracene, acenaphthalene, acenaphthylene, biphenyl, carbazole, dibenzofuran, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, naphthalene, and phenanthrene

[4] National Status and Trends defines high molecular weight PAHs as 4, 5, and 6 ring PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene

[5] The total PAHs result is the sum of the maximum detected concentrations of all PAHs

[6] Region 4 Waste Management Division Freshwater Surface Water Screening Values for Hazardous Waste Sites and Saltwater Surface Water Screening Values for Hazardous Waste Sites, Supplemental Guidance to RAGS Region 4 Bulletins, Ecological Risk Assessment Bulletin No 1, November, 1995 with updates from October 12, 1998 memorandum United States Environmental Protection Agency (USEPA) Ecological Risk Assessment at Military Bases: Process considerations, timing of activities, and inclusion of stakeholders, December 1998

TABLE 2-17
FRESH SURFACE WATER SCREENING RESULTS –COMPOUNDS NOT DETECTED RECENTLY
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
Volatile Organic Compounds					
1,1-Dichloropropene	ug/L	1	NA	NA	NC
1,3-Dichloropropane	ug/L	1	NA	NA	NC
2,2-Dichloropropane	ug/L	1	NA	NA	NC
Bromobenzene	ug/L	1	NA	NA	NC
Bromochloromethane	ug/L	1	NA	NA	NC
Bromodichloromethane (Dichlorobromomethane) (THM)	ug/L	10	22	Florida SWQC [3] (Class III)	0 455
Bromoform (Tribromomethane) (THM)	ug/L	10	293	USEPA Region 4 [1] (Chronic)	0.034
Bromomethane (Methyl bromide)	ug/L	10	110	USEPA Region 4 [1] (Chronic)	0.091
Butanone, 2- (Methyl ethyl ketone) (MEK)	ug/L	25	NA	NA	NC
Carbon Disulfide	ug/L	10	NA	NA	NC
Carbon Tetrachloride	ug/L	10	4 52	Florida SWQC [3] (Class III)	2 21
Chloroethane (Ethyl chloride)	ug/L	10	NA	NA	NC
Chloromethane (Methyl chloride)	ug/L	10	470 8	Florida SWQC [3] (Class III)	0 0212
Chlorotoluene, o-	ug/L	1	NA	NA	NC
Chlorotoluene, p-	ug/L	1	NA	NA	NC
Dibromo-3-chloropropane, 1,2- [or DBCP]	ug/L	1	NA	NA	NC
Dibromochloromethane (Chlorodibromomethane)	ug/L	10	NA	NA	NC
Dibromoethane, 1,2- (Ethylene Dibromide) (EDB)	ug/L	1	NA	NA	NC
Dichlorobenzene, 1,2- (o-)	ug/L	11	14	Federal AWQC [2]	0 79
Dichlorobenzene, 1,3- (m-)	ug/L	11	50	USEPA Region 4 [1] (Chronic)	0 22
Dichlorobenzene, 1,4- (p-)	ug/L	11	11	USEPA Region 4 [1] (Chronic)	1
Dichloroethane, 1,1-	ug/L	1	47	Federal AWQC [2]	0 021
Dichloroethane, 1,2- (EDC)	ug/L	10	2000	USEPA Region 4 [1] (Chronic)	0 005
Dichloroethene, 1,1-	ug/L	1	3 2	Florida SWQC [3] (Class III)	0 313
Dichloroethene, cis-1,2-	ug/L	5	NA	NA	NC
Dichloroethene, trans-1,2-	ug/L	10	1350	USEPA Region 4 [1] (Chronic)	0.0074
Dichloropropane, 1,2-	ug/L	10	525	USEPA Region 4 [1] (Chronic)	0 019
Dichloropropene, cis-1,3-	ug/L	10	NA	NA	NC

TABLE 2-17 (Continued)
FRESH SURFACE WATER SCREENING RESULTS –COMPOUNDS NOT DETECTED RECENTLY
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
Dichloropropene, trans-1,3-	ug/L	10	NA	NA	NC
Dichlorothene, 1,2- (mixture)	ug/L	10	NA	NA	NC
Hexanone, 2-	ug/L	10	NA	NA	NC
Isopropyl benzene [or cumene]	ug/L	1	NA	NA	NC
Methyl butyl ketone [or hexanone, 2-]	ug/L	2 5	NA	NA	NC
Methyl isobutyl ketone (MIBK) (methyl-2-pentanone, 4-)	ug/L	10	NA	NA	NC
Methyl tert butyl ether (MTBE)	ug/L	10	NA	NA	NC
Methylene bromide (Dibromomethane)	ug/L	1	NA	NA	NC
Methylene chloride (Dichloromethane)	ug/L	10	1930	USEPA Region 4 [1] (Chronic)	0 0052
n-Butylbenzene	ug/L	1	NA	NA	NC
n-Propylbenzene	ug/L	1	NA	NA	NC
p-Isopropyltoluene	ug/L	1	NA	NA	NC
sec-Butylbenzene	ug/L	1	NA	NA	NC
Styrene	ug/L	10	NA	NA	NC
tert-Butylbenzene	ug/L	1	NA	NA	NC
Tetrachloroethane, 1,1,1,2-	ug/L	1	NA	NA	NC
Tetrachloroethane, 1,1,2,2-	ug/L	10	10 8	Florida SWQC [3] (Class III)	0 926
Tetrachloroethene (PCE)	ug/L	10	84	USEPA Region 4 [1] (Chronic)	0 12
Total Volatile Organic Aromatics	ug/L	1	NA	NA	NC
Trichloroethane, 1,1,1-	ug/L	5	62	USEPA Region 4 [1] (Chronic)	0 081
Trichloroethane, 1,1,2-	ug/L	10	940	USEPA Region 4 [1] (Chronic)	0 011
Trichloroethene (TCE)	ug/L	10	80 7	Florida SWQC [3] (Class III)	0 124
Trichlorofluoromethane	ug/L	1	NA	NA	NC
Trichloropropane, 1,2,3-	ug/L	1	NA	NA	NC
Trimethylbenzene, 1,2,4-	ug/L	1	NA	NA	NC
Vinyl Acetate	ug/L	10	NA	NA	NC
Vinyl Chloride	ug/L	10	NA	NA	NC
Xylene-o	ug/L	1	NA	NA	NC
Total Petroleum Hydrocarbons					
TRPH	ug/L	1000	NA	NA	NC
Base, Neutral, and Acid Extractables					
(3-and/or 4-)Methylphenol	ug/L	2	NA	NA	NC
2-Methyl-4,6-dinitrophenol	ug/L	25	NA	NA	NC
Benzyl alcohol (a-hydroxy toluene)	ug/L	5	NA	NA	NC
bis(2-Chloroethoxy) methane	ug/L	11	NA	NA	NC
bis(2-Chloroethyl)ether	ug/L	11	2380	USEPA Region 4 [1] (Chronic)	0.0046

TABLE 2-17 (Continued)
FRESH SURFACE WATER SCREENING RESULTS –COMPOUNDS NOT DETECTED RECENTLY
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
bis(2-Chloroisopropyl)ether	ug/L	11	NA	NA	NC
Bromophenyl phenyl ether, 4-	ug/L	11	1 5	Federal AWQC [2]	7 33
Chloro-3-methylphenol, 4- (p-Chloro-m-cresol)	ug/L	11	0 3	USEPA Region 4 [1] (Chronic)	36 7
Chloroaniline, 4-	ug/L	11	NA	NA	NC
Chloronaphthalene, 2- (beta-Chloronaphthalene)	ug/L	11	NA	NA	NC
Chlorophenyl-phenyl ether, 4-	ug/L	11	NA	NA	NC
Dichlorobenzidine, 3,3'-	ug/L	20	NA	NA	NC
Dichlorophenol, 2,4-	ug/L	11	36 5	USEPA Region 4 [1] (Chronic)	0 30
Dimethyl phthalate	ug/L	11	3	Florida SWQC [3] (Class III)	3 67
Dimethylphenol, 2,4-	ug/L	11	21 2	USEPA Region 4 [1] (Chronic)	0 52
Dinitro-2-methylphenol, 4,6- (4,6-Dinitro-O-Cresol)	ug/L	27	2 3	USEPA Region 4 [1] (Chronic)	11 7
Dinitrophenol, 2,4-	ug/L	27	6 2	USEPA Region 4 [1] (Chronic)	4 35
Dinitrotoluene, 2,4-	ug/L	11	NA	NA	NC
Dinitrotoluene, 2,6-	ug/L	11	9 1	Florida SWQC [3] (Class III)	1 21
Di-n-octyl phthalate	ug/L	11	3	Florida SWQC [3] (Class III)	3 67
Hexachlorobenzene	ug/L	11	NA	NA	NC
Hexachlorobutadiene	ug/L	11	0 93	USEPA Region 4 [1] (Chronic)	11 8
Hexachlorocyclopentadiene	ug/L	11	0 07	USEPA Region 4 [1] (Chronic)	157
Hexachloroethane	ug/L	11	9 8	USEPA Region 4 [1] (Chronic)	1 12
Isophorone	ug/L	11	1170	USEPA Region 4 [1] (Chronic)	0.0094
Methylphenol, 2- (o cresol)	ug/L	11	NA	NA	NC
Methylphenol, 4- (p cresol)	ug/L	11	NA	NA	NC
Nitroaniline, 2- (o-)	ug/L	27	NA	NA	NC
Nitroaniline, 3- (m-)	ug/L	27	NA	NA	NC
Nitroaniline, 4- (p-)	ug/L	27	NA	NA	NC
Nitrobenzene	ug/L	11	270	USEPA Region 4 [1] (Chronic)	0 041
Nitrophenol, 2-	ug/L	11	3500	USEPA Region 4 [1] (Chronic)	0 0031
Nitrophenol, 4-	ug/L	27	83	USEPA Region 4 [1] (Chronic)	0 33
Nitroso-di-ethylamine, N-	ug/L	11	NA	NA	NC

TABLE 2-17 (Continued)
FRESH SURFACE WATER SCREENING RESULTS –COMPOUNDS NOT DETECTED RECENTLY
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
N-Nitroso-di-n-propylamine	ug/L	11	NA	NA	NC
N-Nitrosodiphenylamine/diphenylamine	ug/L	2	58.5	USEPA Region 4 [1] (Chronic)	0.034
Pentachlorophenol	ug/L	27	8 2	Florida SWQC [3] (Class III)	3.29
Phenol	ug/L	11	256	USEPA Region 4 [1] (Chronic)	0 043
Tetrachlorophenol, 2,3,4,6-	ug/L	2	NA	NA	NC
Trichlorobenzene, 1,2,3-	ug/L	1	NA	NA	NC
Trichlorobenzene, 1,2,4-	ug/L	11	44.9	USEPA Region 4 [1] (Chronic)	0 24
Trichlorobenzene, 1,3,5-	ug/L	1	NA	NA	NC
Trichlorophenol, 2,4,5-	ug/L	27	NA	NA	NC
Trichlorophenol, 2,4,6-	ug/L	11	3 2	USEPA Region 4 [1] (Chronic)	3 44
Polynuclear Aromatic Hydrocarbons (PAHs)					
Low Molecular Weight [4]					
Acenaphthene	ug/L	11	17	USEPA Region 4 [1] (Chronic)	0 65
Acenaphthylene	ug/L	11	0 031	Florida SWQC [3] (Class III)	355
C1-Fluorenes	ug/L	2	NA	NA	NC
C1-Naphthalenes	ug/L	2	NA	NA	NC
C1-Phenanthrenes/anthracenes	ug/L	2	NA	NA	NC
C2-Fluorenes	ug/L	2	NA	NA	NC
C2-Naphthalenes	ug/L	2	NA	NA	NC
C3-Fluorenes	ug/L	2	NA	NA	NC
C3-Naphthalenes	ug/L	2	NA	NA	NC
C3-Phenanthrenes/anthracenes	ug/L	2	NA	NA	NC
C4-Naphthalenes	ug/L	2	NA	NA	NC
C4-Phenanthrenes/anthracenes	ug/L	2	NA	NA	NC
Carbazole	ug/L	11	NA	NA	NC
Dibenzofuran	ug/L	11	20	Federal AWQC [2]	0 55
Fluorene	ug/L	11	3 9	Federal AWQC [2]	2 82
High Molecular Weight [5]					
Benzo(b)fluoranthene	ug/L	2	NA	Florida SWQC [3] (Class III)	355
Benzo(g,h,i)perylene	ug/L	11	NA	Florida SWQC [3] (Class III)	355
C1 Chrysenes/benzanthracenes	ug/L	2	NA	NA	NC
C1-Fluoranthenes/pyrenes	ug/L	2	NA	NA	NC
C2 Chrysenes/benzanthracenes	ug/L	2	NA	NA	NC
C3 Chrysenes/benzanthracenes	ug/L	2	NA	NA	NC

TABLE 2-17 (Continued)
FRESH SURFACE WATER SCREENING RESULTS –COMPOUNDS NOT DETECTED RECENTLY
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

