



**611TH AIR SUPPORT GROUP  
611TH CIVIL ENGINEER  
SQUADRON  
ELMENDORF AFB, ALASKA**

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**KING SALMON AIR STATION  
KING SALMON, ALASKA  
INSTALLATION RESTORATION PROGRAM**

## **RECORD OF DECISION FOR FINAL REMEDIAL ACTION**

**Sites:   Groundwater Zone OT028 (Zone 2)  
          Waste Accumulation Area 3 (SS017)  
          Eskimo Creek Dump (SS022)  
          Refueler Shop (SS021)  
          Old Power Plant Building (SS020)**

**December 2002**

**RECORD OF DECISION  
FOR  
FINAL REMEDIAL ACTION**

GROUNDWATER ZONE OT028 (ZONE 2)  
WASTE ACCUMULATION AREA 3 (SS017)  
ESKIMO CREEK DUMP (SS022)  
REFUELER SHOP (SS021)  
OLD POWER PLANT BUILDING (SS020)  
KING SALMON AIR STATION  
KING SALMON, ALASKA

DECLARATION,  
DECISION SUMMARY,  
AND  
RESPONSIVENESS SUMMARY

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## **TECHNICAL DOCUMENT TO SUPPORT INSTALLATION RESTORATION DECISION DECLARATION**

### **SITE NAME AND LOCATION**

Installation Restoration Program (IRP) Sites Groundwater Zone OT028 (known as Zone 2), SS017 (Waste Accumulation Area 3), SS022 (Eskimo Creek Dump; also formerly known as LF022), SS021 (Refueler Shop), and SS020 (Old Power Plant Building), located within the base industrial area at King Salmon Air Station (KSA), Alaska.

### **STATEMENT OF BASIS**

This record of decision (ROD) presents the selected remedies for OT028, SS017, SS022, SS021, and SS020. This document has been developed in accordance with the Defense Environmental Restoration Program, 10 *United States Code* (USC) 2701, consistent with Alaska Department of Environmental Conservation (ADEC) Oil and Hazardous Substances Pollution Control Regulations (18 Alaska Administrative Code [AAC] 75), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 USC 9601 and Executive Order 12580 (52 *Federal Register* 2923), and with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 *Code of Federal Regulations* (CFR) 300].

This decision is based on information contained in the Administrative Record, including but not limited to the results of an IRP Records Search, Site Investigations (1987 through 1993), a Remedial Investigation (RI) (1995), a Feasibility Study (FS) (1997), a natural attenuation study (1997), and a focused FS and sampling event (2000).

### **ASSESSMENT OF SITE**

Historical spills and operational practices at the base industrial area have led to contamination of the soil and groundwater with petroleum-based products, specifically diesel-range organics (DRO), gasoline-range organics (GRO), and volatile organic compounds (VOCs) including trichloroethene (TCE) and benzene, toluene, ethylbenzene, and xylenes (BTEX).

Numerous environmental investigations have been performed to evaluate contamination at the KSA Base Industrial Area. RIs were completed between 1989 and 1995 to evaluate the nature and extent of contamination in the soils and groundwater at the KSA Base Industrial Area. Surface water and sediment sampling was performed every year from 1996 through 2000; in addition, aquatic biota and human food chain samples were collected during 1996, 1997, and 1999. A comprehensive FS was completed for all KSA sites in 1997 (EMCON, 1997a). A 1997 monitored natural attenuation study in the Base Industrial Area indicated that additional data were needed to assess whether monitored natural attenuation was adequate to address the dissolved TCE plume.

A soil and groundwater investigation and focused FS was completed in August 2001 to fill in data gaps in the site characterization and to augment the KSA FS. The focused FS was limited to evaluating remedial alternatives for OT028 groundwater.

A Proposed Plan for Final Remedial Action was prepared and distributed in March 2002.

Remedial actions implemented within the Base Industrial Area are listed below:

- Underground Storage Tanks (USTs) were removed from eight buildings in the base industrial area (Buildings 150, 154, 157, 159, 162, 305, 306, and 307).
- Bioventing systems are currently operating at four separate sites in the base industrial area (near Buildings 154, 157/159 (remediated as one site), 306, and 307).
- Two other IRP sites located within the base industrial area (DP013 and OT018) were addressed in a No Further Response Action Planned (NFRAP) decision document that was signed in 1995.

