RECORD OF DECISION

OPERABLE UNIT E
FORT RICHARDSON
ANCHORAGE, ALASKA
September 2005

CERCLIS ID: AK6214522157

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Abbreviations

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
ARARs	applicable or relevant and appropriate requirement
Army	U.S. Department of the Army
ASTM	American Society for Testing and Materials
AVMA	Armored Vehicle Maintenance Area
BAF	bioaccumulation factor
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-dichloroethylene
cm^2	square centimeter(s)
COCs	chemicals of concern
COPCs	chemicals of potential concern
COPECs	chemicals of potential ecological concern
CRP	Community Relations Plan
CRREL	Cold Regions Research and Engineering Laboratory
CSM	conceptual site model
DCE	dichloroethylene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane

DRO	Diesel Range Organics
E&E	Ecology & Environment, Inc.
ECR	Excavation Clearance Request
EDB	2-dibromoethane
ELCR	excess lifetime cancer risk
EPA	Environmental Protection Agency
EPCs	exposure point concentrations
ERA	ecological risk assessments
ERF	Eagle River Flats
FFA	Federal Facility Agreement
FFCA	Federal Facilities Compliance Agreement
FS	feasibility study
GRO	gasoline-range organics
HEAST	Health Effects Assessment Summary Table
HHRA	human health risk assessment
HI	hazard index
HLA	Harding Lawson Associates
HQ	hazard quotient
ICs	institutional controls
IRIS	Integrated Risk Information System
LOAEL	Lowest Observed Adverse Effects Level
MCLs	maximum concentration levels
MCLGs	maximum contaminant level goals
mg/kg	milligrams per kilogram
mg/kg-day	milligrams per kilogram of body weight per day
µg/100 cm^2	microgram(s) per 100 square centimeters
µg/L	micrograms per liter
NAPL	nonaqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action

NPL	National Priorities List
O&M	Operation and Maintenance
OB/OD	Open Burn/Open Detonation
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Units
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
pg/g	picograms per gram
POL	Petroleum, Oil, and Lubricants
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PRG	Preliminary Remediation Goals
PSE	Preliminary Site Evaluation
QA/QC	quality assurance/quality control
RAB	Restoration Advisory Broad
RAOs	remedial action objectives
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RfDs	reference doses
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SF	slope factor
SWMU	Solid Waste Management Unit
TBC	to-be-considered
TCE	Trichloroethylene
TEQ	Toxicity Equivalent Quotient
TMV	toxicity, mobility, or volume

TPH	total petroleum hydrocarbons
TRV	toxicity reference value
TSCA	Toxic Substances Control Act
USACE	United States Army Corps of Engineers
USC	United States Code
UST	Underground Storage Tank
VC	vinyl chloride
VOC	volatile organic compound

PART I - DECLARATION STATEMENT

1.0 Site Name and Location

Operable Unit E
Fort Richardson (AK6214522157)
Anchorage, Alaska

1.1 Statement of Basis and Purpose

This Record of Decision (ROD) presents the selected remedial action for Operable Unit E (OUE) at Fort Richardson near Anchorage, Alaska. OUE is the fifth and final Operable Unit (OU) to be investigated at Fort Richardson. OUE was established because two potential hazardous-substance source areas, the Building 35-752 Area and the Armored Vehicle Maintenance Area (AVMA), required further investigation to determine the nature and extent of contamination at the sites. Based on the remedial investigation and risk assessments, soil and groundwater at the Building 35-752 Area and the soil in the AVMA are recommended for No Further Action (NFA) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Groundwater at the AVMA has been identified for action due to persistent solvent contamination at the site.

In addition, the OUD ROD deferred a decision regarding two potential source areas (Building 796-Battery Shop and Building 955-Former Sludge Bin) until further monitoring could be completed. Based on sample data collected in 2000 and 2001, these source areas are recommended for NFA under CERCLA.

This ROD was developed in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA; 42 United States Code [USC], Section 9601 et seq.) and, to the extent practicable, in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 Code of Federal Regulations [CFR] 300 et seq.). These decisions are based on the Administrative Record for this OU.

The U.S. Department of the Army (Army), the U.S. Environmental Protection Agency (EPA), and the State of Alaska, through the Alaska Department of Environmental Conservation (ADEC), concur with the selected remedy.

1.2 Assessment of the Site

Actual or threatened releases of hazardous substances from OUE, if not addressed by the response actions selected in this ROD, may present a threat to human health, welfare, or the environment. Remedial action is necessary for groundwater contamination at the AVMA to protect human health and the environment.

1.3 Description of Selected Remedy

This is the fifth and final OU to reach a final-action ROD at the Fort Richardson CERCLA National Priorities List (NPL) site. No further action was selected for soil and groundwater at the Building 35-752 Area and for soil at the AVMA. This ROD addresses remedial action for groundwater contamination at the AVMA site. The remedy was selected to reduce or prevent risks to human health and the environment associated with potential current or future exposure to the contaminants. The remedial action objectives (RAOs) for cleanup of groundwater at the AVMA are the following:

- Prevent exposure to and use of groundwater as a potential drinking water source where chemical concentrations that pose an unacceptable risk or exceed maximum concentration levels (MCLs)
- Return groundwater to beneficial use within a reasonable time frame
- Monitor groundwater tetrachloroethylene (PCE) concentrations within the contaminated area to establish concentration trends and provide an early warning if the downward concentration trend does not continue

The remedy selected to address contaminated groundwater at the AVMA has the following components:

- Land use controls to prevent exposure to and use of groundwater at the site
- Natural attenuation to reduce the overall volume and toxicity of contaminants in groundwater at the site, and to return groundwater to a beneficial use
- Monitoring to ensure that contaminant concentrations are decreasing and the remedy remains protective

In addition, no further action was selected for the two sites (Building 796 and Building 955) that were deferred in the OUD ROD, pending confirmational sampling. A detailed discussion of these sites is provided in Sections 2.2.3 and 2.2.4 of this ROD.

1.4 Statutory Determination

The selected remedial action attains the mandates of CERCLA Section 121 and, to the extent practicable, the NCP. Specifically, the remedy is protective of human health and the environment, complies with federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedial action uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The remedy for groundwater at the AVMA does not satisfy the statutory preference for treatment as a principal element. However, the remedy is protective under existing and anticipated future land-use scenarios and, by preventing exposure of contaminants to human and ecological receptors, prevents any risk to those receptors.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a

statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

1.5 ROD Data Certification Checklist

The following information is included in the Decision Summary section (Part II) of this ROD.

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 6, page 44)
- Chemicals of concern and their respective concentrations (Section 7.1.5, page 56, Table 7-3, page 57)
- Baseline risk represented by the chemicals of concern (Section 7.1, page 46)
- Cleanup levels established for chemicals of concern and the basis for these levels (Sections 8.1 and 8.2, page 68)
- Land and groundwater uses that will be available at the sites as a result of No Further Action determinations (Section 8.6.2.1, page 72)
- How source materials constituting principal threats are addressed (Section 10, page 85)
- Key factors that led to selecting the remedy (Section 11, page 86)
- Estimated capital, annual operation and maintenance (O&M), and total present-worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 11.3, page 89 and Appendix D)
- Potential land and groundwater uses that will be available at the site as a result of the selected remedy (Section 11.4, page 89 and Table 11-1, page 89)

Additional information can be found in the Administrative Record file for OUE at Fort Richardson. (An index for this Administrative Record is provided in Appendix B.)

1.6 U.S. Army Authorizing Signature

Signature sheet for the foregoing Operable Unit E at Fort Richardson, Record of Decision, between the United States Department of the Army and the United States Environmental Protection Agency, Region 10, with concurrence by the Alaska Department of Environmental Conservation.

Donna G. Boltz
Colonel, U.S. Army
Commanding

29 Sep 05
Date

1.7 EPA Authorizing Signature

Signature sheet for the foregoing Operable Unit E at Fort Richardson, Record of Decision, between the United States Department of the Army and the United States Environmental Protection Agency, Region 10, with concurrence by the Alaska Department of Environmental Conservation.

9/30/05

Daniel D. Opalski
Director, Office of Environmental Cleanup, Region 10
United States Environmental Protection Agency

Date

1.8 State of Alaska (ADEC) Authorizing Signature

Signature sheet for the foregoing Operable Unit E at Fort Richardson, Record of Decision, between the United States Department of the Army and the United States Environmental Protection Agency, Region 10, with concurrence by the Alaska Department of Environmental Conservation. The decision may be reviewed and modified in the future if new information becomes available that indicates the presence of previously undiscovered contamination or exposures that may cause unacceptable risk to human health or the environment.

Jennifer Roberts
Federal Facilities Section Manager
Division of Spill Prevention and Response
Alaska Department of Environmental Conservation

