FINAL

# Record of Decision
# Road and Runway Oiling Area (SD002)

## Sparrevohn LRRS, Alaska

Prepared By

## United States Air Force
## Pacific Air Forces Command
## 611 CES, Alaska

May 2009

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## Tables



## Figures

# Acronyms

| | |
|---|---|
| AAC | Alaska Administrative Code |
| ADEC | Alaska Department of Environmental Conservation |
| AFCEE | Air Force Center for Engineering and the Environment |
| amsl | above mean sea level |
| AR | Administrative Record |
| BLRA | Baseline Human Health and Ecological Risk Assessment |
| CDI | chronic daily intake |
| CES | Civil Engineering Squadron |
| CEOS | Civil Engineering Operations Squadron |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CERCLIS | Comprehensive Environmental Response, Compensation, and Liability Information System |
| CEVR | Civil Engineering Environmental Restoration Branch |
| CFR | Code of Federal Regulations |
| COPC | contaminant of potential concern |
| CRP | Community Relations Plan |
| DERP | Defense Environmental Restoration Program |
| DRO | Diesel Range Organics |
| EBS | Environmental Baseline Survey |
| EPA | United States Environmental Protection Agency |
| ERP | Environmental Restoration Program |
| ºF | degrees Fahrenheit |
| FS | Feasibility Study |
| GRO | Gasoline Range Organics |
| HCG | Hoefler Consulting Group |
| HEAST | Health Effects Assessment Summary Tables |
| HHERA | Human Health and Ecological Risk Assessment |
| HI | Hazard Index |
| HQ | hazard quotient |
| IRIS | Integrated Risk Information System |
| LRRS | Long Range Radar Station |
| LTM | Long Term Monitoring |
| MAP | Management Action Plan |
| mg/Kg | milligrams per kilogram |
| MNA | Monitored Natural Attenuation |
| NA | Not Applicable |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| ND | non-detect |
| NEPA | National Environmental Policy Act |
| NFA | No Further Action |
| PA | Preliminary Assessment |
| PCBs | Polychlorinated Biphenyls |
| PAH | Polynuclear Aromatic Hydrocarbons |
| POC | Point of Contact |
| PP | Proposed Plan |

| | |
|---|---|
| RA | Remedial Action |
| RCRA | Resource Conservation and Recovery Act |
| RfD | reference dose |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RRO | Residual Range Organics |
| SAR | Sampling and Analysis Report |
| SARA | Superfund Amendments and Reauthorization Act |
| SF | slope factor |
| SI | Site Investigation |
| SVOC | Semivolatile Organic Compound |
| TPH | Total Petroleum Hydrocarbons |
| USAF | United States Air Force |
| U.S.C. | United States Code |
| UTL | Upper Tolerance Limit |
| VOC | Volatile Organic Compound |
| VHF | Very High Frequency |
| WACS | White Alice Communication System |
| WP | Work Plan |

# 1.0 Declaration

## 1.1 Site Name and Location

Facility Name: Road and Runway Oiling Area (SD002), Sparrevohn Long Range Radar Station (LRRS)
Site Location: Sparrevohn, Alaska
CERCLIS ID Number: Not Applicable
Alaska Department of Environmental Conservation (ADEC) Contaminated Sites
Hazard ID: 698
Operable Unit/Site: Not Applicable

Sparrevohn LRRS is located approximately 200 miles west of Anchorage, Alaska and 18 miles south of Lime Village in the foothills of the Alaska Range, 61°10'N latitude and 155°58'W longitude. The Road and Runway Oiling Area is one of eight individual sites located at Sparrevohn LRRS being addressed under the United States Air Force (USAF) Environmental Restoration Program (ERP) (Figure 1-1). Sparrevohn LRRS is not listed on the National Priorities List.

The Sparrevohn LRRS is situated on land owned by the USAF, and bordered by Bureau of Land Management property to the east, north and west, and State of Alaska land to the south. Pursuant to the Defense Environmental Restoration Program 10 United States Code (U.S.C.) 2701 and Executive Order 125801 (signed January 23, 1987), the USAF is responding to historical releases that occurred at its facilities, including Sparrevohn LRRS.

The Road and Runway Oiling Area (SD002) represents the runway and five road segments which include: 1) the road between the Lower Camp and the White Alice Communication System (WACS); 2) the old switchback road to the Upper Camp; 3) the road between the Lower Camp and the ridge-top; 4) the ridge top between the WACS and the Upper Camp; and 5) the road from Lower Camp to the Landfill (Figure 1-2).

## 1.2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the Final Selected Remedy for the source areas listed above at Sparrevohn LRRS, located in Sparrevohn, Alaska. The selected remedy was chosen in accordance with the Alaska State Laws and Regulations and in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

### 1.2.1 CERCLA Statement of Basis and Purpose

Arsenic and chromium were identified as contaminants of potential concern (COPCs) at SD002, but were later ruled out as contaminants of concern because they were within the range of background concentrations for the Sparrevohn LRRS. As a result, this ROD presents a No Action remedy for SD002 at Sparrevohn LRRS, Alaska, in accordance with CERCLA as amended by SARA, and the NCP.

This ROD is issued by the USAF in accordance with and in satisfaction of the requirements of the Defense Environmental Restoration Program (DERP), 10 U.S.C. 2701, et seq.; CERCLA 42 U.S.C. 9601, et seq.; Executive Order 12580, 52 *Federal Register* 2923 (23 January 1987); and NCP, 40 *Code of Federal Regulations (CFR)* 300. The decision put forth in this document is also in accordance with and in satisfaction of 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* (ADEC 2008) regulations for the State of Alaska, revised as of October 9, 2008.

The United States Environmental Protection Agency (EPA) has been consulted consistent with the requirements of 10 U.S.C. 2705, and has chosen to defer to ADEC for regulatory oversight of SD002. The State of Alaska concurs with the selected remedy (No Further Action).

### 1.2.2 Statement of Basis and Purpose under State of Alaska Regulations

This ROD is issued by the USAF in accordance with and in satisfaction of the requirements of the Alaska Oil and Hazardous Substance Pollution Control Act, 18 AAC 75, revised as of October 9, 2008.

DRO has been identified as COPC under 18 AAC 75. However, no further remedial action is necessary for DRO based on existing and future land use at SD002, and the relatively low levels of DRO detected in the soil.

The ADEC agrees that based on site conditions, the selected soil remedy of No Further Action will meet state regulatory requirements.

## 1.3 Description of Selected Remedy

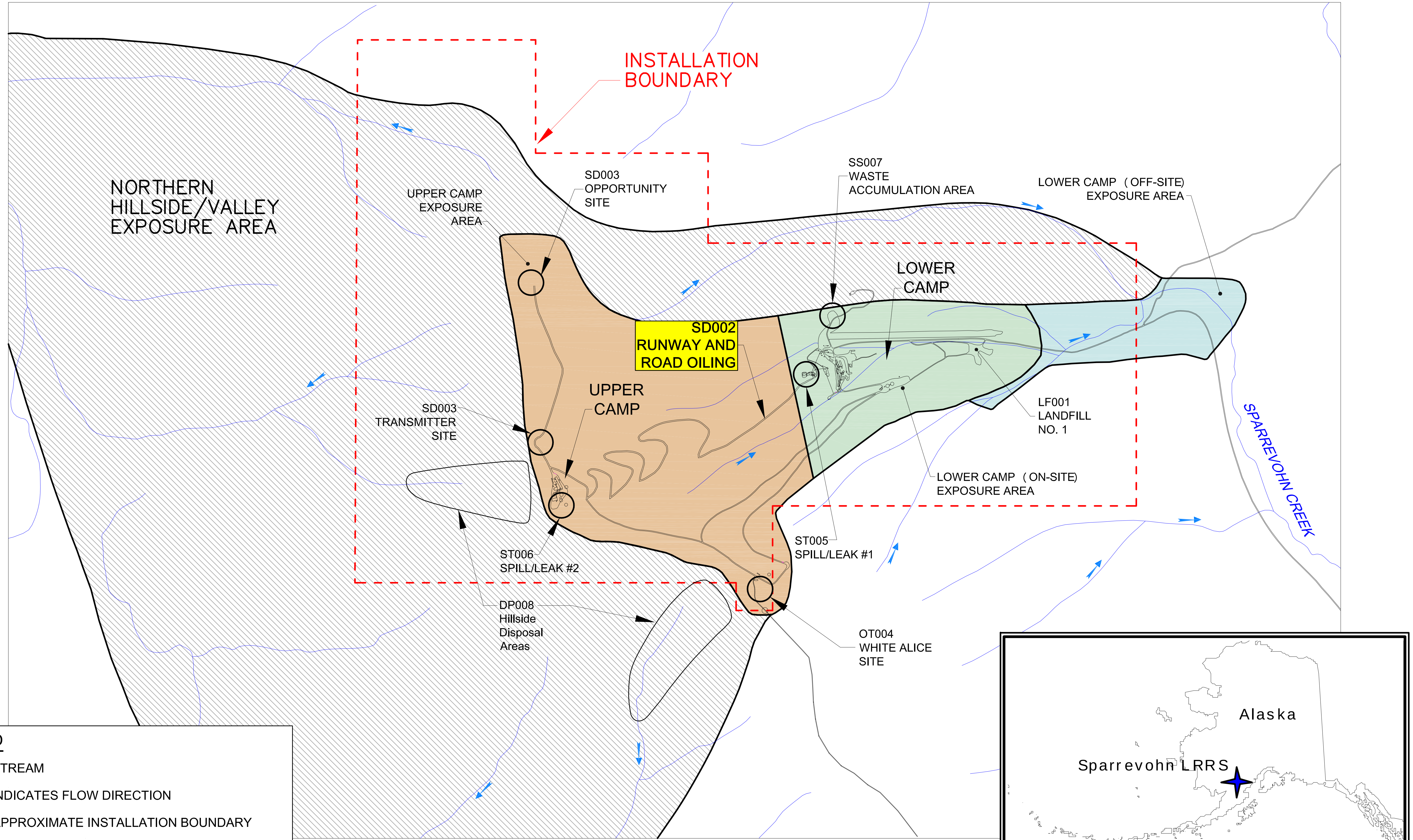
Remedial alternatives for the Road and Runway Oiling site (SD002) were developed from information presented in the remedial investigation (RI) (Shannon and Wilson 1999), risk assessments (Shannon and Wilson 2000a; USAF 2002a) and the feasibility study (FS) (USAF 2002b). The selected remedy for this site is No Further Action, and closure under CERCLA and Alaska State statutes and regulations, respectively. Under the No Further Action alternative, no further investigation, sampling, or remedial actions are necessary at SD002. The site does not pose a risk to human health or the environment.

## 1.4 Statutory Determinations

No remedial action is necessary at SD002 to protect human health or the environment under CERCLA or State of Alaska laws and regulations.

## 1.5 Data Certification Checklist

The current and reasonably anticipated future land use assumptions, as well as the potential future beneficial uses for groundwater used for completing the baseline risk assessment are included in the Decision Summary, Section 2.0, of this ROD.