Based on current site conditions at the KSA Base Industrial Area, actual releases of contaminants from this site, if not addressed by implementing the response actions selected in this Final ROD, could present an imminent or substantial threat to public health, welfare, or the environment. Consequently, action to ensure protection of human health and the environment is warranted.

### **DESCRIPTION OF THE SELECTED REMEDIES**

The selected final remedies for the five subject sites address the risk to human health and the environment caused by hypothetical exposure to petroleum hydrocarbon constituents and the chlorinated solvent, TCE, in site soil, groundwater, and surface water. Exposure is considered hypothetical because under current site conditions and land use there is no exposure to contaminated media. Remedial Action Objectives (RAOs) for these media and contaminants of concern are presented in the table on page *iv*.

The selected final remedies for each IRP site are summarized below. Institutional controls, which are recorded land use restrictions, are a required component of the selected remedies. Only water from the C-Aquifer, the current source of water for KSA, will be used for drinking. Drinking water wells will not be installed in the A- and B-Aquifers in Zone 2 (OT028) or Eskimo Creek Dump (SS022). Excavations and other subsurface activities will be restricted from sites SS020 (Old Power Plant Building), SS021 (Refueler Shop), and SS022 (Eskimo Creek Dump). The institutional controls will be documented in the base master plan and state land records.

#### **Site to be Closed without Required Remedial Action**

**SS017 (Waste Accumulation Area 3):** No contamination was detected above ADEC regulatory levels at SS017. No action is required at this site.

#### **Sites to be Transferred to UST Compliance Program**

**SS021 (Refueler Shop) and SS020 (Old Power Plant):** These two sites will be transferred to the UST compliance program for continued remediation, because site contamination is associated with state-regulated USTs. Bioventing has already been implemented at selected locations (Buildings 154, 157/159, 306, and 307) within these sites under the UST compliance program. Although the completion of site remediation will occur under the control of the UST compliance program, and not the IRP program, the components of the final remedy are listed below for information purposes:

- Continuation of the *in situ* bioventing currently underway at selected locations until RAOs are met as determined by performance testing and subsurface soil confirmation sampling,
- Intrinsic remediation of contaminated soil located outside of the bioventing systems' area of influence,
- Institutional controls (documented in the base master plan and state land records) to minimize human contact with contaminated soil (e.g., institutional controls will restrict excavations and other subsurface activities at the site),
- Annual long-term groundwater monitoring with a five year review, and
- Soil sampling to confirm that cleanup levels have been achieved.

#### **Site Requiring Final Cleanup Action and NFRAP**

**SS022 (Eskimo Creek Dump):** The Eskimo Creek Dump will be addressed by a vegetated soil cap with long-term monitoring. The final remedy for this site includes the following components:

- Removing surface debris as needed;

- Filling in surface depressions to facilitate surface water drainage and minimize ponding;
- Revegetating the cap surface where needed;
- Using institutional controls (documented in the base master plan and state land records) to restrict excavations and other subsurface activities at the landfill;
- Installing new monitoring wells; and
- Annual long-term groundwater and surface water monitoring with a five-year review consistent with a comprehensive monitoring plan to be developed by the agencies.

It is anticipated that groundwater monitoring will include sampling for VOCs, GRO, and DRO for the first five years. Surface water monitoring will likely include VOCs; there is no need to sample surface water for GRO and DRO since trends have already been established and there are no regulatory criteria for these parameters.

### **Site Requiring Final Cleanup Action and Closure**

**OT028 (Groundwater Zone 2):** The final remedy for this site is monitored natural attenuation (MNA) of the TCE, BTEX, and GRO plumes. MNA is the most cost-effective groundwater remedy evaluated and will meet RAOs for the site as long as the following two conditions are met:

- Contaminant levels show a decreasing trend with a predicted end point of reaching cleanup levels within 25 years; and
- Contaminants (specifically TCE) detected at the points of compliance may not exceed action levels shown in the RAOs Table on page *iv*. Points of compliance refer to one or more of the groundwater monitoring wells or well points adjacent to Eskimo Creek. Use of the action levels at the points of compliance is considered protective of ecological receptors in Eskimo Creek by the state of Alaska.