October 11 2005
Date

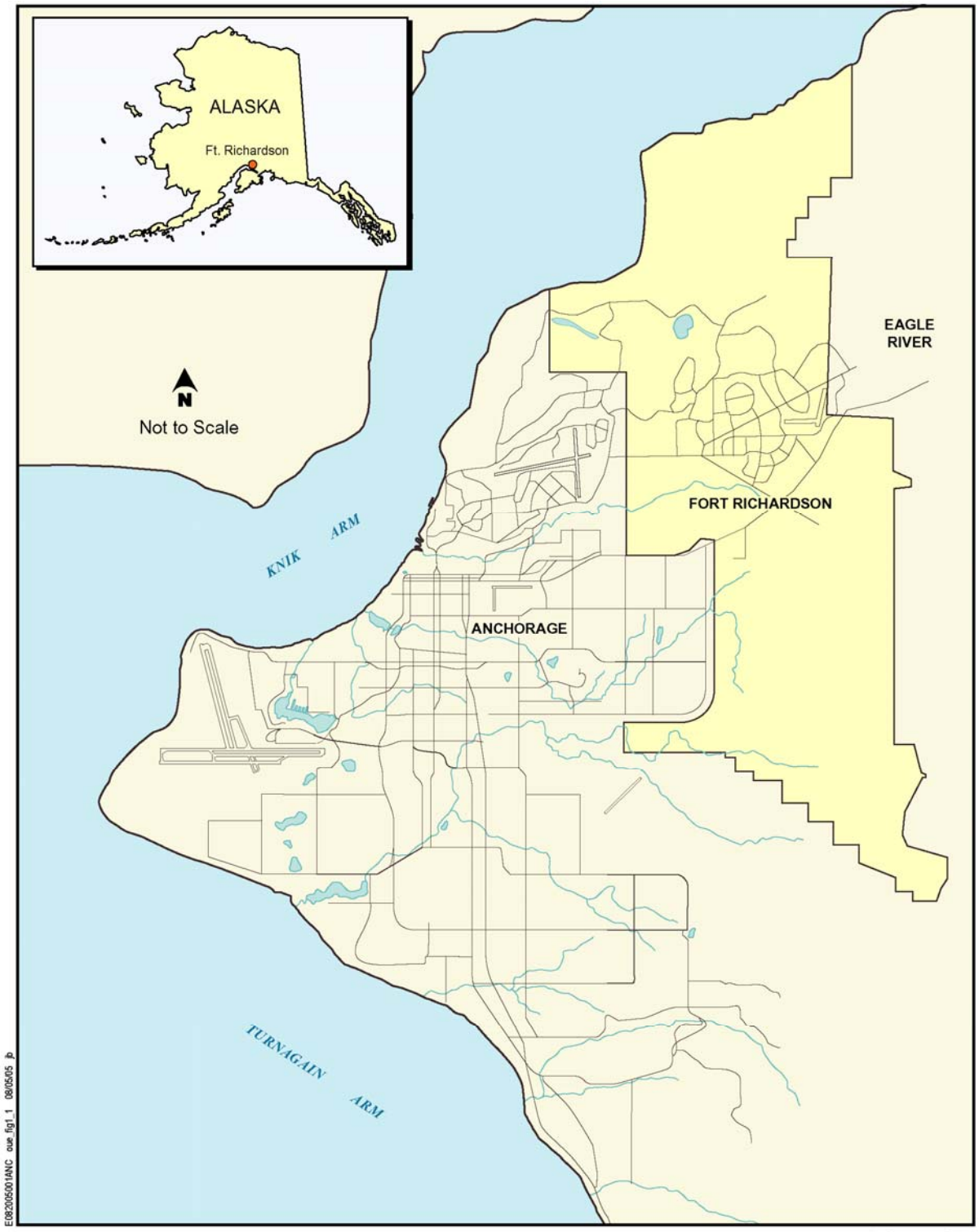


Figure 1-1
Location of Fort Richardson

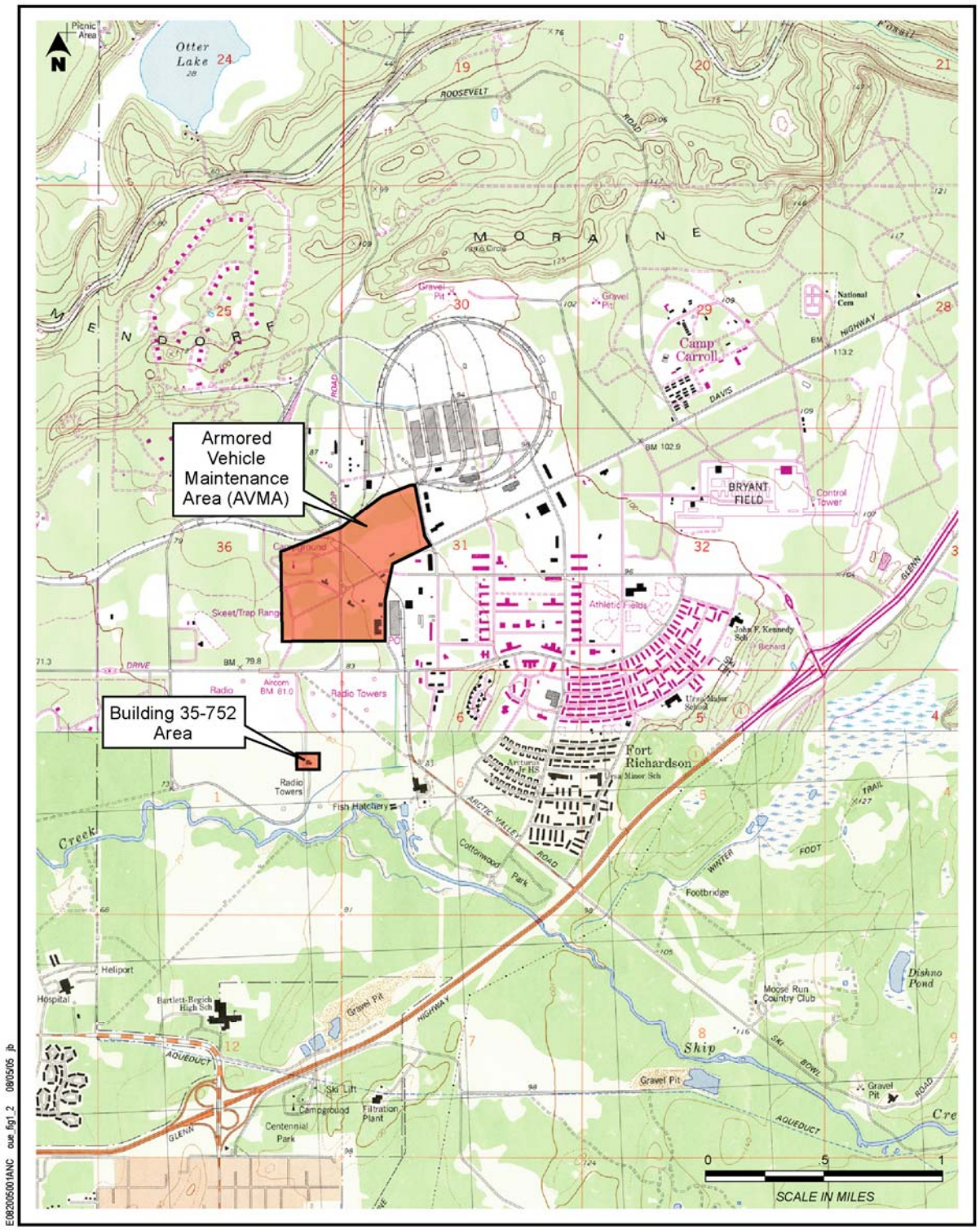


Figure 1-2
Location of OUE Sites

and ecological risks that may become evident from the aggregate of source areas on the installation. None of the OUE sites have threatened or endangered species inhabiting them, none of the sites are listed as historical places, and none of the sites are located on wetlands or in the floodplain of Ship Creek.

Two sites (Building 796-Battery Shop and Building 955-Former Sludge Bin) were identified in the OUD ROD as requiring further sampling before a formal decision could be made regarding the status of the sites. The OUD ROD required that the Army confirm whether concentrations of the pesticide dichlorodiphenyltrichloroethane (DDT) in soil at the Building 955 site exceeded the risk-based cleanup level of 17 parts per million (ppm). In addition, the OUD ROD required that the Army resample groundwater at the Building 796 site to determine if COPCs, specifically 2-dibromoethane (EDB) and benzo(a)pyrene (a polynuclear aromatic hydrocarbon [PAH]), were present at levels exceeding cleanup standards.

Both source areas were re-sampled in 2000 following completion of the OUD ROD. Results of the sampling at Building 796 indicated that EDB and benzo(a)pyrene contamination in groundwater did not exceed ADEC cleanup standards. Additionally, soil sampling conducted at the Building 955 site indicated that concentrations of DDT in soils at the site did not exceed the risk-based cleanup level established in the OUD ROD. Both sites are therefore eligible for NFA under CERCLA. This determination will be documented in this ROD, see Sections 2.2.3 and 2.2.4.

1.1 Armored Vehicle Maintenance Area

The AVMA is located in the western region of the cantonment area of Fort Richardson (Figure 1-2). The area consists of open fields, grasslands, woods, and some buildings covering approximately 140 acres. Because information analyzed during preparation of the OUD ROD indicated that Building 45-590 could not be the source of groundwater contamination in the area (groundwater contamination was detected upgradient from the Building 45-590 site), a potential new source area located upgradient from the Building 45-590 site was identified. The Building 45-590 site was determined to be a NFA site under CERCLA and closed in the OUD ROD. The newly identified AVMA, and associated groundwater contamination, became part of OUE.

The AVMA was identified from aerial photos and other documents that indicated the area had been used for field maintenance for armored vehicles (tanks). The AVMA also includes a motor vehicle maintenance facility and a laundry facility that are likely sources of PCE contamination in groundwater at the site. PCE contaminated groundwater appears to originate north of Building 726 (within the AVMA, see Figure 1-2) and extend downgradient about 600 feet to the northwest.

1.2 Building 35-752 Area

The Building 35-752 Area is located in a relatively undeveloped part of Fort Richardson that includes high-frequency transmitter antennas (Figure 1-2). Building 35-752 is a former generator/power supply building for a high-frequency transmitter facility located in the

adjacent Building 35-750. Building 35-752 is currently vacant and a locked chain-link fence surrounds the area to restrict access.

The potential hazardous source areas at the Building 35-752 Area are related to transformer maintenance and operation, the discharge and burning of transformer cooling oil containing PCBs, the use of PCB-contaminated soil as a base for the peripheral road, and residual contamination in an area where soil containing PCBs had been stockpiled.

1.3 Building 955-Sludge Bin

This site is the location of the former sludge bin that was used as a waste-oil transfer station. Waste liquids containing water and small amounts of solids were transported to the bin from various motor pool operations. The waste liquids were allowed to settle and the contents segregated into water, liquid petroleum compounds, and sludge. The water was pumped from the bin, and the used oil was deposited into underground storage tanks (USTs) located adjacent to the bin. A geotechnical investigation was performed in 1993 for closure of the UST. This resulted in the detection of petroleum hydrocarbons, volatile organic compounds (VOCs), herbicides, and pesticides. Specific details concerning this site can be found in the administrative record and the OUD ROD.

1.4 Building 796-Battery Shop

Building 796, a battery, vehicle, and weapons maintenance repair shop, is located at the southwest corner of Fifth Street and Davis Highway. Former activities at this source area included draining battery fluid into a floor drain that subsequently drained into a dry well located adjacent to the building. This activity took place from the 1950s until the late 1980s. Specific details concerning this site can be found in the administrative record and the OUD ROD.

2.0 Site History and Enforcement Activities

2.1 Action Sites

Only one of the OUE sites, the AVMA, was determined to require action under CERCLA. This determination was based on the remedial investigation (RI), risk assessments, and evaluation in the feasibility study (FS). The details concerning action at this site will be discussed further in the ROD.

2.1.1 Armored Vehicle Maintenance Area (AVMA)

The AVMA site encompasses an area that lies between two sites investigated during the OUD remedial investigation. The former Building 45-590 site lies downgradient from the AVMA and the Building 726 site lies immediately upgradient from the AVMA site.

Solvent contamination (carbon tetrachloride and PCE) in groundwater at the site was first discovered during a UST release investigation conducted at the former Building 45-590 site in 1994. Further investigation during the OUD RI indicated that the highest levels of solvent contamination (PCE and carbon tetrachloride) were detected upgradient from the Building 45-590 site. Therefore, Building 45-590 was determined to not be the source of PCE contamination in groundwater. In addition, the OUD investigations, including a conservative residential risk screening, determined that soil contamination at the Building 45-590 site was not a concern. As documented in the OUD ROD, the Building 45-590 site was designated as an NFA site under CERCLA.

Building 726 (a laundry facility) was also investigated as part of OUD. The site is the location of a laundry and dry cleaning facility where solvents were stored in underground tanks until 1972. The tanks were determined to have leaked and were removed in 1987. As part of the tank removal, solvent contaminated soil was removed, aerated in an adjacent parking lot and then placed back in the excavation. During the OUD RI, soil borings were drilled at the former tank site and samples were collected and analyzed for the presence of petroleum hydrocarbons, solvents, and metals. Groundwater samples were also collected and analyzed for the same constituents. The concentration of solvents in soil and groundwater at the site were less than levels required for unrestricted use. Therefore, the Building 726 site was determined to require NFA, as documented in the OUD ROD.

Because neither the Building 45-590 site nor the Building 726 site were considered to be the source for solvent contamination in groundwater, efforts were made to identify other potential source areas. Historic aerial photographs showed a large disturbed area east of former Building 45-590 that had reportedly been used for field maintenance of armored vehicles (tanks). This area was identified as a potential source of the groundwater contamination upgradient from the Building 45-590 site.

The OUD ROD specified that an area north of Buildings 726 and 732 (a motor pool) would be investigated as part of OUE, referring to the area as the AVMA. The suspected source areas within the AVMA include areas of buried debris and drainage ditches east of former Building 45-590 identified on historic aerial photographs. Additionally, the area north of

Building 726 (including Building 732) was considered to be a potential source requiring further investigation.

The OUE RI, risk assessment, FS, and Proposed Plan were completed in 2004. The data and assessments indicated that solvent contaminated groundwater at the AVMA site required action under CERCLA. Contaminants in soil were determined to not pose an unacceptable risk to human health or the environment and therefore contamination in soil at the site will be recommended for NFA.

2.1.2 Investigations at the AVMA

The following is a list of investigations conducted to determine the source of solvent contamination in groundwater at the AVMA. Because the source area was unknown and covered a fairly large area, several pre-RI investigations were conducted in an effort to focus the RI. The OUE RI began in 2002, following completion of the OUE Management Plan (ENSR, 2002).

2.1.2.1 Aerial Photograph Review and Geophysical Investigation (2001)

In 2001, the Cold Regions Research and Engineering Laboratory (CRREL) conducted an analysis of historical aerial photographs to help determine potential sampling locations for the RI (Astley and Lawson, 2001). In addition, CRREL conducted geophysical investigations to determine if waste disposal areas existed at the AVMA and to better define the site geology.

2.1.2.2 Installation and Sampling of Soil Borings and Monitoring Wells (2001)

Additional work conducted in 2001 included the installation and sampling of new soil borings and monitoring wells (United States Army Corps of Engineers [USACE], 2001). The results of the soil and groundwater sampling were inconclusive.

2.1.2.3 OUE Remedial Investigation and Risk Assessments (2002-2003)

The OUE RI began in 2002 and focused on determining the source of solvent (specifically PCE) contamination in groundwater. The investigation involved excavation to determine the nature of buried debris at the site and installation of groundwater monitoring wells to delineate the extent of solvent contamination in groundwater. Following completion of the RI, a risk assessment was conducted to determine potential human and ecological risks associated with contaminants detected at the site.

2.1.2.4 OUE Feasibility Study (2004)

A FS was conducted in 2004 to develop and evaluate remedial alternatives for contaminated groundwater at the AVMA. The FS evaluated three potential alternatives for treatment of groundwater at the AVMA.

2.1.2.5 OUE Proposed Plan (2004)

The Proposed Plan was developed and made available to the public on September 27, 2004. The Army conducted a public meeting on that date to present the plan to the community. Notice of the meeting was published in the Anchorage Daily News on September 15, 25, 26,

and 27. The 30-day review period ended on October 26, 2004 and only one public comment was submitted during the open period.

2.1.2.6 Groundwater Monitoring Program (2004)

The Army initiated groundwater monitoring following completion of the OUE RI. The monitoring program is ongoing and two sampling events were conducted in 2004. Sample results from the 2004 sampling program indicate that the plume is stable and that down gradient PCE contaminant concentrations decreased or remained static.