LEGEND

- STREAM
- INDICATES FLOW DIRECTION
- APPROXIMATE INSTALLATION BOUNDARY
- ROAD
- NORTHERN HILLSIDE/VALLEY EXPOSURE AREA
- UPPER CAMP EXPOSURE AREA
- LOWER CAMP (ON-SITE) EXPOSURE AREA
- LOWER CAMP (OFF-SITE) EXPOSURE AREA

NORTH

SCALE
0 (In Feet) 1,500

SITE LOCATION MAP
RUNWAY AND ROAD OILING - SD002

RECORD OF DECISION
SPARREVOHN LRRS, ALASKA

| | |
|---|---|
| PROJECT NO: | 9702–044 |
| DATE: | 01–08–09 |
| SHEET SIZE: | 11x17 |
| FIGURE NO: | 1 — 1 |

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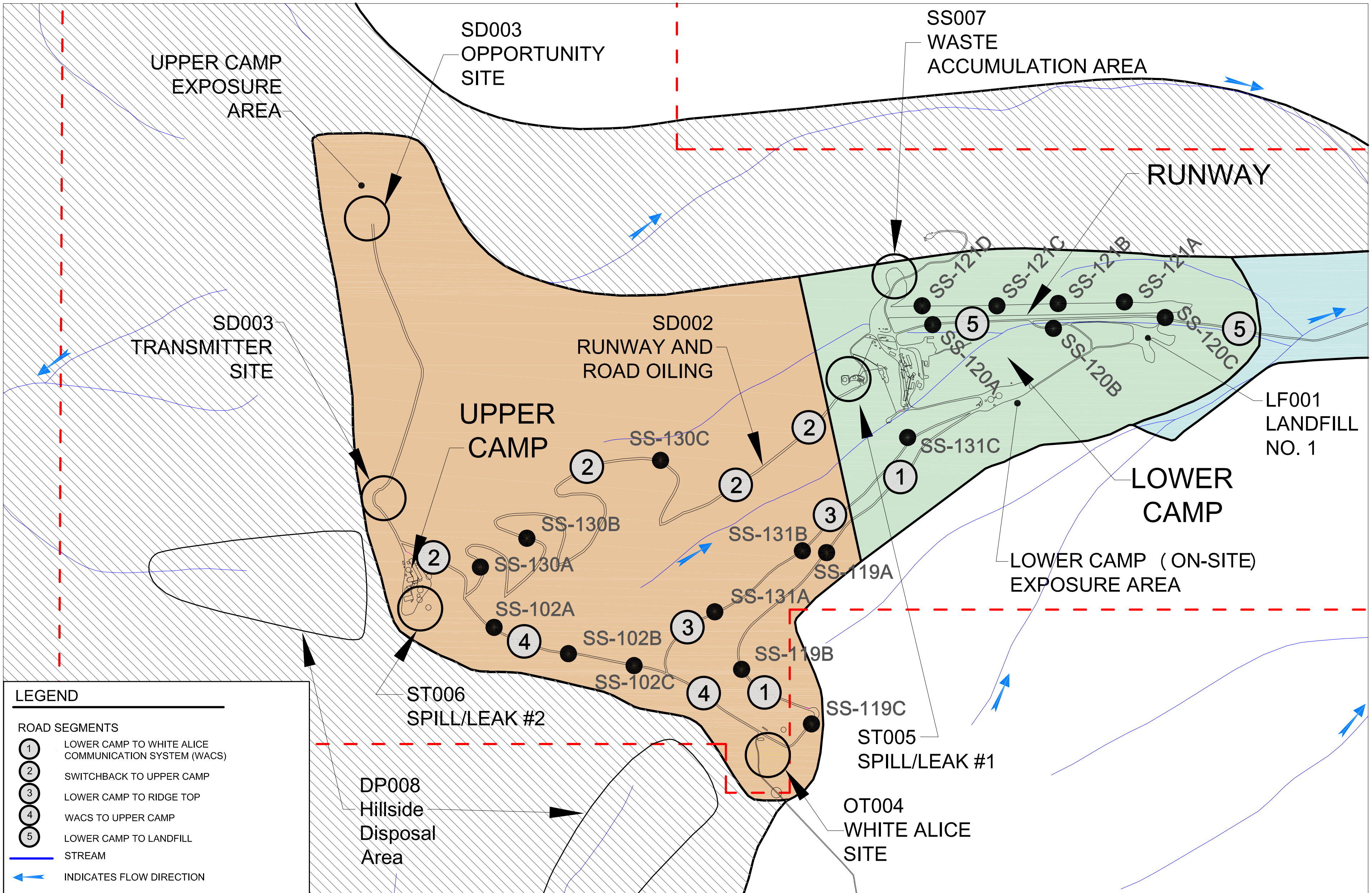


LEGEND

ROAD SEGMENTS

1. LOWER CAMP TO WHITE ALICE COMMUNICATION SYSTEM (WACS)
2. SWITCHBACK TO UPPER CAMP
3. LOWER CAMP TO RIDGE TOP
4. WACS TO UPPER CAMP
5. LOWER CAMP TO LANDFILL

- STREAM
- INDICATES FLOW DIRECTION
- APPROXIMATE INSTALLATION BOUNDARY
- ROAD
- NORTHERN HILLSIDE/VALLEY EXPOSURE AREA
- UPPER CAMP EXPOSURE AREA
- LOWER CAMP (ON-SITE) EXPOSURE AREA
- LOWER CAMP (OFF-SITE) EXPOSURE AREA
- SURFACE SOIL COMPOSITE LOCATION

Note: Composite samples consiste of three discrete samples from each road segment and four discrete samples (A, B, C, & D)

NORTH

SCALE

0 (In Feet) 1,200

SAMPLE LOCATION MAP
ROAD AND RUNWAY OILING - SD002
RECORD OF DECISION
SPARREVOHN LRRS, ALASKA

| | |
|---|---|
| PROJECT NO: | 9702–044 |
| DATE: | 01–08–09 |
| SHEET SIZE: | 8.5X11 |
| FIGURE NO: | 1–2 |

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Additional information can be found in the information repository located at Elmendorf Air Force Base, Alaska. A website is also available with historic and current information on Sparrevohn LRRS, including the complete remedial investigation and feasibility study (RI/FS) and Risk Assessment, at http://www.adminrec.com/PACAF.asp?Location=Alaska.

## 1.6 Authorizing Signatures

This signature sheet documents the USAF and ADEC approval of the remedy selected in this Record of Decision for the Road and Runway Oiling Area (SD002), Sparrevohn LRRS, Alaska.

This decision may be reviewed and modified in the future if new information becomes available that indicates the presence of contaminants or exposures that may cause unacceptable risk to human health or the environment. If additional contaminants are discovered, the USAF and ADEC will determine the compliance levels for soil cleanup actions.

29 Jul 09

ROBYN M. BURK, Colonel, USAF
Commander, 611th Air Support Group

Date

8/18/09

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

Date

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# 2.0 Decision Summary

The Decision Summary identifies the Selected Remedy for the SD002 source area 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

**Facility:** Sparrevohn LRRS, Alaska

The Sparrevohn LRRS Station includes the following CERCLA source areas as depicted on Figure 1-1:

- Landfill No. 1 (LF001) (currently the permitted landfill);
- Road and Runway Oiling (SD002);
- Transmitter Pad/Opportunity Site (SD003);
- White Alice Communication System (OT004);
- Spill/Leak No.1 and Lower Camp Area (ST005);
- Spill/Leak No. 2 (ST006);
- Waste Accumulation Area (SS007); and
- Hillside Disposal Areas (DP008).

**Site Location:** Sparrevohn, Alaska

**Latitude and Longitude:** 61°10'N latitude and 155°58'W longitude.

**Point of Contact (POC):** Mr. Steve Hunt – Project Manager

Steve.Hunt@elmendorf.af.mil
USAF 611/CES/CEVR
10471 20th Street
Elmendorf AFB, AK 99506-2200

The lead agency under CERCLA for the Sparrevohn LRRS cleanup is the USAF. The ADEC is the lead regulatory agency for petroleum and non-CERCLA contaminants at the installation. At this site, the EPA has deferred regulatory authority for CERCLA contaminants to the ADEC. The Sparrevohn LRRS is located in the western foothills of the Alaska Range, approximately 200 miles west of Anchorage, Alaska. Sparrevohn LRRS occupies parts of Sections 23, 24, 25, 26, and 36 of Township 12 N, Range 36 W and parts of Sections 19, 30, and 31 of Township 12 N and Range 35 W of the Seward Meridian.

The installation occupies 1,180 acres on the top ridge and south slope of what is informally referred to as Sparrevohn Mountain. Sparrevohn LRRS is operated as a military installation with access restricted by the USAF. The Sparrevohn LRRS is bordered by Bureau of Land Management property to the east, north and west, and State of Alaska land to the south. There is no road access to Sparrevohn LRRS. The only way to travel to Sparrevohn LRRS is by plane, with special permission from the USAF. The nearest town is Lime Village, located approximately 18 miles to the north. There are two mountains between the main installation at Sparrevohn LRRS and Lime Village, and there is no road access to Sparrevohn LRRS from Lime Village. Radar, telecommunications, and aviation equipment are installed on the mountain ridge at Sparrevohn LRRS.

### 2.1.2 Site Description

The single source area (SD002) addressed in this ROD is shown on Figure 1-1, and described briefly below:

The Road and Runway Oiling Site (SD002) consists of all installation roadways (both current and abandoned), plus the runway. The roads and runway at Sparrevohn LRRS are unpaved and consist of fractured or crushed bedrock. As a result, road and runway oiling was conducted from the 1950s to the mid-1970s using waste oils, hydraulic fluid, and solvents as a means of dust control and waste disposal.

Current land use at the facility consists primarily of industrial use, with occasional recreational or subsistence activities by site contractors and visiting USAF personnel. Future land use is anticipated to be similar, as the USAF intends to maintain the installation indefinitely.

### 2.1.3 Facility ERP History

Table 2-1 provides a summary of the investigations that have been conducted at the Sparrevohn LRRS since 1985.

Initially, 14 potential areas of concern were discussed in the *Installation Restoration Program Phase I Records Search* (Engineering Science 1985). From these, eight were identified for additional investigation, and RODs are currently being prepared for all sites except LF001. The eight ERP sites identified in 1985 and shown on Figure 1-1 are:

- Landfill No. 1 (LF001) (currently the permitted landfill);
- Road and Runway Oiling (SD002);
- Transmitter Pad/Opportunity Site (SD003);
- White Alice Communication System (OT004);
- Spill/Leak No.1 and Lower Camp Area (ST005);
- Spill/Leak No. 2 (ST006);
- Waste Accumulation Area (SS007); and
- Hillside Disposal Areas (DP008).