If long-term monitoring does not indicate that cleanup levels will be met within 25 years, or if action levels are exceeded, then the United States Air Force (USAF) may need to implement an active remediation technique. Compliance with these two conditions will be evaluated by annual groundwater and surface water monitoring results and the results of groundwater modeling every five years. If active remediation becomes necessary, potential remedial techniques would be evaluated at that time.

MNA includes the following components:

- Institutional controls (documented in the base master plan and state land records) to restrict installation of drinking water wells or other intrusive activities that would not be appropriate during remediation;
- Installing new monitoring wells, if necessary;
- Annual groundwater and surface water monitoring with a five year review consistent with a comprehensive monitoring plan to be developed by the agencies; and
- Groundwater modeling every five years.

It is anticipated that groundwater monitoring will include sampling for VOCs, GRO, DRO, and MNA parameters for the first five years. Surface water monitoring will likely include VOCs; there is no need to sample surface water for GRO and DRO since trends have already been established and there are no regulatory criteria for these parameters. After the site MNA conditions have been established and evaluated during the five-year review, sampling for MNA parameters may be performed on a less-frequent basis.

Remedial Action Objectives for IRP Sites in the KSA Base Industrial Area									
Site Data				Screening and Regulatory Criteria				RAOs	
Contaminants of Concern	Maximum Conc.	Maximum Conc. Location (Date)	Maximum Conc. 2000 data	Ecological Screening Criteria	Basis	ADEC Regulatory Criteria	Basis	Action Level at POC*	Cleanup Level or ARAR
<b>A-Aquifer Groundwater (mg/L)</b>									
TCE	0.750	(1988) <sup>a</sup>	0.062 (MW00-05)	--	--	0.005	18AAC75	0.35	0.05 <sup>b</sup>
cis-1,2-DCE	0.13	145 (1996)	0.053 (MW00-02)	--	--	0.07	18AAC75	0.59	0.7 <sup>b</sup>
Benzene	2.0	(1988) <sup>a</sup>	0.48 (MW00-04)	--	--	0.005	18AAC75	0.046 <sup>c</sup>	0.05 <sup>b</sup>
Ethylbenzene	2.3AX	MW-708 (1997)	1.700 (MW00-04)	--	--	0.7	18AAC75	0.29 <sup>c</sup>	7 <sup>b</sup>
Toluene	7.8	AP-12 (1994)	3.4 (MW00-04)	--	--	1.0	18AAC75	0.13 <sup>c</sup>	10 <sup>b</sup>
DRO	26.1	B-06 (1993)	13.0 (MW00-03)	--	--	1.5	18AAC75	na	15 <sup>b</sup>
GRO	30	MW00-04 (2000)	30 (MW00-04)	--	--	1.3	18AAC75	na	13 <sup>b</sup>
<b>Surface Water (mg/L)</b>									
TCE	0.013 <sup>d</sup>	SS-7 (1997)	NS	0.35	Ecotox	0.005	18AAC70	--	0.005
Cis-1,2-DCE	0.0014	138 (1993)	NS	0.59	ORNL	0.07	18AAC70	--	0.07
<b>Soil (mg/kg)<sup>e</sup></b>									
DRO	12,100	VP-9 at 19 ft bgs (1998)	28 (MW00-03 at 9 ft bgs)	--	--	250	18AAC75	--	2,500 <sup>b</sup>
Benzene	1.8	(1988) <sup>a</sup>	ND	--	--	0.02	18AAC75	--	0.2 <sup>b</sup>
Ethylbenzene	94	629 (1994)	0.25 (MW00-04 at 13 ft bgs)	--	--	5.5	18AAC75	--	55 <sup>b</sup>
Toluene	97	629 (1994)	ND	--	--	5.4	18AAC75	--	54 <sup>b</sup>
TCE	1.7	(1988) <sup>a</sup>	0.066 (MW00-05 at 15 ft bgs)	--	--	0.027	18AAC75	--	0.27 <sup>b</sup>

\* Action levels at the POC (defined further in the glossary) refer to groundwater concentrations detected in monitoring wells adjacent to Eskimo Creek that would signal the need for active groundwater cleanup for protection of the creek. The action levels are equal to the surface water ecological screening criteria. Note that there have been no exceedences of the action levels at the POC; the maximum groundwater concentrations shown in Table 1 were not detected at locations adjacent to Eskimo Creek.