2.2 No Further Action Sites

Three source areas are recommended for NFA under CERCLA. These areas include the Building 35-752 Area and the two OUD source areas (Building 955 and Building 796) that required additional sampling. Specific details concerning these sites can be found in the administrative record. No costs are associated with these sites and they were not carried through the remedy selection process that is discussed further in this ROD.

2.2.1 Building 35-752 Area

History

PCBs and petroleum hydrocarbon contamination were detected at the site during a UST site investigation conducted in 1990. Follow-on investigations confirmed that PCBs and petroleum hydrocarbons were present in soil at the site and that petroleum hydrocarbons were present in groundwater at the site. As a result of these investigations, the site was included as part of the OUD RI. A complete list of investigations and removal actions conducted at the site is provided in Section 2.2.2.

The primary industrial activities conducted at the site that contributed contamination to soil and groundwater include operation of USTs and electrical power generation equipment (generators and transformers). Diesel generators were operated at the site from 1953 to 1987. The generators were housed inside Building 35-752 and were used to power a high-frequency transmitter array and control center located in the adjacent Building 35-750. Fuel for the generators was stored in seven 5,000-gallon USTs located on the south side of the building. The generators were removed in 1987 and the building was used for general storage for several years afterward. The building was boarded up and secured with a locked fence in 1995.

Four large transformers (750-kilovolt) were located at the site during operation of the power generation facility. The transformers were located on the northwest side of the adjacent Building 35-750. Sometime around 1982 these transformers were replaced and removed from the site. Reportedly, the oil from several of the transformers was drained onto the ground and burned using diesel fuel as a catalyst.

OUD Remedial Investigation

The OUD RI began in 1996 and was completed in 1998. The RI focused on contamination inside Building 35-752 (PCB contaminated dust), soils at the former UST area, soils at the former drum accumulation area, soils in the cooling pond area, and groundwater. The OUD RI confirmed the results of previous investigations and showed that low levels of PCBs, petroleum hydrocarbons, and solvents were present at the site. However, the OUD risk assessment indicated that contaminant levels present at the site did not pose an unacceptable risk to human health or the environment. The calculated excess lifetime cancer risk (ELCR) from exposure to PCBs in soil was 2×10^{-5} under a residential scenario (unrestricted use). In addition, the ELCR for contaminants (benzene, trichloroethylene [TCE], aluminum, iron, and manganese) in groundwater at the site was calculated to be 3×10^{-5} for unrestricted use. However, the concentration of benzene and TCE in groundwater at the site did exceed the MCLs. Due to new information (PCB-containing oil had reportedly been burned at the site) discovered during development of the OUD ROD, the site was transferred to OUE for further evaluation.

OUE Remedial Investigation

Based on the findings of past investigations, COPCs at OUE included PCBs, dioxin/furan compounds, solvents, and petroleum hydrocarbon compounds.

The OUE RI began in 2002 and was completed in 2003. The OUE investigations at the Building 35-752 site focused on areas where PCBs had reportedly been disposed and burned at the site. These areas included reported releases around a transformer mounting pad, a suspected PCB burn area, potential PCB-contaminated soil in the base for the peripheral road, and an area where soil containing PCBs had been stockpiled. These were areas that had not been previously investigated as part of OUD. The COPCs investigated at this site were PCBs and dioxin/furan compounds that might have been generated as a result of burning PCB-containing oil at the site.

During the OUE RI, 87 soil samples were collected from the various areas of investigation at the site. Soil samples were analyzed for PCBs, dioxin/furans, solvents, and petroleum compounds. Groundwater samples were collected from seven monitoring wells located at the site. Groundwater samples were analyzed for PCBs, VOCs, semi-volatile organic compounds, metals, and petroleum compounds. Figure 2-1 shows locations where samples were collected at the Building 35-752 site.

Soil Results

Table 2-1 lists soil sample results for PCB and dioxin/furan sampling conducted at the Building 35-752 site. The table also lists the results following completion of the post-RI soil removal at the Transformer Mounting Area. Results indicate that PCBs and dioxin/furan compounds are present at the site.

The highest level of PCBs detected during the RI (99.9 milligrams per kilogram [mg/kg]) was confined to a small area less than one square meter in size next to the transformer mounting pad. This area has limited accessibility being located between the transformer enclosure and the building and is not widely used except during maintenance of transformers and other electrical equipment. However, due to concerns for potential exposure, the surface soil around the transformer mounting pad was excavated following completion of the RI.

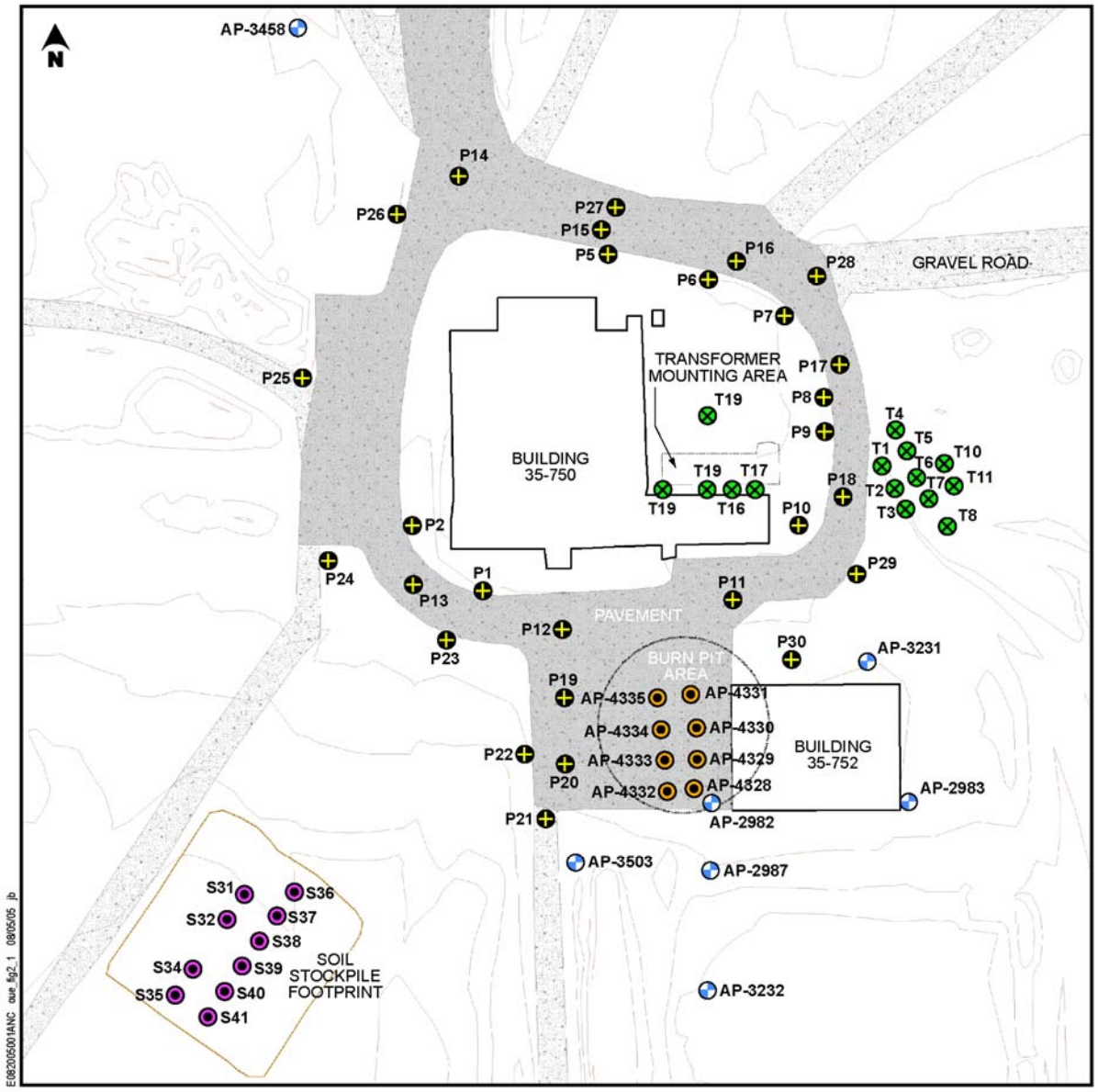


Figure 2-1
Sample Locations at the Building 35-752 Site

TABLE 2-1
Remedial Investigation Results for Soils at the Building 35-752 Site

Chemical Site	Screening Level[a]	TSCA Cleanup Levels[b]	Maximum Value
PCB (Aroclor 1260)	***mg/kg (ppm)***	***mg/kg (ppm)***	***mg/kg (ppm)***
Transformer Mounting Pad and Discharge Area	0.74	25	99.9
Post 2004 PCB removal – mounting area	NA	25	14.1
Post 2004 PCB removal– discharge area	NA	25	2.59
Burn Pit Area	0.74	25	0.69
Soil Stockpile Footprint	0.74	25	0.79
Peripheral Road	0.74	25	3.7 (beneath asphalt road surface)
Total Dioxin (TEQ)	***pg/g (ppt)***	***pg/g (ppt)***	***pg/g (ppt)***
Transformer Mounting Pad and Discharge Area	16	NA	17
Burn Pit Area	16	NA	5.43
Soil Stockpile Footprint	16	NA	1.74
Peripheral Road	16	NA	32

Notes: [a] Screening levels are EPA Region 9 PRGs for soil.
[b] TSCA cleanup level for low-occupancy areas is 25 ppm.
mg/kg = milligrams per kilogram
pg/g = picograms per gram
ppm = parts per million
ppt = parts per trillion

All areas outside the building fit the definition of low-occupancy under the Toxic Substances Control Act (TSCA) regulation (e.g., unoccupied areas outside a building, electrical equipment vaults, or non-office space in a warehouse where occupancy is transitory). Thus, the relevant TSCA cleanup level is 25 ppm. All of the surface soils around the transformer mounting pad that contained PCBs in excess of 1 mg/kg were excavated and disposed at a TSCA landfill. The entire area is capped with geotextile fabric and a minimum of 0.5 foot of clean soil.

The excavation and clean-up of the soils around the transformer mounting pad was accomplished in 2003 under the TSCA self-implementing option for PCB remediation waste. Under this rule, "when there is an actual or proposed change in use of an area cleaned up to the levels of a low occupancy area,…. resulting in a change in status from a low occupancy area to a high occupancy area, the owner of the area shall clean up the area in accordance with the high occupancy area cleanup levels…" (40 CFR 761.61(a)(4)(v)). The Army will be responsible for complying with this requirement outside of CERCLA, though the Army will report on the current and proposed land use in the facility-wide CERCLA five-year review report.

The highest level of PCBs detected in the subsurface following excavation was 14.1 mg/kg at a depth of 1 foot below the ground surface (bgs). The concrete surface of the mounting pad was tested using wipe samples and PCB levels were less than detection limits (1 microgram per 100 square centimeters [1 μg/100 cm^2]).

Toxicity equivalent quotients (TEQs) for dioxin/furan compounds ranged from 0.79 picogram per gram (pg/g) to 32 pg/g (ppt - parts per trillion). Only 2 samples contained dioxin/furan compounds at levels exceeding screening criteria (Region 9 PRG, 16 ppt) and the highest concentration (32 ppt) sample was from an area located underneath the asphalt driveway. There are no promulgated cleanup levels for dioxins/furans and the levels of dioxin/furan detected at the site did not result in calculation of unacceptable risk for exposure to soil.

Groundwater Results

The Building 35-752 Site was investigated previously as part of OUD and sufficient data exist from the OUD investigation to allow comparison with current results collected during the OUE RI. Data collected during the OUD RI (1996) indicated that shallow groundwater beneath Building 35-752 was contaminated with low levels of benzene, TCE, and metals (primarily aluminum, iron, and manganese). In general, these same constituents were identified in groundwater samples collected during the OUE RI that was conducted in 2002/2003. Table 2-2 provides an overview of the results from both OUD and OUE remedial investigations, and shows that the overall chemical concentrations at the site have decreased over time.

Only two compounds were detected in groundwater at the Building 35-752 site during the OUE RI that exceeded MCLs. Benzene was detected at a concentration of 8.2 μg/L in well AP-2892 during sampling conducted in 2002. However, during the most recent sampling event conducted in 2003, benzene was detected at 1.6 μg/L and was less than the MCL (5 μg/L). In 2003, TCE was detected in AP-3231 at a concentration (8.6 μg/L) exceeding the MCL. The concentration of TCE is only slightly greater than the MCL of 5 μg/L and in general the concentration has decreased over time since 1995. The concentration of TCE in groundwater at the site has periodically dropped below the MCL and the trend suggests that the contaminant is degrading.

