



**UNITED STATES AIR FORCE
BARTER ISLAND LONG RANGE RADAR STATION,
ALASKA**

INSTALLATION RESTORATION PROGRAM

**DECISION DOCUMENT
FOR JP-4 SPILL (SS021)**

FINAL

August 2006

Part I DECLARATION

SITE NAME AND LOCATION

JP-4 Spill (SS021) – Non-CERCLA Site
Barter Island Long Range Radar Station, Alaska
Region X

Barter Island Long Range Radar Station (LRRS) is located adjacent to the village of Kaktovik on the Arctic Coastal Plain at 70°07'49"N latitude and 143°38'03"W longitude (NAD83). The JP-4 Spill (SS021) area is one of 15 sites located at the Barter Island LRRS being addressed under the U.S. Air Force (USAF) Environmental Restoration Program (ERP). The Alaska Department of Environmental Conservation (ADEC) contaminated site record key (reckey) number is 198931X102586. Barter Island LRRS is not listed on the National Priorities List.

SS021 is located approximately 1,300 feet east of the main facility, halfway between the village of Kaktovik and the airstrip. The site is located in an industrial area next to a large tank farm operated by the North Slope Borough (NSB). Based upon interviews of former site personnel, the site is the location of a JP-4 fuel spill. The spill area is located on City of Kaktovik property; however, the downgradient portion of the site is owned by the USAF. JP-4 is a type of aviation fuel. The fuel spill reportedly occurred in the 1980s when an aboveground JP-4 pipeline was cut during grading operations. The break in the line was 300 feet downgradient of the JP-4 fuel tank, where the line bends to the northeast and passes under a culvert. The pipeline supplied fuel to the airstrip fuel tanks. The tank associated with the JP-4 line was cleaned in June 1990 and closed in November 1991.

POINT OF CONTACT

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STATEMENT OF BASIS

This decision document presents the selected remedy for the ERP site JP-4 Spill (SS021). This decision document was developed in accordance with the Defense Environmental Restoration Program, 10 United States Code (USC) 2701, consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601 (*et seq.*); Executive Order 12580, 52 Federal Register 2923, and to the extent practicable, with Title 40, Part 300 of the Code of Federal Regulations (CFR): National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Under CERCLA section 101(14): "petroleum, including crude oil or any fraction thereof," are substances excluded from the CERCLA regulation. At SS021, petroleum (or fuel-related) compounds are the sole contaminants; therefore, CERCLA is not applicable and cleanup and closure of the site is regulated by state requirements.

This decision is based on the Administrative Record file for this site. The Administrative Record can be accessed by the public by contacting the Community Relations Coordinator at (907) 552-8166 or (800) 222-4137, or at the following web site:

<http://www.adminrec.com/PACAF.asp?Location=Alaska>

The final decision put forth in this document is also in accordance with the requirements of Title 18, Chapter 75, Article 3, of the Alaska Administrative Code (AAC) Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances regulations and Title 18, Chapter 70, Article 1, of the AAC Water Quality Standards.

The USAF and the State of Alaska, through the ADEC, agree with the selected no further action remedy. Under the no further action alternative, implementation, monitoring and enforcement of remedies by the USAF are not applicable.

ASSESSMENT OF THE SITE

Environmental investigations have been occurring at site SS021 since 1981. A variety of assessment and investigations were performed including initial assessments in 1981 and 1993, and remedial investigations in 1993, and 2003 and 2004.

DESCRIPTION OF SELECTED REMEDY

The selected remedy for this site is no further action and closure under CERCLA and the Alaska State laws and regulations on the part of the USAF. Under the no further action alternative, no further investigations, sampling or CERCLA remedial actions are necessary at SS021. This site does not pose an unacceptable risk to human health or the environment because no contaminants remain at this site above ADEC Method Two soil cleanup levels for the Arctic Zone (18 AAC 75.341, Tables B1 and B2). These cleanup levels meet the risk management standards of 18 AAC 75.325(h), (i.e., the risk from hazardous substances does not exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative non-carcinogenic hazard index of 1.0). In addition, contaminants in the sediment are below the National Oceanic and Atmospheric Association (NOAA) Screening Quick Reference Tables (SQuiRT) Probable Effect Levels (PELs) for fresh water. The site conditions are protective of human health under all current and projected site uses, including unrestricted residential land use. Land use controls (institutional controls) are not applicable at SS021 as the site meets Method Two cleanup levels. In accordance with 18 AAC 75.340(d), ADEC only considers implementation of institutional controls at sites where alternative cleanup levels are being applied. Fuel-related compounds have been detected in a drainage pond at the site above the ADEC 18 AAC 70 Water Quality Standards. Contaminants in the drainage pond do not appear to be associated with past spills attributed to the USAF. The spill area where contaminants were detected in the surface water is not on USAF property and is used by multiple parties.

STATUTORY DETERMINATIONS

The U.S. Environmental Protection Agency has deferred regulatory authority to the ADEC. ADEC is the lead regulator for the Barter Island LRRS ERP sites and the Air Force is the lead cleanup agency. The applicable statutes include Alaska State Statute Title 46, Water, Air, Energy and Environmental Conservation which is consistent with CERCLA and the NCP. No CERCLA remedial action at SS021 is necessary to ensure protection of human health and the environment. There are no COCs identified at the site that can be attributed to the historical USAF JP-4 spill. Further investigation of potential sources is the responsibility of a party other than the USAF. The remedy will result in no hazardous substances or contaminants due to past USAF activities remaining at SS021 above levels that allow for unlimited use and unrestricted exposure; therefore, no five-year review is required.

AUTHORIZING SIGNATURES

This signature sheet documents the USAF and the ADEC agreement on the selection of no further action and authorization of the record of decision the JP-4 Spill (SS021), Barter Island LRRS, Alaska.

This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may cause a risk to human health or the environment.

JENNIFER ROBERTS
Federal Facilities Environmental Restoration
Program Manager
Alaska Department of Environmental Conservation

Date

LOYD S. UTTERBACK
Major General, USAF
Deputy Commander, Pacific Air Forces

Date

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Part II

DECISION SUMMARY

This decision summary provides an overview of Environmental Restoration Program (ERP) Site SS021 (JP-4 Spill) located at Barter Island Long Range Radar Station (LRRS), Alaska. The site description, history, regulatory activities, contamination, risk evaluation, summary of investigations and remedial actions, and the selected cleanup remedy are summarized in this section. It also explains the rationale for selecting the remedy and how the selected remedy satisfies the requirements of the Defense Environmental Restoration Program, 10 United States Code (USC) 2701, consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601 (*et seq.*), Executive Order 12580, the National Contingency Plan (NCP), and the State of Alaska 18 Alaska Administrative Code (AAC) 75, Article 3 regulations. The Alaska Department of Environmental Conservation (ADEC) is the lead regulatory agency for the Barter Island ERP sites and the U.S. Air Force (USAF) is the lead cleanup agency.