	Compound	Units	Maximum Reporting Limit	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
	C4 Chrysenes/benzanthracenes	ug/L	2	NA	NA	NC
	Dibenz(a,h)anthracene	ug/L	11	NA	Florida SWQC [3] (Class III)	355
	Indeno(1,2,3-cd)pyrene	ug/L	11	NA	Florida SWQC [3] (Class III)	355
Pesticides						
	(2,4,5-Trichlorophenoxy)propionic acid, 2-(2,4,5-TP) (Silvex)	ug/L	0 05	NA	NA	NC
	2,4,5-T	ug/L	0.11	NA	NA	NC
	2,4-D	ug/L	0 1	NA	NA	NC
	Aldrin	ug/L	0 25	0 3	USEPA Region 4 [1] (Chronic)	0.83
	Chlordane	ug/L	0 63	0.0043	USEPA Region 4 [1] (Chronic)	147
	Chlordane - gamma	ug/L	0 01	NA	NA	NC
	DDE, 4,4'-	ug/L	0 25	10 5	USEPA Region 4 [1] (Chronic)	0 024
	DDT, 4,4'-	ug/L	0 26	0 001	USEPA Region 4 [1] (Chronic)	260
	Dicamba	ug/L	0.25	NA	NA	NC
	Dieldrin	ug/L	0 25	0 0019	USEPA Region 4 [1] (Chronic)	132
	Endosulfan I (alpha)	ug/L	0 25	0.051	Federal AWQC [2]	4 90
	Endosulfan sulfate	ug/L	0 25	NA	NA	NC
	Endrin	ug/L	0 25	0.0023	USEPA Region 4 [1] (Chronic)	109
	Endrin aldehyde	ug/L	0 11	NA	NA	NC
	Endrin ketone	ug/L	0 25	NA	NA	NC
	HCH, alpha- (BHC, alpha-)	ug/L	0.25	5005	USEPA Region 4 [1] (Chronic)	0 00
	HCH, beta- (BHC, beta-)	ug/L	0 25	50005	USEPA Region 4 [1] (Chronic)	0.00
	HCH, delta- (BHC, delta-)	ug/L	0 25	NA	NA	NC
	HCH, gamma- (BHC, gamma-) (Lindane)	ug/L	0 25	0 08	USEPA Region 4 [1] (Chronic)	3 13
	Heptachlor epoxide	ug/L	0 25	0 0038	USEPA Region 4 [1] (Chronic)	65.8
	Methoxychlor	ug/L	0 62	0 03	USEPA Region 4 [1] (Chronic)	20 7
	Toxaphene	ug/L	10	0.0002	USEPA Region 4 [1] (Chronic)	50000

TABLE 2-17 (Continued)
FRESH SURFACE WATER SCREENING RESULTS –COMPOUNDS NOT DETECTED RECENTLY
SCREENING ECOLOGICAL RISK ASSESSMENT
FORMER HOMESTEAD AIR FORCE BASE, FLORIDA

Compound	Units	Maximum Reporting Limit	Freshwater Screening Value	Source of Screening Value	Hazard Quotient
Polychlorinated Biphenyls (PCBs)					
Arochlor 1232	ug/L	1 3	0 014	Florida SWQC [3] (Class III)	92 9
Arochlor 1242	ug/L	1 3	0 014	Florida SWQC [3] (Class III)	92 9
Arochlor 1248	ug/L	1 3	0 014	Florida SWQC [3] (Class III)	92 9
Arochlor 1254	ug/L	1 3	0 014	Florida SWQC [3] (Class III)	92.9
Arochlor 1260	ug/L	1 3	0.014	Florida SWQC [3] (Class III)	92 9
Aroclor 1016	ug/L	1 3	0 014	Florida SWQC [3] (Class III)	92 9
Aroclor 1221	ug/L	2.2	0 014	Florida SWQC [3] (Class III)	157
Inorganic Compounds					
Cobalt	ug/L	10	3	Federal AWQC [2]	3 33
Cyanide	ug/L	10000	5 2	USEPA Region 4 [1] (Chronic)	1923
Molybdenum	ug/L	0 5	NA	NA	NC
Tellurium	ug/L	50	NA	NA	NC
Thallium	ug/L	50	4	USEPA Region 4 [1] (Chronic)	12 5
Tin	ug/L	0 5	NA	NA	NC
Titanium	ug/L	1	NA	NA	NC
Yttrium	ug/L	0 5	NA	NA	NC

Footnotes

DDD - Dichlorodiphenyldichloroethane
DDE - Dichlorodiphenyldichloroethylene
DDT - Dichlorodiphenyltrichloroethane
NA - Not available
NC - Not calculated - no screening value available
ug/L - Micrograms per liter

[1] USEPA Ecotoxicity Threshold (USEPA, 1996c) Includes, Ambient Water Quality Criteria (AWQC), freshwater, EPA-derived Final Chronic Values (FCV), and Tier II Great Lakes Water Quality Initiative, Tier II methodology, 40CFR 9 (II) designates Tier II values

[2] Region 4 Waste Management Division Freshwater Surface Water Screening Values for Hazardous Waste Sites and Saltwater Surface Water Screening Values for Hazardous Waste Sites, Supplemental Guidance to RAGS Region 4 Bulletins, Ecological Risk Assessment Bulletin No 1, November, 1995 with updates from October 12, 1998 memorandum United States Environmental Protection Agency (USEPA) Ecological Risk Assessment at Military Bases Process considerations, timing of activities, and inclusion of stakeholders, December 1998

[3] *Surface Water Quality Criteria, Florida Administrative Code Chapter 62-302 Section 62-302 530, January 15, 1996*

[4] National Status and Trends defines low molecular weight PAHs as 2 and 3 ring PAHs, including anthracene, acenaphthalene, acenaphthylene, biphenyl, carbazole, dibenzofuran, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, naphthalene, and phenanthrene

[5] National Status and Trends defines high molecular weight PAHs as 4, 5, and 6 ring PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene

TABLE 2-18

Identification and Screening of Remedial Technologies and Process Options
Operable Unit 11 - Military Canal
Homestead Air Force Base
Homestead, Florida

Media	General Response Action	Remedial Technology	Process Option	Description	Applicability
Sediment	No Action	No Action	No Action	No Action	NCP requires no action to be carried through to detailed analysis of alternatives
	Institutional Controls	Access Restriction	Deed Restrictions	Place deed restriction on entire canal	Not viable. Will not prevent potential ecological risks
			Fence	Place fence around entire canal	Not viable. A fence will not prevent potential ecological risks.
		Monitoring	Sediment Monitoring	Long term monitoring of sediment characteristics	Potentially viable
		Sediment Control	Sediment Control Structures	Contain sediment transport to the Bay via surface water	Potentially viable.
	Containment	Encapsulation	Asphalt Pavement	*Cover contaminated areas with a layer of asphalt or* asphalt concrete	Not viable, contamination located in a canal submersed in water
			Concrete Box Culvert Cap	Cover contaminated areas with a concrete box culvert that allows stormwater flow with a barrier of concrete	Potentially viable
			Soil Cap	Cover contaminated areas with a soil cap to reduce erosion	Not viable, contamination located in a canal submersed in water
			Clay Cap	Cover contaminated areas with an impermeable clay cap and vegetative layer to reduce infiltration and erosion	Not viable, contamination located in a canal submersed in water
			Geosynthetic Cap	Cover contaminated areas with a geosynthetic cap and crushed stone to reduce infiltration and erosion	Not viable, *contamination located in a canal submersed in* water
			Grout Slurry	Filling high strength fabric forms with fine aggregate concrete (structural grout)	Potentially viable

LEGEND

Not carried forward

TABLE 2-18

Identification and Screening of Remedial Technologies and Process Options
Operable Unit 11 - Military Canal
Homestead Air Force Base
Homestead, Florida

Media	General Response Action	Remedial Technology	Process Option	Description	Applicability
Sediment	Containment	Vertical Barriers	Slurry Wall	Install perimeter trench extending to impermeable layer backfill trench with impermeable soil bentonite slurry	Potentially viable
			Vertical Geomembrane Wall	Install perimeter impermeable geomembrane wall extending to impermeable layer	Potentially viable
			Sheet Piles	Install perimeter steel sheet piles extending to impermeable layer	Potentially viable
		Surface Stabilization	Revegetation	Establish vegetative cover to stabilize sediment over contaminated areas	Not viable A vegetative cover already exists Does not protect the Bay
		Backfilling	Mechanical Backfill	Mechanically backfill part or all of the canal with existing earthen berm	Potentially viable Need a mechanism for stormwater conveyance.
	Removal and On-Site Treatment	Biological Treatment	Composting	Contaminated sediment is mixed with organic amendments, heat and air and in microbial degradation of organics	Not applicable Treatment technology not effective for COCs
			Controlled Solid Phase	Contaminated sediment is mixed with sediment amendments and placed in above ground enclosures for treatment	Not applicable Treatment technology not effective for COCs
			Landfarming	Contaminated sediment is enclosed and periodically turned over or tilled into the sediment to aerate the waste	Not applicable Treatment technology not effective for COCs
			Slurry Phase	Contaminated sediment is combined with sludge or water to develop an aqueous slurry, which keeps sediment suspended and in contact with microorganisms, then dewatered	Not applicable Treatment technology not effective for COCs
		Physical/Chemical Treatment	Chemical Reduction/Oxidation	Oxidizer such as ozone, hydrogen peroxide, or permanganate is introduced and mixed into sediment and oxidation occurs	Not applicable Treatment technology not effective for COCs
			Soil Washing	Use of water or steam to wash contaminates from soil or gravel	Not applicable Treatment technology not effective for COCs
			Soil Vapor Extraction	A vacuum is applied to above ground piping to encourage volatilization of organics for contaminated sediment	Not applicable Treatment technology not effective for COCs

LEGEND

Not carried forward

TABLE 2-18

Identification and Screening of Remedial Technologies and Process Options
Operable Unit 11 - Military Canal
Homestead Air Force Base
Homestead, Florida

Media	General Response Action	Remedial Technology	Process Option	Description	Applicability
Sediment	Removal and On Site Treatment	Physical/Chemical Treatment	Solidification/ Stabilization	Contaminants are physically bound or enclosed in a stabilized mass, or chemicals added to reduce contaminant mobility	Potentially viable
			Solvent Extraction	Contaminated sediment and solvent are mixed in extractor. Extract is collected and later treated	Not applicable. Treatment technology not effective for COCs
		Thermal Treatment	On Site Incinerator	High temperatures (1600 - 2000 F) combust contaminated sediment in approved incinerator constructed on-site	Not viable. On-site treatment is not an option
			High Temperature Thermal Desorption	Contaminated sediment is heated (600 - 1000 F) to volatilize organics. A carrier gas or vacuum system transports to gas treatment system	Not applicable. Treatment technology not effective for COCs
			Hot Gas Decontamination	Contaminated sediment is heated for a specified time, the gas effluent is then treated in an after burn system	Not applicable. Treatment technology not effective for COCs
			Low Temperature Thermal Desorption	Contaminated sediment is heated (200 - 600 F) to volatilize organics. A carrier gas or vacuum system transports to gas treatment system	Not applicable. Treatment technology not effective for COCs
			Pyrolysis	Contaminated sediment is heated in an oxygen deficient atm. Organics transformed in to gaseous components and a solid residue (coke) containing fixed carbon and ash	Not applicable. Treatment technology not effective for COCs
			Vitrification	Contaminated sediment is melted at high temperature to form a glass and crystalline structure with low leaching characteristics	Not applicable, site is not conducive for this technology
	Removal and Off-Site Treatment	Thermal Treatment	Off-Site Incinerator	High temperatures (1600 - 2000 F) combust contaminated sediment in approved RCRA permitted incinerator off site.	Not applicable, sediment is not considered hazardous and would not need to be treated prior to disposal

LEGEND

Not carried forward

Note: Removal Pertains to Hydraulic Dredging

TABLE 2-18

Identification and Screening of Remedial Technologies and Process Options
Operable Unit 11 - Military Canal
Homestead Air Force Base
Homestead, Florida

