CERCLA
Record of Decision
West End Oil/Water Separator Ponds (SS007)
Underground Storage Tanks at Building 110 (ST039)

FINAL

EARECKSON AIR STATION, ALASKA

Prepared By

United States Air Force
Pacific Air Forces
Elmendorf AFB, Alaska

September 2008

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Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
Army	U.S. Army
AS	Air Station
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chemical of Concern
COE	U.S. Army Corps of Engineers
COEC	chemical of ecological concern
DD	decision document
DERP	Defense Environmental Restoration Program
DRO	diesel range organic
ERP	Environmental Restoration Program
FS	Feasibility Study
GRO	gasoline range organic
IRP	Installation Restoration Program
mg/Kg	milligrams per kilogram
MILCON	Military Construction
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
PCB	polychlorinated biphenyl
PAH	polynuclear aromatic hydrocarbon
ppm	part per million
RI	Remedial Investigation
ROD	Record of Decision
SVOC	semi-volatile organic compound
USAF	U.S. Air Force
USC	United States Code
UST	underground storage tank
VOC	volatile organic compound
WWII	World War II

1.0 Declaration

1.1 Site Name and Location

Facility Name:	Eareckson Air Station (AS), Alaska
Site Location:	Shemya Island, Alaska
CERCLIS ID Number:	NOT APPLICABLE
Site Names (Numbers):	West End Oil/Water Separator Ponds (SS007) Underground Storage Tanks (USTs) at Building 110 (ST039)

Eareckson AS occupies all of Shemya Island, located approximately 1,500 miles southwest of Anchorage, Alaska, at the westernmost tip of the Aleutian Islands. Shemya Island is part of the Near Islands group of the Aleutian Archipelago, and is part of the Alaska Maritime National Wildlife Refuge. The island is approximately 4.5 miles long and 2 miles wide. The island is owned by the U.S. Government. Eareckson AS is one of many U.S. Air Force (USAF) installations that are part of a defense communication network and aircraft warning system across Alaska. There is no community on the island other than the military and its contractors. The nearest native village is located 350 miles to the east on Atka Island.

The U.S. Army (Army) first developed facilities on Shemya Island in 1943 to support operations against the Japanese occupation forces on nearby islands during World War II (WWII). In 1954, the site was deactivated, turned over to the Civil Aeronautics Authority in 1955, and subsequently leased to Northwest Airlines. In 1958, the USAF returned to Shemya Island to support various strategic intelligence gathering activities. The station was designated as an Air Force Base in 1968 and was redesignated as Eareckson AS in 1994. In 1995, Eareckson AS was downsized and reverted to caretaker status, and a private USAF contractor took control of the facility. A work force of 30 to 60 contractor personnel lives and works at the installation. Hazardous and potentially hazardous substances have historically been used or stored at Eareckson AS to support base activities.

1.2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the Selected Remedies for the two Environmental Restoration Program (ERP) sites listed above at Eareckson AS, Alaska, which were chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for these sites.

There are no CERCLA hazardous substances identified as contaminants of concern (COCs) at the two ERP sites; therefore, there is no authority to take action under CERCLA. There are non-CERCLA (e.g., petroleum) substances present above levels allowed by Alaska regulations, or at levels posing an unacceptable risk to human health or the environment; therefore, institutional controls/land use controls are necessary under Alaska State regulations (including but not limited

to Title 46 of the Alaska Statutes and regulations promulgated thereunder). This ROD documents the investigations conducted and the conclusions reached under CERCLA. A separate Decision Document (DD) has been prepared documenting actions taken under Alaska State laws and regulations.

As the lead agency, the USAF has made these determinations. This ROD is issued by the USAF in accordance with, and satisfies the requirements of the: Defense Environmental Restoration Program (DERP), 10 United States Code (USC) 2701 et seq.; CERCLA, 42 USC 9601 et. seq., Executive Order 12580, 52 Federal Register 2923 (23 January 1987); NCP, 40 Code of Federal Regulations 300, and Alaska Oil and Hazardous Substance Pollution Control Act, 18 Alaska Administrative Code (AAC) 75. The State of Alaska Department of Environmental Conservation (ADEC) concurs with the determination that no further action is required under CERCLA. The U.S. Environmental Protection Agency has been consulted consistent with the requirements of 10 USC 2705 and has chosen to defer to ADEC for regulatory oversight of the ERP sites at Eareckson AS.

1.3 Assessment of Sites

Environmental media of interest at SS007 are surface water and sediment only. Groundwater below SS007 will be addressed under the ERP Site ST046 Decision Document, as described in the 2005 Proposed Plan for SS007.

Based on the results of environmental investigations conducted at the two ERP sites addressed in this ROD, no CERCLA hazardous substances are considered COCs or chemicals of ecological concern (COECs), and the USAF has determined that no action is necessary under CERCLA to protect public health or welfare or the environment at either of the sites.

1.4 Description of Selected Remedy

The definition of a hazardous substance in Section 101(14) of CERCLA specifically excludes "petroleum, including crude oil or any fraction thereof." Investigations conducted at ERP Sites SS007 and ST039 have shown that the contamination at these two sites is from discharges of petroleum products and, therefore, there is no further action required under CERCLA.

1.5 Statutory Determinations

As stated in Section 1.4 of this ROD, no remedy is being selected under CERCLA for ERP Sites SS007 and ST039. As a result, it is not necessary to determine if the remedy meets the statutory requirements of CERCLA Section 121.

1.6 Authorizing Signatures

This signature sheet documents the USAF and ADEC's approval of the determination of no further action required under CERCLA for ERP Sites SS007 and ST039 at Eareckson AS, Alaska. This decision may be reviewed and modified in the future if new information becomes available that indicates the presence of previously undiscovered contamination or exposure routes that might cause an unacceptable risk to human health or the environment.

BRENT A. JOHNSON, Colonel, USAF
Commander, 611th Air Support Group

Date

JOHN HALVERSON, Environmental Program Manager
Federal Facilities Section, Contaminated Sites Program
Alaska Department of Environmental Conservation

Date

2.0 Decision Summary

The Decision Summary identifies the Selected Remedy for each of the two ERP sites addressed in this ROD, explains how the remedy fulfills statutory and regulatory requirements, and provides a substantive summary of the Administrative Record file that supports the remedy selection decision.

2.1 Site Name, Location, and Description

2.1.1 Site Name and Location

Site Name (Number) and ADEC Database Record Key Number:	West End Oil/Water Separator Ponds (SS007) – 199725X104318 USTs at Building 110 (ST039) – 198125X004808
Site Location:	Eareckson AS, Alaska
Latitude and Longitude:	52 degrees – 43 minutes North 174 degrees – 07 minutes east of Greenwich
Point of Contact (POC):	Mr. Keith Barnack – Project Manager Keith.barnack@elmendorf.af.mil (907) 552-5160 USAF 611 CES/CEVR 10471 20th Street – Suite 302 Elmendorf AFB, AK 99506-2200