1 SITE DESCRIPTION

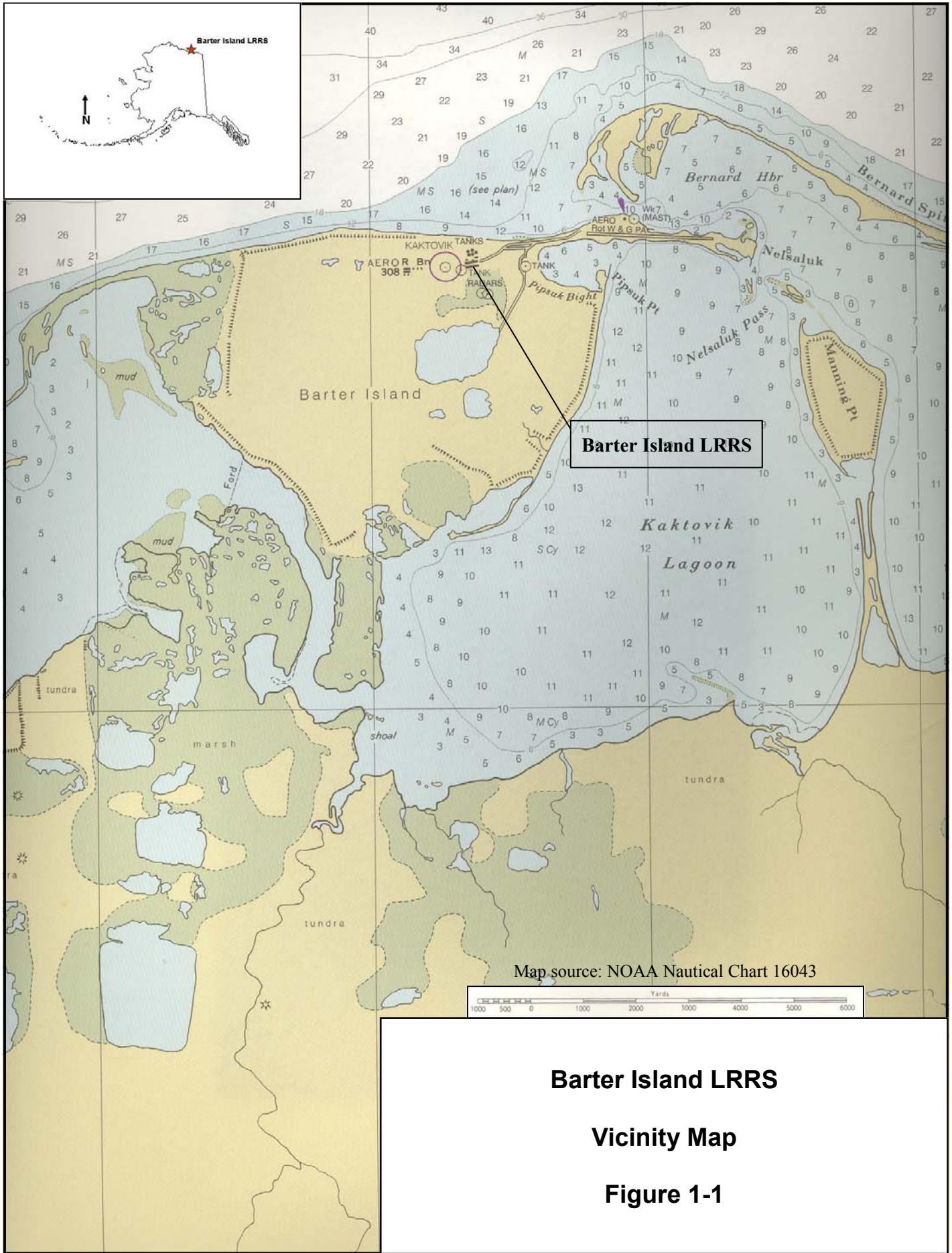
1.1 Regional Setting

Barter Island LRRS is located at latitude 70°07'49"N, longitude 143°38'03"W (NAD83), approximately 75 miles west of the Canadian Border on the Arctic Coastal Plain adjacent to the village of Kaktovik, Alaska (Figure 1-1). The installation consists of 641 acres of low-lying tundra on the northern boundary of the Arctic National Wildlife Refuge. It is located approximately 646 miles north of Anchorage and 389 miles north of Fairbanks. Air travel provides the only year-round access while marine travel provides late summer access. The general location of the Barter Island LRRS is shown on the inset in Figure 1-1.

The average annual precipitation recorded at Barter Island from 1949 to 1988 was 6.19 inches per year, and 41.8 inches of snowfall (Western Regional Climate Center 2003). Average daily minimum and maximum temperatures in July were 34.8 degrees Fahrenheit (°F) and 45.4°F, respectively. In December, these average temperatures were -18.3°F and -5.8°F, respectively. The extreme recorded temperatures are -56°F and 78°F. Low cloud cover and fog are common in the summer.

Barter Island is predominately covered by a thin layer of peaty, organic soil (tundra mat). The tundra vegetation is typical of the region and characterized by low growing plants including mosses, lichens, sedges and grasses. Beneath the tundra mat is approximately 2 to 3 feet of sand and loess (wind-blown silt). Underlying these deposits are lenses and layers of marine and alluvial clay, silt, sand, and sandy gravel of the Meade River Unit of the Gubik Formation. Coastal erosion rates reportedly average between 5 and 8 feet per year (Grantz et al. 1980, 1982; U.S. Army Corps of Engineers [USACE] 1998; and Hoefler Consulting Group [HCG] 2004). Permafrost in the station area is up to 1,300 feet thick (Osterkamp and Payne 1981). The seasonal active zone layer typically varies between 2 to 5 feet in thickness.

Small streams, discharging into the Beaufort Sea, drain the lakes and wetlands surrounding the Barter Island LRRS. The largest lake on the island, Fresh Water Lake, is approximately 0.8 miles south of the station. This 9-foot-deep lake, which freezes to approximately 8 feet in winter, is used as a year-round potable water source (NPRA Task Force 1978a, 1978b; Alaska Department of Community and Economic Development 2003).



Barter Island LRRS

Vicinity Map

Figure 1-1

Land uses at Barter Island LRRS include industrial activities associated with the operation and maintenance of a radar installation and aircraft runway. Portions of the installation, in particular the beach and roads, may be used for subsistence or recreation (or both), by residents of the nearby City of Kaktovik, or the occasional tourist. Current land uses on surrounding properties include industrial and residential activities associated with the City of Kaktovik, as well as subsistence and recreational activities. Future land use is anticipated to be similar with potentially less industrial use and greater recreational and subsistence activities as the installation reduces in size. Residential use is also possible at some sites if the USAF transfers a portion of the property to another party. The village of Kaktovik used to be located on a portion of the installation.

1.2 Facility History

Barter Island LRRS, also known as BAR-M, was the prototype Distant Early Warning (DEW) Line station with a White Alice Communications System (WACS). In 1947, the U.S. Navy constructed the airfield. The main installation was constructed between 1952 and 1953. In 1957, the site was activated and put into operation by the USAF. The WACS was deactivated in 1979, and a contractor operated an earth station at the facility. In the mid-1980s, a Minimally Attended Radar was installed, which still operates today. Two contract personnel are currently stationed at Barter Island LRRS. The contract personnel are responsible for maintenance and management of real property facilities, which include the buildings, roads, grounds, aircraft facilities, antenna structures, and utility plants.

The Barter Island facility consists of four module trains, a rotating radar, and facilities to provide full logistical support for the rest of its sector. The main section of A-Train houses the electronic equipment work areas; the radar tower (radome); personnel quarters; administration offices; a mechanical room with emergency boiler and associated fuel storage; and a personnel support module with water storage, shower, and toilets. Adjacent to this structure, and connected by corridors, are the power plant and vehicle maintenance building. B-Train, now deactivated, was the main living and personnel support area through the 1970s. The inactive structures at Barter Island LRRS are scheduled for demolition under the Clean Sweep Program in 2006.