Media	General Response Action	Remedial Technology	Process Option	Description	Applicability
Sediment	Removal and Disposal	Dredging and Landfill	Hydraulic Dredging and Off-Site Hazardous Landfill	Permanent storage of contaminated sediment in a RCRA permitted off-site hazardous waste landfill	Not applicable Sediment is not considered hazardous
			Hydraulic Dredging and Off Site Solid Waste Landfill	Permanent storage of contaminated sediment in an off-site solid waste landfill	*Potentially viable*
			On-Site Landfill	Permanent storage of contaminated sediment in an landfill constructed on site	Not viable Area is not conducive for this type of construction
			Mechanical Dredging and Off Site Solid Waste Landfill	Permanent storage of contaminated sediment in an off-site solid waste landfill	*Potentially viable*
	In-Situ Treatment	Natural Attenuation	Natural Attenuation	Natural subsurface processes (dilution volatilization ect) are allowed to reduce contaminant concentrations	*Not viable Sediment poses potential risks to the* ecosystem and time is of the essence
		Biological Treatment	Biodegradation	Nutrients oxygen, and microorganisms are added to the subsurface environment *to promote biological degradation*	Not applicable Treatment technology not effective for COCs.
			Bioventing	Oxygen is added to subsurface environment to stimulate biological degradation	Not applicable Treatment technology not effective for COCs
			White Rot Fungus	Incorporation of White Rot fungus into subsurface environment White Rot uses a lignin degrading and wood rotting enzyme system	Not applicable Treatment technology not effective for COCs
		Physical/Chemical Treatment	Pneumatic Fracturing	Pressurized air is injected beneath surface to develop cracks *in low permeability material* to produce new passageways for in situ processes	Not applicable Treatment technology not effective for COCs
			Soil Flushing	Water or additives are applied to contaminated soil to enhance contaminant solubility, and groundwater is extracted	Not applicable Treatment technology not effective for COCs
			Soil Vapor Extraction	Vacuum is applied through extraction wells and VOCs are extracted and treated	Not applicable Treatment technology not effective for COCs
			Solidification/ Stabilization	Contaminants are physically bound or enclosed in a stabilized mass or chemicals added to reduce contaminant mobility	Not applicable Site is not conducive for in situ stabilization
		Thermal Treatment	Thermally Enhanced Soil Vapor Extraction	Steam or hot air is used to heat soil and then a vacuum is applied through extraction wells and VOCs are extracted	Not applicable Treatment technology not effective for COCs
			Vitrification	Contaminated soil is melted at high temperature to form a glass and crystalline structure with low leaching characteristics	Not applicable Treatment technology is not conducive for this technology

LEGEND

Not carried forward

TABLE 2-20
Summary of Potential ARARs
Military Canal - Operable Unit 11
Homestead Air Force Base (HAFB)
Homestead, Florida

	ARARs	Description of Regulation	Applicability, Relevance, and Appropriateness to OU11	Alt 1	Alt 2	Alt 3
	Chemical Specific					
	Federal					
1	40 CFR 50 6 National Primary and Secondary Ambient Air Quality Standards for Particulate Matter	Defined as (1) 150 micrograms per cubic meter, 24-hour concentration, (2) 50 micrograms per cubic meter, annual arithmetic mean, (3) particulate matter shall be measured as PM 20 (particulates with a diameter less than or equal to 10 micrometers)	Applies to alternatives that include construction activities which may involve fugitive particulate emissions		X	X
2.	40 CFR 53 Ambient Air Monitoring Reference and Equivalent Methods	Provides methods for monitoring conventional air pollutants in ambient air	Applies to alternatives that include construction and earthwork		X	X
3	40 CFR 53 Ambient Air Monitoring Reference and Equivalent Methods	Provides methods for monitoring conventional air pollutants in ambient air	Applies to alternatives that include construction activities which may involve fugitive particulate emissions		X	X
	State					
1	62-302 500 FAC - Surface Water Quality Standards Minumum Criteria, General Criteria	Outlines the minumum criteria that all surface waters of the State of Florida, shall at all places and at all times meet	Applies to alternatives that include construction and earthwork		X	X
2	62-302 530 FAC - Surface Water Quality Standards Surface Water Quality Criteria	Contains both numeric and narrative surface water quality criteria to be applied to surface waters except within zones of mixing	Applies to alternatives that include construction and earthwork		X	X
3	62-650 FAC - Water Quality Based Effluent Limitations	Sets forth requirements for the treatment and disposal of domestic and industrial wastewater, concerning development of effluent limitations for wastewater facilities	Applies to alternatives that involve dewatering activities		X	X
	Location Specific					
	Federal					
1	16 U S C 410 Original Legislation of Biscayne National Park	According to Mr Roy Irwin of the National Park Service (NPS), Biscayne National Park (BNP) is considered a pristine environment Therefore, all proposed alternatives must provide BNP with the maximum degree of protection against adverse health and ecological effects as determined by the NPS	Applies to all alternatives that involve the possiblity of adversely affecting the health and the environment within the boundary of the BNP		X	X
2	16 U S C 1 National Park Service Organic Act	This Act by Congress created the NPS whose purpose is to "conserve the scenery and the natural and historic objects and the wildlife therin and to provide enjoyment of the same in such manner and by the means as will leave them unimpaired for the enjoyment of future generations "	Applies to all alternatives that involve the possiblity of adversely affecting the health and the environment within the boundary of the BNP		X	X

TABLE 2-20
Summary of Potential ARARs
Military Canal - Operable Unit 11
Homestead Air Force Base (HAFB)
Homestead, Florida

	ARARs	Description of Regulation	Applicability, Relevance, and Appropriateness to OU11	Alt 1	Alt 2	Alt 3
3	6 U S C 4601-22(c) and 36 CFR part 6	Prohibits solid waste disposal sites within National Parks	Applies to alternatives that involve encapsulation of sediment in the canal or temporary sediment storage spoil areas during dredging that are within the boundary of Biscayne National Park		X	X
4	EO 11990 Protection of Wetlands	Requires wetlands protection	Relevant to remedial activities because wetlands are in close vicinity of the Military Canal		X	X
5	50 CFR 200, 402 Endangered Species Act of 1973 and Regulations	Requires actions to avoid jeopardizing the continued existence of threatened species or modification of their habitats	Applies to alternatives that involve remedial activities which sediment may become entrained in the canal water		X	X
6	Federal Register, 33 CFR Parts 320-330 and 40 CFR 6 Protection of the Environment	Requires the protection of wetlands, floodplains, important farmlands, coastal zones, wild and scenic rivers, fish and wildlife, and endangered species.	Applicable for alternatives that involve remedial activities		X	X
	State					
1	62-4 242 FAC - Permits Antidegradation Permitting Requirements, Outstanding Florida Waters, Outstanding National Resource Waters, Equitable Abatement	Provides standards and permitting requirements for surface water discharge	May be relevant to alternatives that involve remedial activities which surface water will be discharged from the Military Canal into BNP		X	X
	Local: South Florida Water Mangement District					
1	40E-6 FAC - Works or Lands of the District	Provides the guidelines for obtaining a permit to utilize works or lands of the district, Right of Way Permit The district has determined that an unencumbered 40 ft wide strip of right of way, measured from the top of the bank landward	Applies to alternatives which remedial activities require the use of public land on the districts right of way		X	X
	Action Specific					
	Federal					
1	Federal Register, 33 CFR 322 - Permits for Structures or Work in or Affecting Navigable Waters of the United States	Outlines permits and procedures for other structures besides dams and dikes, including excavation, dredging, and/or disposal activities in the navigable waters of the U S	Applies to alternatives that involve remedial activities in navigable waters of the U S		X	X
2	Federal Register, 33 CFR 325 - Processing of Department of Army Permits	Outlines the procedures for processing individual and general permits	Applies to alternatives that involve remedial activities requiring permits		X	X

TABLE 2-20
Summary of Potential ARARs
Military Canal - Operable Unit 11
Homestead Air Force Base (HAFB)
Homestead, Florida

	ARARs	Description of Regulation	Applicability, Relevance, and Appropriateness to OU11	Alt 1	Alt 2	Alt 3
	State					
1	62-25 042(6) FAC Regulations of Stormwater Discharge Permit Requirements I or Wetland Stormwater Discharge Facilities	Provides a list of performance standards for discharging stormwater into a wetlands	Relevant to alternatives that will involve discharge of stormwater through DERM's Wetland Construction Project However, this is not applicable nor appropriate since DERMs project is a Pilot Study and needs stormwater to determine the effectiveness of their wetland construction project		X	X
2	62-25 060(1) FAC Regulations of Stormwater Discharge Relationship To Other Permitting Requirements	A separate permit under this chapter may not be required if permits for dredging or filling are required under Sections 62-12 150 or 62-12 160 or Chapter 62-12, Florida Administrative Code, or a permit or certification is required under Section 401 Federal Clean Water Act In these cases all applicable stormwater issues will be considered in the issuing of the previously mentioned permits	Applicable to alternatives that involve dredging activities		X	X
3	62-4 210 FAC - Construction Permits	Outlines requirements for construction projects, which can reasonably be expected to be a source of air or water pollution	Applies to alternatives that involve remedial activities which contaminated sediment may become entrained in the surface water		X	X
4	62-4 240 FAC - Operation Permits for Water Pollution Sources	Outlines requirements for any person intending to discharge wastes into the waters	Applies to alternatives that involve dredging and dewatering activities		X	X
5	62-312 - Dredge And Fill Activities	Provides requirements and procedures for obtaining permits and jurisdictional declaratory statements for dredge and fill activities	Only applicable to alternatives that involve dredging activities if the Military Canal is not governed by local agency			
6	62-604 FAC - Collection Systems and Transmission Facilities	Establishes that no wastes are to be discharged to any waters of the state without first being given the degree of the treatment necessary to protect the beneficial uses of such water	Applies to alternatives that involve dredging and dewatering activities		X	X
	Local: South Florida Water Mangement District					
1	40E-4 FAC Environmental Resource Permit	Provides Environmental Resource permitting guidelines for any construction, alteration, operation, maintainence, removal, or abandonment of any stormwater management system, dam, impoundment, reservoir, appurtenant work or works, or any combination thereof, including dredging or filling	Applies to the alternatives that involve hydraulic dredging and construction activities		X	X
2	40E-20(3) FAC - General Water Use Permits	Provides guidelines and procedures for persons wishing to obtain a permit for using or withdrawing water in conjuction with short term dewatering or in conjuction with a short term Remedial Action Plan approved by the state or local agency having legal jurisdiction	Applies to alternatives that involve hydraulic dredging, dewatering, and construction activities		X	X

TABLE 2-20
Summary of Potential ARARs
Military Canal - Operable Unit 11
Homestead Air Force Base (HAFB)
Homestead, Florida

	ARARs	Description of Regulation	Applicability, Relevance, and Appropriateness to OU11	Alt 1	Alt 2	Alt 3
	Local Miami-Dade County Dept. of Environmental Resources Management					
1	Chapter 24-58 Code of Metropolitan Miami Dade County	Requires a Class I Permit be obtained prior to performing any work in, on, over, or upon tidal waters or coastal wetlands in all of Dade County including all of the municipalities located within the county. Also deals with dredging requirements	Applies to alternatives that involve remedial activities in the Military Canal		X	X
	To Be Considered (TBC)					
	Federal					
1	42 U.S.C. 4332 National Environmental Policy Act	Requires an Environmental Assessment or Impact Statement for sites that can adversely affect health and the environment. Also, all regulations regarding floodplains, wetlands, endangered species, etc. must be followed	Not applicable, site is listed as a NPL. The site has followed the CERCLA process which includes an RI, RA, FS and a ROD. This process meets tha analytical and public requirements of NEPA			
2	USEPA Region 4 Sediment Screening Values	Screening values were included in a Dec. 22, 1998 USEPA Region 4 Memorandum, regarding *Ecological Risk Assessement at Military Bases: Process Considerations Timing of Activity and Inclusion of Stakeholders*	Relevant and appropriate in the analysis of the extent of sediment contamination levels found in the canals		X	X
3	29 CFR 1910 Occupational Safety and Health Standards	Provides the guidelines for determining permissible exposure limits (PELs)	Relevant and appropriate to any high exposure levels that may be fall above the PELs		X	X
	State					
1	62-302.700 FAC - Special Protection, Outstanding Florida Waters, Outstanding National Resource Waters	Outlines and defines what waters are considered Outstanding Waters	Relevant and appropriate since the canal empties into the Biscayne Bay which is considered an Outstanding Florida Water	X	X	X
2.	Florida Sediment Quality Assessment Guidelines (SQAG)	Provides biological effects-based sediment quality assessment guidelines for Florida costal waters. Intended to assist sediment quality assessment applications, such as to identify priority areas for nonpoint source control, design wetland restoration sites, screen contaminated sediments at waste clean up sites, and monitor trends in environmental contamination. Not intended to be sediment cleanup levels	Applicable in determining the risk to human and ecological receptors from contaminated sediment		X	X

Table 2-21

Evaluation of Process Options
Operable Unit 11 - Military Canal
Homestead Air Force Base
Homestead, Florida

Sediment and Waste General Response Action	Remedial Technology	Process Option	Effectiveness	Implementability	Cost
No Action	No Action	No Action	Does not achieve RA objectives	Not acceptable to Federal, State, and local regulatory agencies	None
Institutional Controls	Monitoring	Sediment Monitoring (1)	Does not achieve RA objectives	Easily implemented	Low capital costs Low operation costs
	Sediment Control	Sediment Control Structures	Does not achieve overall RA objectives but will minimize transport of sediment	Readily implemented	Low capital costs Minimal O&M costs
Containment	Encapsulation	Concrete Box Culvert Cap (3)	Effective. Will achieve RA objectives	Somewhat readily implemented. Box would need to be pre fabricated and placed in the canal	High Costs Moderate maintenance costs
		Grout Slurry	Effective. Will achieve RA objectives	Readily implemented.	Moderate capital costs Low maintenance costs
	Vertical Barriers (1)	Slurry Wall (1,3)	Does not achieve RA objectives	Readily implemented	High capital costs Low maintenance costs
		Vertical Geomembrane Wall (1,3)	Does not achieve RA objectives	Readily implemented	High capital costs Low maintenance costs
		Sheet Piles (1,3)	Does not achieve RA objectives	Easily implemented	High capital costs Low maintenance costs
	Backfilling	Mechanical Backfill (2,3)	Effective in meeting RA objectives	Semi-readily implemented. Would need to manage stormwater flow	High capital cost. High operation costs
Removal and On-Site Treatment	Physical/Chemical Treatment	Solidification/Stabilization (1,2)	Not effective. Sediment is not hazardous or TSCA waste. Sediment does not need to be stabilized or solidified	Semi-readily implementable	High Capital Costs No O&M Costs
Removal and Disposal	Dredging and Landfill	Hydraulic Dredging and Off Site Solid Waste Landfill	Effective in meeting RA objectives	Somewhat readily implemented	High Capital Costs Moderate operation costs
		(1) Mechanical Dredging and Off Site Solid Waste Landfill (1,2)	Semi effective in meeting RA objectives. Will only remove 30 to 70% of sediment	Somewhat readily implemented	High Capital Costs Moderate operation costs.