**Table 2-1 Summary of Sparrevohn LRRS Investigations**

| Investigation | Deliverable Title | Year | Author |
|---|---|---|---|
| Phase I | Installation Restoration Program Phase I Records Search | 1985 | Engineering Science |
| Phase II | Phase II Investigation | 1989 | Woodward-Clyde Consultants |
| RI/FS | RI/FS, Stage II, NFA Decision and Technical Document to Support NFA, LF-01, ST-05, SS-07 | 1991 | Woodward-Clyde Consultants |
| SI | Site Investigation Final Report, LF-01, ST-05, SS-07 | 1993 | Woodward-Clyde Consultants |
| PA | Preliminary Assessment, Final Report | 1993 | 11th CEOS/DEVR |
| EBS | Draft Environmental Baseline Survey | 1995 | Headquarters AFCEE |
| SI | Site Investigation Final Report | 1995 | Shannon and Wilson |
| RA | Remedial Action, PCB Soil Remediation, SD-03 | 1997 | Linder Construction |
| SI | Final Site Characterization Report, ST-05 | 1997 | 611th CES/CEVR |
| CRP | Community Relations Plan | 1997 | Shannon and Wilson, Inc. |
| MAP | Management Action Plan | 1998 | Hart Crowser, Inc. |
| MNA | Monitored Natural Attenuation Report, ST-05 | 1999 | Shannon and Wilson, Inc. |
| RI | Remedial Investigation, Final Report | 1999 | Shannon and Wilson, Inc. |
| MAP | Management Action Plan | 2000 | Shannon and Wilson, Inc. |
| HHERA | Final Baseline Human Health and Ecological Risk Assessment Report | 2000 | Shannon and Wilson, Inc. |
| LTM | Long Term Monitoring, Final Report, ST-05 | 2001 | Montgomery Watson |
| RI/FS | RI/FS, Final Baseline Risk Assessment Report Addendum | 2002 | 611th CES/CEVR |
| FS | Feasibility Study, Final Report | 2002 | 611th CES/CEVR |
| Fact Sheet | Fact Sheet, All Around Alaska | 2003 | 611th CES/CEVR |
| WP | Work Plan for Water Sampling and Sign Installation | 2006 | HCG, Inc. |
| SAR | 2006 Sampling and Analysis Report for ST005 | 2007 | HCG, Inc. |
| PP | Proposed Plan for Seven ERP Sites at Sparrevohn Long Range Radar Site | 2008 | HCG, Inc. |

Note: All reports listed were prepared for the USAF.

## Acronyms and Abbreviations

AFCEE Air Force Center for Engineering and the Environment
CEOS Civil Engineering Operations Squadron
CES Civil Engineer Squadron
CEVR Environmental Restoration Branch
CRP Community Relations Plan
EBS Environmental Baseline Survey
ERP Environmental Restoration Program
FS Feasibility Study
HCG Hoefler Consulting Group, Inc.
LRRS Long Range Radar Station
HHERA Human Health and Ecological Risk Assessment
LTM Long Term Monitoring
MAP Management Action Plan
MNA Monitored Natural Attenuation
NFA No Further Action
PA Preliminary Assessment
PCBs Polychlorinated biphenyls
PP Proposed Plan
RA Remedial Action
RI Remedial Investigation
SAR Sampling and Analysis Report
SI Site Investigation
USAF U.S. Air Force
WP Work Plan

The Sparrevohn LRRS sites were used for a variety of industrial purposes. Past activities potentially resulting in contaminant release being addressed include the following:

- Spills during the transfer of fuels into and out of storage tanks;
- Leaks from fuel lines and tanks;
- Leaks or spills of oil or cleaning solvents from vehicle and equipment maintenance activities at the garage and other areas; and
- Disposal of wastes and other discarded material containing hazardous substances.

Contaminants encountered during investigations at Sparrevohn LRRS were gasoline range organics (GRO); PAHs; PCBs; petroleum, oil, and lubricants; DRO; RRO; SVOCs; metals; and VOCs, including benzene, toluene, ethylbenzene, and xylenes. Most of these contaminants are the result of fuel or oil spills.

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

## *2.2 Site History and Enforcement Activities*

This section provides background information, summarizes the series of investigations that led to this ROD, and describes the CERCLA response actions undertaken at SD002.

Sparrevohn LRRS was activated in 1952 to close a gap in the radar coverage of interior Alaska. Between 1952 and 1958, an experimental very high frequency (VHF) communication system linked Sparrevohn LRRS and Anchorage. The VHF facility is believed to have been operated from the Opportunity Site on the ridge top. The WACS facility was constructed at Upper Camp in 1957, and the VHF facility was deactivated in 1958. The WACS was replaced in 1977 by an Alascom satellite earth terminal. During the period of operation of the WACS, approximately 130 military personnel were stationed at Sparrevohn LRRS. Dismantling of the WACS began in 1980. In 1982, a Minimally Attended Radar was put into operation. By 1984, the number of personnel operating the LRRS had been reduced to approximately ten, and has since been further reduced to approximately four.

The roads and runway at Sparrevohn LRRS are unpaved and consist of fractured or crushed bedrock. As a result, road and runway oiling was conducted from the 1950s to the mid-1970s using waste oils, hydraulic fluid, and solvents as a means of dust control and waste disposal. Because of uncertainty as to which roads may have been oiled, all roads current and abandoned, as well as the runway, were considered to be part of SD002.

As the lead agency for remedial activities, the USAF has conducted environmental investigations at the Sparrevohn LRRS under the ERP since 1985. Site inspections were performed and a RI and FS were completed. These activities were conducted in accordance with CERCLA under the DERP, which was established by Section 211 of the SARA of 1986.

As the support agency, the ADEC provides primary oversight of the environmental restoration actions, in accordance with State of Alaska contaminated sites regulations (18 AAC 75, Article

3, *Discharge Reporting Cleanup and Disposal of Oil and Other Hazardous Substances [October 9, 2008]*). Funding is provided by the Defense Environmental Restoration Account, a funding source approved by Congress to clean up contaminated sites on U.S. Department of Defense installations.

No land use controls are applicable as part of the selected remedy for this site. In addition, there are no Federal Facility Agreements or state agreements for the Sparrevohn LRRS. None of the Sparrevohn LRRS sites are listed on the National Priorities List. Hazardous substances regulated under CERCLA have been detected at SD002; however, there have been no regulatory enforcement activities at the site to date.

In accordance with USAF policy and to the extent practicable, National Environmental Policy Act (NEPA) values have been incorporated throughout the CERCLA process, culminating in this ROD. Separate NEPA documentation will not be issued, since the CERCLA process satisfies NEPA legal requirements.

## *2.3 Community Participation*

### 2.3.1 Community Participation

NCP Section 300.430(f)(3) establishes a number of public participation activities that the lead agency (the USAF) must conduct following preparation of the Proposed Plan and review by the support agency (ADEC).

In accordance with the NCP requirements, the USAF distributed the *Proposed Plan for Seven ERP Sites at Sparrevohn Long Range Radar Site* (Hoefler Consulting Group [HCG] 2008) for public review to solicit public input. The Proposed Plan was distributed on 6 October 2008. The USAF offered to hold a public meeting if requested. However, no request for a public meeting was received regarding the Proposed Plan. One person submitted comments to the Proposed Plan. The USAF received no requests to extend the public comment period. Responses to comments received during the public comment period are included in the Responsiveness Summary, which is provided in Section 3.

### 2.3.2 Sparrevohn LRRS Community Relations Activities

A Management Action Plan (MAP) report is updated periodically and made available to the public in order to provide a summary of all restoration activities in one document. A MAP is prepared to promote communication between the USAF and the general public during environmental restoration activities at Sparrevohn LRRS. The most recent MAP for the Sparrevohn LRRS was published in 2000 (Shannon and Wilson 2000b).

As required by CERCLA, an Administrative Record (AR) has been established for the Sparrevohn LRRS by the 611th Civil Engineering Squadron (CES) Environmental Restoration Section. The AR is the legal record for the ERP process at USAF installations, and includes copies of all technical reports, regulatory correspondence, meeting minutes, and other documents relied upon for restoration decisions. The AR is located at the 611 CES office at 10471 20th Street, Suite 302, Elmendorf AFB, Alaska. Documents relevant to this ROD are listed in Table

2-1, and references directly cited are included in Section 4.0. A website with some of the documents is available to the public at: http://www.adminrec.com/PACAF.asp?Location=Alaska.

The USAF Community Relations Coordinator, Mr. Tommie Baker (or his replacement), is the POC for the Administrative Record. He can be reached at (907) 552-4506 or 1 (800) 222-4137, and by email at tommie.baker@elmendorf.af.mil.

A mailing list of interested parties in the community is maintained and updated regularly by the Community Relations Coordinator. The mailing list is used to provide interested parties copies of the newsletters, fact sheets, and public meeting notices pertaining to the environmental issues at Sparrevohn LRRS.

A statewide toll-free telephone number (800-222-4137) is available throughout Alaska to enable interested individuals to contact the Air Force 611 CES Community Relations Coordinator at Elmendorf AFB. Interested individuals are encouraged to use this toll-free number to obtain information about the activities at the Sparrevohn LRRS or the ERP process.

## *2.4 Scope and Role of Operable Unit or Response Action*

There are no operable units at the Sparrevohn LRRS. No Further Action at SD002 is appropriate for the projected future land use of the site, satisfies the USAF mission requirements, and is consistent with other remediation activities at the Sparrevohn LRRS facility.

## *2.5 Sparrevohn LRRS Environmental Characteristics*

### 2.5.1 Topography

The road network at Sparrevohn LRRS extends from the relatively flat valley floor at approximately 1,500 feet above mean sea level (amsl) to the surrounding ridge tops at approximately 2,650 to 3,300 feet amsl. The runway and Lower Camp road segments are located on the valley floor, which slopes to the south. The valley floor and the ridge tops are connected by relatively steep switchbacks connecting the Lower Camp at 1,750 feet amsl to the former WACS at 2,650 feet amsl. Several road segments within SD002 run along the ridge-top from approximately 2,650 feet amsl at the WACS, to 3,300 feet amsl at the Upper Camp. The ridge-top is formed by steep slopes falling to the north and south.

### 2.5.2 Climate

Climate data at Sparrevohn LRRS were collected from May 1953 until January 1985. Because SD002 extends from the valley floor to the ridge-top, climate can be expected to vary as a function of elevation; however, the available climate data for the site were collected at Lower Camp at an elevation of 1,580 feet amsl. The average annual precipitation over the period of record was 24.2 inches, including 98.1 inches of snow. The lowest monthly mean precipitation occurs in February (0.83 inches) and the greatest precipitation occurs in August (4.39 inches). The mean annual temperature is 30.1 degrees Fahrenheit ($^{o}$F), with average summer temperatures ranging from 40$^{o}$F to 60$^{o}$F, and average winter temperatures between 0$^{o}$F and 20$^{o}$F. Climate data are provided by the Western Regional Climate Data Center (2008).