Under the USAF ERP and its predecessor the Installation Restoration Program, environmental investigations have been conducted at the Barter Island LRRS since 1981. These investigations included preliminary assessments in 1981 and 1993. Environmental samples were collected at Barter Island LRRS in 1993 as part of a Remedial Investigation/Feasibility Study (RI/FS) at 14 sites (ICF 1993). Based on this previous work, the USAF conducted a second RI/FS at 15 ERP sites in 2003. These sampling activities and results were published in the *Final Remedial Investigation/Feasibility Study Report for 15 Sites, Barter Island LRRS* (HCG 2004). Additional environmental sampling occurred in 2004 to fill data gaps at 6 sites on Barter Island (HCG 2005a). Only 9 of the 15 ERP sites were included in the proposed plan and Decision Document processes. The remaining sites are still under evaluation.

Past activities potentially resulting in contaminant release at the Barter Island LRRS include:

- Spills during the transfer of fuels in and out of storage tanks;
- Leaks from fuel lines and tanks;
- Spills or leaks of fuel, lubricants, or solvents during vehicle and equipment maintenance activities;

- Spills or leaks from transformers or other electrical equipment containing polychlorinated biphenyls (PCBs); and
- Disposal of wastes and other discarded material containing hazardous substances.

Some of the contaminants encountered during investigations at Barter Island LRRS are benzene, toluene, ethylbenzene, and total xylenes compounds (BTEX); diesel range organics (DRO); gasoline range organics (GRO); polynuclear aromatic hydrocarbons (PAHs); PCBs; petroleum, oil, lubricants (POL); residual range organics (RRO); semivolatile organic compounds (SVOCs); metals; and volatile organic compounds (VOCs). Most of these contaminants are the result of fuel or oil spills.

2 SITE HISTORY AND ENVIRONMENTAL ACTIVITIES

The following subsections describe the site history of SS021, including environmental investigations and regulatory activities.

2.1 Site Background

SS021 is located approximately 1,300 feet east of the main facility, halfway between the village of Kaktovik and the airstrip at 70°07'51"N latitude, 143°37'05"W longitude (NAD 83) (Figure 2-1). The site is within an industrial area next to a large tank farm operated by the North Slope Borough (NSB). Based upon interviews of former site personnel in 1993, the site is the location of a JP-4 fuel spill (ICF 1996a). The spill area is located on City of Kaktovik property; however, the downgradient portion of the site is owned by the USAF. JP-4 is a type of aviation fuel.

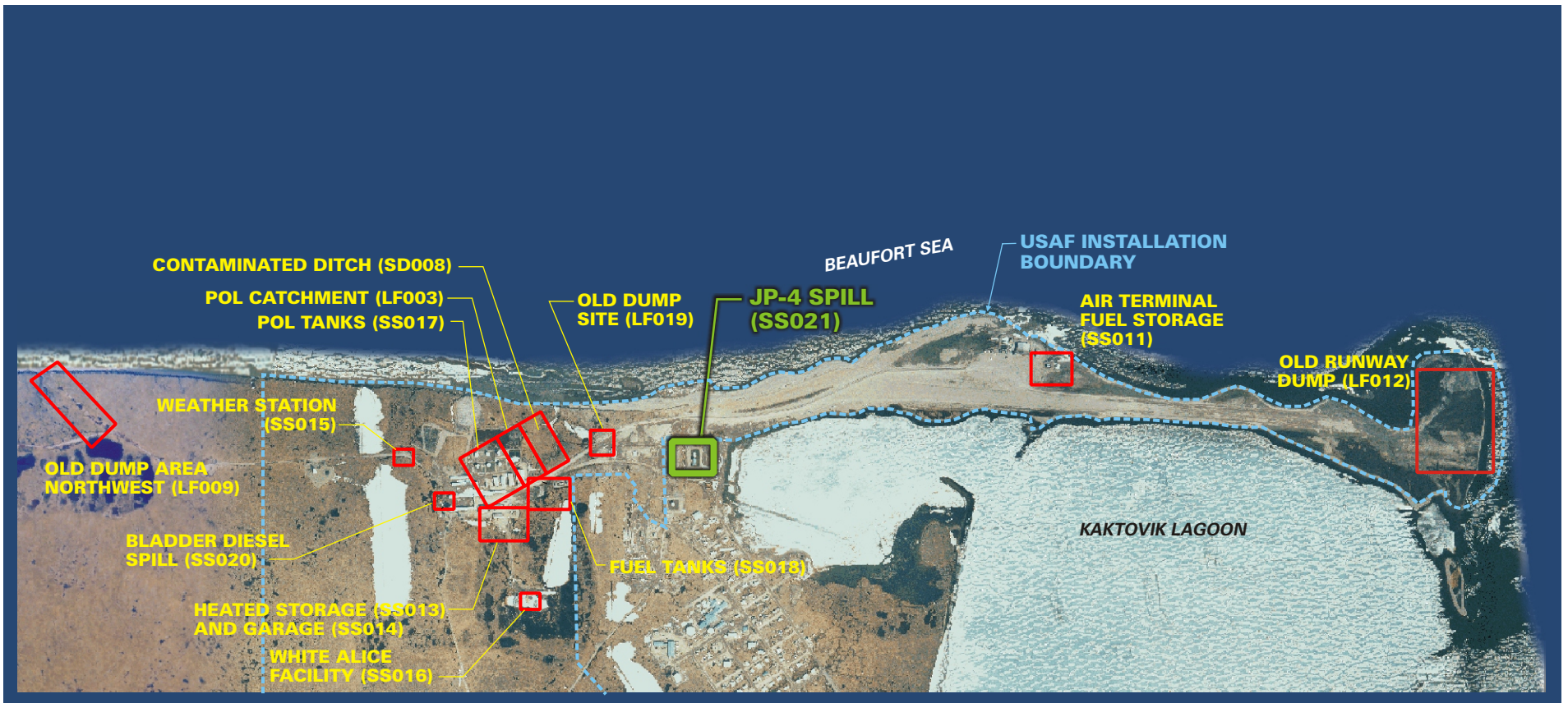
2.2 Site Description

The JP-4 pipeline is an aboveground pipeline running from the JP-4 fuel tank to the hangar area. It parallels the NSB tank farm along its western border, and then passes through a culvert. After exiting the culvert, the line heads toward the airstrip fuel tanks. The pipeline is present in a low-lying area resembling a drainage ditch. The spill reportedly occurred approximately 10 feet upgradient of the culvert. The area in the immediate vicinity of the spill site is moderately vegetated. Figure 2-2 illustrates some of these primary features.

The site is bordered by the NSB tank farm on the east and an active roadway to the west and north. The NSB tank farm is separated from the site by a fence. An equipment and materials staging area for barge landings is located next to the gravel road. The site is located approximately 400 feet from the Kaktovik lagoon near the spit on which the airstrip is constructed. The area east of the culvert area is largely undisturbed, well-vegetated wetlands with some shallow pockets of standing water.

2.2.1 Topography and Stratigraphy

Relief at the site is less than 5 feet. The spill area is located in a localized depression and has an elevation of approximately 7 feet above mean sea level. Soil samples collected in the vicinity of the spill site consisted of sandy gravel. Sediment samples collected near the culvert and the wetlands downgradient of the culvert were comprised of sand with some gravel. These sediments were often dark grey to black in color. The area is presumably underlain by permafrost and soils typical of the area as described in Section 1.1.