Chemical concentrations of cis-1,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride (VC), while still much lower than MCLs, have increased slightly in areas where TCE is found. The increase in concentrations of the daughter products, VC and cis-1,2-DCE, coupled with the generally decreasing concentration of TCE, tend to indicate that degradation of the TCE contamination is occurring at the site.

Results from the OUE RI indicate that only one groundwater sample contained PCBs (Aroclor 1260) at a concentration that exceeded the screening criteria (0.034 μg/L). The only PAH compound detected at concentrations exceeding screening level criteria was naphthalene. However, the concentration of naphthalene (8.3 μg/L) in groundwater at the site was much less than the ADEC cleanup level (1,460 μg/L). Several VOCs (specifically benzene, ethylbenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene) were detected at concentrations exceeding screening criteria. However, concentrations of these chemicals have decreased since 1996 and are less than the MCL values or ADEC standards, where MCLs do not exist.

TABLE 2-2
Remedial Investigation Results for Groundwater at the Building 35-752 Site

Chemical	Screening Level[a]	MCL	OUD (1995/1996) Maximum Observed Concentration	OUE (2002/2003) Maximum Observed Concentration
Units	*µg/L (ppb)*	*µg/L (ppb)*	*µg/L (ppb)*	*µg/L (ppb)*
Benzene	0.34	5	100	8.2 (1.6)
Ethylbenzene	2.9	700	280	61 (25)
1,1,1-Trichloroethane	3,172	200	30	4 (0.72)
1,2,4-Trimethlybenzene	12	1,850 (ADEC)	150	70 (27)
1,3,5-Trimethlybenzene	12	1,850 (ADEC)	50	44 (4.8)
Chromium (Total)	109	100	235	6 (6)
Trichloroethylene (TCE)	0.028	5	11	8.6 (8.6)
Aluminum	36,499	N/A	93,100	2,300 (2,300)
Iron	10,950	N/A	116,700	7,600 (7,600)
Manganese	876	N/A	4,580	3,100 (3,100)
Naphthalene	6.2	700 (ADEC)	40B	26 (8.3)
PCBs (Aroclor 1260)	0.034	0.5	ND	0.061
Vinyl Chloride	0.02	2	ND	0.38

Notes: [a] Screening levels are EPA Region 9 PRGs for groundwater.
The values listed in parentheses represent the values detected during the most recent sampling event.
µg/L = micrograms per liter
ADEC = Alaska Department of Environmental Conservation
ppb = parts per billion

Risk Assessments

Risk assessments were conducted for the Building 35-752 site in 2003. The risk assessments incorporated past and present data for the site, including data collected during the OUD RI. The OUE risk assessments indicated that contaminants in soil did not pose an unacceptable risk to human health or the environment (see Table 2-3). Current and reasonably anticipated land use at the site is industrial and access to the site is limited due to location and use (the site is a restricted access facility used as a control center for a high-frequency antenna array). Calculated risk estimates for soil fell within the acceptable risk range between 1×10^{-4} to 1×10^{-6}, even for unrestricted use of the site. Near surface soil contaminated with PCBs at levels greater than 25 parts per million (ppm) were excavated and removed from the site in 2004. The PCB removal action was conducted in accordance with the self-implementation procedures under TSCA.

The cumulative risk from contaminants in groundwater at the site fell within acceptable risk ranges for unrestricted use. However, TCE levels detected in one well exceeded MCLs. Groundwater at the site is not used as a drinking water supply, and in general the shallow

TABLE 2-3
Calculated Risk Estimates for the Building 35-752 Site

Media	COPCs	ELCR		HI
		Industrial Use	Unrestricted Use	
Soil	PCBs and Dioxins/Furans	5.1×10^{-6}	1.7×10^{-5}	0.2
Groundwater	PCBs, benzene, vinyl chloride, TCE	NA	4.8×10^{-5}	13

Notes: COPCs = Chemicals of Potential Concern
ELCR = Excess Lifetime Cancer Risk
HI = Hazard Index (non-cancer affects)

groundwater is non-potable due to high turbidity levels. Several chemicals, specifically 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene, were detected in groundwater at concentrations that resulted in an elevated hazard index (HI) of 13 (HI less than 1 indicates that site-related exposures do not present non-cancer risk to human health). However, these chemicals were detected at concentrations less than current cleanup levels. Contaminant levels have generally decreased since first measured in 1996 and contaminant concentrations are only slightly greater than MCLs.

Recommendations

Based on the following data, soil at the Building 35-752 Area is recommended for NFA under CERCLA:

- Risk assessment results indicate that contamination in soils poses no unacceptable risk to human health or the environment
- PCB contamination in soils is less than the relevant TSCA cleanup standards and surface soils containing PCBs in excess of 25 ppm have been excavated and removed from the site

Based on the following data, groundwater at the Building 35-752 Area is recommended for NFA under CERCLA:

- Risk assessment results indicate that contamination in groundwater poses no unacceptable risk to human health or the environment
- Shallow groundwater is not used as a drinking water source and is non-potable due to high turbidity and high metals levels
- Contaminant concentrations in groundwater are decreasing and the concentration of TCE (8.6 μg/L) is only slightly greater than the MCL (5 μg/L). Current data suggest that the contaminant is degrading
- To ensure the protectiveness of the NFA decision, the Army will monitor groundwater and site conditions during the five-year reviews

2.2.2 Investigations and Actions at the Building 35-752

A comprehensive history of soil and groundwater investigations performed at the Building 35-752 Area, as well as analytical results from those investigations, can be found in the OUD RI (ENSR, 1998a). The following subsections summarize investigations that have been conducted at Building 35-752 since 1990.

2.2.2.1 Underground Storage Tank Investigation and Removal (1990)

In 1990, seven 5,000-gallon USTs were excavated and removed from the south side of Building 35-752. Soil from within the tank excavation was analyzed to assess the presence and extent of fuel contamination in the soil and groundwater (USACE, 1990). This analysis found that the soil was contaminated with total petroleum hydrocarbons (TPH) and PCBs (such as Aroclor 1260).

2.2.2.2 Site Assessment and Corrective Action Plan (1993)

An additional site assessment was conducted at the UST site in 1993. This site assessment documented the presence of PCBs in the backfill and fuel in the soil and groundwater and determined that the source was not from USTs (Harding Lawson Associates [HLA], 1994a).

2.2.2.3 Closure Plan (1994)

In 1994, ENSR developed a closure plan for Building 35-752 (ENSR, 1994). The plan outlined closure activities for the inside of Building 35-752 and the Outside Drum Storage Area located east of the building.

2.2.2.4 Limited Field Investigation (1994 and 1995)

During the fall and winter of 1994 -1995, ENSR conducted a limited field investigation of the entire site. Complete results of the investigation are presented in the report, *Preliminary Source Evaluation 2, Operable Unit D, Fort Richardson, Alaska* (ENSR, 1996). PCBs and petroleum hydrocarbons were detected throughout the site.

2.2.2.5 OUD Remedial Investigation, Risk Assessment, and Feasibility Study (1996, 1997, and 1998)

Investigations were conducted in 1996, 1997, and 1998, for the OUD RI (ENSR, 1998a). The OUD RI identified prior activities at Building 35-752 that may have contributed to releases of contaminants to the environment. The OUD RI for Building 35-752 investigated several source areas to include USTs, a cooling pond, a drum storage area, and the concrete floor inside Building 35-752. These sites were investigated to assess the presence and extent of contamination resulting from the use and storage of petroleum fuels, solvents, PCBs, pesticides, and metals. PCBs were detected in soils, and solvents were detected in groundwater at the site. However, the risk assessment indicated that the concentrations of contaminants present at the site did not pose an unacceptable risk to human health or the environment.

2.2.2.6 OUD ROD (2000)

While the OUD ROD (ENSR, 2000) was being developed, new information was discovered to indicate that PCB-containing transformer oil may have been burned at the site. Because of

the new information obtained after issuing the Proposed Plan, the Army, EPA, and ADEC determined that the Building 35-752 area had not been adequately characterized for PCBs and, potentially, dioxins/furans. Additional potential hazardous source areas were identified at the site related to transformer maintenance and operation; the discharge and burning of PCB-containing oils; the use of PCB-contaminated soil as a base for the peripheral road; and an area where soil containing PCBs had been stockpiled. In addition, since groundwater at Building 35-752 was found to be contaminated with benzene, TCE, and metals (primarily aluminum, iron, and manganese) during the OUD RI, it was determined that groundwater at Building 35-752 would be investigated as part of the OUE RI.

Significant evidence existed from the OUD RI and risk assessment to suggest that the following areas posed no risk to human health and the environment: the concrete floor in Building 35-752, the former UST areas south of Building 35-752, the former drum accumulation area east of Building 35-752, the former cooling pond southwest of Building 35-752, and the former UST 1102 north of Building 35-752. These areas were considered for NFA under CERCLA. Therefore, those sites were not investigated as part of this RI for OUE. However, the data collected for these areas were used to assess current risk levels.

2.2.2.7 Geophysical Investigations (2000)

An investigation was conducted in 2000 to evaluate the site-specific subsurface geology and identify areas for future sampling (Astley et. al., 2000). CRREL completed investigations around Buildings 35-750 and 35-752 to determine the possible locations where PCB oils were drained from transformers that were previously located at the site.

2.2.2.8 Soil Investigation (2000)

ENSR conducted an investigation of surface and shallow subsurface soil on the west side of Building 35-750 in 2000 (ENSR, 2001). The investigation focused on a small area of the peripheral road to be crossed by a new buried cable. Low levels of PCBs were found in several of the samples analyzed, although none were above action levels of 1 ppm.

2.2.2.9 Soil Removal Action (2001)

In 1997, approximately 1,500 cubic yards of soil were excavated from the site during construction of a parking lot and roadway at the site. The soil was determined to be contaminated with PCBs and stockpiled at the site until transported to a TSCA-regulated landfill in 2001.

2.2.2.10 OUE Remedial Investigation and Risk Assessments (2002-2003)

The OUE RI began in 2002 and focused on determining the nature and extent of PCB and potential dioxin/furan contamination at the site. The investigation involved drilling and sampling at 67 soil boring locations, and groundwater monitoring to determine the current levels of contaminants in groundwater at the site. Following completion of the RI, a risk assessment was conducted to determine potential human and ecological risks associated with contaminants detected at the site.

2.2.2.11 OUE Feasibility Study (2004)

A FS was conducted in 2004 and resulted in a determination of NFA for soil and groundwater at the site.

2.2.2.12 OUE Proposed Plan (2004)

The Proposed Plan was developed and made available to the public on September 27, 2004. The Army conducted a public meeting on that date to present the plan to the community. Notice of the meeting was published in the Anchorage Daily News on September 15, 25, 26, and 27. The 30-day review period ended on October 26, 2004 and only one public comment was submitted during the open period.

2.2.2.13 PCB Soil Removal Action (2004)

Following completion of the RI, the Army conducted a limited removal of PCB contaminated soil at the site. Near surface soils located around the transformer mounting pad that were determined to be contaminated with PCBs at concentrations greater than TSCA cleanup levels were excavated and removed from the site. About 50 cubic yards of PCB contaminated soil (one cubic yard of soil contained greater than 50 ppm PCBs and 49 cubic yards of soil contained less than 50 ppm PCBs) were excavated from the site and disposed at a TSCA-regulated landfill. Post-removal sampling indicated that PCB levels are less than the applicable TSCA cleanup levels for low-occupancy areas (25 mg/kg). Surface soils (0 to 1 foot bgs) around the transformer mounting area were excavated and capped with clean backfill. The highest post-removal sample result was 14.1 mg/kg located at one foot bgs. The area was covered with geotextile fabric and covered with clean backfill.

2.2.3 Building 955-Sludge Bin

This site is the location of the former sludge bin that was used as a waste-oil transfer station and sludge bin. Waste liquids containing water and small amounts of solids were transported to the bin from various motor pool operations. The waste liquids were allowed to settle and the contents segregated into water, liquid petroleum compounds, and sludge. The water was pumped from the bin, and the used oil was deposited into USTs located adjacent to the bin. A geotechnical investigation was performed in 1993 for closure of the UST. This resulted in the detection of petroleum hydrocarbons, VOCs, herbicides, and pesticides at the site.

During a 1995 investigation, four borings were sampled for potential chemicals of concern (COCs) at this site. DDT was detected at 95 ppm at six feet bgs in one boring. This area was considered an isolated small spill site and the Army conducted a removal action of the DDT in 1998. Approximately 100 cubic yards of DDT contaminated soil were excavated and transported to a permitted disposal facility. After the soil was removed, 72 soil samples were collected and analyzed using an Envirogard-Immunoassay test kit. A total of three samples exhibited elevated concentrations of DDT greater than ten ppm. Based on this information, a decision regarding the status of the site was deferred (see the OUD ROD) until the site could be re-sampled and analytical results provided to determine if cleanup goals had been met.