### 2.5.3 Geology

Because SD002 extends from the valley floor to the ridge-top, the geology can be expected to vary across the site (Shannon and Wilson 1999). On the ridge-top, bedrock is covered by a thin layer of gravel consisting of broken and weathered bedrock. In the valley, bedrock is overlain by alluvial valley fill material consisting of silty, sandy gravel with trace clay. The alluvial fill material is typically about 15 feet thick in the Lower Camp area, and tends to become thicker to the south. Talus, of variable thickness and consisting of broken bedrock, covers the slope areas.

### 2.5.4 Hydrogeology

The hydrogeology at SD002 varies from the valley floor to the ridge-top. Groundwater does not occur on the ridge-top at SD002 (Shannon and Wilson 1999). In the valley, groundwater occurs as a shallow water table aquifer within the alluvial cover, and as a deeper aquifer within fractured bedrock. Groundwater in the valley discharges to seeps and streams.

### 2.5.5 Surface Water Hydrology

The ridge line between the Upper Camp and the former WACS forms a drainage divide between the Stink River to the north and Hook Creek to the south. Tributaries draining the valley and the Lower Camp area flow into Hook Creek, which is located approximately 3 miles to the southwest. Drinking water is supplied to the Sparrevohn LRRS from a gallery that collects water from the gravels underneath a stream on the west side of the valley (Shannon and Wilson 1999).

### 2.5.6 Ecology

Because SD002 extends from the valley floor to the ridge-top, it encompasses four vegetative habitats (Shannon and Wilson 1999). The ridge-top is largely devoid of vegetation, with the exception of mosses and lichen on rocks, and small patches of dwarf scrub. The hillside vegetation communities are largely transitional as a function of elevation. The higher elevation communities contain dwarf scrub, which gradually changes to low scrub, and eventually tall scrub at the valley floor. The forested lowlands near the valley bottom areas consist of a mosaic of black spruce in moderately-drained soil and mixed white spruce, paper birch, and balsam poplar in wetter soil. Tamarack is also found amongst the black spruce. The understory is dominated by Labrador tea, prickly rose, blueberry, cranberry, and resin birch with a ground cover of near-continuous mat moss and lichen.

The ridge-top and upper hillsides of SD002 offer limited foraging and no cover (Shannon and Wilson 1999). Permanent residents of the upper slopes are limited to small mammals such as marmot, arctic ground squirrel, vole, and possibly pica. Avian species likely to forage on the upper slopes include peregrine falcon, spruce grouse, golden crowned-sparrow, and common redpoll. Rough-legged hawk, golden eagle, willow and rock ptarmigan, black bellied plover, western and rock sandpiper, horned lark, hermit thrush, lapland longspur, and rosy finch are likely to breed on the upper slopes.

The lower slopes and valley bottom provide forage and cover for variety of mammals, including black and brown bear, lynx, cross and red fox, timber wolf, moose, snowshoe hare, vole, masked shrew, field mouse, marten, short-tailed and least weasel, and mink (Shannon and Wilson 1999). Mulchatna caribou, wolverine and coyote are also found in the area. The range of many of these species, including caribou, may result in their transient occupation of the upper slope habitats.

A variety of avian species either resides in, or are seasonal inhabitants of, the forested lowland (Shannon and Wilson 1999). Permanent residents include the boreal owl and gyrfalcon. Seasonal species include Harlan and sharp-shinned hawks, great grey owls, great horned owls, short-eared owls, long tailed jaegers, and ravens. Bald eagles and kingfishers are found on Hook Creek, close to the Kuskokwim River. Lakes and ponds in the drainage area provide habitat for trumpeter swans, sandhill cranes, and white-fronted geese.

Surface water channels on the hillside upgradient of Lower Camp are intermittent and are not likely to contain fish; however, aquatic invertebrates are likely to be present (Shannon and Wilson 1999). Fish surveys on Hook Creek, approximately 5 miles downstream of Sparrevohn LRRS, reported chinook, sockeye, coho, and chum salmon. Other recreational fish species may also include arctic char, Dolly Varden, white fish, northern pike, and grayling.

The drainage off the northern slope is also intermittent, containing aquatic invertebrates, but not fish species (Shannon and Wilson 1999). The surface water from the northern slope drains to Tundra Lake which contains lake trout, blackfish, sheerfish, sucker, and lamprey. Tundra Lake surface water drains to the Stink, Stony, and Kuskokwim Rivers, which contain chinook, sockeye, coho, and chum salmon.

Based on a records search conducted by the Environmental and Natural Resources Institute at the University of Alaska Anchorage, there are no state- or federally-listed sensitive plant or animal communities in the vicinity of Sparrevohn LRRS.

### 2.5.7 Summary of Characterization Activities at the Sparrevohn LRRS

Investigations were completed at SD002 in 1992 and in 1999. During the 1992 investigation, a total of nine surface samples were collected from SD002. Five of the samples were collected from the road surfaces, and four sediment samples were collected from drainages adjacent to the runway. No samples were collected directly from the runway surface, since the area is frequently graded. The samples collected were analyzed for PCBs, a range of pesticide compounds, and organic compounds (Table 2-2). Data obtained from the 1992 investigation were not included in the risk assessment, and not considered in the overall characterization of the site because of the age of the data at the time the risk assessment was conducted, and uncertainty regarding the conditions under which the data were collected (Shannon and Wilson 2000a).

A RI was conducted to develop sufficient data to define a process by which closure could be achieved at each of the eight ERP sites at Sparrevohn LRRS (Shannon and Wilson 1999). As part of the RI, composite soil samples were collected from the runway and five road segments at the installation: 1) the road between Lower Camp and the WACS; 2) the old switchback road to the Upper Camp; 3) the old Weasel Ridge road from the Lower Camp to the ridge-top; 4) the ridge top road between the WACS and the Upper Camp; and 5) the road from the Lower Camp to Landfill No.1 southwest of the runway (Figure 1-2). A near-surface composite soil sample of three discrete samples was collected from each of the road segments. Four discrete samples were included in the composite sample for the runway. Road segment samples were collected in the drainage ditches next to the road, where contaminants would have been washed during snowmelt

## Table 2-2 Summary of Soil Sample Results

| Media | Analyte[1] | Screening Criteria: 18 AAC 75 Cleanup Level (Under 40-Inch Zone) for Soil[2] | 1992 Site Investigation Maximum Concentration[3,5] | 1992 Site Investigation Frequency of Detection[4,5] | 1999 RI/FS Maximum Concentration[3,5] | 1999 RI/FS Frequency of Detection[4,5] |
|---|---|---|---|---|---|---|
| Soil (mg/Kg) | **Fuels** | | | | | |
| | TPH | -- | NS | NA | 138 | NR |
| | DRO | 250 | NS | NA | **480 J[6]** | 3/6 |
| | RRO | 10,000 | NS | NA | 3,000 J | 6/6 |
| | **VOCs** | | | | | |
| | Carbon Disulfide | 12 | 0.00006 | 1/9 | NR | NA |
| | Chlorobenzene | 0.63 | 0.00008 J | 1/9 | NR | NA |
| | Total Xylenes | 63 | 0.0002 J | 2/9 | NR | NA |
| | Toluene | 6.5 | 0.0005 J | 3/9 | NR | NA |
| | 1,2-Dichloroethane | 0.016 | 0.0001 J | 1/9 | NR | NA |
| | 4-Methyl-2-pentanone | -- | 0.002 J | 1/9 | NR | NA |
| | 2-Hexanone | | 0.004 J | 1/9 | NR | NA |
| | Ethylbenzene | 6.9 | 0.0001 J | 1/9 | NR | NA |
| | Styrene | 0.96 | 0.0002 J | 1/9 | NR | NA |
| | Methylene Chloride | 0.016 | NR | NA | **0.024[a]** | 2/6 |
| | Tetrachloroethene | 0.024 | 0.0009 J | 2/9 | 0.0069 | 1/6 |
| | Trichloroethene | 0.020 | 0.0004 J | 1/9 | 0.018 | 1/6 |
| | **RCRA Metals** | | | | | |
| | Antimony | 3.6 | ND (3.6) | 0/1 | 0.34 | 2/6 |
| | Arsenic | 3.9 | **8.7** | 1/1 | **39.1[b]** | 6/6 |
| | Barium | 1,100 | 219 | 1/1 | NR | NA |
| | Beryllium | 42 | 1.2[c] | 1/1 | 0.783 | 6/6 |
| | Cadmium | 5 | ND (0.43) | 0/1 | 0.67 | 6/6 |
| | Chromium | 25 | **85[c]** | 1/1 | **70.3[b]** | 6/6 |
| | Copper | 460 | 71.5[c] | 1/1 | 64.8 | 6/6 |
| | Lead | 400 | 9.5[c] | 1/1 | 16.9 | 6/6 |
| | Nickel | 86 | (see note c) | 1/1 | 75.3 | 2/2 |
| | Selenium | 3.4 | 0.83 J[c] | 1/1 | 2.25 | 5/6 |
| | Silver | 11.2 | ND (1.1)[c] | 0/1 | 0.344 | 2/6 |
| | Thallium | 1.9 | ND (0.43)[c] | 0/1 | 0.84 | 1/6 |
| | Zinc | 4,100 | 155 | 1/1 | 140 | 6/6 |
| | **SVOCs** | | | | | |
| | 2-Methylphenol | 15 | 1.90 | 1/6 | ND/NR* | NA |
| | 4-Methylphenol | 2 | 0.460 | 1/6 | ND/NR* | NA |
| | **PCBs and Pesticides** | | | | | |
| | 4,4'-DDD | 7.2 | 0.033[c] | 3/9 | 0.031 J, T | 1/6 |
| | 4,4'-DDE | 5.1 | 0.042[c] | 6/9 | 0.028 J, T | 3/6 |
| | 4,4'-DDT | 7.3 | 1.0 J | 9/9 | 0.187 J, T | 5/6 |
| | Aldrin | 0.070 | NR | NA | 0.006 T | 1/6 |
| | alpha-chlordane | -- | 0.0031 J | 3/9 | NR | NA |
| | gamma-chlordane | -- | 0.0041 | 3/9 | NR | NA |
| | Heptachlor | 0.28 | 0.0012 J | 2/9 | NR | NA |
| | Endosulfan II | 64 | NR | NA | 0.0013 T | 1/6 |
| | Endosulfan Sulfate | -- | NR | NA | 0.0013 T | 1/6 |
| | Methoxchlor | 23 | NR | NA | 0.42 J | 1/6 |
| | PCB-Aroclor 1260 | 1 | **4.3** | 4/9 | 0.882 J, T | 2/6 |

NOTES:

1 - Only methods and compounds with detections are shown.

2 - Lowest value of direct contact, inhalation, or migration to groundwater shown from 18 AAC 75, Tables B1 and B2, referred to as "Method Two Cleanup Levels" for the Under 40-Inch Zone (ADEC October 9, 2008).

3 - Highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were nondetect.

4 - The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include duplicate samples collected.

5 - 1992 data taken from *Final Site Investigation Report, Sparrevohn LRRS, Alaska. July 1993* (Woodward-Clyde 1993). 1992 data were considered unusable for risk assessment (Shannon and Wilson 2000a)

1999 data were taken from *Sparrevohn LRRS, Alaska Final Remedial Investigation Report, September 1999* (Shannon & Wilson 1999).