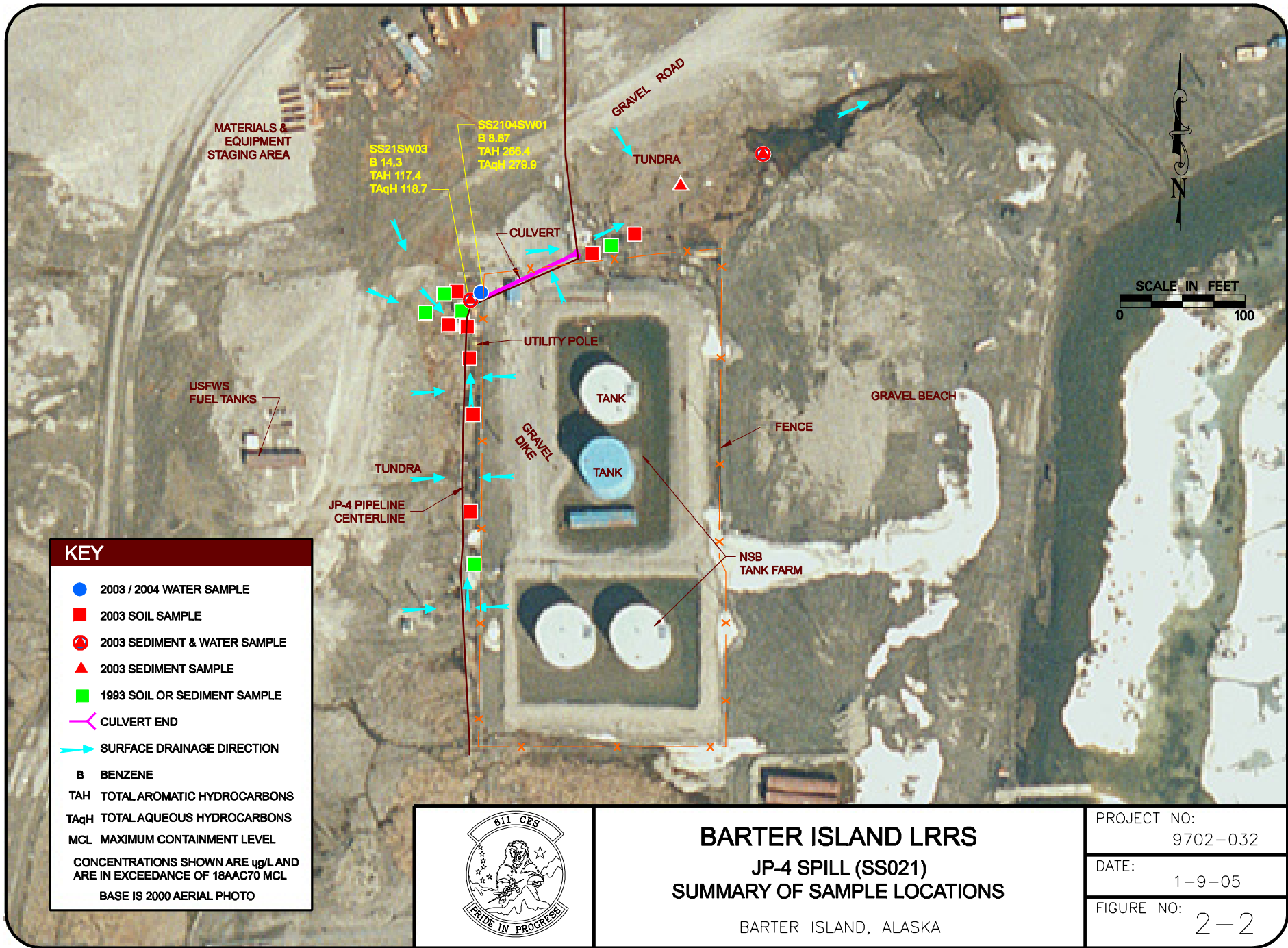
BARTER ISLAND LRRS

ERP SITES MAP
SS021 (JP-4 Spill)
BARTER ISLAND, ALASKA

PROJECT NO:
9702-032

DATE:
4-6-06

FIGURE NO:
2-1



KEY

- 2003 / 2004 WATER SAMPLE
- 2003 SOIL SAMPLE
- ▲ 2003 SEDIMENT & WATER SAMPLE
- ▲ 2003 SEDIMENT SAMPLE
- 1993 SOIL OR SEDIMENT SAMPLE
- ⋈ CULVERT END
- ➔ SURFACE DRAINAGE DIRECTION

B BENZENE
TAH TOTAL AROMATIC HYDROCARBONS
TAqH TOTAL AQUEOUS HYDROCARBONS
MCL MAXIMUM CONTAINMENT LEVEL

CONCENTRATIONS SHOWN ARE $\mu\text{g/L}$ AND
 ARE IN EXCEEDANCE OF 18AAC70 MCL
 BASE IS 2000 AERIAL PHOTO



BARTER ISLAND LRRS
JP-4 SPILL (SS021)
SUMMARY OF SAMPLE LOCATIONS

BARTER ISLAND, ALASKA

PROJECT NO:
9702-032

DATE:
1-9-05

FIGURE NO:
2-2

2.2.2 Surface and Subsurface Hydrology

Small, shallow pools of standing water exist immediately in front of the culvert and in the wetlands east of the culvert. During August 2003, surface water flow was not evident. However, surface water flow likely occurs during significant rain events or during breakup. Based on the topography, the surface water drainage pattern generally follows the pipeline corridor until it reaches the culvert. It then passes through the culvert and flows into a wetland area that borders the Kaktovik lagoon. Surface water east and west of the pipeline flows toward the pipeline and pools in front of the culvert. In August 2003 and 2004, a small pool of water (10 feet long by 5 feet wide by 2 feet deep) was present at the mouth of the culvert.

Subsurface water, likely perched on permafrost, was found from 0.5 to 2 feet below ground surface (bgs) in the tundra area next to the pipeline. This active zone water likely flows in the same direction as the surface gradient. Permafrost was found 2 feet bgs near the JP-4 pipeline.

2.2.3 Ecology

The site is located in an industrial setting, and most of the site consists of a gravel pad. The immediate area is sparsely vegetated and consists of sandy gravel. The site provides relatively poor habitat for plants and animals. Downgradient of the site, the area consists of relatively undisturbed wetlands, which could provide habitat for birds and aquatic life (HCG 2004). The wetlands are not capable of supporting fish due to their shallow depth. The site may be utilized on occasion by small mammals typical of the region (e.g., arctic fox, shrews, weasels, etc) but the lack of vegetation at the site and its proximity to the active installation will deter many animals from frequenting the area.

2.3 **Summary of Investigations and Remedial Actions**

Preliminary assessments and records searches of the facility in 1981 and 1993 indicated that further environmental investigation was warranted. Sampling during the 1993 RI found fuel-related compounds, primarily DRO, in the soil at SS021. Four samples were analyzed for BTEX, DRO, GRO, RRO, and halogenated volatile organic compounds (HVOCs). One sample was analyzed for VOCs, SVOCs, and pesticides. Results of the soil sampling indicated that the contaminated area was located near the reported spill site, but the area of impact was not clearly defined (ICF 1996b). The Human Health and Ecological Risk Assessment concluded that risks posed to human and ecological receptors by site contaminants were insignificant given current and future site uses (ICF 1996c). However, the RI recommended additional sampling to further characterize the extent of contamination.