LEGEND

Not Carried Forward

Notes
(1) Not carried forward due to effectiveness limitations
(2) Not carried forward due to implementability limitations
(3) Not carried forward due to cost limitations

Table 2-22
Comparative Analysis of Alternatives
Military Canal (OU-11)
Homestead Air Force Base
Homestead, Florida

Criteria	Alternative 1 - No Further Action	Alternative 2 - OU-9 Spot Removal, Sediment Control Structure, and Dredging Entire Military Canal	Alternative 3 - OU-9 Spot Removal or Encapsulation, Sediment Control Structure, and Encapsulation of Entire Military Canal	Comments
	Numeric Rating	Numeric Rating	Numeric Rating	
1. Overall Protection of Human Health and the Environment	2	7	8	Alternatives 2 and 3 are protective of human health and the environment based on their ability to meet Remedial Action Objectives, short-term effectiveness, and compliance with ARARs Alternative 3 seems to be more protective to human health and the environment based on the sediment being capped in place. Alternative 2 will disturb and displace some sediment during dredging activities. Dredging will not remove all the sediment in OU-11 and the remaining sediment will pose an ecological risk
2. Compliance with ARARs	1	7	8	Alternative 1 can comply with all ARARs and Guidances since no action will occur. Alternatives 2 and 3 can also comply with all ARARs and Guidances. However, Alternative 3 will have less permits to acquire than Alternative 2 since no dredging will occur in the Military Canal
3. Long-Term Effectiveness and Permanence	1	6	8	Alternative 2 relies on removal of contaminated sediment however the dredging technology is not 100% effective, whereas Alternative 3 relies on containment of the contaminated sediment. Alternative 2 which includes dredging the entire Military Canal relies more heavily on controls put in place to take care of the residual risk associated with dredging than alternative 3. However, some sediment will remain in OU-11 Alternative 3 does not have much residual risk associated with placing a cap over the contaminated sediment
4. Reduction of Toxicity, Mobility, and Volume through Treatment	1	6	7	Alternative 2 will reduce the toxicity, volume, and mobility of the contaminated sediment by removal with hydraulic dredging. However some sediment will remain in OU-11 Alternative 3 is a containment process and not a treatment process. Thus, Alternative 3 reduces the mobility and the toxicity of the contaminated sediment by encapsulation but does not reduce the volume. In both alternatives, sediment control structures will prevent future migration of contaminated sediment to the Military Canal
5. Short-Term Effectiveness	7	7	9	Alternative 1 is not as effective as Alternatives 2 and 3 because it does not meet the Remedial Action Objectives Alternative 3 is more effective in protecting the community and workers during remedial activities because it does not involve removing the contaminated sediment. A geotextile will be placed over the contaminated sediment prior to installing the engineered cap Although environmental impacts are not anticipated during remedial activities, Alternative 3 will involve less environmental impacts because the contaminated sediment will not be disturbed in the Military Canal Alternative 2 may have a shorter construction schedule than Alternative 3

Table 2-22
Comparative Analysis of Alternatives
Military Canal (OU-11)
Homestead Air Force Base
Homestead, Florida

Criteria	Alternative 1 - No Further Action	Alternative 2 - OU-9 Spot Removal, Sediment Control Structure, and Dredging Entire Military Canal	Alternative 3 - OU-9 Spot Removal or Encapsulation, Sediment Control Structure, and Encapsulation of Entire Military Canal	Comments
	Numeric Rating	Numeric Rating	Numeric Rating	
6 Implementability	4	7	8	While all Alternatives are implementable, Alternative 1 would likely not receive regulatory and community acceptance For all Alternatives, the technologies are considered reliable and services and materials are available Alternative 2 seems easier to implement additional remedial actions if necessary than Alternative 3 Alternative 3 is easier to monitor the effectiveness of the encapsulation than Alternative 2 which would have to define the efficiency and removal of contaminated sediment Alternative 3 does not require off-site disposal of contaminated sediment because the sediment will not be removed from the Military Canal Alternative 2 will have to dewater and dispose of the contaminated sediment from dredging operations Additionally, if deemed necessary, the water from dewatering activities may need to be treated on-site prior to discharge or be disposed of off-site at a disposal facility
7. Cost - NPW	9	2	4	Alternative 1 = $0 Alternative 2 = $7,684,000 Alternative 3A = $4,722,000 Alternative 3B = $5,030 000
8 State Acceptance	---	---	---	Not evaluated in this FS Will be addressed after review of this FS
9 Community Acceptance	---	---	---	Not evaluated in this FS Will be addressed after receiving public comments on this FS
Total Rating Score	25	42	52	

Numeric Rating Definition

Rating of 1 to 3 - Alternative does not meet the requirements of the criteria
Rating of 4 to 6 - Alternative partially meets the requirements of the criteria
Rating of 7 to 9 - Alternative meets the requirements of the criteria

Table 2-19
Detailed Analysis of Remedial Action Alternatives
Military Canal (OU-11)

Homestead Air Force Base
Homestead, Florida

CERCLA Requirements per	Alternative 1 - No Further Action	Alternative 2 - Sediment Control Structure and Dredging Entire Military Canal	Alternative 3 - Sediment Control Structure and Encapsulation of Entire Military Canal
1 Overall Protection of Human Health and the Environment	Overall Protection of Human Health and the Environment	Overall Protection of Human Health and the Environment	Overall Protection of Human Health and the Environment
	Description	Description	Description
a. Protection of Human Health and the Environment	OU 9 and OU-11 will pose a possible risk to ecological receptors since no action will be taken at the site	Constructing an engineered sediment control structure at the opening of the Military Canal will prevent future migration of sediment into the Military Canal	Constructing an engineered sediment control structure at the opening of the Military Canal will prevent future migration of sediment into the Military Canal
	Contaminants of concern and exposure pathways discussed in the Screening Level Ecological Risk Assessment (SERA) are unchanged.	Hydraulically dredging the entire Military Canal will be preventive to human health and the environment in the long term by removing contaminated sediment and protective of future migration of contaminated sediment to the Bay	Constructing an engineered concrete cap to encapsulate the sediment underwater will be preventive to human health and the environment in the long term by preventing migration of contaminated sediment to the Bay and protective bioaccumulation by aquatic species
	No ARARs identified because no action will occur	Short term affects during dredging activities at OU 11 and sediment control structure can be mitigated by the use of engineering controls and personal protective equipment and performing the field activities during Florida's dry season, December to February	Short term affects during activities at OU-11 sediment control structure and the engineered cap can be mitigated by the use of engineering controls and personal protective equipment by workers and performing the field activities during Florida's dry season December to February
2 Compliance With ARARs	COMPLIANCE WITH ARARS	COMPLIANCE WITH ARARS	COMPLIANCE WITH ARARS
a. Compliance with Chemical Specific ARARs	No ARARs identified because no action will occur	Compliance with Chemical-Specific ARARs will be met with engineered controls and permits	Compliance with Chemical-Specific ARARs will be met with engineered controls and permits
b. Compliance with Location-Specific ARARs	No ARARs identified because no action will occur	Compliance with Location-Specific ARARs will be met with engineered controls and permits	Compliance with Location Specific ARARs will be met with engineered controls and permits
c. Compliance with Action-Specific ARARs	No ARARs identified, because no action will occur	Compliance with Action Specific ARARs will be met with engineered controls and permits	Compliance with Action-Specific ARARs will be met with engineered controls and permits
d. Compliance with Other Criteria and Guidances	No Compliance with Guidances is needed because no action will occur	Compliance with Guidances and Other Criteria will be met with engineered controls and permits	Compliance with Guidances and Other Criteria will be met with engineered controls and permits
3 Long-Term Effectiveness and Permanence	LONG-TERM EFFECTIVENESS AND PERMANENCE	LONG-TERM EFFECTIVENESS AND PERMANENCE	LONG-TERM EFFECTIVENESS AND PERMANENCE
a. Magnitude of Residual Risk	Remaining risk at OU-11 will be the same as the current risk identified in the RLBRA	The sediment control structure will provide long-term effectiveness of future transport of contaminated sediment into the Military Canal	The sediment control structure will provide long term effectiveness of future transport of contaminated sediment into the Military Canal
		At the conclusion of dredging activities most of the sediment should be removed from the Military Canal The remaining contaminated sediment not removed by dredging will be insulated by silt curtains Therefore the magnitude of the residual risks to the environment may be considered acceptable	At the conclusion of remedial activities the risk of exposure to contaminants will be reduced by installing an engineered cap underwater to encapsulate contaminated sediment Therefore the magnitude of residual risk is considered acceptable
b. Adequacy and Reliability of Controls	No Action will not meet Remedial Action Objectives No action will not prevent migration of contaminated sediment to the Bay	The sediment control structure at the opening of the Military Canal is adequate in preventing future migration of contaminated sediment into the Military Canal	The sediment control structure at the opening of the Military Canal is adequate in preventing future migration of contaminated sediment into the Military Canal
		Dredging the Military Canal is adequate and reliable in removing approximately 60% to 90% of the contaminated sediment Engineering controls can prevent the majority of the remaining contaminated sediment from entering the Bay	Encapsulation of contaminated sediment in the Military Canal is adequate and reliable in preventing future migration of sediment to the Bay and preventing future harm to ecological receptors
4 Reduction of Toxicity Mobility, or Volume Through Treatment	REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT	REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT	REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT
a. Treatment Process and Remedy	No Action will not address the potential ecological threat of contaminated sediment in the Military Canal	Dredging OU 11 and installing the sediment control structure at the opening of the Military Canal will address the principal concern of further migration of contaminated sediment into the Military Canal and ultimately the Bay	Installing the sediment control structure at the opening of the Military Canal will address the principal concern of further migration of contaminated sediment into the Military Canal and ultimately the Bay
			Installing an engineered cap over the contaminated sediment will address the principal concern of potential ecological receptor exposure and future migration of contaminated sediment to the Bay
b. Amount of Hazardous Material Destroyed or Treated	No contaminated sediment will be destroyed treated or removed because the contaminated sediment will remain in its current location under the same current conditions	The contaminated sediment is not hazardous However dredging activities will reduce the amount of contaminated sediment present in the Military Canal	The contaminated sediment is not hazardous In addition the contaminated sediment will not be destroyed or treated but covered with an engineering cap and left in place
c. Reduction in Toxicity Mobility or Volume through Treatment	No reduction in toxicity mobility or volume will occur because contaminated sediment will remain in their current condition at the Military Canal	Installing the sediment control structure at the opening of the Military Canal will provide a treatment process of reducing the volume of contaminated sediment from OU-9 and prevent migration mobility of contaminated sediment into the Military Canal	Installing the sediment control structure at the opening of the Military Canal will provide a treatment process of reducing the volume of contaminated sediment from OU 9 and to prevent migration mobility of contaminated sediment into the Military Canal
		Dredging contaminated sediment from the Military Canal will provide a treatment process to significantly reducing the volume of contaminated sediment	No reduction in volume will occur because the contaminated sediment will be encapsulated by an engineered grout slurry fabric cap
		Engineering controls may be applied to curtail the mobility of contaminated sediment into the bay via water during dredging activities and future storm water runoff	The mobility of the sediment to Biscayne Bay will be reduced because of the encapsulation of contaminated sediments Additionally the mobility of contaminated sediment from OU 9 to the Military Canal will be reduced by the Sediment Control Structure
		Toxicity of the contaminated sediment will be reduced during dredging activities	Toxicity of the contaminated sediment will be reduced by eliminating exposure pathways
d. Irreversibility of the Treatment	No action will be reversible because there will be no treatment	The sediments control structure is not a treatment process and can be reversed by taking the control structure out of the reservoir This could potentially lead to contaminated sediment from the reservoir be transported into the Military Canal via stormwater	The sediment control structure is not a treatment process and can be reversed by taking the control structure out of the reservoir This could potentially lead to contaminated sediment from the reservoir be transported into the Military Canal via stormwater
		Dredging the entire Military Canal is an irreversible process because once the dredged sediment is removed from the Military Canal it will not be placed back in the canal	Encapsulation of contaminated sediment in the Military Canal by applying an engineered cap is not a treatment process and is reversible The engineered cap could be removed, returning the Military Canal to its existing condition.
e. Type and Quantity of Treatment Residual	No treatment residuals will result from treatment because no treatment of the contaminants will occur	Treatment residual that results from dredging will either be disposed off site or the water from dewatering will be discharged back into the canal	No treatment residuals will result from treatment because no treatment of the contaminants will occur at the Military Canal