The 1992 data are presented for reference. 1992 and prior data were not considered usable in the risk assessment (Shannon and Wilson 2000a).

It was not considered usable for quantitative purposes due to age and unknown conditions during sampling.

6 - This result is below the most stringent Method Two Under-40-Inch Zone cleanup level of 10,250 mg/Kg for direct contact.

a- common laboratory contaminant

b- These compounds were considered to be naturally occurring; concentrations were consistent with background concentrations.

c- This 1992 data are not completely legible in the scanned document available on the web, and may be incorrect.

**Abbreviations**

| | | | |
|---|---|---|---|
| "--" | Screening criteria does not exist for this compound | NS | Not Sampled |
| J | Estimated value | NA | Not Applicable |
| ND/NR* | Total SVOCs were nondetect; individual analytes not reported. | NR | Not Reported |
| T | Due to laboratory problems in 1997, the sample was recollected for this analysis in 1998, and thus may show temporal or spatial variation from other parameters for this sample. | ND | The analyte was analyzed for, but not detected. The PQL is in adjacent parenthesis. |

**Acronyms**

| | | | |
|---|---|---|---|
| AAC | Alaska Administrative Code | TPH | Total Petroleum Hydrocarbons |
| mg/Kg | milligrams per kilogram | DRO | Diesel Range Organics |
| PQL | Practical Quantitation Limit | RRO | Residual Range Organics |
| RI/FS | Remedial Investigation/Feasibility Study | PCBs | Polychlorinated Biphenyls |
| USAF | United States Air Force | VOCs | Volatile Organic Compounds |
| LRRS | Long Range Radar Station | SVOCs | Semivolatile Organic Compounds |
| RCRA | Resource Conservation and Recovery Act | | |

**Bold and shaded** result indicates an exceedance of the 18 AAC 75 cleanup level.
Shaded result indicates an exceedance of one-tenth of the inhalation or direct contact criteria (most stringent).
Per 18 AAC 75.340 (k), a chemical ≥ this value must be included in cumulative risk calculations. This requirement is not applicable to GRO, DRO, RRO, and lead.

or rainfall. The runway samples were collected from holes dug in the runway to the approximate depth of the runway surface during the time of oiling activities. Composite samples were analyzed for DRO, RRO, selected VOCs and SVOCs, PCBs, pesticides, and metals.

Results from the 1999 RI indicated that only diesel range organics (DRO), arsenic, and chromium concentrations exceeded the ADEC cleanup levels listed under18 AAC 75.341(c) and (d). DRO concentrations ranged from non-detect to 480 milligrams per kilogram (mg/Kg), with the greatest concentration occurring in the runway composite sample. Of the six composite samples collected at SD002, only the runway sample exceeded the ADEC soil cleanup level of 250 mg/Kg. Because of the generally low DRO concentrations at SD002 and the fact that petroleum-related risk indicator compounds (e.g., volatile organic compounds [VOCs], semivolatile organic compounds [SVOCs], and polynuclear aromatic hydrocarbons [PAHs]) did not exceed ADEC Method Two cleanup levels, SD002 is not considered a significant source of contamination at either the Upper Camp or Lower Camp exposure areas (Figure 1-1) (Shannon and Wilson 1999).

Although arsenic and chromium concentrations exceeded the ADEC Method Two soil cleanup levels, both metal concentrations were within the range of background concentrations determined for the Sparrevohn LRRS. One of six samples collected at SD002, from the old switchback road leading to the Upper Camp, did have an arsenic concentration approximately two times the background level. However, this sample was isolated, was not associated with any other exceedance of soil cleanup levels, and is not representative of the overall conditions at SD002. Methylene chloride was detected in two of six samples, with one concentration of 0.024 mg/Kg exceeding the soil cleanup level of 0.015 mg/Kg. The methylene chloride detections at SD002 are likely the result of laboratory interference, as methylene chloride is a common laboratory contaminant (Shannon and Wilson 1999).

Because of laboratory control problems with the RI data collected in 1997, many samples were recollected and analyzed in 1998. Twenty-five percent of the DRO and residual range organics (RRO) samples and 20 percent of the polychlorinated biphenyl (PCB) and pesticide samples, as well as a limited number of SVOC samples collected in 1997 were recollected in 1998 (Shannon and Wilson 1999). Ultimately, the RI results incorporated into the risk assessment and feasibility study were determined to be usable and of sufficient quality and quantity for those purposes.

### 2.5.8 Nature and Extent of Contamination

Only low concentrations of contaminants were observed on the runway and roads within SD002. The source of potential contamination at SD002 is from the former practice of road and runway oiling, for the purpose of dust abatement and waste disposal. The practice utilized waste oils, hydraulic fluid, and solvents, and continued at the installation from the 1950s to the mid-1970s.

Results from the 1999 RI indicated that DRO, arsenic, and chromium concentrations exceeded ADEC Method Two soil cleanup levels under 18 AAC 75.341, Tables B1 and B2. A summary of soil sample results is provided in Table 2-2. Soil sample locations are shown on Figure 1-2. At the runway, the DRO concentration of 480 mg/Kg exceeded the ADEC Method Two soil screening level. However, this DRO exceedance was isolated to the runway area, and the concentration was less than a factor of two greater than the soil cleanup level of 250 mg/Kg. In addition, other fuel hydrocarbon-related compounds (e.g., SVOCs) from the runway sample were not detected (Shannon and Wilson 1999).

Arsenic and chromium detections were within the background range of concentrations for all sample locations, with the exception of one arsenic sample collected on the old switchback road leading from the Lower Camp to the Upper Camp (Figure 1-2). At this location, the arsenic concentration was 39.1 mg/Kg, which is approximately 2.5 times the background concentration of 15.6 mg/Kg (Shannon and Wilson 2000a). Although arsenic exceeded the background value, it was not associated with any other compound that exceeded ADEC Method Two soil cleanup levels, and is not attributed to site activities (Shannon and Wilson 1999).

Methylene chloride was also detected in two of six RI samples. One of the two methylene chloride detections had a concentration of 0.024 mg/Kg which exceeded the soil cleanup level of 0.015 mg/Kg (Table 2-2). However, the methylene chloride detections at SD002 are likely the result of laboratory interference, as methylene chloride is a common laboratory contaminant (Shannon and Wilson 1999).

Road oiling was stopped at the site in the mid-1970s. With the exception of residual contamination on the roads and runway, there is no discrete source contributing to further soil contamination. The RI sampling results indicate that while low level concentrations of some compounds associated with road oiling do exist, the compounds are localized, and not representative of site activities.

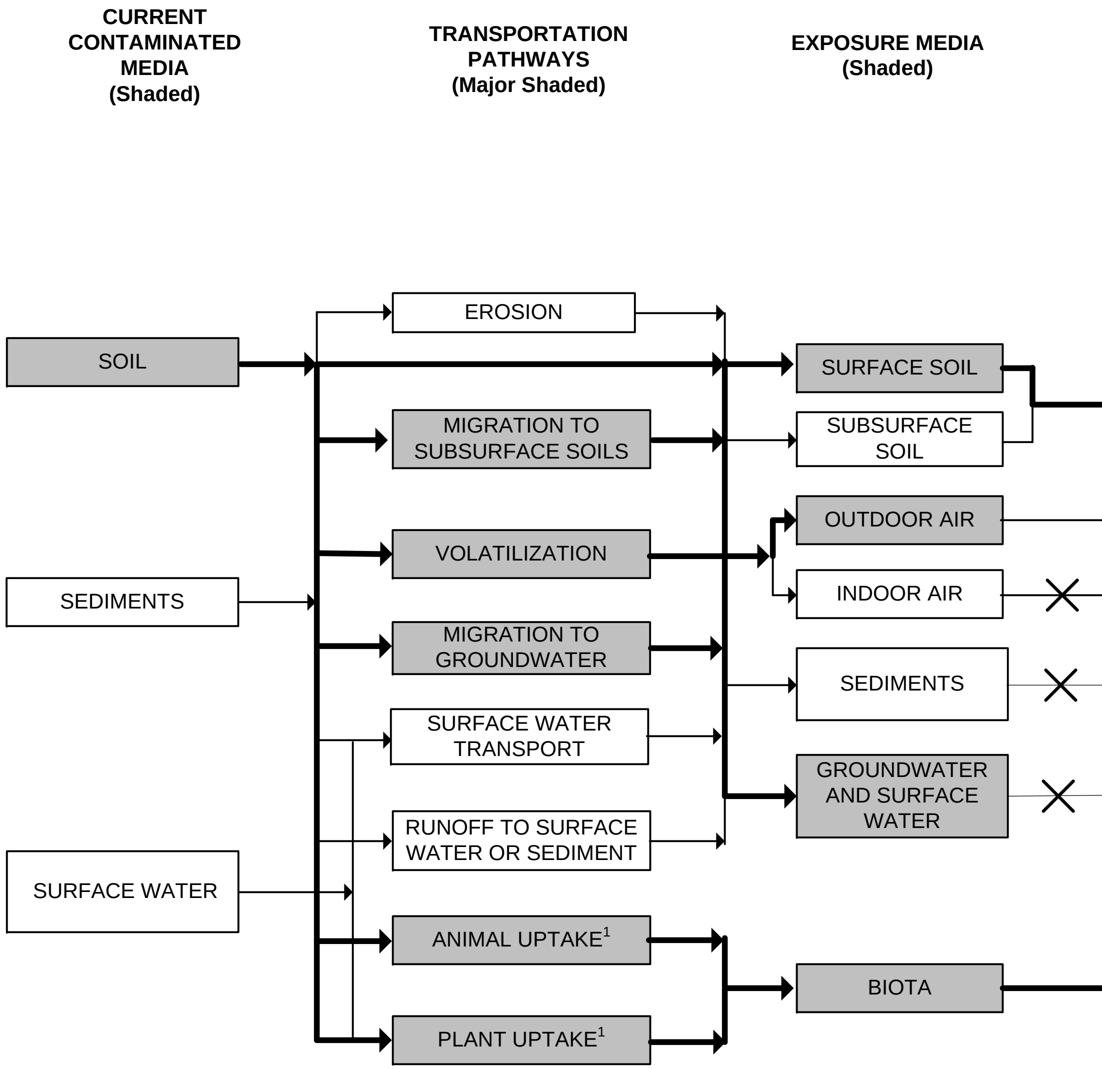
### 2.5.9 Conceptual Site Model

A conceptual site model was developed to depict the potential relationship or exposure pathway between chemical sources and receptors (Figures 2-1 and 2-2). An exposure pathway describes the means by which a receptor can be exposed to contaminated media. For purposes of evaluating human health exposure pathways, it was assumed there were no current permanent residents at the Sparrevohn LRRS. Current site use is limited to periodic site workers. Future exposure pathway scenarios assume that the Sparrevohn LRRS facility will maintain a staff of periodic resident workers.