The site was re-sampled in 2000, and 16 soil samples (11 subsurface samples and 5 surface samples) were collected and analyzed for pesticides, specifically dichlorodiphenyldichloro-

ethane (DDD), dichlorodiphenyldichloroethene (DDE), and DDT. Sampling results indicated that the highest levels of contaminants detected at the site were DDT at 3.96 mg/kg, DDE at 0.407 mg/kg, and DDD at 0.872 mg/kg (see Table 2-4). The maximum detected concentrations are less than the applicable risk-based concentrations (RBCs) (EPA Region 9 for industrial soil [7.0 mg/kg for DDT and DDE, and 10 mg/kg for DDD]). The concentration of DDT is also less than the 17 mg/kg cleanup level established in the OUD ROD. The site is therefore recommended for NFA.

TABLE 2-4
Soil Sample Results from the Building 955 Sludge Bin Site

Chemical	Cleanup Level[a]	Sample Depth	Maximum Sample Value
Units	*mg/kg (ppm)*	*feet*	*mg/kg (ppm)*
DDE	17	0.5	0.407
DDD	17	0.5	0.872
DDT	17	0.5	3.96

Notes: [a] Cleanup level is greater than the Region 9 PRG, but was established by the OUD ROD that was signed in 2000

2.2.4 Building 796-Battery Shop

Building 796, a battery, vehicle, and weapons maintenance repair shop, is located at the southwest corner of Fifth Street and Davis Highway. Former activities at this source area included draining battery fluid into a floor drain that subsequently drained into a dry well located adjacent to the building. This activity took place from the 1950s until the late 1980s.

Several investigations have been conducted at this site: a 1993 UST investigation, a second Preliminary Site Evaluation (PSE) in 1994, and the RI for OUD in 1996. During pre-RI investigations, chloroform was detected at 3.4 ppm and carbon tetrachloride was detected at 30 ppm (estimated value) in one well. These values resulted in acceptable risk estimates. Even though the concentrations of chloroform and carbon tetrachloride were below risk numbers, the source area was recommended to be included in the RI because of the carcinogenic potency of the two chemicals.

Groundwater sampling events, conducted during the pre-RI, did not detect the presence of chloroform or carbon tetrachloride; however, EDB and benzo(a)pyrene (a PAH) were detected above MCLs. During the RI, EDB was detected in one of 12 sampling events at a concentration of 0.13 parts per billion (ppb) and the PAH was detected in two of eight samples at concentrations of 0.5 and 1.0 ppb.

Based on this information a decision regarding the site was deferred (see the OUD ROD) until groundwater at the site could be re-sampled to determine if EDB and PAHs were present in groundwater at levels exceeding cleanup levels (State of Alaska 18 Alaska Administrative Code [AAC] 75, Table C, Groundwater Cleanup Levels; and federal Drinking Water MCLs).

The Army re-sampled groundwater at the site in 2000 and 2001. Groundwater samples were analyzed for the presence of PAHs, EDB, VOCs, metals, and diesel range organics (DRO). None of the samples contained chemical constituents that exceeded applicable cleanup standards. The only PAH compounds detected were phenanthrene (0.0818 µg/L) and naphthalene (0.0611 µg/L). The concentrations of naphthalene and phenanthrene detected at the site were less than the published cleanup values. EDB was not detected in any of the groundwater samples. Carbon tetrachloride (2.28 µg/L) and chloroform (3.21 µg/L) were detected at the site, but at levels less than the State and federal MCLs. (See Table 2-5.) Because contaminants were not detected at concentrations exceeding State and federal MCLs, the site is therefore recommended for NFA.

TABLE 2-5
Groundwater Sample Results from the Building 796 Site

Chemical	**Cleanup Level[a]**	**Maximum Sample Value**
Units	***µg/L (ppb)***	***µg/L (ppb)***
Phenanthrene	11,000 (ADEC)	0.0818
Naphthalene	700 (ADEC)	0.0611
Benzo(a)pyrene	0.2 (MCL)	ND
2-Dibromoethane (EDB)	0.05 (MCL)	ND
Carbon Tetrachloride	5 (MCL)	2.28
Chloroform	100 (MCL)	3.21
Chromium	100 (MCL)	16.6
Barium	2,000 (MCL)	78.4

Notes: [a] Cleanup levels are based on State (18 AAC 75, Table C, Groundwater Cleanup Levels) and federal Drinking Water MCLs.

3.0 Highlights of Community Participation

The public participation requirements in CERCLA and the NCP were met in the remedy selection process by:

- Providing public access to documents related to OUE
- Soliciting public comment related to the OUE Proposed Plan and remedial decisions
- Conducting a public meeting to present the OUE Proposed Plan
- Conducting general community relations activities
- Providing a responsiveness summary

The public was encouraged to participate in the remedy selection process during a public comment period for the OUE Proposed Plan that was open from September 27 to October 26, 2004. The *Proposed Plan for Remedial Action at Operable Unit E, Fort Richardson, Alaska* (CH2M HILL, 2004e) presented options considered by the Army, ADEC, and EPA to address contamination in groundwater at the AVMA site in OUE. The Proposed Plan was released to the public on September 26, 2004 and was sent to approximately 156 interested parties and 9 Restoration Advisory Board (RAB) members.

Interested citizens were invited to comment on the proposed plan and remedy selection process by mailing comments to the Fort Richardson project manager, by calling a toll-free number and recording a comment, or by attending a public meeting held at the Russian Jack Springs Park Chalet on September 27, 2004. Only one comment was received from the public during the open comment period. Announcements for the public meeting and availability of the proposed plan were published in the Anchorage Daily News on September 15, 25, 26, and 27, 2004. Announcements were also placed in the Alaska Star (weekly paper) during the weeks of September 13 and 20, 2004.

Community involvement regarding environmental issues at Fort Richardson began in the late 1980s with the discovery of high waterfowl mortality at Eagle River Flats. The Army developed the first Community Relations Plan (CRP) in 1995 after discovery of the Poleline Road Disposal Area. The CRP identified community concerns and included proposals for community involvement in the cleanup process at Fort Richardson. The Army updated the CRP by developing an Areawide Community Involvement Plan for Fort Richardson that was published in 2004. In 1995, the Army began distributing fact sheets (the Environmental Restoration News) describing the environmental restoration activities at Fort Richardson. The newsletters have been distributed regularly since 1995. The RAB, a group that focuses on restoration and community relations activities, first met in 1997. RAB meetings were conducted quarterly during the period from 1997 to 2004. The RAB voted in 2004 to reduce the number of meetings to three per year (two meetings and an informational tour).

Decisions regarding OUE are based on information and documents that are contained in the Administrative Record. An information repository that included all the OUE documents and the current Administrative Record was established at the U.S. Army Garrison Alaska Directorate of Public Works, 724 Quartermaster Road at Fort Richardson. In addition, the

Administrative Record was available at two other repositories: the Alaska Resource Library and Information Services and the University of Alaska Anchorage Consortium Library (Reserve Desk).

This ROD presents the selected remedial action for OUE chosen in accordance with CERCLA as amended by SARA and, to the extent practicable, the NCP. The decision for OUE is based on information and documents that are in the Administrative Record. (Appendix B provides an index of the Administrative Record for OUE.)

4.0 Scope and Role of Operable Units

As with many CERCLA sites at large installations, the scope of environmental cleanup at Fort Richardson is complex. As a result, the Army, EPA, and ADEC signed a FFA in 1994 that organized the work into four operable units, A, B, C, and D. OUD was intended to be the final OU, but new information necessitated the formation of OUE to complete CERCLA investigations at Fort Richardson. Operable Units A, B, C, and D have been addressed in previous RODs. OUE is the fifth and last OU to have completed the RI/FS process and to begin remedial activities. Only OUE is addressed in this ROD.

Early on in the CERCLA process, a large number of sites (approximately 108) were identified and investigated to determine which sites warranted inclusion within the CERCLA cleanup process. Sites that were not eligible for inclusion in the CERCLA process were investigated and remediated under several companion agreements between the Army and the State of Alaska. Sites determined to be eligible under CERCLA were grouped into OUs based on the amount of existing information, the similarity of the potential hazardous contamination, and the level of effort required to complete the investigations.

Operable Unit A: This OU consisted of three sites—Roosevelt Road Transmitter Site Leachfield, Petroleum, Oil, and Lubricant Lab Dry Well, and Ruff Road Fire Training Area. The remedy for OUA was selected in a ROD signed on September 18, 1997. The principal contamination at the OUA source areas was petroleum in soil that did not pose an unacceptable risk to human health or the environment, based on EPA criteria for residential use. Thus, the sites were considered NFA under CERCLA. However, petroleum contamination in the soil did exceed ADEC cleanup levels and the sites were remediated under the Non-UST Petroleum, Oil, and Lubricants (POL) Environmental Restoration Agreement (Two-Party Agreement) between the Army and ADEC. Remedial action has been completed at all three sites and they have subsequently been closed under State of Alaska statute.

Operable Unit B: This OU consists of only one site, the Pole Line Road Disposal Area. The remedy for OUB was selected in a ROD signed on September 18, 1997. The principal contamination at OUB was chlorinated solvents in soil and groundwater. A removal action was conducted in 1993 and 1994 to excavate and thermally treat grossly contaminated soil at the site. Subsequent remedial action was accomplished through Six-phase Soil Heating Treatability Studies conducted in 1997 and 1999. The Army is currently monitoring the site and investigating a residual source area that may require treatment.

Operable Unit C: OUC consists of the Eagle River Flats (ERF) ordnance impact area and the Open Burn/Open Detonation (OB/OD) Pad. The remedy for OUC was selected in a ROD signed on September 30, 1998. ERF is a 2,160-acre estuarine salt marsh at the mouth of the Eagle River. The principal contaminant at this site is white phosphorus in sediments that has resulted in mortality of dabbling waterfowl. The remedy selected for this site was pond pumping to dry the wetland sediments, eliminating the white phosphorus. The site is in the remedial action phase and the Army continues to conduct monitoring at the site.

Operable Unit D: OUD originally consisted of 12 potential source areas (Building 35-752 - High Frequency Transmitter Site, Building 45-590 - Auto Hobby Shop, Building 726 - Laundry

Facility, Building 796 - Battery Shop, Storm Water Outfall to Ship Creek, Dust Palliative Locations (four separate areas), Landfill Fire Training Area, Grease Pits, Circle Road Drum Site, Building 700/718, Building 704, Building 955). Four sites were carried through an RI/FS—Building 35-752 High Frequency Transmitter Site, Building 45-590 Auto Hobby Shop, Building 726 Laundry, and Building 796 Battery Shop. The remedy for OUD was selected in a ROD signed on June 30, 2000. Nine sites were determined to require NFA, decisions at two sites (Building 792 and Building 955) were deferred until additional sampling could be completed, and one site (Building 35-752) was transferred to OUE.

Operable Unit E: OUE is the subject of this ROD and consists of two sites (the Building 35-752 Area and the AVMA Site). The Building 35-752 site was determined to require NFA. Solvent contaminated groundwater at the AVMA poses a potential risk to human health because calculated risk estimates exceed the acceptable risk range and solvent concentrations in groundwater exceed MCLs for drinking water. Remedial action at the AVMA will involve implementation of land use controls, reduction of contaminants through natural attenuation, and monitoring to ensure protectiveness. OUE represents the final response action at Fort Richardson. This ROD integrates the remaining evaluations at Fort Richardson and includes the potential cumulative human health and ecological risks that may become evident from the aggregate of source areas and areas not otherwise resolved in previous OUs.

This ROD presents the selected remedial action for OUE source areas in accordance with CERCLA as amended by SARA and, to the extent practicable, the NCP. The decision for OUE is based on information and documents that are in the Administrative Record. The actions identified in this ROD are intended to significantly reduce risks to human health and the environment associated with contamination resulting from past activities at Fort Richardson.

5.0 Summary of Source Area Characteristics

This section provides information concerning the AVMA site characteristics, including information on exposure pathways, geological and hydrological characteristics, types of contamination, locations of contaminants, and sampling strategies.

5.1 Conceptual Site Model

The original conceptual site model (CSM) listed the following potential pathways for human exposure at the AVMA.

- Ingestion, dermal contact, and inhalation of groundwater contaminants from use of groundwater as drinking water by potential future residents
- Ingestion and dermal contact with contaminants in surface soil by onsite workers, trespassers, and hypothetical future residents
- Ingestion and dermal contact with contaminants in subsurface soil by onsite excavation workers
- Inhalation of contaminated dust by on-site workers, onsite excavation workers, trespassers, and hypothetical future residents

These exposure pathways were evaluated during the OUE investigations and risk assessments. Exposure pathways were based on current and reasonably anticipated land use at the AVMA site (industrial land use) and data gathered during a series of pre-RI investigations at the site.

