

R E C E I V E

FEB 06 2001

DEPARTMENT OF
ENVIRONMENTAL CONSERVATION



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

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

**RECORD OF DECISION FOR
INTERIM REMEDIAL ACTION**

Site: Groundwater Zone OT027 (Zone 1)

NOVEMBER 2000

ORIGINAL



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**GROUNDWATER ZONE OT027 (ZONE 1)
KING SALMON AIR STATION
KING SALMON, ALASKA**

**DECLARATION,
DECISION SUMMARY,
AND
RESPONSIVENESS SUMMARY**

Prepared for:

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TECHNICAL DOCUMENT TO SUPPORT INSTALLATION RESTORATION DECISION

DECLARATION

SITE NAME AND LOCATION

Installation Restoration Program (IRP) Site Groundwater Zone OT027 (known as Zone 1), located at King Salmon Air Station, Alaska. Four source areas have potentially contributed to the contamination at Zone 1: Dry Well Site (DP023); Eskimo Creek (SS011); POL Tanks (SS015); and the MOGAS Station (SS019).

STATEMENT OF BASIS

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 (1997-1998), and a focused FS (1999).

Remedial actions have been implemented at a number of the sources of contamination:

SS011 (Eskimo Creek) – Two French drains were installed and all ground water collected is treated by activated carbon;

SS015 (POL Tanks) – Three of the four POL tanks have been taken out of service, and the one remaining tank has been reconditioned in accordance with ASTM standards;

SS019 (MOGAS Station) – The site currently is being biovented and has been administratively closed as an IRP site and ADEC contaminated site. SS019 currently is being managed by the 611th Compliance Section under regulatory oversight from ADEC's Storage Tank Program; and

DP023 (Dry Well Site) – The dry well was excavated, contaminated soil was removed from ground surface to the top of the groundwater smear zone and placed into a bioremediation cell, and the site was backfilled with clean fill.

This Interim Record of Decision (ROD) presents the selected interim remedial action for Zone 1 groundwater contamination and administrative site closure for DP023 and SS019 within Zone 1. Remaining contamination in other site media (e.g., soil) will be addressed in the Final ROD at a later date. 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 (CERCLA), 42 USC 9601 and Executive Order 12580 (52 *Federal Register* 2923), and with the National Oil and Hazardous Substances Pollution Contingency Plan [40 *Code of Federal Regulations* (CFR) 300].

ASSESSMENT OF SITE

Historical spills and operational practices at Zone 1 have led to contamination of the water table with petroleum-based products, specifically petroleum product floating on the groundwater, diesel range organics (DRO) dissolved in the groundwater, and volatile organic compounds (VOCs) including trichloroethene (TCE) dissolved in the groundwater. Four source areas have potentially contributed to the contamination at Zone 1: Dry Well Site (DP023); Eskimo Creek (SS011); POL Tanks (SS015); and the MOGAS Station (SS019).

In 1981 and 1990, floating product recovery pumps and French drains were installed along Eskimo Creek to intercept petroleum product seeping from the creek's banks. A permanent groundwater treatment system was installed in the early 1990s to treat the petroleum-contaminated water.

An RI was completed between 1989 and 1993 to evaluate the nature and extent of contamination in the soils and groundwater in Zone 1. A-aquifer product recovery wells installed near the POL Tanks in 1992 were never operated because insufficient product was

accumulated within the wells. In 1994, the Dry Well (DP023) was excavated, contaminated soil was removed from ground surface to the top of the groundwater smear zone and placed into a bioremediation cell, and the site was backfilled with clean fill (611 CES, 1994).

A comprehensive FS was completed for all KSA sites in 1997 (EMCON, 1997a). Subsequently, a Proposed Plan for Remedial Action was prepared in October 1997. However, a 1997-98 monitored natural attenuation study indicated that floating petroleum product (diesel fuel floating on the groundwater) was more extensive than previously believed, and monitored natural attenuation would not be adequate to address the floating petroleum product in a reasonable timeframe.

A focused FS was completed in July 1999 to identify more aggressive remedial alternatives for remaining site contamination. A wetland/biota study showed that the preferred remedial alternative identified in the focused FS was adequate to protect aquatic resources. A new Proposed Plan for Interim Remedial Action was prepared and distributed in August 1999.