The primary exposure pathway for both human health and ecological risk at SD002 is via direct contact with contaminated soil (Figures 2-1 and 2-2). Inhalation via volatilization to outdoor air is also considered a complete pathway, but due to the low concentrations of volatiles detected in the soil and the low ambient air temperature, it is a minor pathway. Because no buildings are present at SD002, exposure via indoor air is not a complete pathway for human exposure.

Although future residential land use is considered unlikely at SD002, it has been considered in the human health risk assessment to determine whether the site would be suitable for unrestricted use or unlimited exposure, as described within this ROD.

Figure 2-1  Human Health Conceptual Site Model




| EXPOSURE ROUTE | HUMAN RECEPTORS: CURRENT (Active Facility) | | | | FUTURE | | | |
|---|---|---|---|---|---|---|---|---|
| | SUBSISTENCE | RECREATIONAL | SITE WORKER | RESIDENTIAL | SUBSISTENCE | RECREATIONAL | SITE WORKER | RESIDENTIAL |
| INGESTION | + | + | + | | + | + | + | |
| DERMAL CONTACT | + | + | + | | + | + | + | |
| INHALATION | - | - | - | | - | - | - | |
| INHALATION | | | | | | | | |
| INGESTION | | | | | | | | |
| DERMAL CONTACT | | | | | | | | |
| INGESTION | | | | | | | | |
| DERMAL CONTACT | | | | | | | | |
| INGESTION OF FISH | | | | | | | | |
| INGESTION OF MEAT | - | - | - | | - | - | - | |
| PLANT INGESTION | - | - | - | | - | - | - | |

**X** Pathway Not Complete  **+** Complete Exposure Pathway  **-** Negligible Effect  Primary Pathways

[1] Concentrations may increase due to bioaccumulation.

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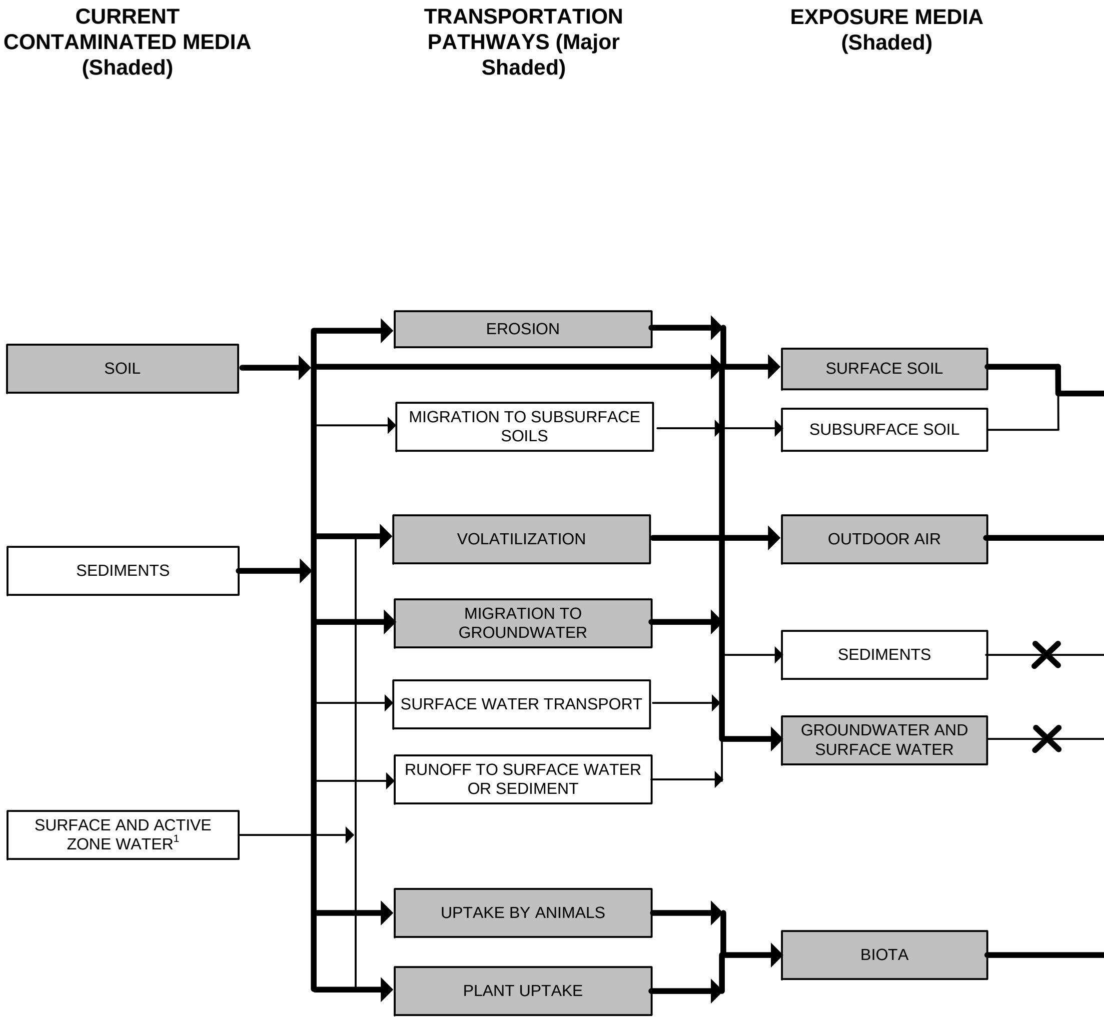
Figure 2-2 Ecological Conceptual Site Model




**ECOLOGICAL RECEPTORS**

| Exposure Route | CURRENT (Active Facility): PLANTS | INVERTEBRATES | BIRDS | MAMMALS | FISH | FUTURE: PLANTS | INVERTEBRATES | BIRDS | MAMMALS | FISH |
|---|---|---|---|---|---|---|---|---|---|---|
| INGESTION | | + | | | | | + | | - | |
| DERMAL CONTACT / UPTAKE | - | - | | - | | - | - | | - | |
| INHALATION | - | - | - | - | - | - | - | - | - | - |
| INGESTION | | | | | | | | | | |
| DERMAL CONTACT / UPTAKE | | | | | | | | | | |
| INGESTION | | | | | | | | | | |
| DERMAL CONTACT / UPTAKE | | | | | | | | | | |
| DERMAL CONTACT / UPTAKE | - | - | - | - | | - | - | - | - | |

**X** Pathway Not Complete **+** Complete Exposure Pathway **-** Negligible Effect ➡ Primary Pathways

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

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## 2.6 Current and Potential Future Land and Resource Uses

### 2.6.1 Land Use

The current land use of SD002 is industrial, as the Sparrevohn LRRS is only used by USAF personnel and their contractors. As the lead agency, the USAF has the authority to determine the future anticipated land use of SD002. After considering input from ADEC, the USAF has determined that land use at SD002 will not change for the foreseeable future. This determination is made considering the following assumptions:

- The USAF plans to retain control of the property for the foreseeable future;
- The USAF does not currently consider the property excess;
- Sparrevohn LRRS is remote and only accessible by air with special permission of the USAF; and
- The nearest settlement is Lime Village, which is located approximately 18 miles north with no road access to the area.

Because there are no settlements within 18 miles of the Sparrevohn LRRS and all site industrial activities occur within the facility boundaries, the current land use for the surrounding area is generally limited to occasional recreational and subsistence activities. The current use of adjacent/surrounding land is expected to remain the same over the foreseeable future.

Prior approval from ADEC will be obtained for any disturbance, movement, or disposal of soil which was subject to 18 AAC 75 (per 18 AAC 75.325(i)).

### 2.6.2 Ground and Surface Water Uses

Groundwater from the shallow alluvial aquifer is used as drinking water at the Sparrevohn LRRS but is not important as a regional drinking water source. Drinking water is currently supplied by a collection gallery located west of the Lower Camp, on a tributary of Sparrevohn Creek. The gallery was installed approximately 20 feet below the streambed and provides drinking water to the residential facility year-round. No drinking water is currently provided to the Upper Camp. No groundwater exists beneath the Upper Camp portion of SD002, and surface water only occurs as runoff from precipitation. Groundwater and surface water do occur beneath the Lower Camp portion of SD002.

## 2.7 Summary of Site Risks

This section summarizes the human health and ecological risk assessments that have been performed at the Sparrevohn LRRS. In accordance with the NCP's requirement for a baseline risk assessment (40 CFR §300.400(d)) to characterize current and potential threats to human health and the environment, risk due to contamination at the Sparrevohn LRRS was evaluated.

A Baseline Human Health and Ecological Risk Assessment (BLRA) was completed in 2000 (Shannon and Wilson 2000a). Based on ADEC comments, a Risk Assessment Addendum (Addendum) was completed in 2002 (USAF 2002a). The objectives of the Addendum were to include the sediment-to-fish contaminant pathway for bioaccumulative chemicals, and additional residential exposure scenarios for the Lower Camp (USAF 2002a). These additional calculations were not applicable to SD002.

The BLRA was not conducted on a site-by-site basis (i.e., no risk assessment was completed specifically for SD002). Rather, the BLRA was completed for five exposure areas that were potentially impacted by the ERP sites. The five exposure areas are the Lower Camp (on-site), Lower Camp (off-site), Northern Hillside/Valley, Upper Camp, and Hook Creek (Figure 1-1) (Shannon and Wilson 2000a).

The findings presented in the BLRA and Addendum indicate that no human health or ecological risk is associated with SD002 (Shannon and Wilson 2000a; USAF 2002a). As a result, no remedial action is necessary to ensure protection of human health and the environment. Therefore, No Further Action is recommended under CERCLA. This recommendation is also compliant with State of Alaska laws and regulations. The following sections provide a summary of the BLRA and Addendum, which are the basis for the No Further Action decision.

### 2.7.1 Summary of Health Risk Assessment

The baseline risk assessment estimates the risks posed by the site if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the approaches used and the results of the baseline risk assessment for the subject site.

There are many uncertainties in assessing risks to people from chemicals occurring in the environment. Uncertainty reflects limitations in knowledge and assumptions that must be made in order to quantify health risks. Risk assessments involve several components, including analysis of toxicity and exposure, each with inherent uncertainty.

#### 2.7.1.1 Identification of COPCs

This section identifies those chemicals associated with unacceptable risk at the site and that are the basis for the proposed remedial action. The data used in the risk calculations were deemed to be of sufficient quality and quantity for their intended use.

The sampling results from the remedial investigations at SD002 were compared against screening criteria to determine whether there were COPCs which require remedial action to protect human health and the environment. The primary soil screening criteria are derived from 18 AAC 75, specifically Method Two soil cleanup levels for the Under 40-Inch climate zone. Method Two soil cleanup levels have been established for specific chemicals which are listed in 18 AAC 75.341, Tables B1 and B2. These concentration levels are protective of human health over long-term exposures under residential land use scenarios. ADEC Method Two soil cleanup levels are risk-based cleanup levels based on a cancer risk management standard of 1 in 100,000 ($1x10^{-5}$) and a hazard index (HI) of 1.0, which are established in 18 AAC 75.325(h).