5.2 Overview of AVMA Area

The AVMA is located in the western region of the cantonment area on Fort Richardson as shown in Figure 1-2. The site consists of open fields, grasslands, and woods, as wells as a vehicle maintenance facility (Building 732) and a laundry facility (Building 726), covering approximately 140 acres. Section 2.1.1 provides an overview of the history and conditions at the AVMA, including details of investigations conducted at the Building 45-590 site and at the Building 726 site during the OUD RI.

Solvent contamination (specifically PCE) has been detected in groundwater at the site. The highest concentrations of PCE were observed in the shallow, unconfined aquifer located in an area between Building 726 and the former Building 45-590 (see Figure 5-2 for locations). The contaminated groundwater plume extends about 600 feet northwest from Building 726. Current data indicate that the plume is stable and contained.

After significant sampling efforts, including borings and wells installed during the OUD investigations, contaminated soil areas were not detected, and therefore a specific release site or mechanism could not be identified at the AVMA site. The OUD remedial investigations conducted at Buildings 45-590 and 726 did not detect significant levels of soil contamination that exceeded cleanup standards or that indicated potential source areas

were present at the sites. Based in part on this finding, both the Building 726 and the Building 45-590 sites were considered NFA as documented in the OUD ROD.

However, the data collected during the OUE RI strongly suggest that PCE contamination in groundwater at the AVMA resulted from vehicle maintenance and laundry operations conducted at Buildings 732 and 726, respectively. Historical data show that PCE was used at the laundry facility and low levels of PCE were detected in soils at the Building 726 site during the OUD RI. There appears to be a direct link between the Building 726 site and the downgradient contamination. It is highly likely that PCE contamination from the former underground tanks located at Building 726 had been removed during excavation of the USTs or had migrated downgradient prior to the time the OUD RI had been conducted. Thus, soil and groundwater samples collected directly at the site did not contain high levels of solvents.

In addition, the OUD data appear to be biased by the fact that the groundwater samples were not collected from the unconfined aquifer in the area between Building 726 and Building 45-590. Groundwater samples collected during the OUE RI from wells installed in the unconfined aquifer indicated that PCE contamination was present, and that there was a contaminant pathway linking the Building 726 site with the PCE contamination found near Building 45-590.

Groundwater contamination was detected immediately downgradient from the Building 732 location during the OUD RI. Low levels of PCE contamination were detected in well AP-3789 and could indicate a link to vehicle maintenance activities conducted at Building 732.

5.3 Geology and Hydrology of the AVMA

The site lies on an alluvial plain, often referred to as the Anchorage Lowland. The Elmendorf moraine can be found approximately one-half mile north of the site. The underlying geology at the AVMA is complex and highly variable. The Mountain View fan is on the order of 40- to 60-feet thick under most of the site. The fan consists mostly of sands and gravels with localized deposits of silt and clay. There are no wetlands or surface water features located on the site.

Groundwater underlying the AVMA is encountered in both shallow and deep aquifers separated by a confining layer. The thickness of the confining layer varies across the site and pinches out towards the north edge of the site. The confining layer is about 37 feet thick at the well AP-4412/AP-4413 location and 30 feet thick at the well AP-4415/AP-4416 location. The northern extent of the confining unit was determined to be adjacent to the Davis Highway, northwest of Building 732.

In areas where the confining layer is present, a shallow unconfined aquifer is encountered at about 60 feet bgs and a deeper confined aquifer is encountered at about 100 feet bgs. The aquifers merge where the confining layer pinches out, forming a thick unconfined aquifer. Groundwater flow at the site is complex due the nature of the geology, but the general groundwater flow direction is towards the northwest. Figure 5-1 shows a conceptual cross-sectional model of the geology and hydrology at the site.

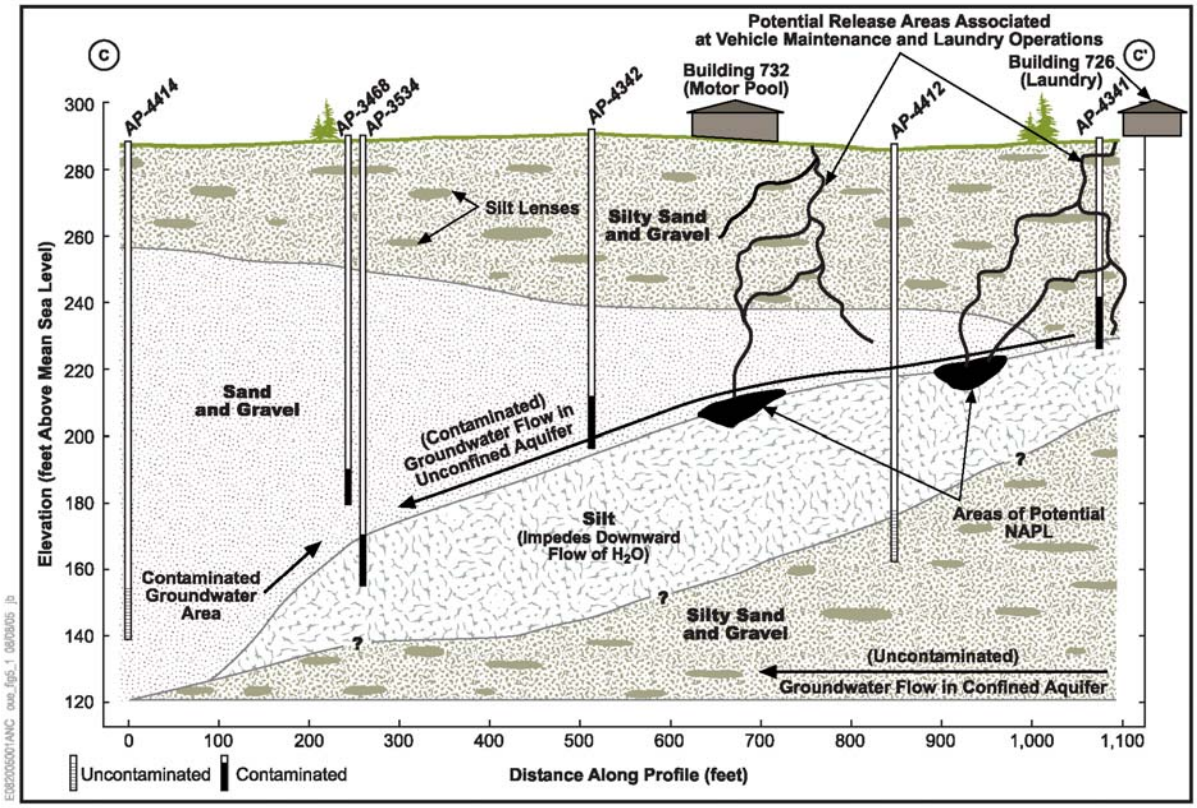


Figure 5-1
Conceptual Cross-Sectional Model of the AVMA Site

5.4 Sampling Strategy

The general area around the AVMA site has been extensively investigated (OUD RI, pre-RI investigations, and OUE RI). During the OUD RI, seven soil borings were installed at the 45-590 site and groundwater samples were collected from 23 monitoring wells in an effort to define a source area for PCE contamination in groundwater. The Building 726 site was also investigated during the OUD RI (ENSR, 1998a)) and the Preliminary Source Evaluation (ENSR, 1996). During those investigations, seven soil borings and three groundwater monitoring wells were installed and sampled for contaminants. Pre-RI investigations conducted in 2001 involved a geotechnical assessment, drilling of 15 soil borings, and installation of two monitoring wells at the AVMA site. Over 50 soil samples were collected during pre-RI investigations at the AVMA site. In addition, the Army conducted an extensive historical records review of the site and evaluated maps, photos, and archived documents.

The OUE RI at the AVMA was conducted during 2002 and 2003. Objectives of the OUE RI at the AVMA included the following:

- Define the extent of solvent contamination in groundwater at the site
- Evaluate and define potential source areas for dissolved PCE and other contaminants in groundwater

- Characterize the disturbed area east of Building 45-590, where historic photographs show potential areas of contamination

The OUE RI included collection and analysis of about 75 soil samples from 9 trenches and 14 soil borings. In addition, groundwater samples were collected from 41 monitoring wells located across the site. Table 5-1 summarizes information about the sample locations and concerns related to the AVMA.

TABLE 5-1
Summary of AVMA Sampling Strategy

Sample Location/Type	Number of Sampling Locations	Purpose or Target of Sampling
Trench Excavations Soil and Debris	9 trenches located in an area east of the former Building 45-590 site	Investigating disturbed area as potential source of groundwater contamination
Monitoring Well/Soil Borings	14 wells	Determining northern extent and thickness of confining layer of an aquifer, identifying hydrogeologic conditions, checking for contamination
Groundwater	41 wells	Contamination of groundwater with carbon tetrachloride and PCE

The target analyte list for each site was determined based on site history and previous investigations. Figure 5-2 shows all groundwater sample locations. Chemical samples, including project field samples and quality assurance/quality control (QA/QC) samples, were submitted to analytical laboratories for various analyses. To ensure consistency and reproducibility of test results, soil and water samples were analyzed following approved ADEC, EPA, and American Society for Testing and Materials (ASTM) methods.

Groundwater samples were collected during the OUE RI (CH2M HILL, 2004a) and during subsequent sampling events conducted in spring and fall 2004. The spring and fall 2004 events included analysis of natural attenuation parameters.

5.5 Nature and Extent of Contamination at the AVMA

Laboratory analyses were performed on soil and groundwater samples collected from the AVMA site. Data from the OUD RI were also incorporated to provide a more complete evaluation of the site. All the information was evaluated to understand the amount and types of contamination that are present at the site. Figure 5-2 shows the sample locations for trenches, borings, and monitoring wells.

5.5.1 Soil

OUE Remedial Investigation

Sample results for soil at the AVMA are summarized in Table 5-2. The COPCs detected in soil samples above their screening levels were DRO, arsenic, and PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthrene, and dibenzo(a,h)anthracene).

TABLE 5-2
Soil Sample Results for the AVMA

Chemical	Screening Value[a] (mg/kg)	Samples	Range of Concentrations (mg/kg)	Comments/Conclusions
Diesel Range Organics (DRO)	250	67 (2)	0.78 – 3,800	Only 2 sample results exceeded the screening criteria (median was 75 mg/kg). The 3800 mg/kg sample result was likely due to asphalt and tar materials found at that sample location.
Arsenic	1.6	54 (42)	1 – 75	The median arsenic concentration detected at the AVMA was 5.32 mg/kg, and the median background concentration detected at Fort Richardson was 6 mg/kg. Thus, arsenic in soils is attributed to naturally occurring deposits.
Benzo(a)anthracene	2.1	55 (1)	0.069 - 5.3	One sample from trench T3 contained low level concentrations of VOCs. Two other samples (one from T1 and one from T3) contained low levels of benzo(a)pyrene that exceeded screening criteria. No obvious source of contamination was observed during excavation and the contaminants are believed to be localized in the subsurface.
Benzo(a)pyrene	0.21	55 (3)	0.051 - 4.1	
Benzo(b)fluoranthrene	2.1	55 (1)	0.049 - 3.2	
Dibenzo(a,h)anthracene	0.21	55 (1)	0.1 – 0.61	

Notes: [a] Screening levels are EPA Region 9 PRGs for soil, with the exception of DRO, which is a State of Alaska UST standard.
Numbers in parentheses indicate the number of values exceeding the screening criteria.

Arsenic was detected at almost every location and depth that was sampled during the RI. Forty-two of the 54 samples that were collected contained arsenic at levels exceeding screening criteria. Comparison of arsenic levels detected in samples from the AVMA site and background sample data from Fort Richardson, indicate that arsenic detected in soil is naturally occurring. Background soils data for Fort Richardson and the surrounding Anchorage Basin were collected from various sources, including studies conducted by the Army (Ecology & Environment, Inc. [E&E], 1996) and the Air Force (U.S. Air Force, 1993). The mean arsenic concentration detected at the AVMA was 5.32 mg/kg and the mean background concentration measured during the 1994 study was 6 mg/kg.