Based on current site conditions at Zone 1, actual releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this Interim ROD, could present an imminent or substantial threat to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected interim remedy for Zone 1 addresses the risk to human health and the environment caused by hypothetical exposure to petroleum product floating on groundwater and TCE-contaminated groundwater, surface water, and sediment. Other contaminants of concern include the TCE degradation products cis- and trans-1,2-dichloroethene (DCE), 1,1-DCE, and VC (VC). Remedial Action Objectives (RAOs) for these media and contaminants of concern are presented in the following table. Other contamination present in Zone 1 (e.g., dissolved diesel-range organics [DRO] and VOCs in groundwater and site soil) will be addressed in the Final ROD at a later date. The selected interim remedy includes the following components:

Floating Petroleum Product Recovery. An estimated 14,000 to 54,000 cubic feet (105,000 to 404,000 gallons) of floating petroleum product (measured in 1998) is present on the water table at Zone 1. The contamination encompasses an area of approximately 410,000 square feet. Dual-phase extraction (DPE) techniques will be used to actively recover floating petroleum product to the extent practicable. The estimated timeframe for removal is 10 years. The vacuum applied by the DPE system will enhance monitored natural attenuation in the smear zone and dissolved-phase plume. Groundwater monitoring will occur during and after DPE system remediation. Following removal of floating petroleum product, the progress of monitored natural attenuation of the remaining dissolved-phase hydrocarbons will be evaluated.

TCE in Groundwater. TCE is present in A-Aquifer groundwater within four localized plumes at Zone 1. A previously defined fifth area of contamination no longer exists. TCE has also been documented in one B-Aquifer well. Only the A-Aquifer plume at Eskimo Creek Seep No. 2 currently poses a significant risk. Cleanup levels have been established for TCE and its degradation products in A- and B-Aquifer groundwater (see table below). Additionally, action levels have been set for A-Aquifer points of compliance (POC), which are the sentry wells established for Seep No. 2 adjacent to Eskimo Creek. Action levels in these wells are the ecological surface water quality criteria which must be met in Eskimo Creek and adjacent wetlands. Groundwater data collected in 1999 indicate that TCE is present at a concentration exceeding the site action level of 0.35 mg/L in one sentry well (GP-1). If the actions level continues to be exceeded in GP-1 and other POC wells during the year 2001 and subsequent sampling events, the TCE plume will be remediated by installing a permeable reactive treatment wall downgradient of the suspected source area. The wall would be in place for the entire remediation timeframe of 25 years. If POC TCE concentrations remain below the action level, the plume will be remediated through monitored natural attenuation. Groundwater, surface water, and sediment monitoring will be conducted annually for 25 years to document the

Eskimo Creek Water Treatment System. Operation and maintenance of the water-treatment system at Eskimo Creek (SS011) will continue. The objective of the treatment system is to intercept seep water leaching from the banks of Eskimo Creek and remove petroleum hydrocarbons and other organic chemicals that may be present. Following treatment, the water is discharged into the wetlands adjacent to Eskimo Creek. The treatment system is operated under ADEC oversight.

Groundwater Use Restriction. 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.

STATUTORY DETERMINATIONS

This interim action is protective of human health and the environment in the short term, and is intended to provide adequate protection until a final action ROD is signed. The interim action is cost-effective and complies with all applicable or relevant and appropriate federal and state requirements. Because this remedy will result in hazardous substances remaining on-site above risk-based levels, it will be reviewed by USAF and ADEC at a frequency of not less than once every five years after implementation of the selected remedy to evaluate if the remedy continues to be effective and appropriate. Input from the Naknek/South Naknek Native Village Council, King Salmon Village Council, Federal and State trustees, and the King Salmon Restoration Advisory Board (RAB) will be solicited prior to implementing any significant changes.



Michael Wyka, Colonel/USAF
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29 DEC 00

Date



Jennifer Roberts
Contaminated Sites Section Manager
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Nov 21 2000

Date

remediation progress. Groundwater contamination will be modeled every five years to assess TCE fate and transport. Modeling based on the most recent analytical data indicates that the source will attenuate to RAO levels in approximately 3 years. The entire plume will attenuate to RAO levels in an estimated 10 to 11 years.