Table 2-19
Detailed Analysis of Remedial Action Alternatives
Military Canal (OU-11)

Homestead Air Force Base
Homestead, Florida

CERCLA Requirements per	Alternative 1 - No Further Action	Alternative 2 - Sediment Control Structure and Dredging Entire Military Canal	Alternative 3 - Sediment Control Structure and Encapsulation of Entire Military Canal
f. Statutory Preference for Treatment as a Principal Element	The hazards at the Military Canal will not be reduced because the contaminated sediment will remain in its current condition and future transport of contaminated sediment into the Military Canal will not be prevented	The hazards at OU 11 will be reduced by dredging the contaminated sediment and disposing off-site.	The hazards at OU 11 will be reduced by encapsulating the contaminated sediment. Additionally, future migration of sediment from OU-9 and the reservoir to the Military Canal will be reduced by the use of a sediment control structure
5. Short-Term Effectiveness	SHORT-TERM EFFECTIVENESS	SHORT-TERM EFFECTIVENESS	SHORT-TERM EFFECTIVENESS
a. Protection of Community During Remedial Action	Current risks described in the RA will remain because the contaminated sediments will remain in their current condition in OU 9 and the Military Canal	Potential risks may occur during dredging and dewatering activities of entire Military Canal	Minimal risk during activities in the Military Canal
		Particulates from the sediment after dewatering will be sprayed with a water mist to protect the air quality	
		Potential risks may be incurred by the community during remedial activities due to increased truck traffic in the vicinity of the Military Canal during off site transportation of the contaminated sediment to the disposal facility	Potential risks may be incurred by the community during remedial activities at the Military Canal due to increased truck traffic and heavy equipment to construct the engineered cap
b. Protection of Workers During Remedial Action	Workers will not be needed for this alternative	Workers may be exposed to contaminated sediment by direct contact or inhalation during dredging activities at the Military Canal and construction of sediment control structure. Workers will be protected during remedial actions by wearing personal protective equipment. In addition dust control measures will be applied during dewatering activities	Workers may be exposed to contaminated sediment by direct contact or inhalation during encapsulation activities at the Military Canal and construction of sediment control structure. Workers will be protected during remedial actions by wearing personal protective equipment. In addition dust control measures will be applied during dewatering activities
		Workers will be exposed to routine risks associated with typical construction activities and heavy equipment	Workers performing tasks underwater in direct contact with the contaminated sediment will be protected from exposure through personal protective equipment. In addition precautions will be taken when remedial activities take place underwater (i.e. buddy system)
			Workers will be exposed to routine risks associated with typical construction activities and heavy equipment
c. Environmental Impacts	Ecological risks described in the RA will remain because the contaminated sediment will remain in their current condition in OU 9 and the Military Canal	Additional environmental impacts are not anticipated during dredging activities at the Military Canal. Stormwater and sediment control measures will be implemented to prevent the transport of contaminated sediment to the Bay	Stormwater and sediment control measures will be implemented to prevent the transport of contaminated sediment to the Bay
		Additional environmental impacts are not anticipated during construction of sediment control structure in the Reservoir area	Additional environmental impacts are not anticipated during construction of sediment control structure in the Reservoir area
			Additional environmental impacts are not anticipated during construction of the engineered cap
d. Time Until Remedial Action Objectives Are Achieved	Remedial Action Objectives will not be achieved because the contaminated sediment will remain in their current condition in OU 9 and the Military Canal	Remedial action objectives can be achieved immediately after construction activities including dredging the entire Military Canal and placement of the sediment control structure at the Reservoir	Remedial action objectives can be achieved immediately after construction activities including placement of the sediment control structure at the Reservoir
		It is anticipated to complete all remedial actions will require approximately 4 to 5 months not including time associated with design, bidding, and permits	Remedial action objectives can be achieved immediately after construction activities and placement of the engineered cap over the contaminated sediments
			It is anticipated to complete all remedial actions will require approximately 5 to 6 months not including time associated with design, bidding, and permits
6. Implementability	IMPLEMENTABILITY	IMPLEMENTABILITY	IMPLEMENTABILITY
a. Technical Feasibility			
i. Ability to Construct and Operate the Technology	No technology will be constructed because no action will occur	Construction of a sediment control structure using sheet piles and silt curtains are proven technologies	Construction of a sediment control structure using sheet piles and silt curtains are proven technologies
		Hydraulic Dredging is a proven technology. It is not anticipated that any problems will occur. However because of the marl material within the sediment layer in OU 11 the technology will likely be 60% to 90% efficient, so some sediment will remain	Encapsulation using a uniform engineered cap are proven technologies
		Dewatering and disposal of contaminated sediment is a proven technology	Construction of the chosen Uniform Lining Engineered Cap for this project is a proven technology
			Divers will be needed for construction and placement of the engineered cap since the cap will be placed underwater. Otherwise standard equipment will be used
ii. Reliability of the Technology	Not Applicable	Sediment control structure is a reliable technology. The technology should not result in schedule delays. Potential problems are manageable	Sediment control structure is a reliable technology. The technology should not result in schedule delays. Potential problems are manageable
		Hydraulic dredging is a reliable technology. Technology should not result in schedule delays unless there is a problem with the marl mixed in the organic layer	Encapsulation is also a reliable technology, at eliminating exposure pathways by cutting access to contaminated material
		Arrangements will be coordinated with off-site disposal facilities prior to initiating field activities	The engineered cap is a proven technology for underwater layment. The technology should not result in schedule delays. Potential problems are manageable.
iii. Ease of Undertaking Additional Remedial Actions If Necessary	Easy to implement additional remedial actions if necessary because no action will initially occur	Easy to implement additional remedial actions if necessary because the sediment control structure is repairable if future sediment transport were to take place	Easy to implement additional remedial actions if necessary because the sediment control structure is repairable if future sediment transport were to take place
		Hydraulic dredging may remove 60% to 90% of the contaminated sediment so some sediment will remain. Additionally, the sediment controls will further prevent future migration of sediment into the Military Canal	No additional remedial actions are anticipated with the construction of an engineered cap over the sediment, thus reducing potential transport and exposure of contaminated sediment

Table 2-19
Detailed Analysis of Remedial Action Alternatives
Military Canal (OU-11)

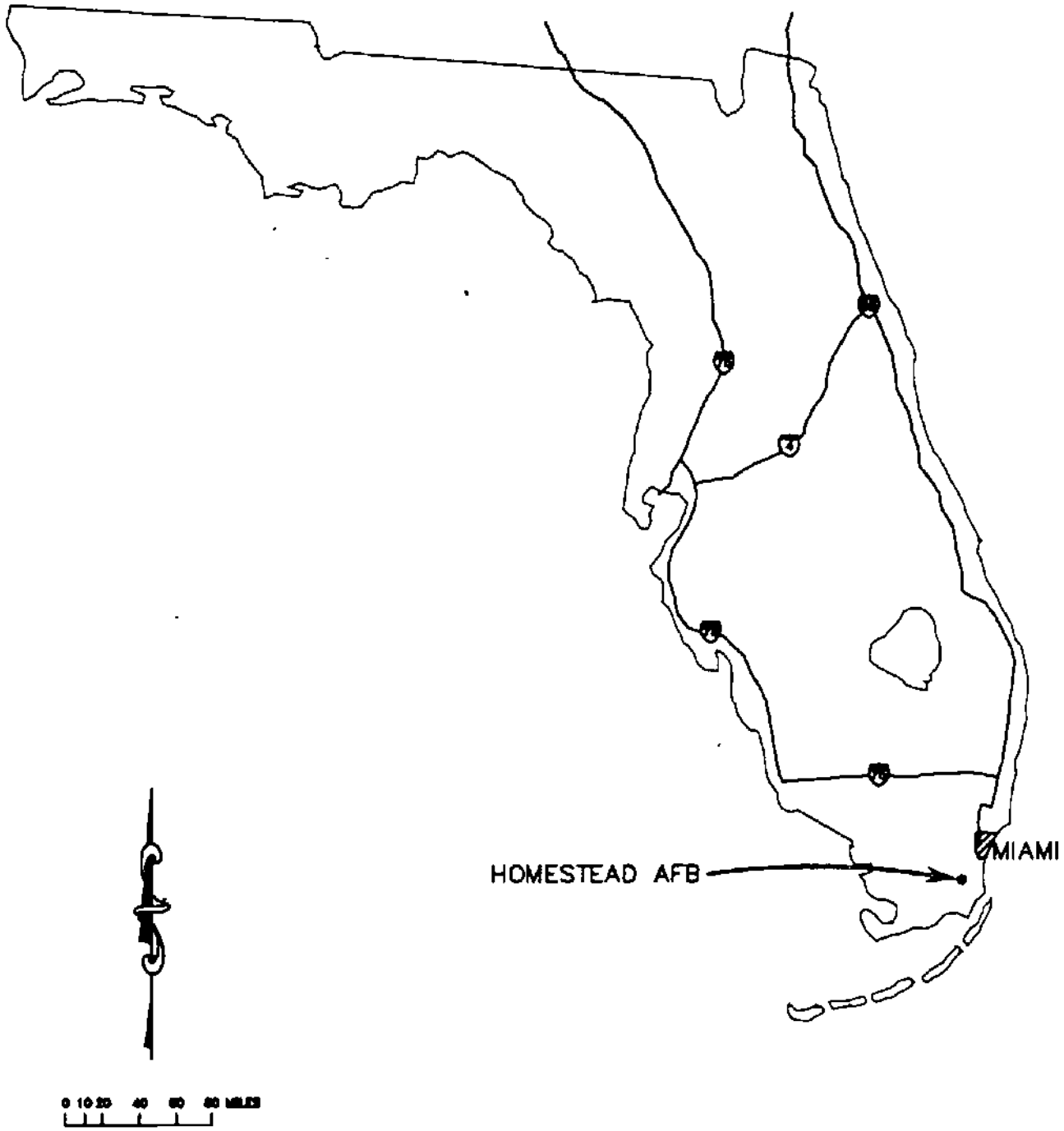
Homestead Air Force Base
Homestead, Florida

CERCLA Requirements per	Alternative 1 - No Further Action	Alternative 2 - Sediment Control Structure and Dredging Entire Military Canal	Alternative 3 - Sediment Control Structure and Encapsulation of Entire Military Canal
iv. Ability to Monitor Effectiveness of Remedy	Monitoring the effectiveness of the remedy is easy since no action will occur	Monitoring the effectiveness of the sediment control structure is easy to determine if sediment migration is occurring into the Military Canal from OU-9 and the Reservoir area. This can be accomplished by periodic inspections and sampling	Monitoring the effectiveness of the sediment control structure is easy to determine if sediment migration is occurring into the Military Canal from OU-9 and the Reservoir area. This can be accomplished by periodic inspections and sampling
		Monitoring the effectiveness of dredging activities will be semi straightforward. Sediment that is generated in the canal water will need time to settle before the effectiveness can be monitored. Sampling will need to take place to determine a baseline for any sediment still left in the canal so future sediment transport can also be monitored.	Easy to monitor the effectiveness of the engineered cap. Visual inspections and sampling will be performed to documents the effectiveness of sediment containment.
b. Administrative Feasibility			
i. Coordination With Other Agencies	Approval from all involved regulatory agencies will likely not be received	Approvals from other agencies should be obtainable for with this technology. Permits of various nature will be required from various agencies	Approvals from other agencies should be obtainable for with this technology. Permits of various nature will be required from various agencies
c. Availability of Services and Materials			
i. Availability of Off Site Treatment, Disposal Services and Capacity	No off-site treatment, disposal and capacity services are needed because no action will occur	There is availability to perform off site disposal of contaminated sediment within a reasonable distance of remedial activities	There is availability to perform off site disposal of contaminated sediment within a reasonable distance of remedial activities
ii. Availability of Necessary Equipment and Specialists	No equipment or specialists needed since no action will occur	The necessary equipment to perform dredging and off site disposal are readily available	No specialists or equipment will be needed for the sediment control structure
		No specialists or equipment will be needed for the sediment control structure	Encapsulation of the Military Canal will use the manufacturer and contractor specifically familiar with the Uniform Lifting technology. The water in the canal is at an average depth of 10 to 12 feet. Therefore divers will be needed to lay the liner
		A dredging contractor will perform dredging activities in the Military Canal. Additionally barges will be used for dredging and dewatering activities in the Military Canal.	
iii. Availability of Prospective Technologies	No technology needed since no action will occur	Dredging is a readily available technology. Competitive bids will be obtained for hydraulic dredging	Encapsulation technology is readily available. However, manufacturers and contractors of this technology are limited but competitive bidding can be completed
7 Costs	COSTS	COSTS	COSTS
A. Capital costs	Estimated capital cost is $0	Estimated capital costs without DERM Pilot Study is $7,635,000	Estimated capital costs is $4,981,000
8 State Acceptance	STATE ACCEPTANCE	STATE ACCEPTANCE	STATE ACCEPTANCE
	Not evaluated in this FS. Will be evaluated after review of this FS	Not evaluated in this FS. Will be evaluated after review of this FS	Not evaluated in this FS. Will be evaluated after review of this FS
9 Community Acceptance	COMMUNITY ACCEPTANCE	COMMUNITY ACCEPTANCE	COMMUNITY ACCEPTANCE
	Not evaluated in this FS. Will be evaluated after comments are received from this FS	Not evaluated in this FS. Will be evaluated after comments are received from this FS	Not evaluated in this FS. Will be evaluated after comments are received from this FS