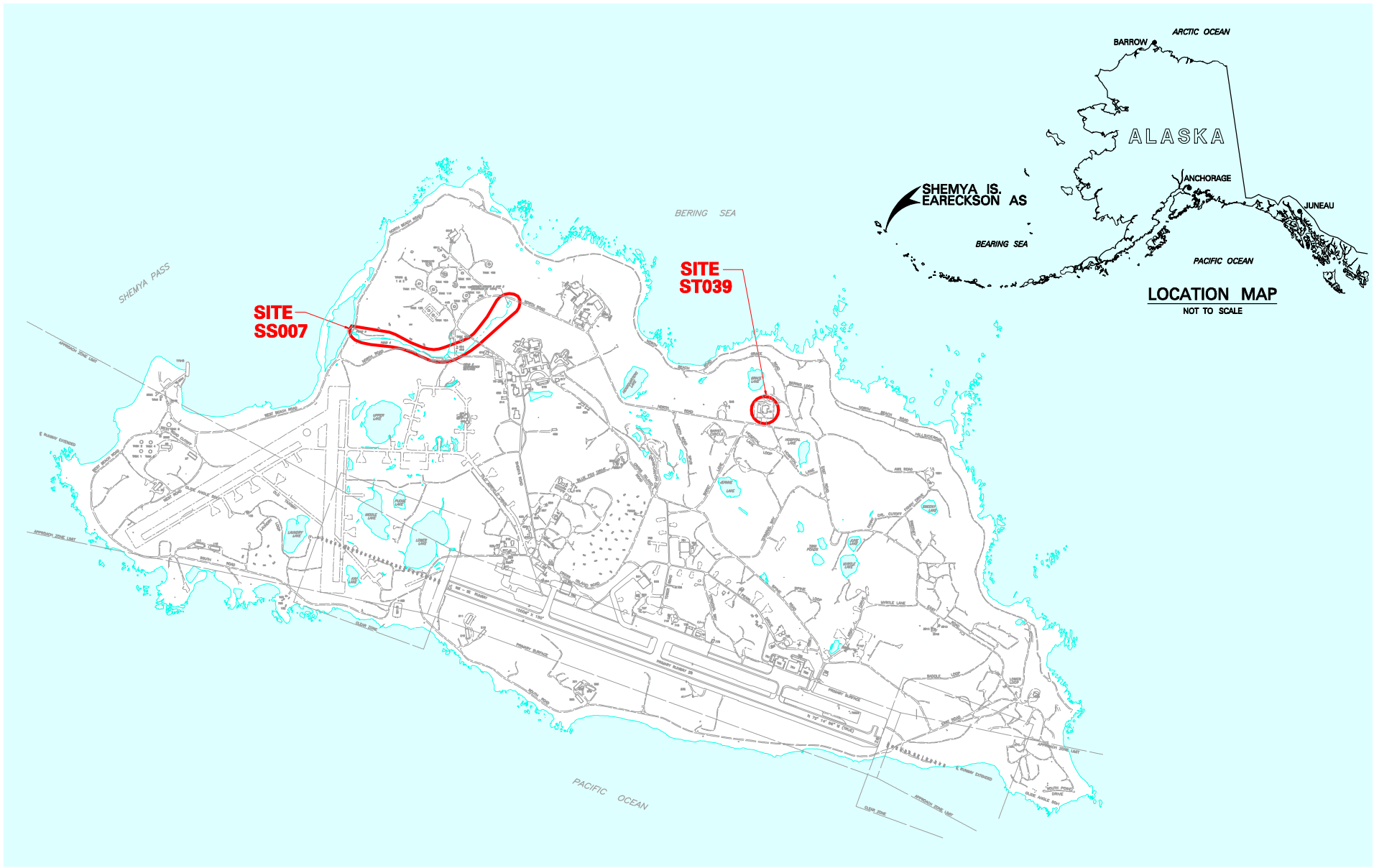
Eareckson AS occupies all of Shemya Island, located approximately 1,500 miles southwest of Anchorage, Alaska, at the westernmost tip of the Aleutian Islands (**Figure 2-1**). Shemya Island is part of the Near Islands group of the Aleutian Archipelago. The island is approximately 4.5 miles long and 2 miles wide. The island is owned by the U.S. Government.

2.1.2 Site Descriptions

Figure 2-1 provides an overview of the Eareckson AS installation. The two ERP sites addressed in this ROD are described briefly as follows:

- **West End Oil/Water Separator Ponds (SS007).** SS007 is located on the northwest end of Shemya Island adjacent to the Abandoned Tank Farm (ST046). SS007 historically consisted of a series of five unlined earthen ponds connected by shallow ditches (**Figure 2-2**). The series of ponds extended westward from an area southwest of the Power Plant to a point near the intersection of North Road and North Beach Road, where the last pond (Pond 5) discharged into a tidal lagoon, and then into the Bering Sea. The ponds were designed as a remedial action to intercept oil-contaminated surface water drainage from areas upgradient of the ponds, such as at the Power Plant and an abandoned tank farm. The system now consists of three ponds and an Engineered Wetland area.

JOB No. 1851213.10010402 TIME: 16-SEP-2008 10:32 FILE: C:\Proj\afcee\shemya\DecesionDoc2007\SS07 and ST39\CERCLA\final\FIG2-1.dgn



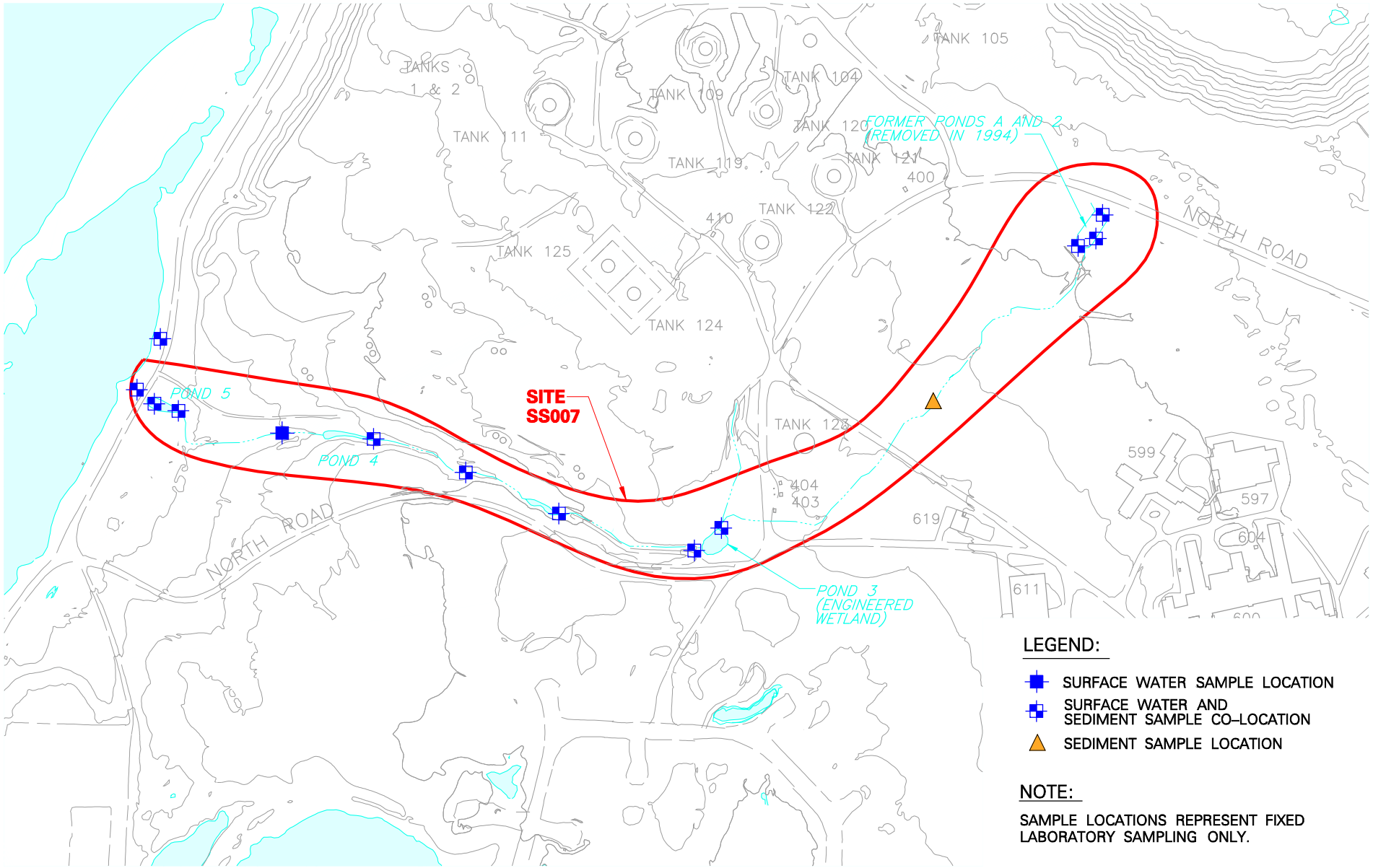
NORTH
SCALE IN FEET
0 3000

FIGURE 2-1

U.S. AIR FORCE, EARECKSON AIR STATION, ALASKA
SS007 AND ST039 CERCLA RECORD OF DECISION

LOCATION AND VICINITY MAP

JOB No. 1851213.10010402 TIME: 16-SEP-2008 10:34 FILE: C:\Proj\afcee\shemya\DecesionDoc2007\SS07 and ST39\CERCLA\final\FIG2-2.dgn