<sup>a</sup>This information was obtained from the EMCON, 1995 KSA RI, which did not provide specific sample locations. The RI stated that the results were obtained from 1988 sampling by the Corps of Engineers at the Refueler Shop site.

<sup>b</sup>Basis for the soil and groundwater cleanup levels is 18 AAC 75 using the tabulated cleanup levels (Table B1 and B2 for soil and Table C for groundwater) adjusted (multiplied by ten) for the situation where groundwater is determined to not be a drinking water source.

<sup>c</sup>These action levels correspond to the USEPA Ecotox (defined below in "Definitions") thresholds for surface water.

<sup>d</sup>The reported TCE concentration was detected in a sample from Eskimo Creek Dump surface water (not from Eskimo Creek itself). TCE has been detected in only one sample from Eskimo Creek adjacent to Groundwater Zone 2 (0.00055 mg/L in 1999). TCE was also detected in a 1997 surface water sample collected from Eskimo Creek upgradient of Zone 2; the detection is considered to be unrelated to Zone 2 impacts.

<sup>e</sup>Sediment has been investigated and is not considered a medium of concern because no criteria were exceeded.

**Definitions:**

18AAC75 = Oil and Hazardous Substances Pollution Control Regulations (ADEC, 2002a)	18AAC70 = Alaska Water Quality Standards (ADEC, 1999)
POC = point of compliance	ARAR = applicable or relevant and appropriate requirement
DRO = diesel-range organics	TCE = trichloroethene
NS = Not sampled	-- Not applicable
J = Estimated value	AX = Sample too dilute to quantify surrogate
mg/L = milligrams per liter	mg/kg = milligrams per kilogram
	RAO = remedial action objectives
	ND = not detected
	bgs = below ground surface

Ecotox = USEPA Office of Solid Waste and Emergency Response (OSWER) Ecotox Threshold benchmark values for freshwater (ECO Update, Publication 9345.0-12FSI; EPA 540/F-05/038, January 1996)

ORNL = Oak Ridge National Laboratory Preliminary Remediation Goal for Ecological Receptors (RAIS database at [http://risk.lsd.ornl.gov/rap\\_hp.shtml](http://risk.lsd.ornl.gov/rap_hp.shtml), 2002)

**STATUTORY DETERMINATIONS**

The final remedies documented in this ROD are protective of human health and the environment. The remedies are cost-effective and comply with all applicable or relevant and appropriate federal and state requirements. The remedies also satisfy the statutory preference for treatment as a principal element of the remedy. Because the remedies will result in hazardous substances remaining on-site above risk-based levels, they will be reviewed by USAF and ADEC at a frequency of not less than once every five years after implementation to evaluate if the remedies continue to be effective and appropriate. Input from Federal and State trustees, King Salmon Village Council, Naknek Village Council, South Naknek Native Village Council, and the King Salmon Restoration Advisory Board (RAB) will be solicited prior to implementing any significant changes. These decisions may be reviewed and modified in the future if new information becomes available which indicates the presence of previously undiscovered contamination or exposure routes that may cause a risk to human health or the environment.



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18 Dec 02

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Signed

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18 Dec 2002

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## ABBREVIATIONS AND ACRONYMS

611th CES	611th Civil Engineer Squadron
AAC	Alaska Administrative Code
AAC	Alaska Air Command
ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
ARARs	Applicable or Relevant and Appropriate Requirements
AWQS	Alaska Water Quality Standards (18 AAC 70)
bgs	Below Ground Surface
BLM	Bureau of Land Management
Bristol	Bristol Environmental and Engineering Services
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
COC	Contaminants of Concern
COD	Chemical Oxygen Demand
COPCs	Contaminants of Potential Concern
CRP	Community Relations Plan
DO	Dissolved Oxygen
DRO	Diesel-Range Organics
EMCON	EMCON Alaska, Inc.
ES	Engineering Science
FAA	Federal Aviation Administration
FS	Feasibility Study
GRO	Gasoline-Range Organics
HI	Hazard Index
HQ	Hazard Quotient
HRC	Hydrogen Releasing Compound
IRP	Installation Restoration Program
KSA	King Salmon Air Station
LFI	Limited Field Investigation
MCL	Maximum Contaminant Level
MEK	Methyl Ethyl Ketone
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Not Detected
NFRAP	No Further Response Action Planned
NORAD	Northern American Aerospace Defense Command
O&M	Operation and Maintenance
OASIS	OASIS Environmental, Inc.
ORNL	Oak Ridge National Laboratory
PCB	Polychlorinated Biphenyl
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study