Remedial Action Objectives for Zone 1					ARARs				FINAL RAOs	
Media	Contaminants of Concern	Maximum Conc.	Maximum Conc. Location (Date)	Maximum Conc. 1997/98/99 data	Ecological Criteria	Basis	Human Health/ADEC Criteria	Basis	Action Level at POC*	Cleanup Level
Floating Petroleum Product	--	--	--	--	--	--	No FPP	18AAC75	NA	No FPP
Groundwater (mg/L) (A- Aquifer)	TCE	7.4	MW-28 (1994)	1.65 (MW-28)	NE	NE	0.05 ^a	18AAC75	0.35	0.05
	cis-1,2-DCE	0.0011	MW-402 (1993)	0.0032 (MW-27)	NE	NE	0.7 ^a	18AAC75	0.59	0.7
	trans-1,2-DCE	ND	ND	ND	NE	NE	1 ^a	18AAC75	0.59	1
	1,1-DCE	ND	ND	ND	NE	NE	0.07 ^a	18AAC75	0.025	0.07
	Vinyl Chloride	ND	ND	ND	NE	NE	0.02 ^a	18AAC75	0.782	0.02
Groundwater (mg/L) (B- Aquifer)	TCE	0.099	MW-41 (1992)	0.041 (MW-41)	NE	NE	0.005	18AAC75	NA	0.005
	cis-1,2-DCE	ND	ND	ND	NE	NE	0.07	18AAC75	NA	0.07
	trans-1,2-DCE	ND	ND	ND	NE	NE	0.1	18AAC75	NA	0.1
	1,1-DCE	ND	ND	ND	NE	NE	0.007	18AAC75	NA	0.007
	Vinyl Chloride	ND	ND	ND	NE	NE	0.002	18AAC75	NA	0.002
Surface Water (mg/L)	TCE	0.0153	SW-1 (1997) ^b	0.0153	0.35	Ecotox	0.0027 ^c	18AAC70	--	0.0027
	cis-1,2-DCE	ND	ND	ND	0.59	ORNL PRGs	0.07	18AAC70	--	0.07
	trans-1,2-DCE	ND	ND	ND	0.59	ORNL PRGs	0.1	18AAC70	--	0.1
	1,1-DCE	ND	ND	ND	0.025	ORNL PRGs	3.3E-05 ^c	18AAC70	--	3.3E-05
	Vinyl Chloride	ND	ND	ND	0.782	ORNL PRGs	0.002 ^c	18AAC70	--	0.002
Sediment (mg/kg)	TCE	0.0018	SWF-15 (1999)	0.0018	0.041 ^d	NOAA SQUIRTS	--	--	--	0.04
	cis-1,2-DCE	0.2	SS011-37 (1996)	NA	0.4 ^e	SQB	--	--	--	0.4
	trans-1,2-DCE	ND	ND	NA	0.4 ^e	SQB	--	--	--	0.4
	1,1-DCE	ND	ND	NA	0.031 ^e	SQB	--	--	--	0.031
	Vinyl Chloride	ND	ND	NA	--	--	--	--	--	--

* The points of compliance are the sentry wells established at the groundwater/surface water interface adjacent to Eskimo Creek. Action levels in these wells are the ecological surface water quality criteria.

^a ADEC Table C Groundwater Cleanup Levels with the "10 times rule" applied.

^b TCE exceeded the RAO in one of six surface water samples collected from Eskimo Creek (SW-1, downgradient of Seep No. 2) during 1996 and 1997. There were no exceedences in 1999 surface water samples collected from Eskimo Creek.

^c Based on the consumption of water and organisms, and 10⁻⁶ carcinogenic risk.

^d Apparent Effects Threshold level for exposure of Neanthes bioassays to TCE in marine sediments (adverse effects to Neanthes bioassays would be expected when exposed to this level of TCE). Freshwater values are not available.

^e Sediment quality benchmark (SQB) presented by Jones et al, 1997; values normalized to 1% total organic carbon.