NORTH

SCALE IN FEET

0 500

FIGURE 2-2

U.S. AIR FORCE, EARECKSON AIR STATION, ALASKA
SS007 AND ST039 CERCLA RECORD OF DECISION

SS007 SITE MAP WITH SAMPLE LOCATIONS

- **USTs at Building 110 (ST039).** ST039 is located in the north-central portion of Shemya Island near Building 110. This ERP site consists of two USTs (110-2 and 110-3), located to the east of Building 110 (**Figure 2-3**), that were removed in 1993. There exists some inconsistencies in the records for ST039 regarding the number of USTs and their designations. Although the Proposed Plan for ST039 describes three USTs present at ST039, only USTs 110-2 and 110-3 were present. A review of the 1993 Interim Action Report, the Remedial Investigation (RI) reports, and discussions with the former USAF Remedial Project Manager, the USAF concluded that only two USTs existed at the site. These two USTs, identified in the 1993 report as 110-2 and 110-3, were located on the east side of Building 110 as depicted in the Proposed Plan and were removed. No other USTs were found at ST039.

The USAF has conducted environmental restoration at the Eareckson AS ERP Sites SS007 and ST039 in accordance with CERCLA under DERP, which was established by Section 211 of the Superfund Amendments and Reauthorization Act of 1986. ADEC provides regulatory oversight of the environmental restoration actions.

Funding is provided by the Defense Environmental Restoration Account; a funding source approved by Congress to clean up contaminated sites at U.S. Department of Defense installations.

2.2 Site History and Enforcement Activities

This section provides background information and summarizes the series of investigations that led to this ROD. It describes the CERCLA response actions undertaken at the sites addressed in this ROD. In accordance with USAF policy, to the extent practicable, National Environmental Policy Act (NEPA) values have been incorporated throughout the approach adopted in reaching the selected remedies culminating in this ROD.

Eareckson AS is one of many USAF communication installations that are part of a defense communication network and aircraft warning system across Alaska. The Army first developed facilities on Shemya Island in 1943 to support operations against the Japanese occupation forces on the nearby islands during WWII. In 1954, the site was deactivated, and was turned over to the Civil Aeronautics Authority in 1955. In 1958, the USAF returned to Shemya Island to support various USAF and Army strategic intelligence gathering activities. It has remained active in this capacity to the present. In 1995, the AS was downsized and converted to caretaker status, and a private USAF contractor took control of the facility.

Since 1943, military support operations on Shemya generated a variety of wastes including waste fuels, oils, solvents, scrap metal, used batteries, and other industrial/vehicle-related wastes. Because of the remoteness and the lack of environmental awareness in the past, nearly all waste was disposed of on the island. Some wastes were disposed in landfills, others were burned in fire training pits, and many waste materials (reportedly including hundreds of thousands of drums) were buried in the ground or placed in storage areas across the island.

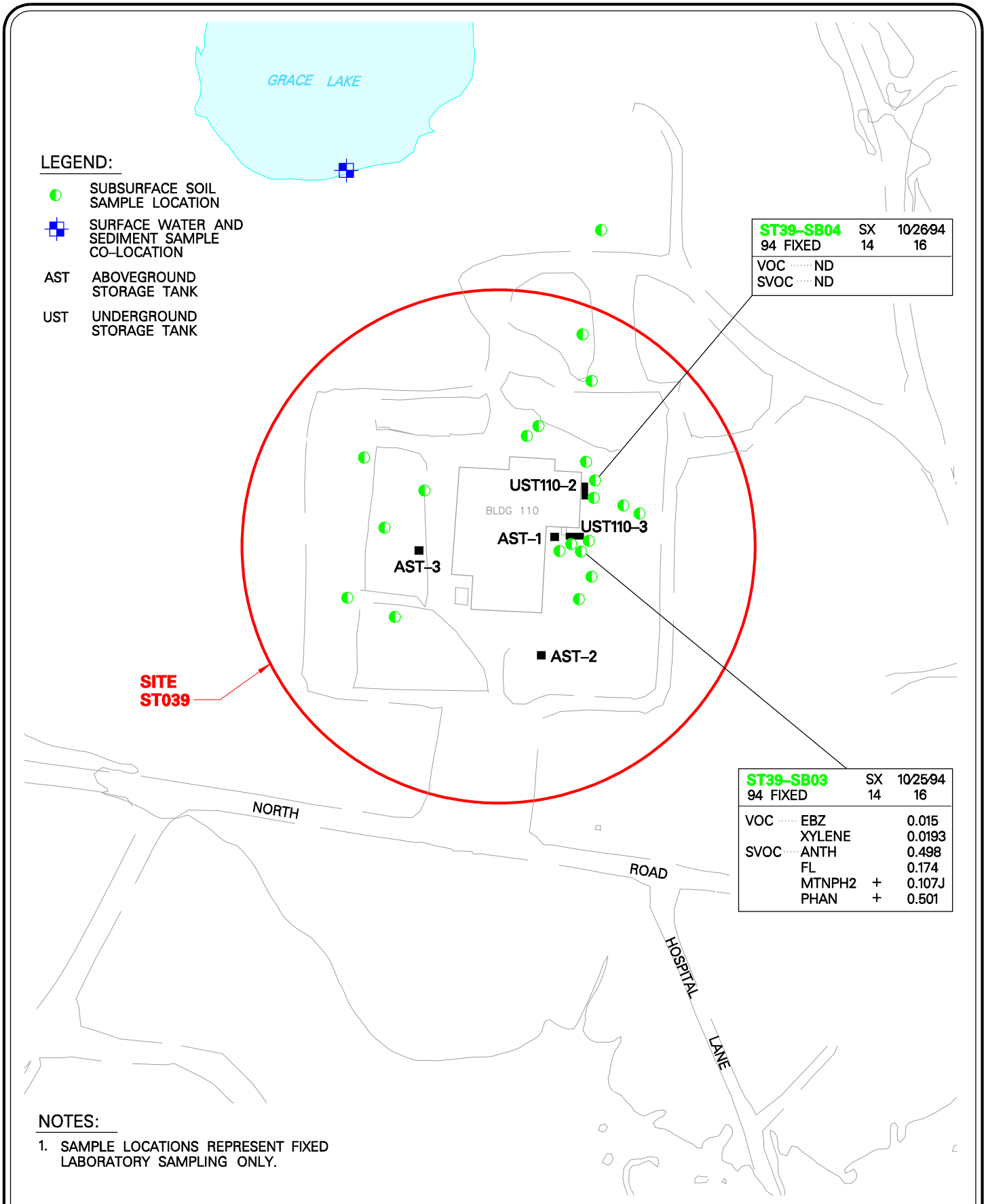


FIGURE 2–3

U.S. AIR FORCE, EARECKSON AIR STATION, ALASKA
SS007 AND ST039 CERCLA RECORD OF DECISION

ST039 SITE MAP WITH SAMPLE LOCATIONS

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Most contamination found on the island is related to fuels, oils, and lubricants. Investigations have shown areas of fuel-contaminated soils in, and next to, many of the landfills, fire training pits, and other disposal areas. Fuel-contaminated soils are related to specific sources. Contamination of sediments and surface water bodies, including drainage into the ocean, is relatively non-existent, except at one or two specific source areas.

Groundwater contamination is very isolated and is primarily a result of fuel handling activities (i.e., storage tanks and pipelines) and the fire training pits. Groundwater contamination noted is localized to specific sources and is not widespread across the island. Contaminants detected in groundwater include benzene, toluene, ethylbenzene, and xylenes (BTEX), which are components of fuel, and trichloroethylene (TCE), which is a solvent commonly used as a degreasing agent.