A follow-up investigation was conducted in 2003 to further characterize the extent of the fuel contamination at SS021. A total of 11 soil and sediment samples (including replicates) was collected near the reported spill site, including upgradient and downgradient locations. Soil and sediment samples were analyzed for fuel-related compounds including: BTEX, DRO, GRO, RRO, and PAHs. A surface water sample was collected in a small pond of water (3 feet deep) at the mouth of the culvert at the site and analyzed for BTEX and PAH compounds; this surface water location was sampled again in August 2004. No contaminants were detected above the risk-based screening criteria established for the site (see Table 6-1) that could be attributed to the historical JP-4 fuel spill. Based on the results of the 2003 and 2004 RI/FS, no further action was recommended at SS021 on the part of the USAF. A summary of sampling results is included in Table 2-1.

Table 2-1 Summary of Sample Results at SS021

Media	Analyte	Screening Criteria				1993 RI/FS			2003 RI/FS		2004 RI/FS	
		18 AAC 75 Cleanup Level (Arctic Zone) for Soil ¹	NOAA SQiRT for Sediment ²	18 AAC 70 MCL for Surface Water ³	NOAA SQiRT for Surface Water ⁴	Maximum Concentration ^{5,6}	Maximum Concentration ^{5,6}	Frequency of Detections ⁷	Maximum Concentration ^{5,6}	Frequency of Detections ⁷		
Soil (mg/Kg)	Fuels⁸											
	GRO	1,400	--	--	--	300 J	16.2 J	2/2	NS	NA		
	DRO	12,500	--	--	--	1000 J	419	7/7	NS	NA		
	RRO	13,700	--	--	--	U (200) J	753 J	7/7	NS	NA		
	VOCs											
	Benzene	13	--	--	--	3.9 J	U (0.0085)	0/3	NS	NA		
	Toluene	180	--	--	--	24	0.059 J	2/2	NS	NA		
	Ethylbenzene	89	--	--	--	11.6	0.098 J	2/2	NS	NA		
	Xylene (total)	81	--	--	--	69	0.207 J	2/2	NS	NA		
	1,2,4-Trichlorobenzene	--	--	--	--	18.1	NS	NA	NS	NA		
	1,3,5-Trimethylbenzene	--	--	--	--	9.16	NS	NA	NS	NA		
	Isopropylbenzene	--	--	--	--	2.25	NS	NA	NS	NA		
	n-Butylbenzene	--	--	--	--	4.2	NS	NA	NS	NA		
	n-Propylbenzene	--	--	--	--	3.26	NS	NA	NS	NA		
	sec-Butylbenzene	--	--	--	--	1.94	NS	NA	NS	NA		
	tert-Butylbenzene	--	--	--	--	0.345	NS	NA	NS	NA		
	SVOCs/PAHs											
	Benzo[b]fluoranthene	15	--	--	--	NS	0.0048 F	1/1	NS	NA		
	Benzo[g,h,i]perylene	--	--	--	--	NS	0.007 F	1/1	NS	NA		
	Fluoranthene	5,500	--	--	--	NS	0.0031 F	1/1	NS	NA		
	Fluorene	5,500	--	--	--	NS	0.0366	1/1	NS	NA		
	Naphthalene	180	--	--	--	5.54	0.134	1/1	NS	NA		
	Phenanthrene	41,000	--	--	--	NS	0.0118	1/1	NS	NA		
	Pyrene	4,100	--	--	--	NS	0.006 F	1/1	NS	NA		
	2-Methylnaphthalene	--	--	--	--	1.42	NS	NA	NS	NA		
	p-Isopropyltoluene	--	--	--	--	2.56	NS	NA	NS	NA		
	Sediment (mg/Kg)											
	SVOCs/PAHs											
Fluoranthene	--	2.355	--	--	0.0031 F	NS	NA	NS	NA			
Phenanthrene	--	0.515	--	--	0.0118	NS	NA	NS	NA			
Pyrene	--	0.875	--	--	0.006 F	NS	NA	NS	NA			
Surface Water (µg/L)												
VOCs												
Benzene	--	--	5	700 ^M	NS	14.3	1/2	8.87	1/1			
Toluene	--	--	1,000	5,000 ^{M,CMC}	NS	36.4	1/2	31 J	1/1			
Ethylbenzene	--	--	700	430 ^{M,CMC}	NS	8.16	1/2	80.2 J	1/1			
Xylene (total)	--	--	10,000	--	NS	58.5	1/2	146.3 J	1/1			
PAHs												
Acenaphthene	--	--	--	520	NS	0.0322 F	2/2	U (1.5)	0/1			
Acenaphthylene	--	--	--	--	NS	0.046 F	1/2	U (1.5)	0/1			
Anthracene	--	--	--	300 ^M	NS	U (0.0521)	0/2	0.183	1/1			
Fluorene	--	--	--	300 ^M	NS	0.0389 F	1/2	2.14 F	1/1			
Naphthalene ⁹	--	--	--	620	NS	1.21	2/2	9.91 J	1/1			
Phenanthrene	--	--	--	6.3	NS	0.0335 F	1/2	1.25 J	1/1			
TAH	--	--	10	--	NQ	117.36	1/2	266.37 J	1/1			
TAqH	--	--	15	--	NQ	118.73 F	2/2	279.85 J,F	1/1			

- Notes**
- 1- Lowest value of ingestion or inhalation shown from 18 AAC 75, Tables B1 and B2, referred to as "Method Two Cleanup Levels" for the Arctic Zone
 - 2- NOAA SQiRT value is the probable effects level (PEL) for freshwater values indicated. Marine water (M) value shown if no fresh water value available.
 - 3- 18 AAC 70 Maximum Contaminant Level (ADEC 2003).
 - 4- NOAA SQiRT values shown for fresh water criteria continuous concentration (CCC) unless otherwise indicated (NOAA 1999). Criteria maximum concentration (CMC) shown if no CCC available.
 - 5- Highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were ND.
 - 6- 1993 data taken from the *Final RI/FS, Vol. 1 and 2, Barter Island Radar Installation, Alaska* (ICF 1996a).
 - 7- 2003 data taken from the *Final RI/FS Study Report for 15 Sites, Barter Island LRRS, Alaska* (USAF 2004).
 - 8- 2004 data taken from the *Draft RI/FS Addendum Report for Six Sites, Barter Island LRRS, Alaska* (USAF 2005).
 - 9- The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.
 - 8 - Methods used in 1993 were GRPH, DRPH and RRPB, which are comparable to current AK Methods for GRO, DRO and RRO.
 - 9- The Alaska groundwater cleanup standard for naphthalene (18 AAC 75.341, Table C) is 0.7 mg/L. The EPA has not published a drinking water MCL for naphthalene.

Data Flags

U Compound not detected (MDL in parentheses)
 F Analyte was positively identified, but the associated numerical value was below the PQL
 J Analyte was positively identified, but the quantitation was an estimate

Bold Bold sample result exceeded the corresponding 18 AAC MCL. Exceedances were detected in samples collected from ponded water adjacent to the culvert at SS021.