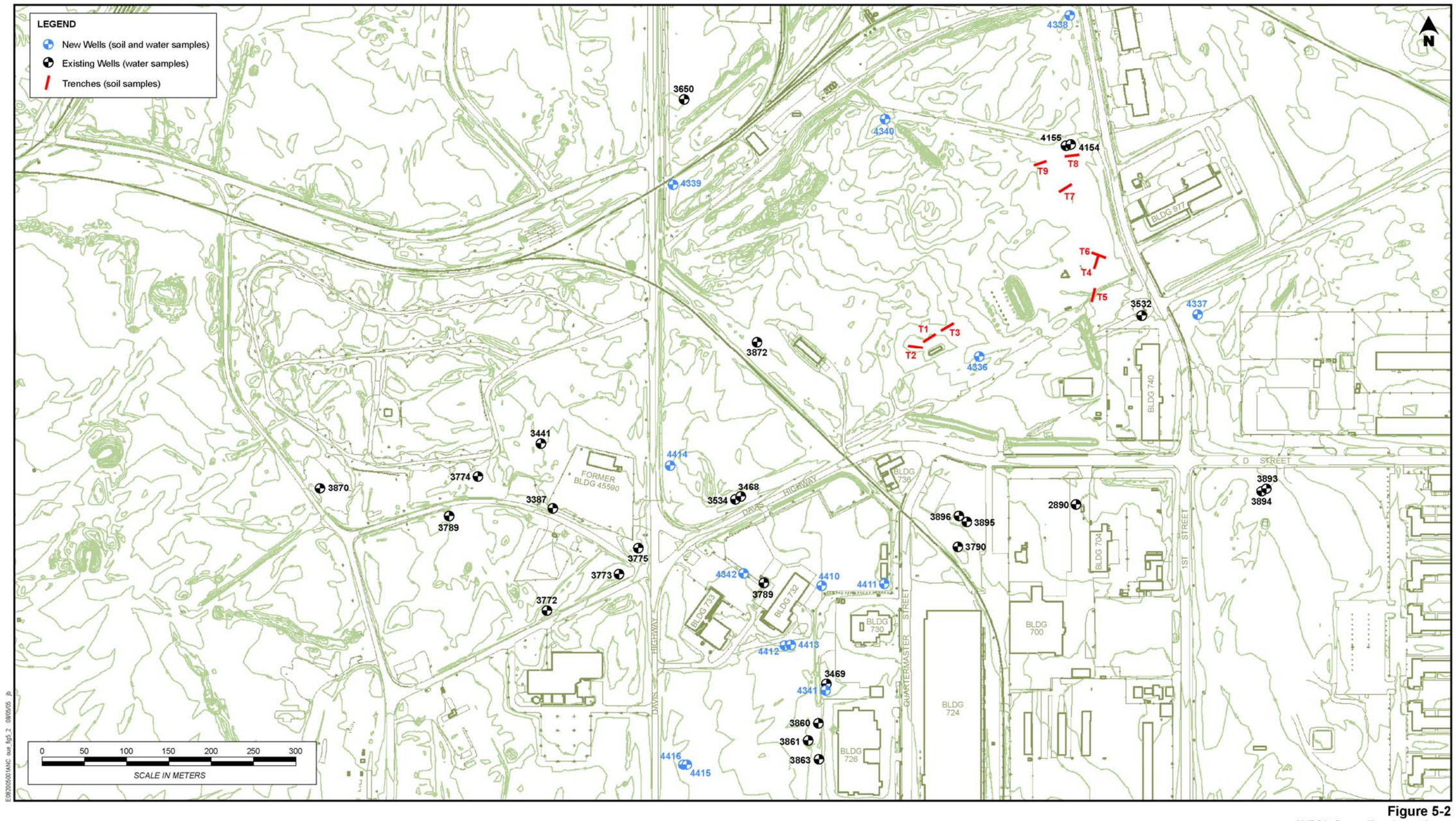


Figure 5-2
AVMA Sampling Locations

Dibenzo(a,h)anthracene, benzo(a)anthracene, and benzo(b)fluoranthrene were detected in one soil sampling location in Trench T3 (20 feet bgs) at levels greater than the screening levels. Benzo(a)pyrene was detected in three soil samples from trenches T1 (0.5 foot bgs) and T3 (15 and 20 feet bgs) at levels exceeding screening criteria. No obvious source of contamination was noted during the investigation and the low-level contaminants are likely associated with the debris (wood, metal, etc.) found in the trenches. Analysis of groundwater samples collected from an area adjacent to, and downgradient from, trenches T1 and T3 did not indicate the presence of any of these chemicals.

DRO and gasoline range organics (GRO) were detected in near surface soils (0 to 1 foot) within several trench locations (T2 and T9). Concentrations of DRO and GRO were not widespread and appear to have resulted from small localized releases that were likely the result of paving operations conducted at the site. At one time, until about 1958, the Davis Highway traversed through the AVMA area where the trenches were excavated. Sections of the former highway appear to have been discovered during excavation at the AVMA (sections of paved asphalt surface were discovered at T9 and T5). Both samples that contained DRO concentrations greater than the screening criteria were collected from areas containing paving materials (pieces of asphalt and tar).

Analytical results from soil samples collected during installation of 14 monitoring wells at the AVMA site did not indicate the presence of a source area capable of producing a dissolved plume. Only two compounds (arsenic and benzo(a,h)anthracene) were detected at levels exceeding screening criteria.

OUD Remedial Investigation

Near surface soil samples (to 2 feet bgs) were collected in three locations near the northwest corner of Building 726. PCE was detected in samples ranging from 0.005 to 0.1 mg/kg. DRO and GRO were detected at almost all locations at concentrations ranging from 29 to 98 mg/kg.

Four soil borings were also drilled at the location of the former UST (previously used for storage of dry cleaning solvents) located near the northwest corner of Building 726. Results indicated that low concentrations of PCE, DRO, and GRO were detected in the subsurface. GRO and DRO were detected in the near surface (2 feet bgs) at levels of 72 and 19 mg/kg, respectively. Samples were collected from the interface of the unconfined aquifer at about 60 feet bgs. Soil samples contained PCE at concentrations ranging from 0.004 to 0.88 mg/kg. GRO and DRO were also detected at the same depth at concentrations up to 2890 and 27 mg/kg, respectively. Other compounds such as toluene, acetone, and methylene chloride were detected in soil samples collected at the site. Levels were less than MCLs and methylene chloride was also detected in the laboratory method blank, so the result was likely due to lab contamination.

Results

Following an interpretation of the results of the soil sampling efforts, the conclusions reached are discussed below:

- The disturbed area east of former Building 45-590, where historic photographs showed potential areas of contamination, was characterized. No significant source of contamination was identified during the trench excavations.
- Low level concentrations of petroleum compounds (DRO, GRO), and PAHs such as benzo(a,h)anthracene were detected in soil samples collected during installation of borings and monitoring wells. Contaminant concentrations did not exceed cleanup levels, and did not indicate that a significant source area existed at the AVMA.
- Low levels of PCE were detected at the Building 726 site during the OUD RI, but not at concentrations exceeding cleanup or risk levels.
- Even though significant levels of soil contamination were not detected at the AVMA site, there is anecdotal evidence to indicate that a localized source area must exist near the northwest side of Building 726. Water sampling data indicate that dissolved-phase PCE contamination in groundwater originates in the area immediately downgradient from Building 726. Dry cleaning solvents (PCE and/or Stoddard solvent) were stored in USTs at the site and tank bottoms were disposed in a dumpster at the site. Low levels of PCE contamination were detected in soils at the Building 726 site, indicating that PCE had been used at the facility.

5.5.2 Groundwater

OUE Remedial Investigation

Results of groundwater sampling at the AVMA are summarized in Table 5-3. The elevated total metals concentrations in groundwater samples from the AVMA wells are attributed to two major factors: 1) elevated background concentrations of metals have been observed in the Anchorage basin, and 2) wells with elevated metals concentrations often were very turbid and contained large quantities of sediment. Collection of sediment-free samples was not possible because of the soil types present, the discontinuous nature of the shallow unconfined aquifer, and the low yield of wells installed in that aquifer. Comparison of analytical results from filtered and unfiltered samples indicates that the metals sorbed to the sediments represent a substantial percentage of the overall result.

TABLE 5-3
Groundwater Sample Results for the AVMA

Chemical	Screening Value (μg/L)[a]	Number of Samples	MCL (μg/L)[b]	Range of Detected Concentrations (μg/L)	Detections Exceeding Screening Value
DRO	1,500	63	1,500	38 – 1,800	1
Aluminum	36,499	21	NA	17 – 610,000	3
Antimony	15	21	6	16 – 60	2
Arsenic	0.045	21	10	20 – 130	4
Barium	2,555	21	2,000	4.3 – 3,500	1

TABLE 5-3
Groundwater Sample Results for the AVMA

Chemical	Screening Value (μg/L)[a]	Number of Samples	MCL (μg/L)[b]	Range of Detected Concentrations (μg/L)	Detections Exceeding Screening Value
Cadmium	18	21	5	2.4 – 35	1
Chromium (Total)	109	21	100	2.9 – 1,700	5
Iron	10,950	21	NA	12 – 1,200,000	7
Lead	15	21	15	16 – 180	3
Manganese	876	21	NA	1.1 – 22,000	3
Nickel	730	21	100 (ADEC)	10 – 1,400	1
Selenium	182	21	50	32 – 370	1
Vanadium	255	21	260 (ADEC)	17 – 1,900	1
Arsenic (dissolved)	0.045	6	10	59	1
Benzo(a)pyrene	0.0092	60	0.2	0.17	1
Benzo(b)fluoranthrene	0.092	60	1 (ADEC)	0.056 – 0.22	1
Dibenzo(a,h)anthracene	0.0092	60	0.1 (ADEC)	0.032 – 0.24	3
Indeno(1,2,3-cd)pyrene	0.092	60	1 (ADEC)	0.043 – 0.22	1
Bromodichloromethane	0.18	62	100 (ADEC)	0.42	1
Carbon Tetrachloride	0.17	62	5	0.12 – 1.5	25
Chloroform	6.2	62	100 (ADEC)	0.12 – 7	1
Chloromethane	1.5	62	NA	0.1 – 5.9	7
Methylene Chloride	4.3	62	5 (ADEC)	0.43 – 6	2
Tetrachloroethylene (PCE)	0.66	62	5	0.26 – 120	21
Trichloroethylene (TCE)	0.028	62	5	0.16	1

Notes: [a] Screening levels from Region 9 PRGs with the exception of DRO, which is from ADEC levels.
[b] MCLs are from National Primary Drinking Water Regulations, unless otherwise noted.

Of the 11 wells where metals concentrations exceeded the screening values, five are located in an arc that coincides with the edge of the confining layer. These wells are installed above that confining layer in an area that was characterized by interbedded silt and water-bearing units. Two other wells are located upgradient in the shallow, unconfined aquifer where little

groundwater was encountered. These wells barely produce enough water for sample collection, and the water that is collected is extremely turbid because the wells could not be developed or purged properly.

The primary COPCs in groundwater at the AVMA are PCE, carbon tetrachloride, dibenzo(a,h)anthracene, and metals. The observed metals concentrations in groundwater are believed to be the result of naturally occurring metals and the observed high silt content in wells installed in the shallow aquifer. Additionally, no historical evidence regarding possible sources of metals at the AVMA has been located.

The extent of the dissolved PCE contamination in groundwater at the AVMA site was determined during the RI. Figure 5-3 shows the approximate extent of PCE contamination in groundwater at the site. Contamination, when encountered, extends from an area immediately upgradient of Building 732 to slightly past the junction of the confined and unconfined aquifers north of the Davis Highway. Contamination was not encountered in upgradient portions of the confined aquifer. Concentrations of PCE decreased in the unconfined aquifer north of the Davis Highway.

The concentration of PCE in wells AP-3534 and AP-3468 has decreased during the past 7 years and was detected at concentrations that were about 40 percent less than levels detected in 1998 (see Table 5-4). The basic daughter products of PCE are TCE, dichloroethylene (DCE), and vinyl chloride. TCE was detected in one well (AP-4336) sampled during the RI, but that well is not located in the area downgradient from the perceived source area. None of the daughter products have been detected at concentrations above screening levels in the same area as the dissolved PCE has been detected. The highest observed concentrations of PCE were detected in the shallow, unconfined aquifer along a transect between Building 726 and the former Building 45-590. Downgradient wells located in the merged, unconfined aquifer have periodically contained measurable levels of PCE, but at levels much less than the MCL.

TABLE 5-4
PCE Concentration Trends at the AVMA

Date	January 1995		January 1998		June 2003	
Well	***AP-3534***	***AP-3468***	***AP-3534***	***AP-3468***	***AP-3534***	***AP-3468***
PCE (μg/L)	26	102	36	91	28	69

Notes: Wells AP-3468 (shallow) and AP-3534 (deep) are nested wells located in an area where the shallow and deeper aquifer merge on the north side of the Davis Highway.