In 1984, recognizing the need to undertake a comprehensive program to investigate and clean up all past contamination problems at Shemya Island, the USAF initiated Installation Restoration Program (IRP) investigations. Between 1984 and the present, the USAF conducted a variety of IRP activities to identify possible sources of contamination on the island. These activities included record searches (similar to a CERCLA Preliminary Assessment), a Site Investigation, limited source investigations, and multi-media RI sampling at different locations throughout the island. Major IRP site investigations conducted to date involving sites SS007 and ST039 are summarized below.

Phase I, Records Search Report (JRB, 1984)

The Phase I report identified 28 source areas as potentially containing hazardous material from past activities. Eight of the areas were assessed as having a low potential for contaminant release; the Hazard Assessment Ranking Methodology was used to prioritize the remaining 20 source areas. These source areas were determined to be likely areas containing hazardous waste constituents where significant potential for migration of the potentially hazardous constituents was thought to exist.

Water System Upgrade, Phase II, POL Contamination Investigation, Shemya AFB (USACE, 1989a)

A field investigation was conducted by the U.S. Army Corps of Engineers (COE) in October 1988 near USTs 110-2 and 110-3 (ST039). Four boreholes were drilled and sampled (AP1543 through AP1546). One additional borehole was hand-drilled and sampled (AP1547).

FY-89 Diesel Storage Tanks (Schedule A), Add To and Alter Water System (Schedule B), Shemya AFB (USACE, 1989b)

Military Construction (MILCON)/COE investigations in 1988 and 1989 documented floating product in several wells located in the vicinity of SS007. Approximately 3 feet of floating fuel product was observed in Well AP1471, located east of Pond 5. Floating product was also detected in two wells located near Tank 123. Approximately 6 inches of floating product was measured in Well AP1218 located southeast of Tank 123, and 0.5 to 1.5 feet of floating fuel product was measured in Well AP1470 located southwest of Tank 123.

IRP Stage 1 Final Technical Report (USAF, 1990)

Limited investigations at the SS007 source area were conducted in 1988. Sediment and soil samples were collected from drainages that connect each of the ponds. Additionally, surface water and sediment samples were collected at the drainage outlets of Ponds 2, 3, 4, and 5. The base Civil Engineer spill team excavated an area of obvious surface staining during the 1988 excavation. The exact location and size of the excavation is unknown; however, it was reportedly adjacent to Pond 5.

1990 USAF MILCON/COE Foundation Investigation.

This investigation was conducted in August 1990 to assess potential soil contamination in conjunction with a foundation study. Nine soil boreholes were drilled inside and around Building 110 (ST039). Nine surface soil and seven subsurface soil samples were collected from the soil boreholes.

Site Assessment, U.S. Department of Defense Anders Station, Building 110 (Terrasat, 1992).

In October 1992, a site assessment was conducted at Building 110 to document existing site conditions before remodeling the facility and surrounding area (ST039). Three aboveground storage tanks (ASTs) and three USTs (110-1, 110-2, and 110-3) were investigated for potential contamination. Surface soil samples were collected from beneath the AST stands at depths of approximately 1 foot below ground surface (bgs). Subsurface soil samples were collected from five test pits excavated near USTs 110-2 and 110-3, and one from a test pit located near UST 110-1. Visual contamination was noted beneath the ASTs and in the test pits located near USTs 110-2 and 110-3.

Interim Action Report – UST Removals, DOD Anders Building 110 (USAF, 1993b)

In June 1993, the 611th CES/CEOR conducted site assessment activities at USTs 110-2 and 110-3. The USTs were removed during the investigation. A total of 390 cubic yards of soil at UST 110-2 and 885 cubic yards at UST 110-3 were observed to be contaminated. Subsurface soil samples were collected following tank removal, and the excavated soils were placed back into the pits. Because holding times were missed for the soil samples collected, it was concluded that analytical results from these samples could be biased low.

RI/FS, Volumes I-IV and Appendices (USAF 1995b; 1996a, b, and c).

ERP Site SS007. During 1993 RI/Feasibility Study (FS) activities, seven groundwater monitoring wells and numerous wellpoints were installed within the area adjacent to the Site SS007 drainage ponds. Surface soil, subsurface soil, and groundwater samples were collected from each monitoring well. In addition, surface water and sediment samples were collected from each of the five oil/water separator ponds, as well as from points of off-island discharge below Pond 5 and in seeps adjacent to Pond 5. Additional sediment samples were collected from three locations in the drainage between the Power Plant and Pond 1. Floating product was present on Ponds 1 and 2 and in two small puddles near the Pond 3 area. In order to assess the effect of tidal influences on fluctuations within the groundwater near Pond 5, a data logger and transducer station was installed at one well (MW-19) and collected continuous water-level data for

approximately one week. A slug test was also conducted on a well (MW-18) near Pond 5 to determine aquifer characteristics. Finally, an extensive ecological survey was conducted throughout the SS007 drainage in order to identify existing ecological habitats and vegetative communities.

In 1994, one additional monitoring well was installed downgradient from the Pond 2 location at Site SS007. The well was installed to assess the degree of hydraulic communication between the saturated peat layer and the groundwater aquifer, and to assess the effectiveness of the removal action at Ponds 1 and 2. Subsurface soil and groundwater samples were collected from the well, and additional groundwater samples were collected from previously installed wells in the SS007 area. Surface-water and sediment samples were also collected from ponds and drainages. Ecological samples were collected from within the small tidal pond that receives discharged surface water from the SS007 drainage.

ERP Site ST039. In 1993, surface-water and sediment samples were collected from Grace Lake, and three wellpoints were installed in the vicinity of ERP Site ST039. Two of the three wellpoints were dry and could not be sampled. A sample was collected from the third wellpoint (BWWP-079), which is located upgradient of the site ST039. The sample was field screened for BTEX, trichloroethylene, perchloroethyene, gasoline range organics (GRO), and gasoline range organics (DRO). The results were non-detect, with no reporting limit listed. This sample is likely to be a representative of peat water and not true groundwater and, therefore, is not discussed further.

In 1994, four boreholes were drilled at ST039 to collect samples for contaminant source strength information. The soil boreholes were located within or near the former locations of USTs 110-2 and 110-3. Boreholes were advanced using hollow-stem auger methods until refusal was encountered or field observations and measurements suggested the zone of soil contamination had been bounded. Soil Boreholes ST039-SB01 and SB-02 hit refusal at 9 feet bgs on what is believed to be the former concrete tank pads that the USTs were located upon. Soil samples collected from these soil boreholes are most likely representative of contaminated soil placed back into the pits following the 1993 tank excavations. Soil boreholes ST039-SB03 and ST039-SB04, located to the south and north of the two previously noted soil boreholes, did not encounter the concrete pad during drilling and samples may represent undisturbed soils. Fuel odors were observed during the drilling of these two boreholes.

Although a monitoring well was originally planned for ST039, the well was not attempted based on the findings of deep well installation efforts at the Power Plant area. Groundwater samples were collected from nearby Monitoring Well COE-12; however, basewide data indicate that COE-12 is located hydrogeologically upgradient of ST039.

Eareckson AS, Remove/Replace Ponds 1 and 2 West End Oil/Water Separator, Final Report. (USAF, 1995a)

During the 1994 field season, the USAF conducted a removal action at Site SS007 Ponds 1 and 2. The water in each pond was drained, and the soil was excavated to an average depth of approximately 12 feet at each pond. Soil samples were collected before soil was removed and

after excavation. A total of 41 soil samples were collected after excavation from Ponds 1 and 2 and analyzed for DRO, BTEX, and GRO. Of the 41 samples, DRO concentration in seven samples was above the ADEC petroleum hydrocarbon soil cleanup level of 230 milligrams per kilogram (mg/Kg). The DRO concentration in these seven samples ranged from 250 mg/Kg to 1,600 mg/Kg. The BTEX concentration for soil samples ranged from less than 0.028 mg/Kg to 0.31 mg/Kg, and is the cumulative concentration of benzene, toluene, ethylbenzene, and xylenes in the soil samples. The GRO concentration for the soil samples ranged from less than 1.0 mg/Kg to 95 mg/Kg. A new pond was constructed with an impermeable liner to replace original Ponds 1 and 2. Soils from the excavation were stockpiled for future treatment or disposal.