Abbreviations

-- * Screening criteria does not exist for this compound NQ Not quantified
 mg/Kg Milligrams per Kilogram PAH Polyaromatic Hydrocarbons
 µg/L Micrograms per Liter PEL Probable Effects Level
 MCL Maximum Contaminant Level PQL Practical Quantitation Limit
 MDL Method detection limit SQiRT Screening Quick Reference Table
 NA Not Applicable TAH Total Aromatic Hydrocarbons (TAH = Total of BTEX compounds)
 NS Not Sampled TAqH Total Aqueous Hydrocarbons (TAqH = Total PAH + TAH)
 NOAA National Oceanic and Atmospheric Administration

2.4 Regulatory Enforcement Activities

There are no Federal Facility Agreements or state agreements for the Barter Island LRRS. No sites are listed on the National Priorities List. Hazardous substances regulated under CERCLA have not been detected at SS021. There have been no regulatory enforcement activities at the site.

3 COMMUNITY PARTICIPATION

Public participation has been an important component of the cleanup process at Barter Island LRRS. All decisions made for SS021 were based on information contained in the administrative record. Activities aimed at informing and soliciting public input regarding cleanup activities for the site are as follows:

Proposed Plan. A proposed plan that presented the cleanup alternatives proposed by the Air Force for Barter Island LRRS was submitted for public review on August 16, 2005. A public meeting was also held at that time.

Public Comment Period. The public comment period for the proposed plan was August 16, 2005, to September 14, 2005. A summary of the public comments and responses to public comments are provided in Appendix A.

Public Meetings. The Air Force held a public meeting in Kaktovik on August 16, 2005 to discuss the proposed plan and record verbal comments. Responses to all comments received on the proposed plan are included in Appendix A of this decision document. Additional community involvement activities for Barter Island LRRS include Restoration Advisory Board (RAB) meetings. The RAB consists of representatives from the community, ADEC and the USAF. A RAB was formed in Kaktovik in 1998 and meets quarterly. RABs provide a forum for discussion and exchange of information among federal and state agencies and the community regarding cleanup of a military site. The RAB plays an important role in the decision-making process.

Responsiveness Summary. Appendix A of this decision document summarizes comments on the proposed plan. Comment 1 in the responsiveness summary pertains to SS021.

Updated Mailing List and Mailing Events. A mailing list of interested parties is maintained and updated regularly by the Air Force Community Relations Coordinator.

Administrative Record. The administrative record, located at the 611 Civil Engineering Squadron (CES) office at Elmendorf Air Force Base, Alaska, is continually updated. The administrative record for the Barter Island LRRS contains the information used to support this decision and is accessible to the public. An index of documents is included in Appendix B. A website with the administrative record current up to 2003 is also available to the public at:

<http://www.adminrec.com/PACAF.asp?Location=Alaska>

Information Repository. The information repository is a file containing newsletters, fact sheets, and community relations documents relating to proposed plans and response actions for all of the ERP sites at Barter Island LRRS. Four information repositories are located in Kaktovik: the mayor's office, the school library, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation.

Management Action Plan. The Management Action Plan (MAP) is updated periodically and made available to the public in order to provide a summary of all restoration activities in one document. The most recent MAP was published in 2003 (USAF 2003) and is part of the Administrative Record.

4 SITE CONTAMINATION AND CHARACTERISTICS

4.1 Nature and Extent of Contamination

4.1.1 Known or Suspected Sources

Fuel-related contamination at SS021 has been attributed to a break in the JP-4 fuel line during the late 1980s. JP-4 is a type of aviation fuel. Site personnel indicated that a diesel spill also occurred around the same time at an old village tank farm, which was upgradient of the reported JP-4 spill. Some of the product from the village spill may have migrated into the JP-4 spill site. In addition, the JP-4 spill site is located next to the NSB tank farm that has been active since at least the early 1980s.

4.1.2 Types of Contamination and the Affected Media

Contaminants that have been detected in the soil and sediment were fuel-related compounds, primarily DRO and GRO. BTEX, total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH) compounds were also detected in the surface water directly in front of the culvert. The high TAH and TAqH concentrations are principally caused by the presence of BTEX compounds in the water. Table 2-1 summarizes the maximum concentration of detected contaminants or highest practical quantitation limit (PQL) if samples were not detected. Figure 2-2 shows the location of samples collected during previous RIs at SS021.

4.1.3 Known or Potential Routes of Migration

The area of impact is in a low-lying region. Soil contamination and active zone water should be confined within this topographical low. Vertical migration is limited by the presence of permafrost. However, dissolved substances or sediments may be transported by surface water runoff through the culvert and into adjacent wetlands. The current distribution of contaminants does not indicate that this transport mechanism is significant although it may have occurred in the past. In 2003, the downgradient sediment and water quality show little impact and no exceedances of screening criteria (HCG 2004).

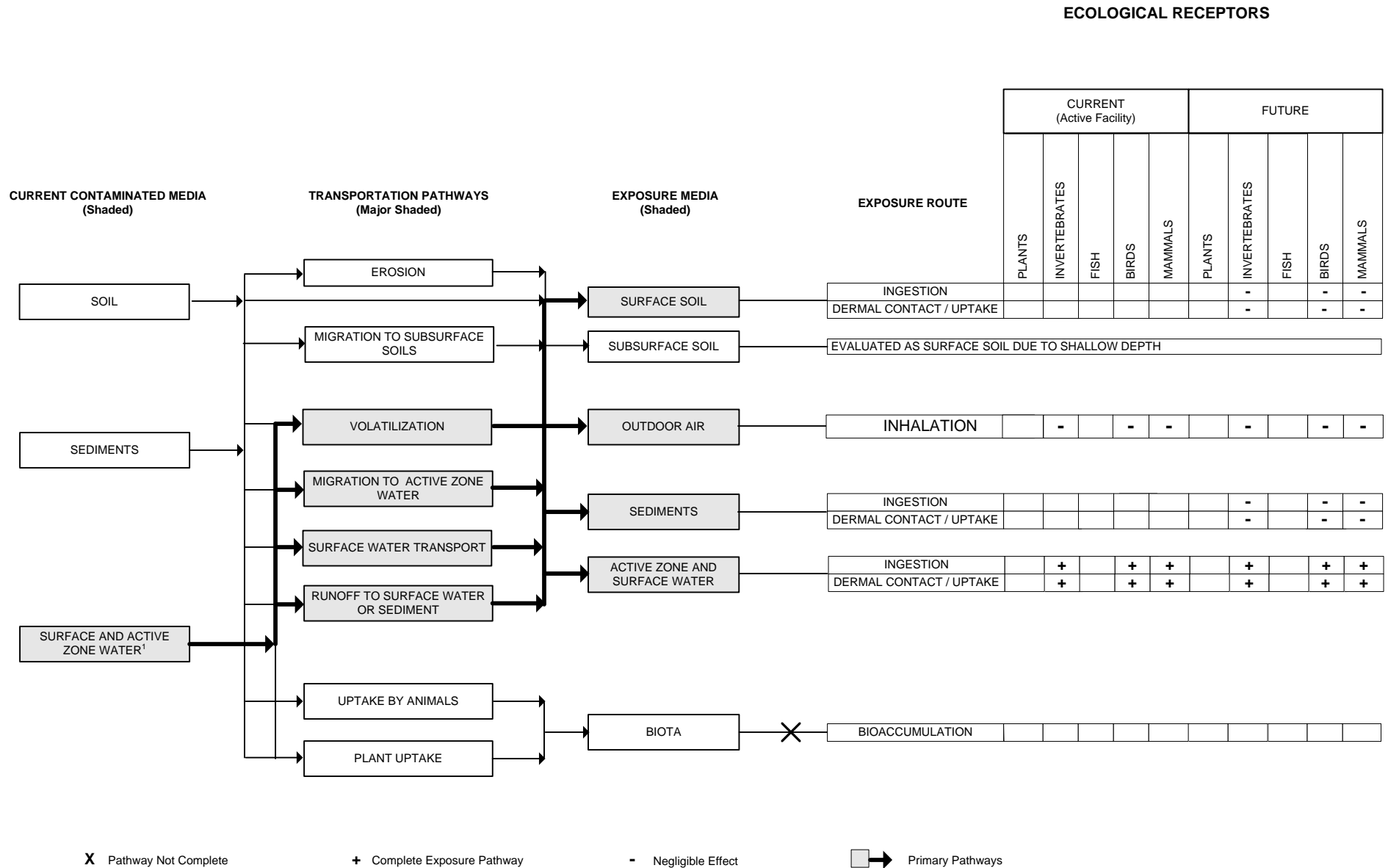
4.2 Conceptual Site Model for Human Health and Ecological Receptors