Definitions

18 AAC 75 Oil and Hazardous Substances Pollution Control Regulations (ADEC, 1999a)

18 AAC 70 Alaska Water Quality Standards (ADEC, 1999c)

Ecotox - USEPA Tier II Water Quality Criteria for freshwater (USEPA, 1996)

ORNL PRG - Oak Ridge National Laboratory Preliminary Remediation Goals for Ecological Receptors (August 1997)

NOAA SQUIRTS - National Oceanic and Atmospheric Administration Screening Quick Ref. Tables (September 1999)

POC - Point of Compliance

SQB - Sediment Quality Benchmark

TCE - Trichloroethene

DCE - Dichloroethene

-- No criteria available

mg/kg - milligrams per kilogram

FPP - Floating Petroleum Product

ND - Not detected

NE - Not evaluated

NA - Not analyzed

mg/L - milligrams per liter

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ABBREVIATIONS AND ACRONYMS

611 CES	611th Civil Engineer Squadron
AAC	Alaska Administrative Code
AAC	Alaska Air Command
ACLs	Alternative Cleanup Levels
ADEC	Alaska Department of Environmental Conservation
ADWS	Alaska Drinking Water Standards (18 AAC 80)
AFB	Air Force Base
ARARs	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
ASTM	American Standard for Testing and Materials
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
COPCs	Contaminants of Potential Concern
CRP	Community Relations Plan
DPE	Dual-Phase Extraction
DRO	Diesel-Range Organics
ED	Exposure Duration
EF	Exposure Frequency
EMCON	EMCON Alaska, Inc.
ES	Engineering Science
ET	Exposure Time
FAA	Federal Aviation Administration
FS	Feasibility Study
GRO	Gasoline-Range Organics
HDPE	High-Density Polyethylene
IRP	Installation Restoration Program
KSA	King Salmon Air Station
LNAPL	Light Non-Aqueous-Phase Liquid
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NFRAP	No Further Response Action Planned
NORAD	Northern American Aerospace Defense Command
OASIS	OASIS Environmental, Inc.
POL	Petroleum, Oil, and Lubricants
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SAIC	Science Applications International Corporation
SVE	Soil Vapor Extraction
TCE	Trichloroethene

ABBREVIATIONS AND ACRONYMS (cont.)

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
gpd	Gallons Per Day
mg/kg	Milligrams Analyte per Kilogram of Sample
mg/L	Milligrams Analyte per Liter of Sample

1 INTRODUCTION

This Interim Record of Decision (ROD) details the remedial actions selected by the United States Air Force (USAF) to clean up groundwater contamination at Zone 1 at the King Salmon Air Station (KSA), Alaska. Also included in this Interim 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].

The USAF has completed a remedial investigation, two feasibility studies, human health and ecological risk assessments, a monitored natural attenuation analysis, and additional sampling at Zone 1. The results of the various investigation activities and the risk assessments were used to determine the need for remedial action at Zone 1.

There are four general types of contamination present at Zone 1:

- Dissolved trichloroethene (TCE) in four discrete groundwater plumes,
- Floating petroleum product in one large plume,
- Dissolved-phase petroleum product (primarily diesel-range organics [DRO], with a low percentage of volatile organic compounds [VOCs] in the area of the floating petroleum product plume, and
- Residual petroleum product in smear zone soils (the soil located within the area of groundwater table fluctuations) associated with the floating petroleum product plume.

A Proposed Plan for Interim Remedial Action was prepared in August 1999. The Proposed Plan, presented here as Appendix B, outlined a preferred remedial alternative for the site. After consideration of public comments, the preferred remedial alternative was selected. The selected alternative for interim remedial action is documented in this Interim ROD.

In general, the remedial alternatives identified in the FS and Proposed Plan addressed two of the four contaminant types in the short-term (dissolved TCE and floating petroleum product), with decisions about the other two contaminant types (petroleum hydrocarbon contamination of the smear zone soils and dissolved-phase petroleum hydrocarbon contamination) deferred until after the floating petroleum product is remediated to the maximum extent practicable. This Interim ROD addresses only the two contaminant types identified for short-term remedial action (dissolved TCE and floating petroleum product). The remaining two contaminant types (petroleum hydrocarbon contamination of the smear zone soils and dissolved-phase petroleum hydrocarbon contamination) will be addressed in the Final ROD at a later date.