Technical Memorandum, Results of 1995 IRP Field Program (USAF, 1996d)

In 1995, a surface water sample was collected from the newly constructed pond at Site SS007 that replaced former Ponds 1 and 2. Surface water and sediment samples were collected at the inlet to Pond 3 and from the Tank 123 drainage. The rocks lining the drainage system south of Tank 123 were observed to be stained with fuel-related materials.

Basewide Monitoring Program Reports (USAF 1999b, 2000, 2001).

Annual monitoring events consisted of collecting groundwater, surface water, and sediment samples. Collocated surface water and sediment samples were collected from the inlet and outlet of the Engineered Wetland at Site SS007.

2.3 Community Participation

A number of public participation activities were undertaken by the lead agency (the USAF) following preparation of the Proposed Plans (USAF, 2002, 2005) and review by ADEC. The public participation process was performed in a manner consistent with NCP Section 300.430(f)(3).

Prior to conducting investigations at SS007 and ST039, the USAF initiated a community relations program for Eareckson AS (USAF, 1994). Three public meetings were held in Anchorage in 1994 (regarding environmental cleanup at Eareckson AS), 2002 (for Site ST039), and 2005 (for Site SS007) to discuss findings of the investigations. A community meeting was held at Eareckson AS in 1995 to discuss island-wide environmental investigations. In addition, Fact Sheets and newsletters were published to update the community on the activities being conducted at Eareckson AS.

The public notification for documents available concerning ERP Sites SS007 and ST039 is presented in **Table 2-1**, and the public comment period requirements are presented in **Table 2-2**.

No comments on the either of the Proposed Plans were received, as stated in Section 3 (Responsiveness Summary) of this ROD.

Table 2-1
Public Notification of Document Availability for Sites SS007 and ST039

Requirement:	Satisfied by:
Notice of availability of the Proposed Plan and RI/FS must be made in a widely-read section of a major local newspaper.	**SS007:** Notice of availability of The Proposed Plan for Four Sites, including Site SS0007, was published in the *Anchorage Daily News* in August 2005. **ST039:** Notice of availability of The Proposed Plan for Six Sites, including Site ST039, was published in the *Anchorage Daily News* in March 2002.
Notice of availability should consist of the following information: • Site name and location • Date and location of public meeting • Identification of lead and support agencies • Request for public comments • Public participation opportunities including: o Location of information repositories and Administrative Record file o Methods by which the public may submit written and oral comments, including a contact person o Dates of public comment period o Contact person for the community advisory group (e.g., Restoration Advisory Board) if applicable	The notices of availability included all these components.

Key:
RI/FS – Remedial Investigation/Feasibility Study

2.4 Scope and Role of Operable Unit or Response Action

As with many large sites, the environmental problems at Eareckson AS are complex. As a result, the USAF, with concurrence from ADEC, has organized the environmental restoration work at Eareckson AS into 51 ERP sites. Two of the ERP sites are addressed in this ROD.

2.5 Site Characteristics

Most of the following discussion is derived from the 1995 and 1996 RI/FS Report (USAF, 1995b; USAF, 1996 a and b).

Table 2-2
Public Comment Period Requirements for Sites SS007 and ST039

Requirement:	Satisfied by:
Lead agency should make document available to public for review on same date as newspaper notification.	**SS007:** Document was available to the public when the notification of availability was made. **ST039:** Document was available to the public when the notification of availability was made.
Lead agency must ensure that all information that forms the basis for selecting the response action is included as part of the Administrative Record file and made available to the public during the public comment period.	All data collected and all CERCLA primary documents produced for these sites available at http://www.adminrec.com/PACAF.asp.
CERCLA Section 177(a)(2) requires the lead agency to provide the public with a reasonable opportunity to submit written and oral comments on the Proposed Plan. NCP Section 300.430(f)(3)(i) requires the lead agency to allow the public a minimum of 30 days to comment on the RI/FS and the Proposed Plan.	**SS007:** The USAF provided a public comment period for the RI/FS and the Proposed Plan from August 12, 2005, to September 12, 2005. **ST039:** The USAF provided a public comment period for the RI/FS and the Proposed Plan from May 1 to May 31, 2002.
The lead agency must extend the public comment period by at least 30 additional days upon timely request.	**SS007 and ST039:** The USAF received no requests to extend the public comment period for these two sites.
The lead agency must provide the opportunity for a public meeting to be held at or near the site during the public comment period. A transcript of this meeting must be made available to the public and be maintained in the Administrative Record for the site (pursuant to NCP Section 300.430(f)(3)(i)(E)).	**SS007:** A public meeting was held for SS007 on August 24, 2005, at the Loussac Library in Anchorage, Alaska. **ST039:** A public meeting was held for ST039 on May 2, 2002, at the Loussac Library in Anchorage, Alaska.

Key:
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
NCP – National Contingency Plan
RI/FS – Remedial Investigation/Feasibility Study
USAF – U.S. Air Force

2.5.1 Physiography and Climate

Eareckson AS occupies all of Shemya Island, located approximately 1,500 miles southwest of Anchorage, Alaska, at the westernmost tip of the Aleutian Islands. Shemya Island topography consists of elevations ranging from sea level to 300 feet above mean sea level (msl), with a gently rolling plain that slopes downward from north to south. Coastal sea cliffs and the island's higher ground are located on the north side of the island. The island's natural terrain, where undisturbed by human activities, consists of rolling hills of hummocky tundra, dotted with small lakes and low-lying marshy areas. The south side coastal areas are low-lying drainages with gentle, sandy dunes and beach areas.

The climate of Shemya Island is marine, with moist conditions and temperature variances moderated by the Pacific Ocean. As a result, Shemya's climate is milder than expected considering the island's latitude. Local weather conditions are influenced by Shemya's location within a fairly persistent low pressure system, referred to as the "Aleutian Low," which causes North Pacific storms to track through the area and perpetuates constant windy and rainy conditions. The often-abundant precipitation and high winds can frequently interfere with air transportation to and from the island.

The most extreme weather occurs during the winter months. The warmest month is August, and the coldest month is January, with measurable precipitation occurring approximately 330 days per year. Average annual measurements at the island's meteorological record include:

- Mean annual temperature – 39.4 degrees Fahrenheit.
- Mean annual precipitation – 30.3 inches (highest precipitation rate occurs from August to December).
- Mean annual wind speeds – 15.3 knots (no prevailing wind direction)

Hours of daylight at Shemya Island vary significantly from summer to winter, from approximately 17 hours at the summer solstice to approximately 7.5 hours at the winter solstice.

2.5.2 Geology

Bedrock at Shemya Island consists of a fairly flat, wave-cut platform of sedimentary marine deposits intruded by igneous material, with overlying layers of igneous rock material. The bedrock surface is highly faulted and fractured, which provides source material for the overlying surface sediments. The unconsolidated surface sediments of natural origin generally consist of sand and gravel deposits, with a significant occurrence of organic peat derived from the abundant tundra plant material.

Much of the island's natural terrain has been disturbed by years of military and construction activities, which began during WWII. Many areas are covered by fill material placed to provide stable construction and road surfaces.

2.5.2.1 Site SS007

At SS007, the surficial peat layer varies from 2 to 12 feet in thickness, and in some locations (e.g., the west side of Pond 5) is nonexistent. Fine- to medium-grained eolian sands and/or fine-grained gravel deposits underlying the peat layer are typically present in thicknesses ranging from 2 to 10 feet. The bedrock underlying the area consists of a highly weathered greywacke layer. As with most areas on Shemya Island, the bedrock appears to be moderately to severely fractured and weathered. Depth to bedrock is greater than 15 feet at SS007, and the top of the bedrock surface closely matches that of the existing topographic surface.

2.5.2.2 Site ST039

A gravel layer ranging in thickness from 1 to 12 feet is present throughout much of the ST039 area. The gravel is somewhat naturally occurring in the area and was also used for the parking lot and fill material. Mixtures of sand, silt, and gravel were observed beneath the fill materials in several boreholes. Competent bedrock was not encountered during drilling activities to a maximum depth of 39 feet bgs. It is believed that the geology underlying ST039 is weathered mudstone lenses lying above an andesite bedrock layer existing at approximately 46 feet bgs (207 feet msl).