As part of the 1993 and 2003 RI/FS, conceptual site models were developed for human and ecological exposure pathways for the various contaminated media to illustrate complete and incomplete exposure pathways for sites at Barter Island LRRS. For purposes of evaluating exposure pathways, it is assumed there are no current site residents at Barter Island LRRS. Current site use is limited to site workers, and occasional recreational or subsistence uses by residents of Kaktovik. Future exposure pathways assume the Barter LRRS is inactive. Future land uses could include subsistence, recreational and residential. However, at SS021 residential land use is considered unlikely as discussed in Section 5.1.

Conceptual human health and ecological site models for SS021 are contained in Figures 4-1 and 4-2, respectively. The accidental ingestion of contaminated water is considered the most probable exposure pathway at SS021. Other primary routes of potential exposures at Barter Island are direct contact or ingestion of soils/sediments. Groundwater is not a current or future source of drinking water at Barter Island. In some cases, there is the potential for contaminants to migrate from the soils to the surrounding surface water. Air transportation is not a significant pathway of exposure because of lack of volatiles detected in the soils and the low air temperatures. However, there could be exposure to volatiles in the surface water.

Based on community interviews and environmental sampling conducted during the 2003 RI, there is a low potential for residents to become exposed to contaminants from the SS021 site through the consumption of local plants or animals. The most prevalent contaminants detected at the site,

Figure 4-2 Ecological Conceptual Site Model for Site SS021 (JP-4 Spill)



¹ Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.

petroleum hydrocarbons, do not bioaccumulate in the food chain. Furthermore, the USAF installation does not appear to be used by residents for subsistence activities, with the exception of fishing along the beach.

5 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

5.1 Land Uses

SS021 is located in an industrial setting. It is situated between a large, active tank farm, an active roadway, and a materials staging area. Gravel pads surround the area. The immediate area is sparsely vegetated and consists of sandy gravel. The spill area is not located on USAF property and is used by multiple parties. Downgradient of the site, the area consists of relatively undisturbed wetlands, which could provide habitat for birds and aquatic life. The drainage itself is too small to support fish. Current land use in the reported spill area is primarily industrial, with occasional recreational use. Future land use at the site is anticipated to be similar to current use. There is residential land use in the nearby Village of Kaktovik. Residential land use at SS021 is unlikely. It is likely to remain an industrial area because of its proximity to the barge landing area. In addition, it is located in a relatively low-lying area which makes it undesirable for housing.

5.2 Ground and Surface Water Uses

The surface water at the site is not currently used as drinking water sources or for other beneficial purposes. There may be incidental use of the water for recreation, principally by children. Groundwater is not a current or future source of drinking water at Barter Island.

6 SITE RISKS

6.1 Site Screening Criteria

The sampling results from the remedial investigations conducted at SS021 were compared against screening criteria to determine whether there were COCs that require remedial actions to protect human health and the environment. Table 6-1 contains the primary regulatory and risk-based screening criteria used to identify COCs and evaluate risk.

These screening criteria are extra protective of human health and the environment. They were selected in accordance with the current and projected land use at the site as described in Section 5. Criteria protective of people using the site for residential purposes were used to screen the data, even though there is no current or planned residential land use at the site.

The primary soil screening criteria are derived from 18 AAC 75, specifically Methods One or Two cleanup levels for the Arctic Zone. The Method One cleanup levels are conservative, nonrisk-based cleanup levels that have been established for petroleum hydrocarbons (DRO, GRO, RRO). Method One cleanup levels are more stringent than the Method Two cleanup levels. Method Two Cleanup levels have been established for specific chemicals (listed in 18 AAC 75.341, Tables B1 and B2) and are protective of long-term exposures under residential land use scenarios. Method Two cleanup levels are risk-based cleanup levels based on a cancer risk management standard of 1 in 100,000 (1×10^{-5}) and a noncarcinogenic risk standard or hazard index of 1.0, set forth in 18 AAC 75.325(h). In accordance with 18 AAC 75.340 (c), the Method Two cleanup levels were used when contaminants were not expected to migrate to surface water bodies. Concentrations of petroleum hydrocarbons associated with a weathered JP-4 spill detected in the soil were sufficiently low that they were not migrating and impacting adjacent surface water bodies. Therefore, Method Two cleanup levels are appropriate for this site.

When applying Method Two cleanup levels for a site, 18 AAC 75.325(g) states that the risk from hazardous substances can not exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0. Chemicals that are detected at greater than or equal to 1/10th of the Method Two ingestion or inhalation cleanup levels must be included when calculating cumulative risk. Therefore, as part of the screening process, contaminants exceeding 1/10th the ADEC Method Two cleanup levels from the most recent RIs (2003 and 2004), were identified and their maximum concentration used to calculate the cumulative human health risk in accordance with ADEC guidelines (ADEC 2002). Per this ADEC guidance, lead, GRO, DRO and RRO are not included in cumulative risk calculations.

Water and sediment sample results were screened against the National Oceanic and Atmospheric Association (NOAA) Screening Quick Reference Tables (SQuiRTs) (NOAA 1999). The SQuiRTs were developed for internal use by the Coastal Protection and Restoration (CPR) Division of NOAA. The CPR Division identifies potential impacts to coastal resources and habitats likely to be affected by hazardous waste sites. The SQuiRT values are intended for screening purposes only; they do not represent official NOAA policy and do not constitute cleanup levels (NOAA 1999). Probable effects levels (PELs) are criteria that have been developed by NOAA for various contaminants that represent levels above which adverse effects in ecological receptors are expected. For surface water, Criteria Continuous Concentrations were also developed for by NOAA for various contaminants that represent levels below which no adverse effects in ecological receptors are expected even under long-term exposure conditions. Surface water samples were also compared to the 18 AAC 70 Alaska Water Quality Standards, which include criteria protective of human health (referred to as maximum contaminant levels [MCL]) and ecological receptors in both marine and fresh waters.

A chemical was considered a COC if it exceeded the screening criteria, unless further evaluation indicated the contaminants posed little risk. At Barter Island sites where COCs were identified, a baseline human health and ecological risk assessment using the data from the 1993 RI was performed to evaluate risk (1996c). The baseline human health risk assessment evaluated both industrial and residential exposure groups (DEW line installation worker, native adult and child inhabitant).