TABLE 2-23
SUMMARY OF ESTIMATED COSTS
Total Encapsulation of Military Canal
Homestead Airforce Base, Florida

Task Number	Activity	Unit	Unit Rate	QTY	Cost
1.0	Planning Management and Oversight				
1.1	Program and Construction Project Management	lump sum	$ 648,000	1	$ 648,000
1.2	Permitting	lump sum	$ 81,000	1	$ 81,000
1.3	Health and Safety Oversight	lump sum	$ 32,400	1	$ 32,000
1.4	Quality Control	lump sum	$ 27,000	1	$ 27,000
1.5	Work Plan and Design	lump sum	$ 54,000	1	$ 54,000
				Total	$ 842,000
2.0	OU-9 Hot Spot (via Ecapsulation)				
		Unit	Unit Rate	QTY	Cost
2.1	Mobilization/Demobilization	lump sum	$ 1,600	1	$ 2,000
2.2	Rough Grading/Course Debris Removal	lump sum	$ 2,500.00	1	$ 3,000
2.3	Debris Staging Area	square feet	$ 3.24	100	$ 300
2.4	Texicon 8" Filter Point Mat with 6 oz Geotextile Underlayment	square feet	$ 3.67	5000	$ 18,000
2.5	Silt Curtain	feet	$ 108	100	$ 11,000
2.6	Off Site Transportation of Course Debris	tons	$ 24	10	$ 200
2.7	Disposal Costs	tons	$ 24	10	$ 200
				Total	$ 34,700
3.0	Sediment Transport Control Structure				
		Unit	Unit Rate	QTY	Cost
3.1	Mobilization/Demobilization	lump sum	$ 21,600	1	$ 22,000
3.2	Sheet Pile Construction (Reservoir)	square feet	$ 44.28	4,800	$ 213,000
3.3	Rerouting of flow into the reservoir and scoour lining	lump sum	$ 200,000	1	$ 200,000
3.4	Silt Curtain	feet	$ 108.00	150	$ 16,000
				Total	$ 451,000
4.0	Encapsulation of Entire Military Canal				
		Unit	Unit Rate	QTY	Cost
4.1	Rough Grading/Course Debris Removal	lump sum	$ 16,200	1	$ 16,000
4.2	Debris Staging Area	square feet	$ 3.24	5,000	$ 16,000
4.3	Texicon 8" Filter Point Mat with 6 oz Geotextile Underlayment	square feet	$ 3.67	542,400	$ 1,992,000
4.6	Silt Curtain	feet	$ 108	500	$ 54,000
4.7	Off Site Transportation of Course Debris	tons	$ 24	2,000	$ 48,000
4.8	Disposal Costs	tons	$ 24	2,000	$ 48,000
				Total	$ 2,174,000
5.0	Sewage Treatment Plant				
5.1	Plug Open Conduits at Sewage Treatment Plant	lump sum	$ 10,000	1	$ 10,000
				Total	$ 10,000
6.0	Constructed Wetlands				
6.1	Air Force Contribution to DERM Project	lump sum	$ 800,000	1	$ 800,000
				Total	$ 800,000
7.0	Report and Closeout				
		Unit	Unit Rate	QTY	Cost
7.1	As-built	lump sum	$ 27,443	1	$ 27,000
7.2	Project Closeout	lump sum	$ 27,443	1	$ 27,000
				Total	$ 54,000
		Grand Total			$ 4,366,000
		Estimated Contingency (15%)			$ 5,021,000

Notes:
All costs are based on supplier quotes, similar projects, and engineering estimates



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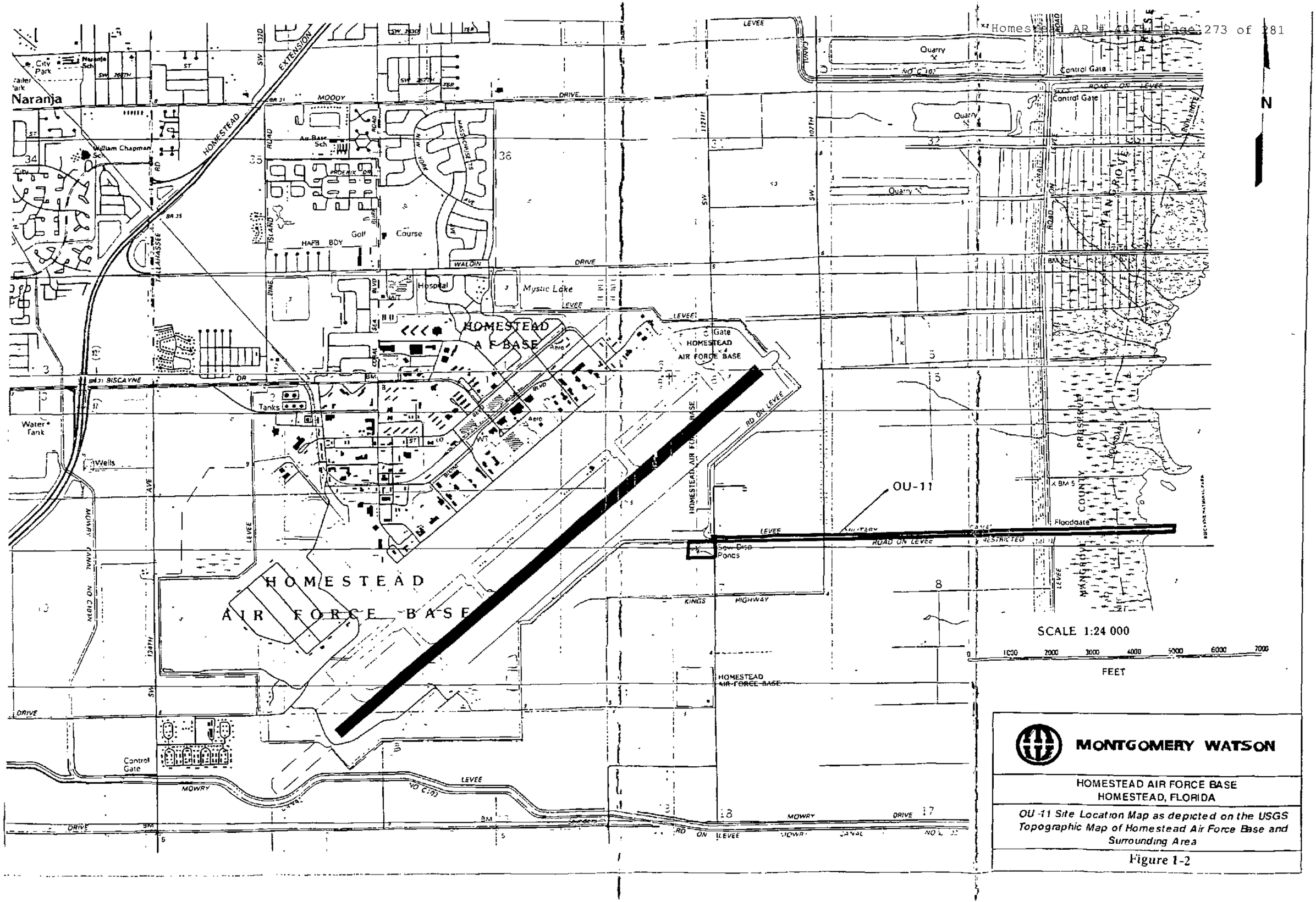
Homestead Air Force Base	[illegible]	LOCATION MAP	[illegible] 1-1