2.5.3 Hydrogeology

There are two groundwater systems identified on Shemya Island: a shallow aquifer and a deep aquifer. The shallow aquifer occurs in the unconsolidated surface material overlying bedrock. The base depth of the deep aquifer is inferred to be the interface between freshwater and saline water that occurs at about sea level, at depths between 50 and 139 feet bgs. Recharge to the deep aquifer is believed to be by downward percolation from the shallow aquifer.

The shallow aquifer occurs at the interface between unconsolidated surface material and the bedrock surface, at a depth of 10 to 20 feet bgs. Recharge to the shallow aquifer system is provided by precipitation and surface water runoff, which is rapidly transmitted to the shallow aquifer by percolation through the sediments to the bedrock layer interface. Within the unconsolidated surface material are extensive lenses and layers of organic peat deposits that can absorb large quantities of subsurface water, and trap them as "perched" water deposits. While subsurface perched water deposits are not considered to be true groundwater resources, perched water deposits meet the definition of groundwater in 18 AAC 75.990(46) and there may be some hydraulic communication between the perched zone and the underlying aquifers.

Groundwater flow direction in the shallow aquifer is generally to the south, consistent with the southward slope of the bedrock layer. A groundwater divide exists near the island's elevated coastal cliffs along the north shore, trending in an east to west direction. Groundwater on the north side of this divide has been identified at deeper and often sporadic occurrences and generally flows northward, discharging from seeps along the coastal cliffs.

2.5.3.1 Site SS007

In most of the SS007 area, groundwater was encountered in the upper portion of the fractured bedrock. However, in the vicinity of Pond 5, groundwater was encountered in the unconsolidated materials overlying bedrock. The transition between groundwater in the bedrock and groundwater within the unconsolidated materials appears to occur somewhere between Ponds 4 and 5. The depth to groundwater at SS007 varies considerably across the site due to the changes in surface topography. In the topographically lower areas, groundwater was found at a depth of approximately 3 to 5 feet bgs. Near the Engineered Wetland in the middle of the system, the depth to groundwater was approximately 10 to 15 feet bgs. In the higher elevation

areas of the site (near former Ponds 1 and 2), groundwater has been reported at depths of 40 feet bgs.

2.5.3.2 Site ST039

Groundwater below ST039 is believed to be at approximately 137 to 142 feet bgs (105 to 110 feet msl) based on measurements at Monitoring Well COE-12, which is located approximately 500 feet southwest of ST039. During the basewide groundwater evaluation, a groundwater divide was identified south of ST039. The groundwater divide is present in a northwest-southeast trending position. Data collected in 1993 and 1994 indicate that groundwater beneath ST039 flows north toward the Bering Sea, with a relatively steep hydraulic gradient.

2.5.4 Surface Water Hydrology

Precipitation is the primary factor controlling the amount and availability of surface water on Shemya. The island receives approximately 30 inches of precipitation annually in the form of rains, mist, and snow. Surface water occurs on the island in three forms: 1) lakes and ponds, 2) streams and creeks, and 3) springs and seeps.

Numerous streams and creeks are present on the island, and most tend to flow in a southward direction, consistent with the general topographic slope. All of the surface streams are less than 2 miles in length, and are typically 2 to 4 feet wide. Many of the island's surface water flow patterns have been altered by the construction of runways, roads, ditches, and culverts.

2.5.4.1 Site SS007

The SS007 drainage and its tributaries represent the dominant surface drainage within the area, where most of the surface runoff flows into the SS007 drainage and then into the Bering Sea. The flow from the Pond 5 outfall (Shemya Falls) was measured three times during the 1993 field season. Observations indicate that the discharge rate increases rapidly in direct response to high precipitation events. Varying degrees of connection between the surface water and the peat, and the surface water and groundwater exist at different locations along the SS007 drainage. Based on the apparent mounding of water around Ponds 1 and 2 and the depth to true groundwater in the area, these ponds appear to be losing water to the peat and/or bedrock aquifer. Based on observations made during drilling near Pond 3, the pond appears to be located in an area of transition between a gaining environment upstream, and a losing environment downstream. A water typing analysis performed using both Piper and Stiff methods show a general similarity in the water chemistry between each of the ponds and the off-island discharge water.

2.5.4.2 Site ST039

Surface waterbodies near ST039 include Grace Lake to the northwest and Hospital Lake to the southeast. ST039 is located on the northern edge of the OT048 watershed boundary area. The area surrounding ST039 is relatively flat and surface drainage is minimal, except north of ST039

near Grace Lake. The majority of precipitation falling on this area is absorbed into the tundra and percolates downward.

2.5.5 Ecology

Shemya's interior natural, undisturbed terrain can be classified as wetlands according to the COE definition. However, due to decades of military use, much of the island's natural interior terrain has been disturbed or altered in some way, and no longer meets this definition. The two major types of naturally occurring plant communities identified on the island are wet tundra and moist tundra.

Shemya Island does not support any large terrestrial mammal populations. The Arctic fox, introduced by Russians in the 1800s, is the largest terrestrial mammal in residence on the island. Lacking natural predators, the local fox population has had to be controlled by the U.S. Fish and Wildlife Service (USAF, 1996c).

The island's coastal terrain provides protected habitat for both sea birds and marine mammals. Nesting colonies of approximately 170,000 migratory seabirds use the island's northern coastal cliffs, including pelagic and red-faced cormorants, and horned and tufted puffins. Migratory birds use the island as a stop over area on their annual migrations. Aleutian Canadian geese, Asian ducks, emperor geese, glaucous-winged gulls, common eiders, ruddy turnstone, and some species of Asiatic songbirds have been observed. Some raptors and seabird species use the island year-round. None of the migratory birds, including the threatened Aleutian Canadian goose, nest on the island due the presence of foxes.

All of the coastal areas and the marine mammals that inhabit them are federally protected. Several species of marine mammals use the island's protected coastal areas extensively. Sea lions commonly use the island's northeastern coast and adjacent rocky sea stacks as prime haul out and resting areas. Sea otters prefer the island's southwest coastline for a resting and pupping area because of the protected coves and bays, and the kelp beds located there. Harbor seals commonly use all the coastal waters around the island.

2.5.6 Previous Site Characterization Activities

This ROD is based on documents contained in the Administrative Record file for Eareckson AS, including but not limited to the following:

- 1984 Phase I Records Search (JRB, 1984)
- 1990 IRP Stage 1 Final Technical Report (USAF, 1990)
- 1992 IRP Field Investigation Report (USAF, 1993a)
- 1992 Site Assessment, Building 110 (Terrasat, 1992)
- 1993 Interim Action Report – UST Removals at Building 110 (USAF, 1993b)
- 1995 IRP Field Program Technical Memorandum (USAF, 1996d)
- 1995 Remove/Replace Ponds 1 and 2 West End Oil/Water Separator (USAF, 1995a)

- 1995-1996 RI/FS Report, Volumes I – IV (USAF 1995b, 1996a, 1996b, 1996c)
- 1999 Remedial Action Report and Operation and Maintenance Manual, SS07/ST46 Engineered Wetland (USAF, 1999a)
- 1998, 1999, 2000 Eareckson AS Comprehensive Basewide Monitoring Reports (USAF, 1999b, 2001, 2001)
- 2006 Human Health and Ecological Risk Assessments for FT01, FT02, FT03, and SS07 (USAF, 2006)

A summary of previous site investigations was provided in Section 2.2. Conclusions reached by the 2006 Risk Assessment are provided in Section 2.6.2.

2.6 Characteristics of the ERP Sites

2.6.1 Remedial Activities Performed

This section of the ROD summarizes remedial actions performed at SS007 and ST039 to date. At SS007, action was intended to address migration of petroleum-contaminated water from other sites. Action taken at ST039 involved removal of multiple USTs.