Table 6-1 summarizes the screening criteria that were used to identify COCs and evaluate risk at SS021.

Table 6-1 Primary Regulatory and Risk-Based Screening Criteria for SS021

Media	Screening Criteria (Chemical ARAR)
Soil (including tundra, beach sands, and gravel pads)	<ul style="list-style-type: none"> 18 AAC 75.341, Tables B1 and B2, Arctic Zone (i.e., ADEC Method Two Soil cleanup levels for the Arctic Zone), Ingestion and Inhalation¹
Sediment (from aquatic habitats)	<ul style="list-style-type: none"> National Oceanic and Atmospheric Association SQuiRT Probable Effects Levels for freshwater or marine sediment²
Surface Water	<ul style="list-style-type: none"> 18 AAC 70 (Alaska Water Quality Standards) Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances SQuiRT for aquatic life criteria continuous concentration
Notes: ¹ Referred in this document as "Method Two cleanup levels." ² Samples collected from permanent waterbodies or ephemeral drainages judged to be viable aquatic habitat were classified as sediment and screened against sediment criteria. This criterion is also considered secondarily for soils that have a high likelihood to erode into freshwater or marine environments.	

6.2 Risk Evaluation

6.2.1 Contaminants of Concern

After evaluating the risk assessment (USAF 1996c) and subsequent sampling results obtained during the RIs (ICF 1996b, HCG 2004, and HCG 2005a), benzene, TAH, and TAqH were identified as COCs in the ponded water directly in front of the culvert at SS021. Concentrations of these contaminants in the surface water exceeded the 18 AAC 70 MCLs. There are no COCs in the soil or sediment.

6.2.2 Summary of Site Risks

Based on findings of the previous RIs and the baseline risk assessment, no remedial action is necessary at SS021 to ensure protection of human health and the environment. No further action and closure under CERCLA and Alaska State laws and regulations is recommended. The following sections detail the basis for this no further action decision.

6.2.2.1 Evaluation of Site Risks

Sampling and analysis during the 1993 RI found that SS021 was contaminated with petroleum hydrocarbons (ICF 1996b). GRO, DRO, BTEX, and benzene were detected with maximum concentrations of 300, 1,300, 48, and 3.9 milligrams per kilogram (mg/Kg), respectively; results of the soil sampling indicated that the concentrations of these contaminants were below the Method Two cleanup levels for the Arctic Zone.

A baseline human health and ecological risk assessment was conducted using the data collected in 1993 at Barter Island LRRS (ICF 1996b). The 1993 Ecological Risk Assessment determined that a site-specific quantitative evaluation of the risks posed to ecological receptors was not required at SS021. The areal extent of contamination was relatively small and suitable habitat was not present at the site (ICF 1996c, p. 3-79). The 1993 Human Health and Ecological Risk Assessment concluded that human and ecological receptors by site contaminants were acceptable given current or future site uses (ICF 1996c); however, additional investigation was recommended in the RI/FS to further characterize the extent of contamination.

As part of the 2003 RI/FS, additional sampling of the sediment, soil and surface water samples were collected near the reported spill site and downgradient locations. Results of the soil sampling indicated that the concentrations of all potential contaminants of concern were below detection limits or the ADEC Method Two soil cleanup levels for the Arctic Zone; low concentrations of DRO and GRO (419 and 482 mg/Kg, respectively) were present in the area of the reported spill. The concentration of BTEX in the sediment sample collected within the small pond was well below the Method Two soil cleanup levels; these soil criteria were used for comparison purposes only as there are no established NOAA SQuiRT PELs for BTEX compounds in sediment.

The surface water sample collected in the small pond upgradient of the culvert contained elevated levels of benzene, TAH, and TAqH. The surface water next to the culvert was sampled again in August 2004. Sample results from both 2003 and 2004 exceeded the 18 AAC 70 MCLs for benzene, TAH and TAqH with maximum concentrations of 14.3, 266.4 and 279.9 micrograms per liter (µg/L), respectively (HCG 2005a). The high TAH and TAqH concentrations are due to BTEX compounds in the water. PAH concentrations in the water are low. These exceedances indicate there is a potential risk posed by the water to ecological receptors or humans if the surface water is used as a drinking water source. However, ecological receptors are not present in significant quantities and suitable ecological habitat is not present at the specific site area as discussed in previous paragraphs. Additionally, the BTEX levels did not exceed the NOAA

SQuiRT criteria continuous concentrations, suggesting there would not be adverse effects to aquatic organisms, even with long-term exposure. In the sample collected from a downgradient pond (see Figure 2-2, sediment/water sample northeast of tanks), fuel-related compounds were below detection limits or the MCLs.

Based on the sample results, the area of soil and surface water impact is localized with no evidence of contamination downgradient of the culvert. This localized area of contamination is likely caused by a recent release of lighter grade fuel than JP-4. The USAF has not conducted recent or past activities in this area that can be attributed to such a release. The high levels of BTEX in the water and low levels of BTEX in the adjacent soil suggest the water is impacted with fuel contaminants other than from a historical JP-4 spill. BTEX in the flowing surface water is unlikely to be persistent unless there is a continued source for the volatile compounds. The contaminant concentrations in the soils are too low to impact water quality. The source of the water contamination could not be identified. Potential sources of contamination include surface spills or leaks from the nearby fuel tanks. The 2003 and 2004 RIs recommended no further action on the part of the USAF with respect to the historical JP-4 spill (HCG 2004, 2005).

6.2.2.2 ADEC Cumulative Risk Calculation

Cumulative risk calculations were performed as part of the risk screening process, as described in Section 6.1. As listed in Table 2-1, sample results from RIs conducted at SS021 indicated that the sediment concentrations for BTEX compounds exceeded 1/10th of the Method Two cleanup level for soil in the Arctic Zone. These criteria are not directly applicable to sediments, but indicate that there may be a risk posed by these sediments if exposure was to occur. Cumulative risk calculations revealed a cumulative cancer risk of 4.6×10^{-6} and a cumulative noncarcinogenic hazard index of 0.16, both of which are below the ADEC 18 AAC 75.325(h) guidelines. These calculated values are very protective. Inhalation or ingestion of these contaminants is unlikely given they are contained in underwater sediments. Despite this very protective exposure scenario, cumulative risk calculations indicate that the risk is low. Based on this analysis, there is no significant risk posed by contaminants in the sediments or soils.

6.3 Conclusion

RIs have been conducted at SS021 since 1993. Based on the findings of these investigations and the baseline risk assessment, no remedial action or land use controls are necessary on the part of the USAF to ensure protection of human health and the environment. Land use controls (institutional controls) are not applicable at SS021 as the site meets Method Two cleanup levels. In accordance with 18 AAC 75.340(d), ADEC only considers implementation of institutional controls at sites where alternative cleanup levels are being applied. As the lead cleanup agency, the USAF is closing the site with the concurrence of ADEC, based on the USAF having fulfilled its responsibilities on the site. The selected remedy for SS021 is no further action under CERCLA and Alaska State laws and regulations.

7 DOCUMENTATION OF SIGNIFICANT CHANGES

The proposed plan for nine ERP Sites at Barter Island LRRS including SS021 was released for public comment on August 16, 2005. The proposed plan identified no further action and closure under CERCLA and Alaska State laws and regulations as the proposed action. The USAF and ADEC reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the proposed action, as originally identified in the proposed plan, were necessary or appropriate.