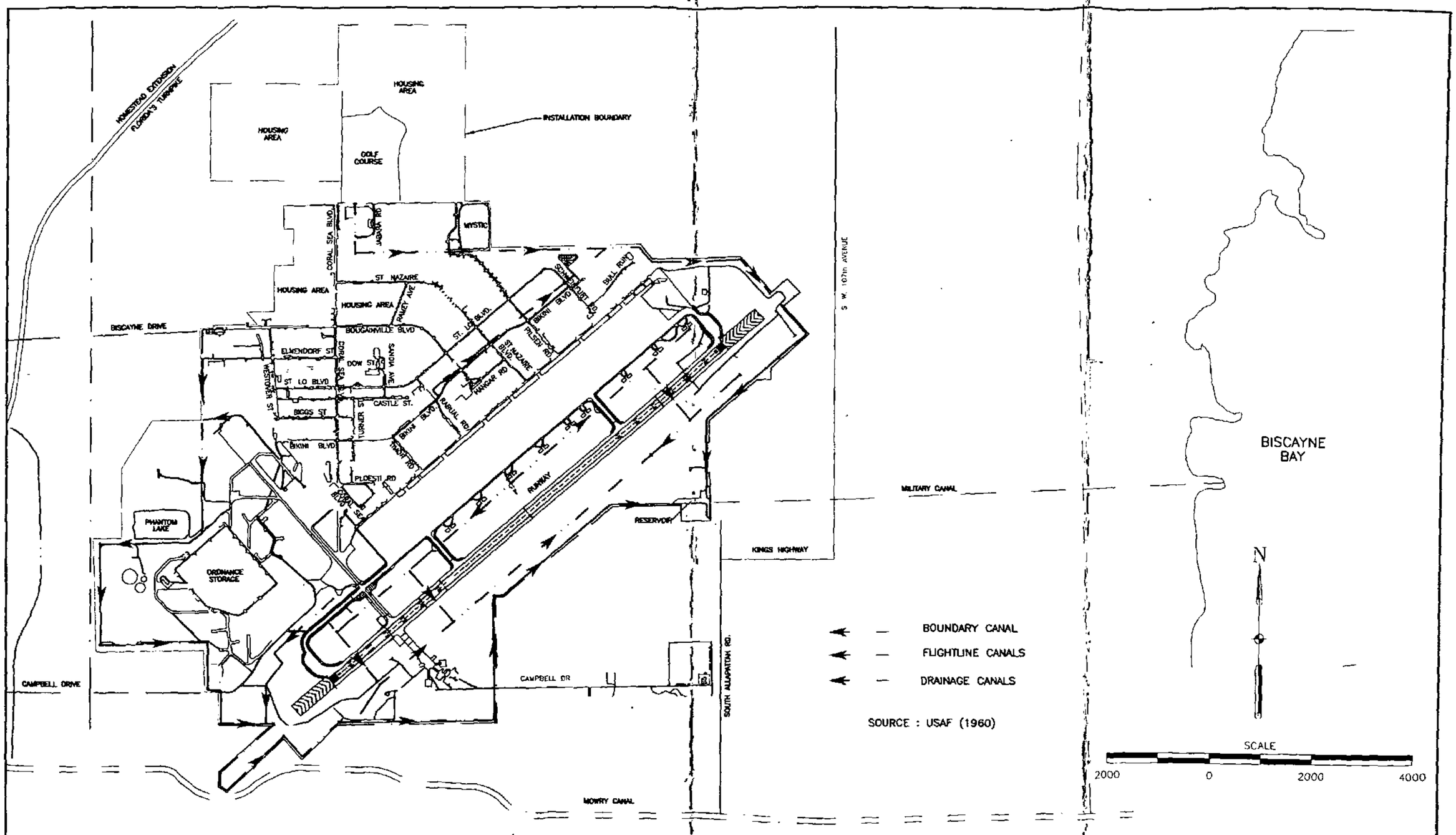


MONTGOMERY WATSON

HOMESTEAD AIR FORCE BASE
HOMESTEAD, FLORIDA

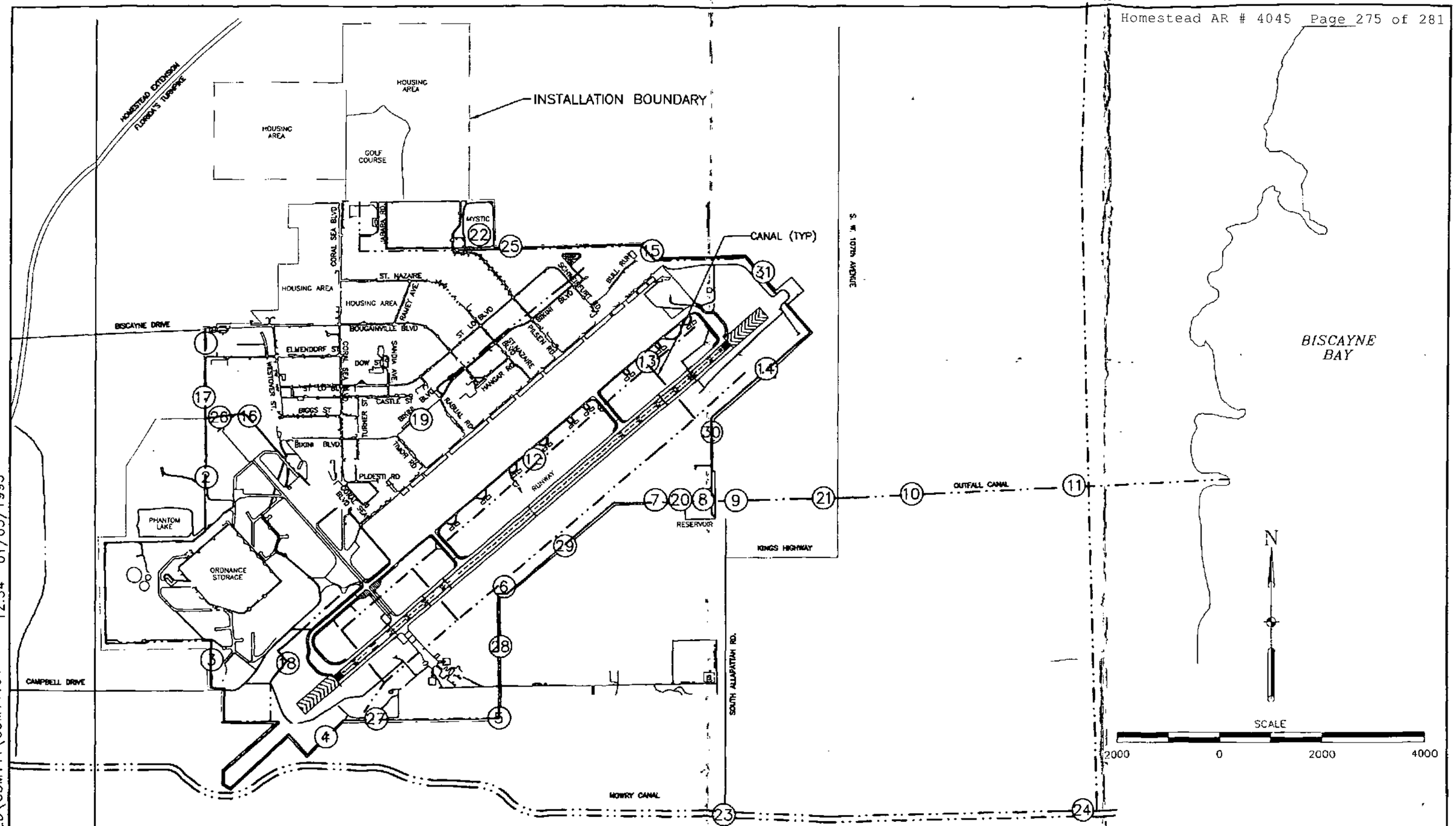
OU-11 Site Location Map as depicted on the USGS Topographic Map of Homestead Air Force Base and Surrounding Area

Figure 1-2



Location B R LA File name C3M11T09 DWG Last edited 07/28/94 @ 13 57

HOMESTEAD AIR RESERVE BASE, FLORIDA	BOUNDARY CANAL SYSTEM OU-9 REMEDIAL INVESTIGATION	FIG. NO. 2-1



HOMESTEAD AIR RESERVE BASE, FLORIDA

SURFACE WATER SAMPLING LOCATIONS
OU-9 REMEDIAL INVESTIGATION

FIG. NO. 2-2

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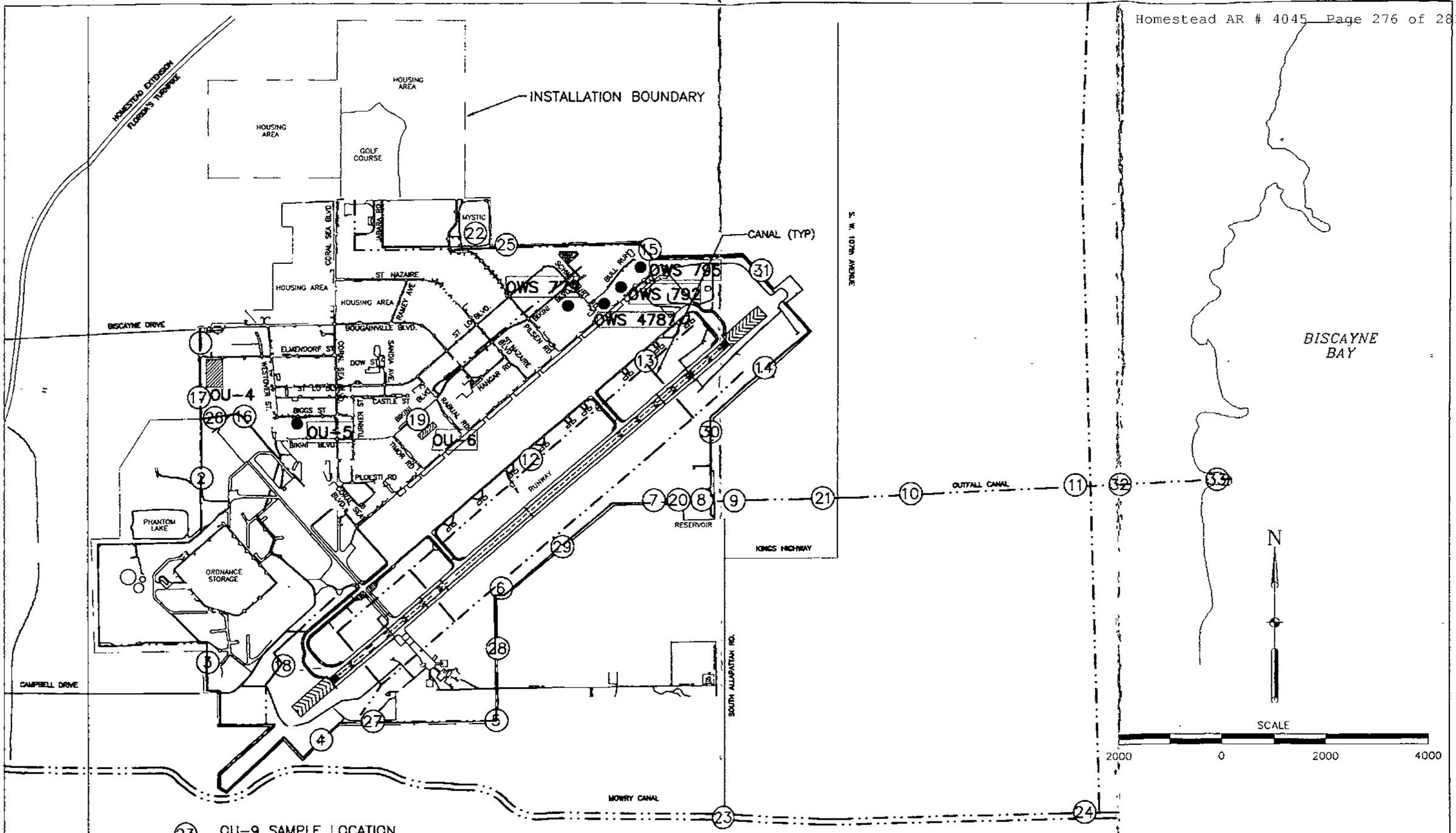
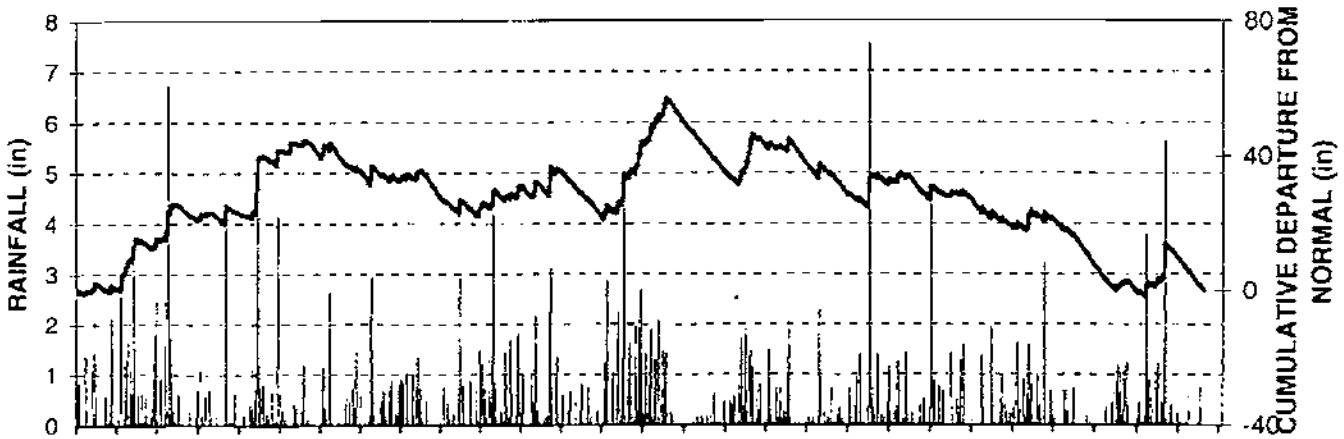


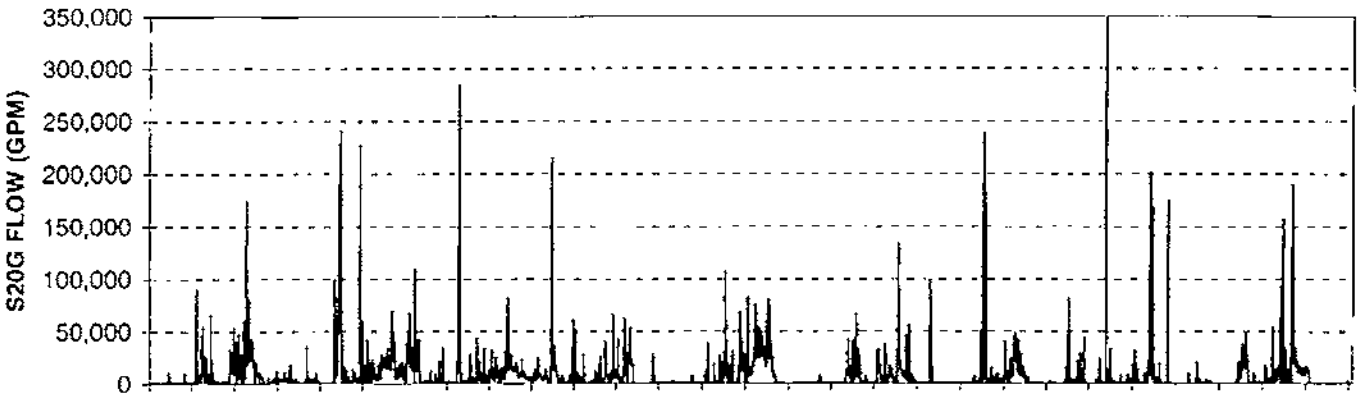
HOMESTEAD AIR FORCE BASE, FLORIDA	LOCATIONS OF VOLUNTARY CUSTODIAL ACTIONS IN RELATIONSHIP TO OU-9	FIG. NO. 2-3

FIGURE 2-4
HISTORICAL TRENDS

S-20G RAINFALL AND CUMULATIVE DEPARTURE FROM NORMAL



S-20G FLOW RECORD (SFWMD 1985-2000)



STORM DRAIN PUMP HOUSE OPERATOR LOG (DCAD RECORDS)