2.6.1.1 SS007

The ponds in the SS007 (West End Oil/Water Separator Ponds) system were originally constructed to intercept oil-contaminated runoff from the Power Plant and from the tank farm to the northwest (ST046). Ponds 1 and 2 were located at the eastern end of the drainage system, near the Power Plant. Pond 3 was located in the middle of the drainage system, just southwest of Tank 123.

Ponds 1 and 2 were excavated in 1994, along with potentially contaminated soil, and a new, lined pond was constructed in the approximate location of the two original ponds.

In 1998, the USAF constructed an Engineered Wetland area at the Pond 3 location. It was designed as a cap to underlying contaminated sediments, and to intercept and attenuate the hydrocarbon sheen on surface water flowing from upgradient areas. Ponds 4 and 5 are located at the western end of the drainage system and have not been modified.

2.6.1.2 ST039

In June 1993, USTs 110-2 and 110-3 at Building 110 (ST039) were removed during a site assessment (USAF, 1993b). The assessment included excavating, cleaning, and disposing of the two diesel USTs and their associated piping. Closure was conducted in accordance with State regulations (18 AAC 78.090). ADEC's matrix score sheet generated a total score of 43 for the site, placing the cleanup requirements within the limits of Level A. Per 18 AAC 78.315, soil cleanup levels for Level A sites are 100 parts per million (ppm) for diesel range petroleum hydrocarbons, 50 ppm for gasoline range petroleum hydrocarbons, 0.1 ppm for benzene, and 10

ppm for total BTEX. Analytical sample data and onsite observations indicated these cleanup concentrations were not met.

A total of 390 cubic yards of soil at UST 110-2 and 885 cubic yards of soil at UST 110-3 were observed to be contaminated. The excavated soils were placed back into the UST excavations. Subsequent laboratory analyses of affected material indicate hydrocarbon concentrations were above regulatory cleanup levels.

2.6.2 Nature and Extent of Contamination

This section of the ROD establishes that there is evidence of contamination remaining above regulatory cleanup levels at the two ERP sites by comparing investigation results to the applicable regulatory cleanup levels. The regulatory framework establishing applicable cleanup levels is discussed below, followed by a summary of environmental investigation results for the two ERP sites addressed in this ROD.

ERP Sites SS007 and ST039 and their historical sampling locations are shown on Figures 2-2 and 2-3, respectively.

2.6.2.1 Site SS007

Surface Water. From 1988 to 2000, 30 surface water samples were collected from the ponds, drainages, and seeps within the SS007 area. The samples were analyzed for: petroleum hydrocarbons, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), inorganics, pesticides, and polychlorinated biphenyls (PCBs). Results from samples collected between Pond 3 and Pond 5 indicated the presence of Total Petroleum Hydrocarbons and DRO, and low levels of benzene, aluminum, iron and manganese. The highest concentrations were generally observed near Pond 3 and from seeps in the vicinity of Pond 5.

Surface water samples were collected from the inlet and outlet of the Engineered Wetland (former Pond 3). The results for the inlet surface water samples from 1998 to 2000 indicated the presence of DRO and two PAHs (fluorene and phenanthrene). Phenanthrene did not exceed its surface water quality standard. Neither DRO nor fluorene have established ADEC water quality standards. However, the fluorene concentration is well below its ecological benchmark; DRO has no ecological benchmark. The DRO concentrations in the inlet sample were similar in 1999 and 2000, at 230 and 220 micrograms per liter, respectively. No constituents were detected in the outlet samples. No hydrocarbon sheen was observed on the surface water either within the wetland cells or at the outlet during the most recent inspection (USAF, 2001).

Freshwater Sediment. Thirty-four freshwater sediment samples were collected from SS007 between 1988 and 2000. Selected samples were analyzed for inorganics, VOCs, SVOCs, PAHs, and petroleum hydrocarbons. Aluminum, DRO, and residual range organics were detected at levels exceeding screening criteria. Aluminum is probably naturally occurring and not related to USAF activities.

Marine Samples. In addition to the environmental samples collected in and around SS007, offshore sediments were also screened to determine whether contaminants being discharged via groundwater or surface water were present in the tidal pond adjacent to SS007 at concentrations that would pose an ecological risk. Four marine sediment samples were collected from the adjacent tidal pool and subjected to P450 analysis. Comparison of P450 results for sediment samples with samples collected from background areas of Shemya Island suggested that levels of organic chemicals might be elevated at one tidal pool. One surface water sample and two sediment samples were collected from this location, as well as a composite sample of blue mussel tissue for laboratory chemical analysis. The sediment sample was also evaluated in a chronic sediment toxicity test.

Results of the sediment toxicity test indicate that impacts to marine benthic organisms located downgradient of SS007 are not anticipated. All Hazard Index ecological risk estimates associated with marine habitat exposure at SS007 were below the ADEC Hazard Index criterion of 1.0. These results suggest that chemicals present in the SS007 drainage are not impacting marine benthic organisms, or higher trophic level organisms, inhabiting the marine environment downgradient of the site.

Freshwater Vegetation. Samples of freshwater vegetation were collected from Pond 5 and a background location, and analyzed to evaluate potential food chain transfer of chemicals in SS007 surface water and sediment to higher trophic levels. The only organic chemicals detected in the vegetation sample collected from Pond 5 were benzyl alcohol and benzoic acid. The benzyl alcohol concentration was below the laboratory detection limit (and not site-related). The benzoic acid concentration was likely attributed to crowberry tundra at the site.

Exposure and Risk. The primary exposure points evaluated at the SS007 source area included the three remaining oil/water separator ponds, the drainage between the ponds, and the tidal pool at the west end of the drainage. After evaluating all environmental media and performing Tier I screening and a Tier II quantitative risk assessment, the only exposure pathway and potential ecological risk was the surface water at Pond 3. Groundwater below SS007 will be addressed in the ROD for ERP Site ST046, as described in the 2005 Proposed Plan for SS007.

2.6.2.2 Site ST039

Surface Soil. Surface soil samples were collected at ST039 during 1988, 1990, and 1992. Surface soil samples from the 1988 and 1992 investigations were not collected from areas surrounding USTs 110-2 and 110-3 and are not representative of potentially affected surface soils; therefore, these samples and analytical results are not discussed further in this ROD. Surface soil results for the 1990 USAF MILCON/COE investigation, which evaluated surface soils near USTs 110-2 and 110-3, are believed to represent surface soil conditions at the USTs. In 1990, nine surface soil samples were collected from nine soil boreholes in and around Building 110. Analytical results indicated that Total Petroleum Hydrocarbons were present at 68 and 21.7 mg/Kg; PCBs were present at low levels (less than 1 mg/Kg). No BTEX compounds were detected in surface soils, and metals were not detected at concentrations above background levels.

Subsurface Soil. Subsurface soil data for ST039 include data from samples collected during the 1988 USAF MILCON/COE activities, the 1992 site assessment, the 1993 site assessment and UST removal, and the 1994 RI/FS activities.

In the 1988 samples collected from ST039, Total Recoverable Petroleum Hydrocarbons were found at concentrations ranging from 23.9 to 4,600 mg/Kg. Most samples contained no detectable VOC components; however, xylenes (0.1 and 0.6 mg/Kg) and ethylbenzene (0.04 mg/Kg) were detected.

In 1990, seven subsurface soil samples were collected from soil boreholes around Building 110. Analytical results indicate no fuels or PCBs were present. Toluene (79 mg/Kg) and xylenes (14 mg/Kg) were detected in one sample. Metals were not encountered at concentrations above 1990 background levels.

Subsurface soil samples were collected from test pits at ST039 in 1992. Extractable Petroleum Hydrocarbon concentrations (which generally correlate to DRO) ranged from non-detect to 11,000 mg/Kg in samples collected from test pits near USTs 110-2 and 110-3.

Subsurface soil samples collected following the 1993 UST removal at ST039 indicated 14 of the 24 analytical samples exceeded 100 mg/Kg DRO. Concentrations ranged from non-detect to 7,224 mg/Kg DRO. GRO concentrations ranged from non-detect to 130 mg/Kg and six samples were found to exceed the cleanup level of 300 mg/Kg GRO. One sample concentration was equal to the allowable concentration of 0.1 mg/Kg for benzene; other benzene levels were below 0.1 mg/Kg. Toluene, ethylbenzene, and xylenes were also detected in some samples.