The screening criteria are protective of human health and the environment. They were selected to be conservative, and are in accordance with the current and projected land use at the site as described in Section 2.6. 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.

A chemical was considered a COPC if it exceeded one-tenth the ADEC Method Two soil cleanup levels in 18 AAC 75.341(c), Table B1, for the Under 40-Inch climate zone, unless further evaluation indicated that the contaminants posed little risk. Petroleum hydrocarbons exceeding the soil cleanup levels in 18 AAC 75.341(c), Table B2, were also considered for retention as COPCs. No COPCs were identified for SD002.

No human health or ecological risks associated with COPCs were identified at SD002. Although DRO, RRO, VOCs, pesticides, PCBs, and metals were detected in soil, all were at generally low concentrations. PCBs were found to exceed one-tenth the Method Two soil cleanup level at one sample location. PCBs were not carried forward as a COPC at SD002 due the single one-tenth exceedance, and the lack of other COPCs designated at the site. In addition, the risk associated with the PCB detection is minimal when considered on an individual site basis. Although methylene chloride was detected and exceeded the ADEC Method Two soil cleanup level (Table 2-2), this compound was determined to be the result of laboratory contamination (Shannon and Wilson 1999). DRO, arsenic, and chromium (Table 2-2) exceeded ADEC Method Two soil cleanup levels listed under 18 AAC 75.341, Tables B1 and B2. These compounds are discussed further below.

Arsenic and chromium concentrations were considered to be naturally occurring when compared with the upper tolerance limits (UTL) for mean background concentrations (i.e., metals concentrations in soil from areas outside of anthropogenic impacts) (Shannon and Wilson 1999). The maximum chromium concentration of 70.3 mg/Kg occurred along the road segment between the Lower Camp and Landfill No. 1 (LF001), and was close to the background UTL concentration of 70.1 mg/Kg (Shannon and Wilson 1999). The maximum arsenic concentration of 39.1 mg/Kg occurred on the switchback road leading to the Upper Camp, and was approximately a factor of two greater than the background UTL of 15.6 mg/Kg. However, given the ubiquitous distribution of arsenic at the site (i.e., arsenic was detected in approximately 95 percent of all samples), the relatively narrow range of arsenic concentrations observed (0.95 to 39.1 mg/Kg), and the fact that site activities did not involve arsenic, arsenic is considered to be naturally occurring (Shannon and Wilson 1999). Although naturally occurring, arsenic and chromium were considered COPCs and were included in the overall risk calculations for the Lower Camp and Upper Camp exposure areas.

DRO exceeded the most conservative ADEC cleanup level of 250 mg/Kg for migration to groundwater in one sample collected at the runway, with a concentration of 480 mg/Kg. However, no petroleum hydrocarbon indicator compounds such as SVOCs (e.g., carcinogenic PAHs) exceeded cleanup levels, indicating that that this occurrence is unlikely to present significant risk. Although the occurrence of DRO is unlikely to present a significant risk, DRO was considered a COPC and included in risk calculations for the Lower Camp and Upper Camp exposure areas (Shannon and Wilson 2000a).

Although sampling data from the 1992 SI are included for reference (Table 2-2; Woodward-Clyde 1993), they were excluded from the 2000 risk assessment because of the age of the data and the unknown site conditions at the time of the sample collection (Shannon and Wilson

2000a).

#### 2.7.1.2 Exposure Assessment

The objectives of the exposure assessment are to characterize potentially exposed human populations in the area associated with the Sparrevohn LRRS facility, to identify actual or potential exposure pathways, and to determine the extent of exposure. The exposure assessment involves several key elements including the following: definition of local land use; definition of local water use; identification of the potential receptors/exposure scenarios; identification of exposure routes; estimation of exposure point concentrations; and estimation of daily doses.

As part of the exposure assessment, a conceptual site model (Figure 2-1) was developed separately for the SD002 site showing the potential human exposure pathways. Complete exposure pathways included ingestion of chemicals in surface soil, and dermal contact by current site workers, recreational users, and subsistence users, as well as uptake by biota.

#### 2.7.1.3 Toxicity Assessment

Human health criteria (cancer slope factors and reference doses [RfD]) developed by the EPA were obtained preferentially from the Integrated Risk Information System database (IRIS; EPA 1999) or the 1997 Health Effects Assessment Summary Tables (HEAST; EPA 1998). In some cases, the National Center for Environmental Assessment toxicity values found in the Region III Risk-Based Concentration Table were used when neither IRIS nor HEAST had data.

The purpose of the toxicity assessment is to select toxicity values (criteria) for each chemical evaluated in the human health risk assessment. The toxicity values are used in combination with the estimated doses to which a human could be exposed to evaluate the potential human health risks associated with each chemical.

For each COPC, carcinogenic and noncarcinogenic effects (where applicable) were considered for the inhalation, dermal contact and ingestion exposure routes. Risk characterization methodology and results are presented below.

#### 2.7.1.4 Risk Characterization

The site specific human health risk assessment was conducted in 2000. Cumulative risk calculations were performed using RI soil data following the ADEC *Risk Assessment Procedure Manual* (ADEC 1998). Cumulative risks for all relevant pathways and populations are described. The risk estimates for carcinogens and noncarcinogens are summarized in Tables 2-3 through 2-6. The results of the human health risk assessment are interpreted within the context of the CERCLA acceptable risk range and ADEC risk management standards, in accordance with 18 AAC 75.325(g). The approaches to calculating carcinogenic and noncarcinogenic compounds and the resulting risk values are presented in this section.

When applying ADEC Method Two cleanup levels to a site, 18 AAC 75.325(g) states that the risks from hazardous substances cannot exceed a cumulative carcinogenic risk of 1 in 100,000 (or $1x10^{-5}$) and a cumulative noncarcinogenic HI of 1.0. As specified in 18 AAC 75.340(k), chemicals that are detected at greater than or equal to one-tenth of the ADEC Method Two direct contact or inhalation cleanup levels must be included when calculating cumulative risk.

Therefore, as part of the screening process, contaminants exceeding one-tenth the ADEC Method Two cleanup levels were identified, and their maximum concentrations were used to calculate the cumulative human health risk in accordance with ADEC guidelines (ADEC 2002).

Analytical data from different areas of SD002 were included in the risk calculations for both the Upper Camp and Lower Camp (on-site) exposure areas (Shannon and Wilson 2000a). The road segments between the Lower Camp and Upper Camp as well as the road segments along the ridge-top were included as part of the Upper Camp exposure area (Figure 1-2). The road segments between the Lower Camp and the landfill, and between the Lower Camp and the runway were included in the Lower Camp (on-site) exposure area (Figure 1-2). Three compounds (arsenic, chromium, and DRO) were identified as COPCs for the Lower Camp and Upper Camp exposure areas based on concentrations exceeding ADEC Method Two cleanup levels in these exposure areas. However, no compounds were retained as COPCs for SD002 based on data collected specifically at the site.

Carcinogenic Risk Approach

For carcinogens, risks are generally expressed as the incremental probability of an individual's likelihood of developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

Where:

> Risk = a unitless probability (e.g., $2 \times 10^{-5}$) of an individual's likelihood of developing cancer
>
> CDI = chronic daily intake averaged over 70 years (mg/kg-day)
>
> SF = slope factor, expressed as $(\text{mg/kg-day})^{-1}$.

These risks are probabilities that usually are expressed in scientific notation (e.g., $1 \times 10^{-6}$). An excess lifetime cancer risk of $1 \times 10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. The Environmental Protection Agency's generally acceptable risk range for site-related exposure is $10^{-4}$ to $10^{-6}$.

Carcinogenic Risk Results

The maximum excess lifetime cumulative cancer risk for the Upper Camp was calculated in the Addendum to be $7.53 \times 10^{-6}$ based on consumption of caribou in the subsistence hunter scenario (USAF 2002a). The maximum excess lifetime cumulative cancer risk for a worker resident at the Upper Camp was $4.16 \times 10^{-6}$ (Shannon and Wilson 2000a; Table 2-3). These values do not exceed ADEC risk management standards.

Evaluating the same risk scenarios for current use at the Lower Camp exposure area, the calculated cumulative human health risk for the recreational or subsistence receptors does not exceed the ADEC risk management standards (USAF 2002a). However, for a Lower Camp resident worker, the excess cumulative lifetime cancer risk is $6x10^{-3}$ (Table 2-4). Although this risk value for the Lower Camp (on-site) exposure area exceeds the ADEC risk management standards, it is not representative of the specific site conditions at SD002, as discussed in the Conclusions section below.

**Table 2-3 Risk Characterization Summary – Carcinogens (Industrial) Upper Camp**

| Medium | Exposure Point | Cumulative Carcinogenic Risk | |
|---|---|---|---|
| **Soil** | On-Site Contact[1,2] | $4.16 \times 10^{-6}$ | |
| | | **Total Risk=** | **$4.16 \times 10^{-6}$** |

**Key:**
**[1] For a worker resident exposed to Upper Camp soil and Lower Camp groundwater.**
**[2] Data from the 2000 BLRA for the Upper Camp combine both ingestion and direct contact exposure routes (Shannon and Wilson 2000a).**

**Table 2-4 Risk Characterization Summary – Carcinogens (Industrial) Lower Camp**

| Medium | Exposure Point | Cumulative Carcinogenic Risk | |
|---|---|---|---|
| | | Ingestion | Direct Contact |
| **Soil** | **Lower Camp soil[1]** | $6 \times 10^{-4}$ | $5 \times 10^{-5}$ |
| | | **Soil risk (Lower Camp) total =** | **$6.5 \times 10^{-4}$** |
| **Groundwater** | **Lower Camp groundwater** | $5 \times 10^{-3}$ | $2 \times 10^{-7}$ |
| | | **Groundwater risk (Lower Camp) total =** | **$5.002 \times 10^{-3}$** |
| | | **Total Risk[3]=** | **$6 \times 10^{-3}$** |

**Key:**
**[1]Data taken from the 2002 Final BLRA Addendum, Remedial Investigation/Feasibility Study, Sparrevohn LRRS, Alaska (USAF 2002a).**

Noncarcinogenic Risk Approach

Noncarcinogenic health effects can range from rashes, eye irritation, and breathing difficulties to organ damage, birth defects, and death. The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a RfD derived for a similar exposure period. An RfD represents a daily individual intake that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of site-related daily intake to the RfD is called a hazard quotient (HQ).

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

Where: CDI = chronic daily intake

RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely.

The HI is generated by adding the HQs for all COPCs at a site that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which an individual may reasonably be exposed. An HI less than 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI greater than 1 indicates that site-related exposures may present a risk to human health.

Noncarcinogenic Risk Results

Based on current land use scenarios evaluated for applicable media in the Upper Camp, no estimated human health risks exceeded ADEC risk management standards (i.e., worker resident, recreational receptor, combined worker resident and recreational receptor, and subsistence hunter) (Shannon and Wilson 2000a). The Upper Camp noncarcinogenic HI was calculated to be 0.07 based on the resident worker scenario (Table 2-5).