### **ABBREVIATIONS AND ACRONYMS (cont.)**

RME	Reasonable Maximum Exposure
ROD	Record of Decision
SAIC	Science Applications International Corporation
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compounds
TCA	Trichloroethane
TCE	Trichloroethene
TRPH	Total Recovered Petroleum Hydrocarbon
UCL	Upper Confidence Level
USAF	United States Air Force
USC	United States Code
USDOI	U.S. Department of Interior
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

### **UNITS OF MEASURE**

F	Fahrenheit
gpm	Gallons Per Minute
mg/kg	Milligrams Analyte per Kilogram of Sample
mg/L	Milligrams Analyte per Liter of Sample

## **PART II**

### **DECISION SUMMARY**

#### **Five Installation Restoration Program Sites at the King Salmon Air Station Base Industrial Area**

# 1 INTRODUCTION

This Final Record of Decision (ROD) details the remedial actions selected by the United States Air Force (USAF) to clean up soil and groundwater contamination at the base industrial area at the King Salmon Air Station (KSA), Alaska. Five sites located at the base industrial area are addressed in this ROD: Groundwater Zone 2 (OT028), Waste Accumulation Area 3 (SS017), Eskimo Creek Dump (SS022), Refueler Shop (SS021), and the Old Power Plant Building (SS020). Also included in this ROD are discussions of the physical site features, a summary of site investigation and remedial actions already performed, a summary of site risks, documentation of the remedial action selection process, and an evaluation of applicable or relevant and appropriate requirements (ARARs) that govern action at the sites.

This document also states how the determination satisfies requirements of the Defense Environmental Restoration Program, 10 *United States Code* (USC) 2701, consistent with Alaska Department of Environmental Conservation (ADEC) Oil and Hazardous Substances Pollution Control Regulations [18 Alaska Administrative Code (AAC) 75], the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and to the extent practicable with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 *Code of Federal Regulations* (CFR) 300].

USAF has completed a remedial investigation, two feasibility studies, human health and ecological risk assessments, a monitored natural attenuation analysis, and additional sampling at the base industrial area. The results of the various investigation activities and the risk assessments were used to determine the need for remedial action at the base industrial area.

There are three general types of contamination present at the base industrial area:

- Dissolved-phase trichloroethene (TCE),
- Dissolved-phase petroleum product (diesel-range organics [DRO], gasoline range organics [GRO], and benzene, toluene, ethylbenzene, and xylenes [BTEX], and
- Residual petroleum product in soils.

Remedial actions implemented within the Base Industrial Area are listed below:

- Underground Storage Tanks (USTs) were removed from eight buildings in the base industrial area (Buildings 150, 154, 157, 159, 162, 305, 306, and 307).
- Bioventing systems are currently operating at four separate sites in the base industrial area (near Buildings 154, 157/159 (remediated as one site), 306, and 307).
- Two other IRP sites located within the base industrial area (DP013 and OT018) were addressed under a No Further Response Action Planned (NFRAP) decision document that was signed in 1995.

A Proposed Plan for Final Remedial Action was prepared in March 2002. The Proposed Plan, presented here as Appendix B, outlined preferred remedial alternatives for each site. After consideration of public comments, the preferred remedial alternatives were selected. The selected alternatives for final remedial action are documented in this Final ROD.

The selected actions are summarized below:

- Administrative closure (transferal to the UST compliance program for continued remediation) for sites SS020 and SS021;
- Continued operation of four bioventing systems until cleanup levels are met;
- Removal of surface debris and installation of a limited soil cap over the Eskimo Creek Dump;
- Annual monitoring of groundwater and surface water to assess remediation progress;
- Modification of appropriate land records and planning documents to restrict the installation of drinking water wells and soil excavation; and
- Presentation of monitoring results to USAF, ADEC, USEPA, Naknek/South Naknek Native Village Council, King Salmon Village Council, Federal and State trustees, and the King Salmon Restoration Advisory Board (RAB).