In 1994, four subsurface soil samples collected for field screening analysis at ST039 showed DRO concentrations of 36 to 49 mg/Kg. No other organic compounds were detected. Two subsurface soil samples collected for laboratory analysis had detectable concentrations of ethylbenzene, total xylenes, anthracene, fluorene, 2-methylnaphthalene, and phenanthracene.

2.6.3 Conceptual Exposure Model

The purpose of a conceptual exposure model is to evaluate and depict potential relationships or exposure pathways between chemical sources and receptors (human or ecological). An exposure pathway describes the means by which a receptor can be exposed to contaminants in environmental media.

2.6.3.1 SS007

Environmental media of interest at SS007 are surface water and sediment only. Groundwater below SS007 will be addressed under the ERP Site ST046 Decision Document, as described in the 2005 Proposed Plan for SS007. A review of the sampling results, remaining potential migration pathways, and exposure points resulted in the conclusion that no exposure pathways were complete for human receptors at SS007. Therefore, no conceptual exposure model was

developed for human receptors at SS007. Two ecological exposure pathways were identified – fresh surface water and sediment.

2.6.3.2 ST039

Review of sampling results, potential migration pathways, and exposure points resulted in the conclusion that no exposure pathways were complete for human or ecological receptors at ST039. Therefore, no conceptual exposure model was developed for human or ecological receptors at Site ST039.

Due to the lack of complete exposure routes, media-specific and cumulative risks were not calculated for human receptors at either site.

2.7 Current and Potential Future Land and Resource Uses

Current and potential future land and resource uses are generally the same for both ERP Sites SS007 and ST039 and are discussed in this section.

2.7.1 Land Use

Eareckson AS encompasses Shemya Island in its entirety. Shemya Island has no local communities or residents; access to the island is limited to USAF-approved activities only. There are no current plans for any future development at SS007 or ST039; therefore, the reasonably anticipated future land use is the same as the current land use.

2.7.2 Ground and Surface Water Uses

Environmental media of interest at SS007 are surface water and sediment only. Groundwater below SS007 will be addressed under the ERP Site ST046 Decision Document, as described in the 2005 Proposed Plan for SS007. There is no evidence of groundwater contamination associated with ST039.

The surface water resources in the vicinity of SS007 and ST039 are described in Section 2.5.4. There is evidence of surface water contamination associated with SS007 addressed in this ROD. Surface water is used for aquatic life and wildlife propagation. Surface water is not currently being used for water supply purposes at Eareckson AS, and there are no plans to develop surface water as a drinking water source.

2.8 Statutory Authority Finding

There are no CERCLA hazardous substances identified as COCs or COECs at the two ERP sites; therefore, there is no authority to take action under CERCLA. Since no remedy is being selected under CERCLA for SS007 and ST039, it is not necessary to determine if the remedy meets the statutory requirements of CERCLA Section 121.

There are non-CERCLA (e.g., petroleum) substances present above levels allowed by Alaska regulations or at levels posing an unacceptable risk to human health or the environment; therefore, institutional controls are necessary under Alaska State regulations (including, but not limited to, Title 46 of the Alaska Statutes and regulations promulgated thereunder). A separate ROD has been prepared documenting actions taken under Alaska State laws and regulations.

2.9 Documentation of Significant Changes

There have been no significant changes to the proposed remedy presented in the Proposed Plans for ERP Sites SS007 and ST039.

3.0 Responsiveness Summary

This section provides a summary of the public comments regarding the Proposed Plans (USAF, 2002, 2005) for remedial action at ERP Sites SS007 and ST039, Eareckson AS. At the time of the public review period, the USAF had selected No Further Action for SS007 and ST039 as the preferred alternative for the sites.

No written comments were received on the Proposed Plans; therefore, the USAF's Proposed Plans were accepted by the public.

3.1 Stakeholder Comments and Lead Agency Responses

Not Applicable – no comments were received.

3.2 Technical and Legal Issues

No technical or legal issues were identified during the public review period of the Proposed Plans.

4.0 References

JRB Associates (JRB). 1984. Phase I, Records Search Report. Prepared for the U.S. Air Force by JRB Associates. September.

Terrasat. 1992. Site Assessment, Department of Defense Anders Station, Building 110, Shemya Air Force Base, Shemya Island, Alaska. November 1.

U.S. Army Corps of Engineers (USACE). 1989a. Water System Upgrade, Phase II (Power Plant, D.O.D. Anders, Hangar 4), POL contamination Investigation, Shemya AFB, AK. Technical Memorandum by D. F. Thomas. March 30.

USACE. 1989b. FY-89 Diesel Storage Tanks (Schedule A). Add to and Alter Water System (Schedule B), Shemya AFB, Alaska (Contract Number: DACA85-89-C-0012) Discovery of Additional POL Contamination. Memorandum from D.L. Hardy, USACE. June 6.

U.S. Air Force (USAF). 1990. Installation Restoration Program Stage 1 Final Technical Report for Shemya Air Force Base. Prepared by. CH2M Hill. 10 August.

USAF. 1993a. Shemya Air Force Base, Alaska, 1992 Installation Restoration Program Field Investigation Report. Prepared for the Alaska Air Command 5099 ACES/CC. February.

USAF. 1993b. Interim Action Report – UST Removals, DOD Anders Building 110, Eareckson AFS, AK. 11 CEOS/CEOR. 10 December.

USAF. 1994. Final Community Relations Plan. Prepared for the U.S. Air Force. August.

USAF. 1995a. Eareckson AS, Remove/Replace Ponds 1 and 2 West End Oil/Water Separator, Final Report. 611th Civil Engineer Squadron, Civil Engineering Operating Engineers. June.

USAF. 1995b. Remedial Investigation/Feasibility Study, Volumes I and II. Prepared by Jacobs Engineering Group, Inc., for the U.S. Air Force. August.

USAF. 1996a. Remedial Investigation/Feasibility Study, Volume III of IV. Prepared by Jacobs Engineering Group, Inc., for the U.S. Air Force. January.

USAF. 1996b. Remedial Investigation/Feasibility Study, Volume IV of IV and Appendices M through Y. Prepared by Jacobs Engineering Group, Inc., for the U.S. Air Force. March.

USAF. 1996c. Remedial Investigation/Feasibility Study, Appendix H. Prepared by Jacobs Engineering Group, Inc., for the U.S. Air Force. March.

USAF. 1996d. Technical Memorandum. Results of 1995 IRP Field Program. Prepared by Jacobs Engineering Group, Inc. for the U.S. Air Force, 611th Air Support Group, 611th Civil Engineer Squadron, Elmendorf AFB, Alaska, and Eareckson Air Station, Alaska. January.

USAF. 1999a. Remedial Action Report and Operation and Maintenance Manual. SS07/ST46 Engineered Wetland. Prepared by Jacobs Engineering Group, Inc. for the US Air Force 611th Civil Engineer Squadron. 29 April

USAF. 1999b. Remedial Investigation, Basewide Groundwater Monitoring Report, Aug – Sep 98. Prepared by Jacobs Engineering Group, Inc., for the U.S. Air Force. 19 June.

USAF. 2000. Comprehensive Basewide Monitoring Report, Jun 99. Prepared by Jacobs Engineering Group, Inc., for the U.S. Air Force. 31 January.

USAF. 2001. Final Basewide Monitoring Program Report, 2000. Prepared by Montgomery Watson for the U.S. Air Force. 27 July.

USAF. 2002. Final Proposed Plan for Remedial Action, Eareckson Air Station, Shemya Island, Alaska. Prepared by Montgomery Watson for the USAF. March.

USAF. 2005. Final Proposed Plan for Remedial Action, Eareckson Air Station, Shemya Island, Alaska. Prepared by MWH for the USAF. August.

USAF. 2006. Human Health and Ecological Risk Assessments for FT01, FT02, FT03, and SS07. Final. December.