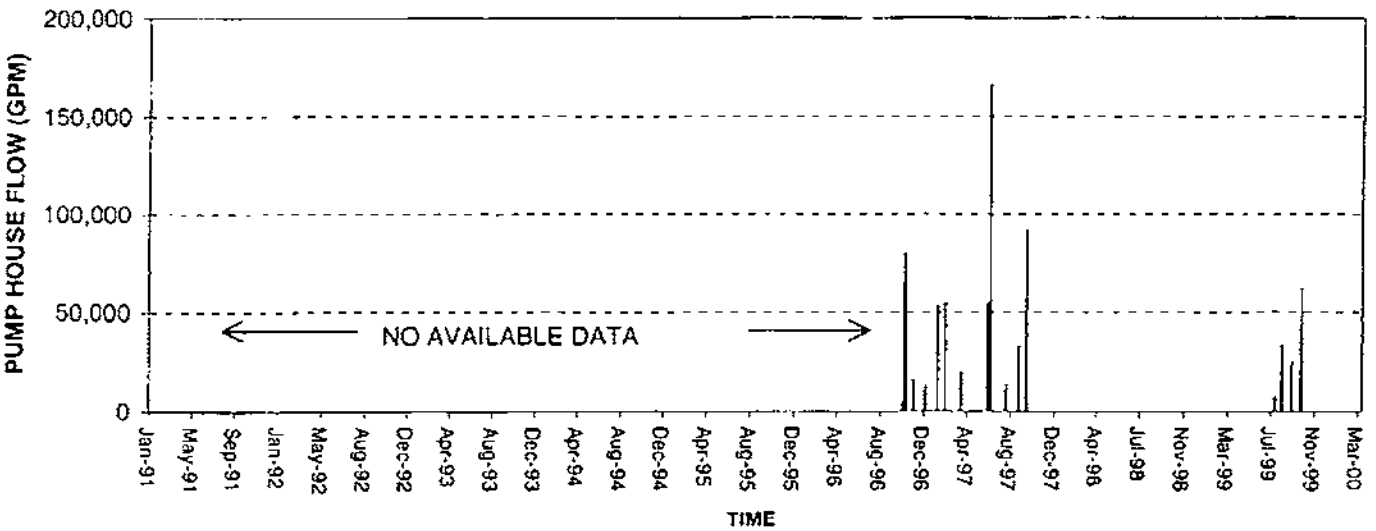


Figure 2-5
Sediment Settling Velocities

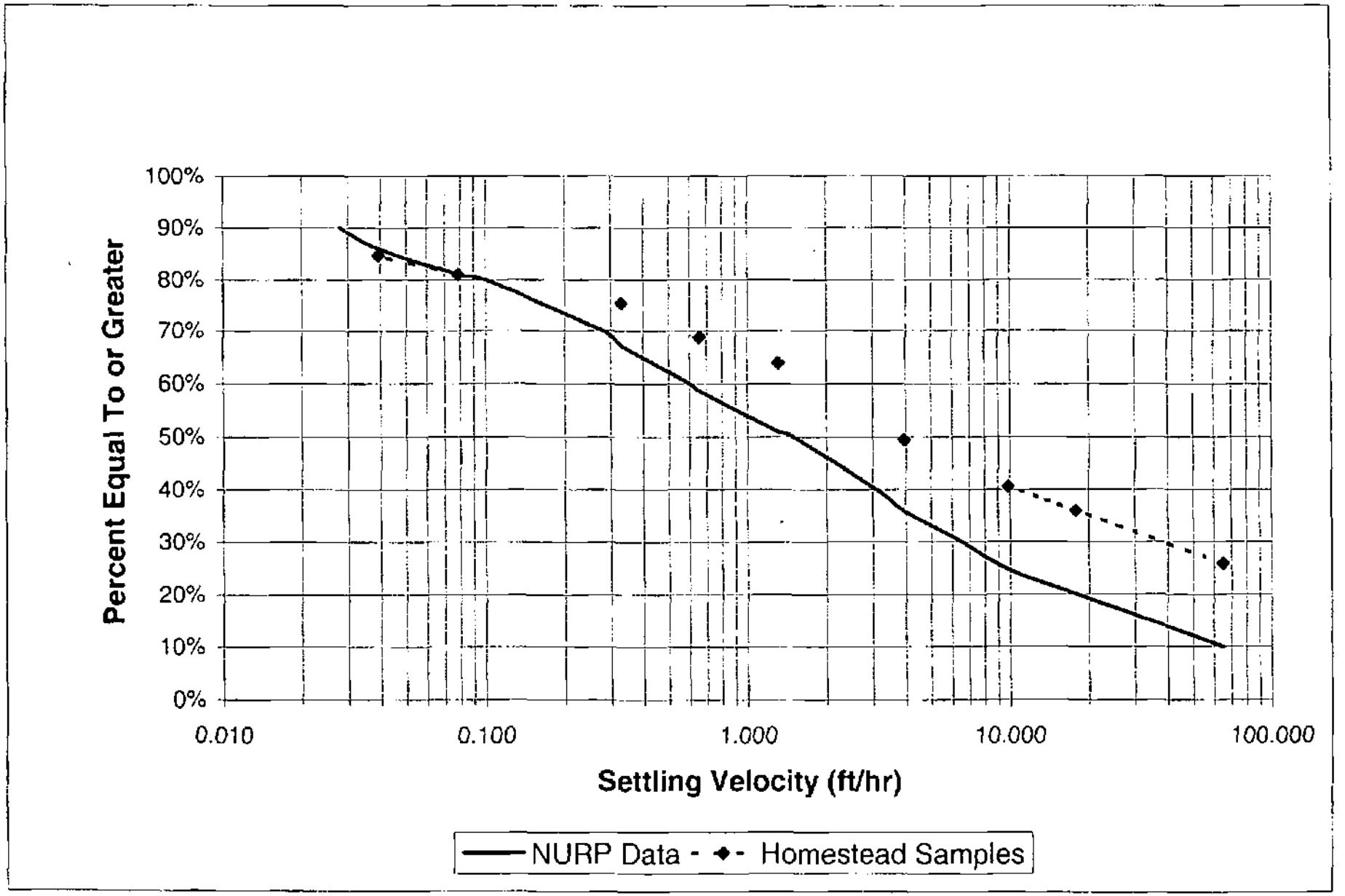
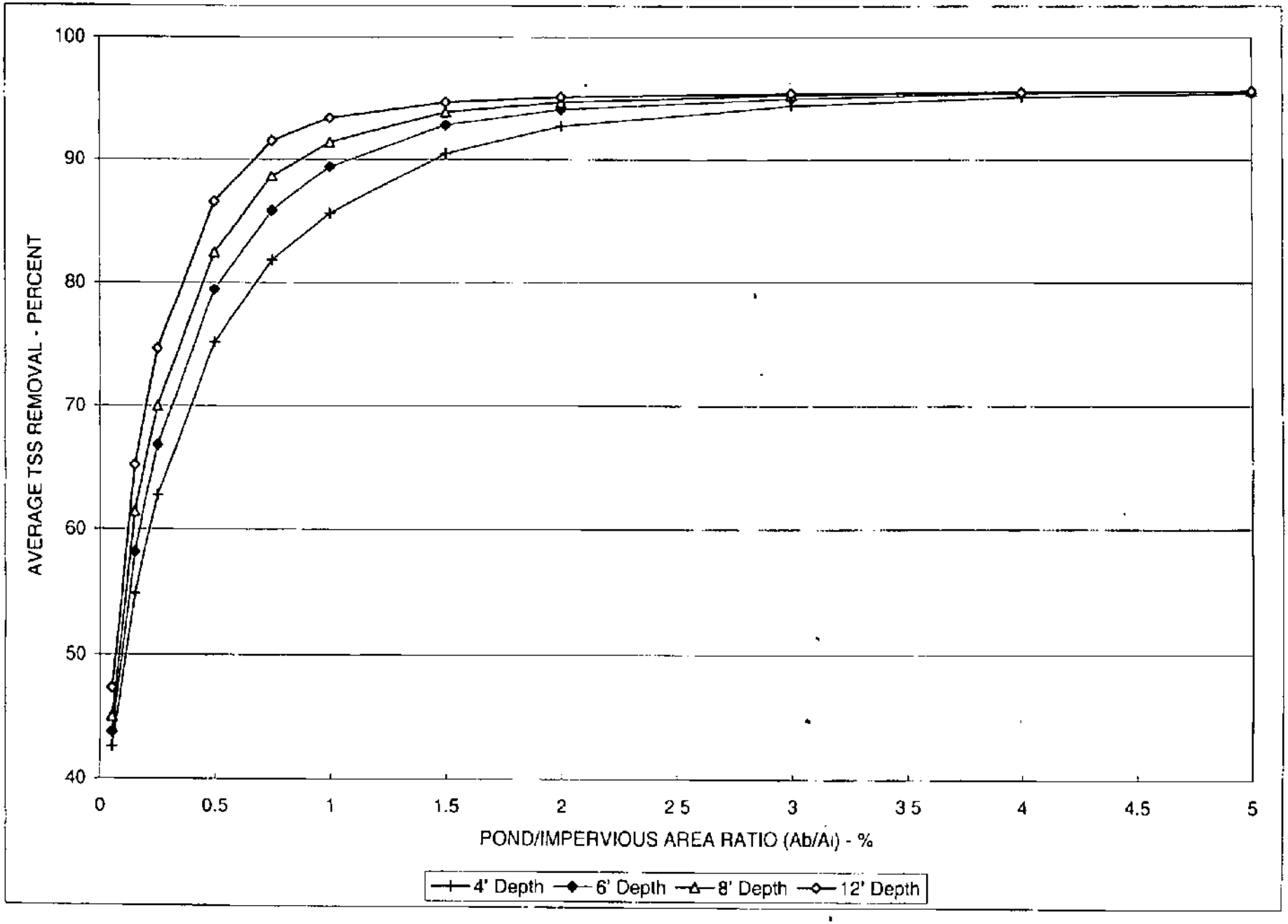
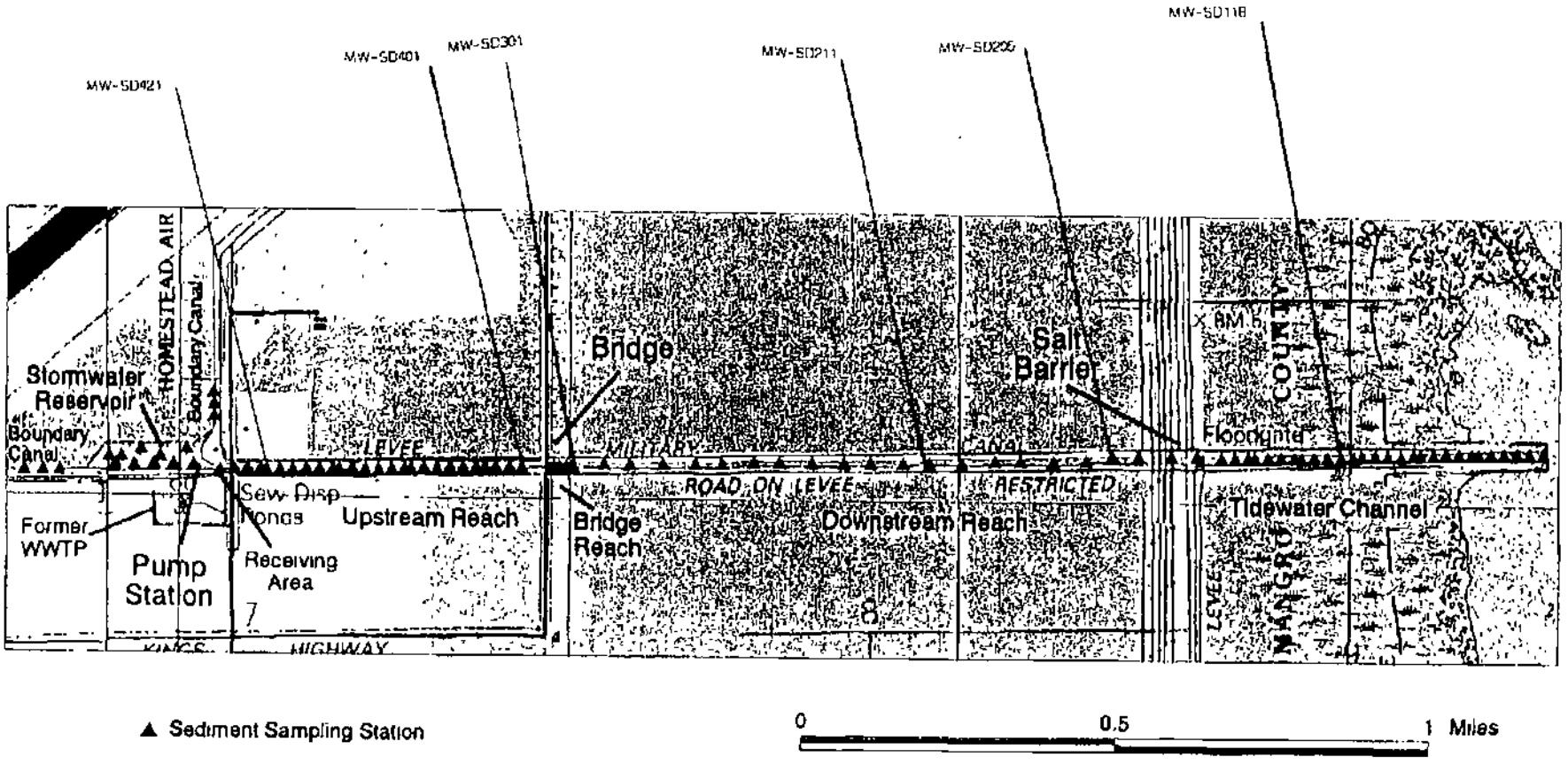


Figure 2-6
TSS REMOVAL BY WET DETENTION
Homestead Air Force Base
Stormwater Reservoir and Perimeter Canal





HOMESTEAD AIR FORCE BASE
HOMESTEAD, FLORIDA

SEDIMENT SAMPLING LOCATION FOR MAY 2000 SAMPLING EVENT