2 SITE DESCRIPTION

2.1 SITE LOCATION AND DESCRIPTION

King Salmon is situated on the Alaska Peninsula adjacent to Bristol Bay and Katmai National Park and Preserve, approximately 280 miles southwest of Anchorage and 15 miles east of Kvichak Bay (Figure 1). King Salmon lies in the Nushagak-Bristol Bay Lowland, a broad piedmont characterized by morainal topography and abundant fresh-water lakes. The area is accessible only by air or water.

The name "King Salmon" is used in this Interim ROD to indicate the general area of the property and installation, including the commercial airport, current and former USAF property, and the community of King Salmon. KSA refers specifically to current and former USAF property.

KSA covers approximately 727 acres in four general areas and sixteen parcels adjacent to the commercial airport and north of the commercial area of King Salmon. The land occupied by KSA is owned by the U.S. Department of the Interior (USDOI), Bureau of Land Management (BLM), and USAF. Paug-Vik, Ltd. leases land occupied by the radar facility to the USAF. KSA is open to public access and thoroughfare, although security fencing surrounds priority assets and a 24-hour security patrol covers the installation. KSA used and maintained the state-owned 8,500-foot by 150-foot primary runway, a class B facility, but did not operate from the substandard crosswind runway. The developed area west and north of the airfield lies within the largest of the KSA parcels. This area includes the alert hangar, operations, munitions storage area, and other support-related facilities.

Installation Restoration Program (IRP) remedial investigation (RI) sites at KSA have been grouped into five environmental management zones. The zones are geographically and hydrogeologically contiguous areas that are amenable to investigative and remedial management as a single unit. The five zones are shown on Figure 2. In the RI report, the KSA zones were referred to as Zones 1 through 5. In 1996, the USAF assigned IRP site designations to the groundwater zones. The area formerly called Zone 1 was named OT027. Only the actions planned for Zone 1 are addressed in this Interim ROD.

Zone 1 is centrally located at KSA and contains five recognized subareas (Figure 2):

Dry Well Site (DP023). The former dry well site is located on Cantonment Avenue east of the petroleum, oil, and lubricants (POL) storage tanks. The dry well was a vertically buried culvert used for disposal of petroleum and other liquid waste products from the late 1950s until the mid-1970s. The USAF 611th Civil Engineer Squadron (611 CES) installed monitoring wells to evaluate soil and groundwater quality near the dry well in April and May 1994. Following this investigation, the dry well and contaminated soil above the smear zone were excavated and removed by the 611 CES, and the excavation was backfilled with clean fill (611 CES, 1994).

Eskimo Creek (SS011). The Eskimo Creek site is located just west of Eskimo Creek within Zone 1. POL seeps were first reported in the mid-1970s along the west bank of Eskimo Creek, east of Building #603. In 1981, two French drains were installed along the west bank of the creek to intercept free phase product prior to its entry into Eskimo Creek. Product recovery wells installed in 1992 were not successful in recovering floating petroleum product from the A-Aquifer (EMCON, 1997b). A permanent

groundwater treatment system was installed in the early 1990s to treat the petroleum-contaminated water.

POL Tanks (SS015). The POL storage area site is located north of the intersection of Storage Road and Silver Street. The POL area contains four aboveground storage tanks (ASTs), designated AST 11, AST 12, AST 13, and AST 14, with secondary containment for individual and multiple tanks. ASTs 11 and 12 each have a 214,000-gallon capacity; AST 13 has a 516,000-gallon capacity; and AST 14 can hold 105,000 gallons. Past and present tank contents include JP-4, diesel fuel, and possibly gasoline. Three of the tanks have been taken out of service and one remaining tank has been reconditioned in accordance with American Standards for Testing and Materials (ASTM) standards.

MOGAS Station (SS019). The MOGAS Station site (SS019) was a motor vehicle refueling facility located southeast of the KSA boundary and northeast of Silver Street. The MOGAS Station contained three underground storage tanks (USTs) (Tanks 19 and 20, each with a 50,000-gallon capacity and Tank 21 with a 25,000-gallon capacity), one 500-gallon AST, and a small office building located north of the fuel island. The tanks were removed in 1994 and the site currently is being biovented. SS019 has been administratively closed as an IRP site and ADEC contaminated site, and currently is being managed by the 611th Compliance Section under regulatory oversight by ADEC's Storage Tank Program.