In the Lower Camp exposure area, neither the recreational or subsistence receptors exceed the noncarcinogenic ADEC risk management standards (USAF 2002a). However, for a Lower Camp resident worker, the noncarcinogenic HI is 25.2 (Table 2-6). This risk value for the Lower Camp (on-site) exposure area exceeds the ADEC risk management standards, but is not representative of the specific site conditions at SD002, as discussed in the Conclusions section below.

**Table 2-5 Risk Characterization Summary – Non-Carcinogens Upper Camp**

| Medium | Exposure Point | Cumulative Hazard Index | |
|---|---|---|---|
| Soil | Upper Camp (on-site) Soil[1,2] | 0.07 | |
| | | Receptor Hazard Index | **0.07** |
| **Key:** [1]For a worker resident exposed to Upper Camp soil and Lower Camp groundwater. [2] Data from the 2000 BLRA for the Upper Camp combine both ingestion and direct contact exposure routes (Shannon and Wilson 2000a). | | | |

**Table 2-6 Risk Characterization Summary – Non-Carcinogens Lower Camp**

| Medium | Exposure Point | Cumulative Hazard Index | | |
|---|---|---|---|---|
| | | Ingestion and Direct Contact | Inhalation | |
| Soil | Lower Camp Soil[1] | 2.0 | 3.2 | |
| | | | Soil Hazard Index (Lower Camp) total | **5.2** |
| Groundwater | Lower Camp groundwater[1] | 20 | 0.007 | |
| | | | Groundwater Hazard Index (Lower Camp) total | **20.007** |
| | | | Receptor Hazard Index | **25.2** |
| **Key:** [1] Data taken from the 2002 Final BLRA Addendum, Remedial Investigation/Feasibility Study, Sparrevohn LRRS, Alaska (USAF 2002a). | | | | |

Risk Assessment Conclusions

Based on current land use scenarios evaluated for applicable media in the Upper Camp, no estimated human health risks exceeded ADEC risk management standards (i.e., worker resident, recreational receptor, combined worker resident and recreational receptor, and subsistence hunter) (Shannon and Wilson 2000a). Because the Upper Camp risk values are below ADEC risk management standards and no compound in the Upper Camp exposure area corresponding to SD002 exceeds the ADEC Method Two soil cleanup levels, no remedial action is warranted in the Upper Camp portion of SD002 in order to protect human health.

The excess cumulative lifetime cancer risk potentially associated with SD002 is $6x10^{-3}$ (Lower Camp resident worker), and the maximum noncarcinogenic HI is 25.2 (Tables 2-4 and 2-6). These values exceed the ADEC risk management standards. The primary risk drivers for the direct contact and ingestion exposures at the Lower Camp exposure area are arsenic, PCBs, and DRO, and the risk drivers for inhalation are chloroform, cis-1,2 dichloroethane, GRO, and tetrachloroethene (USAF 2002a). However, chloroform, cis-1,2 dichloroethane, GRO, and tetrachloroethene, which contribute to risk at the Lower Camp, were not detected or do not exceed ADEC soil cleanup levels at SD002 (Table 2-2). Additionally, arsenic was determined to be naturally occurring at SD002 and PCBs at SD002 are below ADEC Method Two soil cleanup levels (Shannon and Wilson 1999). As a result, SD002 is not a source for these contaminants and does not contribute to the overall risk calculated for the Lower Camp exposure area. DRO was detected in the Lower Camp area of SD002 at a concentration of 480 mg/Kg, which is lower than the ADEC soil cleanup level for direct contact and ingestion of 10,250 mg/Kg. However, this concentration exceeds the more conservative ADEC Method Two cleanup level of 250 mg/Kg for protection of groundwater via contaminant migration. However, because of the low DRO concentrations and because petroleum-related risk indicator compounds (e.g., SVOCs, and PAHs) do not exceed ADEC cleanup levels, DRO from SD002 is not considered a significant source of contamination to the Lower Camp exposure area (Shannon and Wilson 2000a).

For future land use scenarios, there is no increased risk to either recreational or subsistence receptors in the Lower Camp exposure area (Shannon and Wilson 2000a). However, based on scenarios of potential use of groundwater by future resident workers, at selected locations in the Lower Camp, the cumulative risk would exceed ADEC risk management standards (Shannon and Wilson 2000a). Of the groundwater COPCs identified for the Lower Camp, only chromium and DRO were detected in the Lower Camp portion of SD002 at concentrations exceeding the ADEC Method Two migration to groundwater cleanup level. Chromium was deemed to be naturally occurring (Shannon and Wilson 1999). DRO occurs at the runway segment of SD002 at a concentration of 480 mg/Kg, which is only slightly (less than a factor of two) greater than the ADEC Method Two cleanup level of 250 mg/Kg. Based on the SD002 concentrations of chromium and DRO neither significantly contribute to risk in the Lower Camp exposure area.

### 2.7.2 Summary of Ecological Risk Assessment

This section summarizes the approach and findings of the BLRA (Shannon and Wilson 2000a) and Addendum (USAF 2002a) that were performed at the Sparrevohn LRRS and included SD002.

#### 2.7.2.1 Identification of Chemicals of Concern

No COPCs associated with ecological risk were identified.

#### 2.7.2.2 Ecological Risk Characterization

The ecological risk characterization included a risk estimation and risk description (Shannon and Wilson 2000a). The risk estimation reported significant HQs for each combination of chemicals, indicator species (i.e., flora and fauna species representative of the site), and exposure areas. The HQs were considered indicative of a chemical's potential to pose ecological risk to the indicator species within a given exposure area. The risk description presented a discussion regarding the predicted ecological significance of the risk estimates, based on the uncertainties in the assessment and a weight-of-evidence evaluation.

The HQs for a given indicator species and exposure medium were summed across all media-specific chemicals to obtain HIs for indicator species. The HIs were then summed across all exposure media to obtain the total risk to an indicator species for a given exposure area. A total risk, HI, or HQ of 1 was considered the threshold level at which adverse effects might occur for a particular community or species. For total risk, HI, or HQ between 1 and 10, there was only a small potential for ecological effects, and for total risk between 10 and 100, there was a significant potential for ecological effects (Shannon and Wilson 2000a).

Because soil is the only media of interest at SD002, aquatic and benthic ecological risk is not considered for the site. In the Upper Camp exposure area, the BLRA indicated a potential for risk to plants from PCBs and to soil invertebrates from metals (arsenic, nickel and selenium) (Shannon and Wilson 2000a). In the Upper Camp, PCBs are limited to the Transmitter Pad (SD003). PCBs were not detected in the Upper Camp portion of SD002. Arsenic and nickel are considered to be naturally occurring at SD002, and are therefore not a source of excess ecological risk (Shannon and Wilson 2000a). In the Upper Camp exposure area, selenium represents the greatest potential source of risk to plants. The maximum selenium concentration at SD002 is 2.25 mg/Kg does occur in the Upper Camp portion of SD002. Because the harsh environment at the ridge tops naturally limits the abundance and diversity of plants, the overall ecological effects due to PCBs are likely minimal (Shannon and Wilson 2000a).

In the Lower Camp exposure area, the BLRA concluded that the majority of risk to plants and soil invertebrates was attributed to chromium. However, the exposure point concentration calculated for chromium (59 mg/Kg) is below the background concentration (70.1 mg/Kg) (Shannon and Wilson 2000a), and therefore, chromium from site activities is not considered a risk. Because soil is the only media represented at SD002, the Lower Camp exposure area aquatic and benthic risks were not considered applicable and were not considered.

In the Lower Camp exposure area, DRO-aliphatic, RRO-aliphatic, RRO-aromatic, metals, and PCBs represent a potential risk to upper trophic species such as rock ptarmigan, masked shrew, Lapland longspur, and mink (Shannon and Wilson 2000a). However, because exposure point concentrations for metals are less than background levels, metals from site operations are not considered an ecological risk. Excluding metals, the overall ecological risk posed to rock ptarmigan, Lapland longspur, and mink by DRO-aliphatic, RRO-aliphatic, and RRO-aromatic is very low (Shannon and Wilson 2000a).

Risks to the masked shrew are mostly from DRO-aliphatic, RRO-aliphatic, and RRO-aromatic. The risks from these petroleum compounds are assessed using a surrogate approach (Shannon and Wilson 2000a). The surrogate approach assumes one hydrocarbon compound within the carbon range of each group (e.g., DRO is carbon number 10 to 25) is present and representative of the toxicity for the entire group (e.g., DRO-aliphatic, RRO-aliphatic, and RRO-aromatic).

However, because the petroleum products at the site are likely weathered, many of the surrogate compounds may not even be present, and as a result the toxicity of DRO and RRO may be overestimated (Shannon and Wilson 2000a). The magnitude of the overestimation of risk is unknown, and therefore it is possible that petroleum compounds pose a significant risk to the masked shrew. Although DRO concentrations (up to 480 mg/Kg) exceed the ADEC Method Two soil cleanup level (250 mg/Kg) in the runway composite sample at SD002, no fuel related hydrocarbon compounds, such as PAHs, were detected, suggesting that DRO presents low risk at the site. Additionally, the limited extent of occurrence and low concentrations of DRO in soil at SD002 would also indicate that risk from DRO is not significant. As a result, remedial action at SD002 would have little effect on ecological risk at the Sparrevohn LRRS.

### 2.7.3 Basis for Action

Arsenic, chromium, and DRO were detected at levels exceeding the ADEC Method Two soil cleanup levels at SD002. However, arsenic and chromium were not retained as COPCs, as concentrations of these contaminants fall within the respective background ranges for Sparrevohn LRRS. In addition, DRO only exceeds the ADEC Method Two cleanup level at one location, and is less than a factor of two greater than the cleanup level.

Because of the overall low contaminant concentrations and minimal estimated human health and ecological risk, no remedial action is required under CERCLA or State of Alaska regulations (18 AAC 75) to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances.

Prior approval from ADEC will be obtained for any disturbance, movement, or disposal of soil which was subject to site cleanup rules (per 18 AAC 75.325(i)). Placement of soils in environmentally sensitive areas, such as wetlands or waters, which could cause a violation of water quality standards (i.e., sheening) is prohibited.

## *2.8 Documentation of Significant Changes*

The Proposed Plan for SD002 was released for public comment on October 6, 2008 (HCG 2008). The Proposed Plan identified No Further Action and closure under Alaska State laws and regulations as the preferred alternative for the site. The USAF reviewed all written and verbal comments submitted during the public comment period. Although public comments were received for the Proposed Plan, none were applicable to SD002. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

# 3.0 Responsiveness Summary

This section provides a summary of the public comments regarding the *Proposed Plan for Seven Sites at the Sparrevohn Long Range Radar Site* (HCG 2008). At the time of the public review period, the USAF had selected No Further Action under CERCLA and closure under Alaska State laws and regulations for the Road and Runway Oiling Area (SD002). Although written comments were received on the Proposed Plan, none were applicable to SD002, and as a result no response summary is required.

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