The data indicate that the dissolved concentrations of PCE are decreasing and that the PCE originates from a diffuse and low-strength source lacking significant enough magnitude to create a substantial dissolved PCE plume. The likely conceptual model (Figure 5-1) is that small volumes of residual nonaqueous phase liquid (NAPL) are present in the subsurface in the area north of Building 726. The model conceptualizes that residual NAPL dissolves into groundwater flowing through the shallow unconfined aquifer (low yield aquifer) and is subsequently diluted with uncontaminated water from the deeper partially confined aquifer

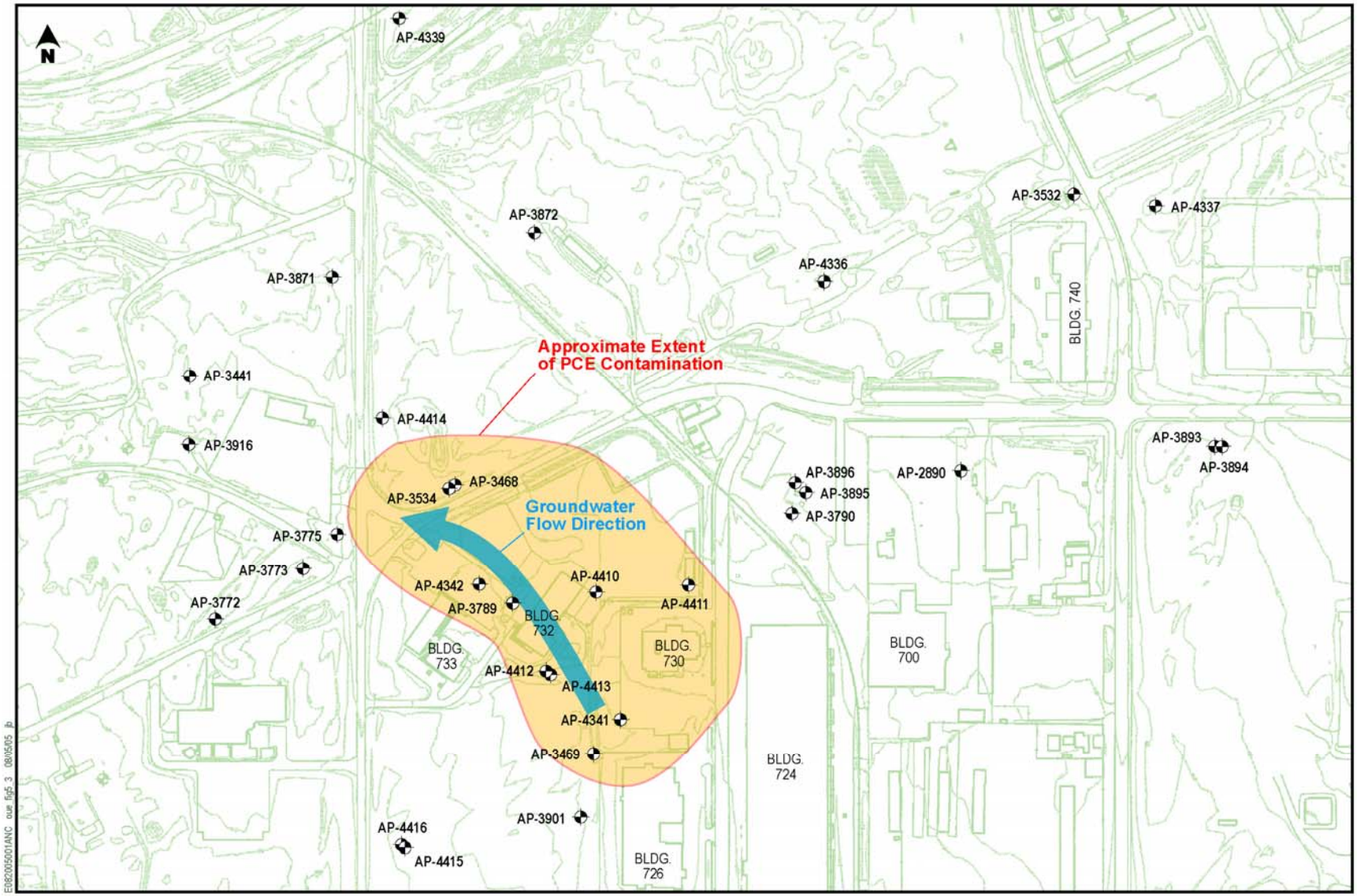


Figure 5-3
Approximate Extent of PCE Contamination in Groundwater at the AVMA

in the area where they merge just north of the Davis Highway (near wells AP-3534 and AP-3468). This conceptual source area was not located during the remedial investigation but must exist as evidenced by dissolved-phase PCE in groundwater at the site. In addition, the lack of observed degradation products of PCE is consistent with the theory that the PCE from the shallow, unconfined aquifer is diluted upon merging with the deeper partially confined aquifer.

Dibenzo(a,h)anthracene was detected in groundwater samples from several wells at the AVMA, but only the sample from well AP-3893 contained concentrations exceeding screening levels. Because the primary source of many PAHs is petroleum, the dibenzo(a,h)anthracene contamination detected at well AP-3893 is not considered to be related to the PCE contamination detected downgradient from Building 726. In addition, well AP-3893 is located about 650 meters crossgradient from the PCE contamination area.

The contamination detected at well AP-3893 more than likely originated from a petroleum release in that area. The area upgradient from well AP-3893 is an open field and no facilities have been constructed at the site. There are no obvious signs of surface contamination in the area. The site has been used as a helicopter landing zone in the past and military personnel have conducted abbreviated training exercises in the area. Inspection of the original well drilling log indicated that gross contamination was not detected during drilling operations. Groundwater samples collected from two wells (AP-3532 and AP-4337) located downgradient from well AP-3893 did not contain dibenzo(a,h)anthracene at measurable levels.

Results

Following an interpretation of the results of the groundwater sampling efforts, the conclusions reached are discussed below in relationship to the objectives of the RI.

- The extent of the dissolved PCE contamination in groundwater was determined as shown on Figure 5-3. Contamination, where encountered, extends from an area immediately downgradient from Building 726 to slightly past the junction of the confined and unconfined aquifers north of the Davis Highway. PCE contamination was detected in the shallow unconfined aquifer underlying the Building 726 and 732 areas, but not in the deeper semi-confined aquifer located under those sites.

- PCE contamination exceeding the MCL, was detected in the area where the unconfined and semi-confined aquifers merge (wells AP-3534 and AP-3468). Groundwater found at, and downgradient from wells AP-3534 and AP-3468 contains high metals levels and PCE, but is otherwise potable. Groundwater in the unconfined aquifer located upgradient from wells AP-3534 and AP-3468 is non-potable due to high turbidity and low yield.

- Ongoing monitoring indicates that the contaminant is attenuating downgradient from the point of origin near Building 726. The primary means of attenuation appears to be dilution. Chemical degradation does not appear to be a major pathway of contaminant reduction at this site.

- Dibenzo(a,h)anthracene was detected in well AP-3893. This contaminant is not related to the PCE release and was detected in an area about 650 meters crossgradient from the PCE-contaminated area.
- Because dibenzo(a,h)anthracene contamination detected at well AP-3893 likely originates from a release of petroleum products in an area not associated with the PCE contaminated area, this contaminant is not considered to be a part of the CERCLA decision for OUE and will be managed and monitored under the State – Fort Richardson Environmental Restoration Agreement (Two-Party Agreement) for petroleum products. Under the two-party agreement, the Army and State will address contamination at well AP-3893 in accordance with applicable State of Alaska regulations. Because this contaminant will be addressed through the Two-Party Agreement, it is not discussed further in this ROD.

6.0 Land and Resource Uses

This section identifies institutional controls and current and potential future uses of the land and water at the OUE. It is organized into the following subsections:

- Land use
- Groundwater beneficial use

6.1 Land Use

6.1.1 Fort Richardson

Fort Richardson is, in essence, a small city. The Post contains housing, commercial, industrial, military training, and recreational areas. Land use varies across the Post and is controlled through the Army's Master Planning process. Residential areas (including schools and the library) are strictly segregated from the rest of the Post.

Areas surrounding Fort Richardson are made up of military (Elmendorf AFB), State of Alaska, and residential holdings. As shown in Figure 1-1, the cities of Anchorage and Eagle River constitute the major adjacent population centers and reside to the southwest and northeast, respectively. The combined population of Anchorage and Eagle River is approximately 260,283 (U.S. Bureau of the Census, 2000).

6.1.2 AVMA

The AVMA is open fields and some buildings covering approximately 140 acres. The AVMA site contains a laundry facility (Building 726), a commercial building (Headquarters for the Directorate of Public Works), a military motor pool (Building 732), and a military training facility (Building 733). The downgradient area north of Building 732 has been used as a training area and obstacle course since 1973. The Army is in the process of reconstructing a jump tower at the site, and will be upgrading the training facilities (obstacle course) at the site during the next several years.

Land use at the AVMA and neighboring areas is industrial and will remain industrial for the reasonably anticipated future. Future residential use of the OUE land is not reasonable, nor is it consistent with the Master Plan for Fort Richardson. The AVMA area does not fit the criteria for residential land use as outlined in the Army's Master Planning Guidance, AR 210-20 (Army, 2005).

6.2 Groundwater Beneficial Use

A description of the hydrogeology at the AVMA site is provided in Section 5.3. A brief description of the groundwater beneficial use follows.

6.2.1 AVMA

The primary aquifer of concern in the vicinity of the AVMA is the unconfined aquifer and groundwater that is approximately 100 feet bgs. The general flow direction in this aquifer is to the northwest; however, groundwater flow trends more to the west during the summer. A confining layer has been identified in the southern portion of the AVMA (under Buildings 726 and 732) at a depth of about 60 feet that separates the unconfined aquifer from the deeper locally confined aquifer (see Figure 5-1). There is no surface water in the immediate vicinity of the AVMA. The deep unconfined aquifer downgradient from the AVMA could be used as a drinking water source. However, the shallow, unconfined aquifer underlying Buildings 726 and 732 is non-potable due to high turbidity and low yield.

Groundwater associated with the AVMA is not used as a source of drinking water. The nearest potable supply well in the area of the AVMA is Supply Well 1, located approximately 1.25 miles south (upgradient) of the site. This well is completed in the confined aquifer at a depth of 162 feet bgs. Another nearby supply well, Otter Lake Well, is located approximately 2.5 miles north-northwest of the site. The closest surface water to the AVMA is Ship Creek, located about one mile from the AVMA.

All of the facilities near the AVMA, including those downgradient, use water from the existing potable water supply system. The Post has adequate infrastructure to provide potable water to every location within the main cantonment area and there are no future plans to install drinking water wells in the immediate vicinity of the AVMA. In addition, existing institutional controls (ICs) prohibit access to the groundwater at the AVMA as a source of drinking water. The AVMA site has been added to the Fort Richardson GIS Environmental Database that is used to track and manage sites where ICs have been implemented as a remedy (where contamination has been left in place). The GIS database is used as an integral part of the Master Planning process and alerts planners of areas where ICs have been established. This allows the planners to make accommodations (avoid the site or plan to clean it up) when designating land uses and/or planning future construction projects. It also notifies a planner that certain activities cannot be conducted at IC sites (e.g., no groundwater use).

An additional aspect of the IC policy at Fort Richardson is the requirement that all entities (including all Army personnel, civilians, and contractors) obtain an excavation clearance request (ECR) prior to excavating to a depth of more than six inches bgs. Even installation of a fence post requires an ECR. The Environmental Department must review and sign each ECR prior to approval. Any conflicts with IC sites are noted on the ECR and the request will be denied if the activity impacts an IC site, unless the requesting entity develops a plan to safely handle and treat any materials excavated during the proposed operation. (As an example: an entity wishes to install a water supply well at the AVMA site and submits an ECR; upon review the request would be denied because the GIS database would indicate that there is an IC prohibiting groundwater use at the site.)

7.0 Summary of Site Risks

Baseline human health and ecological risk assessments (HHRA and ERA, respectively) were conducted for the AVMA to determine the need to take action, and to indicate the exposure pathways for chemicals that need to be addressed by remedial action. A detailed presentation of the baseline risk assessments for the AVMA are contained in the 2004 Operable Unit E Risk Assessment Report, Fort Richardson, Alaska (CH2M HILL, 2004b). Both current and potential future exposure scenarios were considered for the AVMA. The HHRA estimates the human health risk that the AVMA site could pose if no action was taken. Site risk is a factor that is consider when deciding what actions to take at a particular site. The risk assessment also identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

For the AVMA, the need for remedial action is based primarily on the presence of PCE contamination in groundwater at levels that exceed drinking water standards, that exceed cleanup levels, and that present an unacceptable risk to human health. Hypothetical future users (either residential or commercial groundwater users) could be affected if the land were developed for use other than what is now anticipated.

The RI, FS, HHRA, ERA, and Proposed Plan for OUE may be found in the Administrative Record file for Fort Richardson. At the current time, there are no human health exposures to contaminants at the AVMA site. The following sections of the ROD summarize the risks at the AVMA site.

7.1 Summary of Human Health Risk Assessment

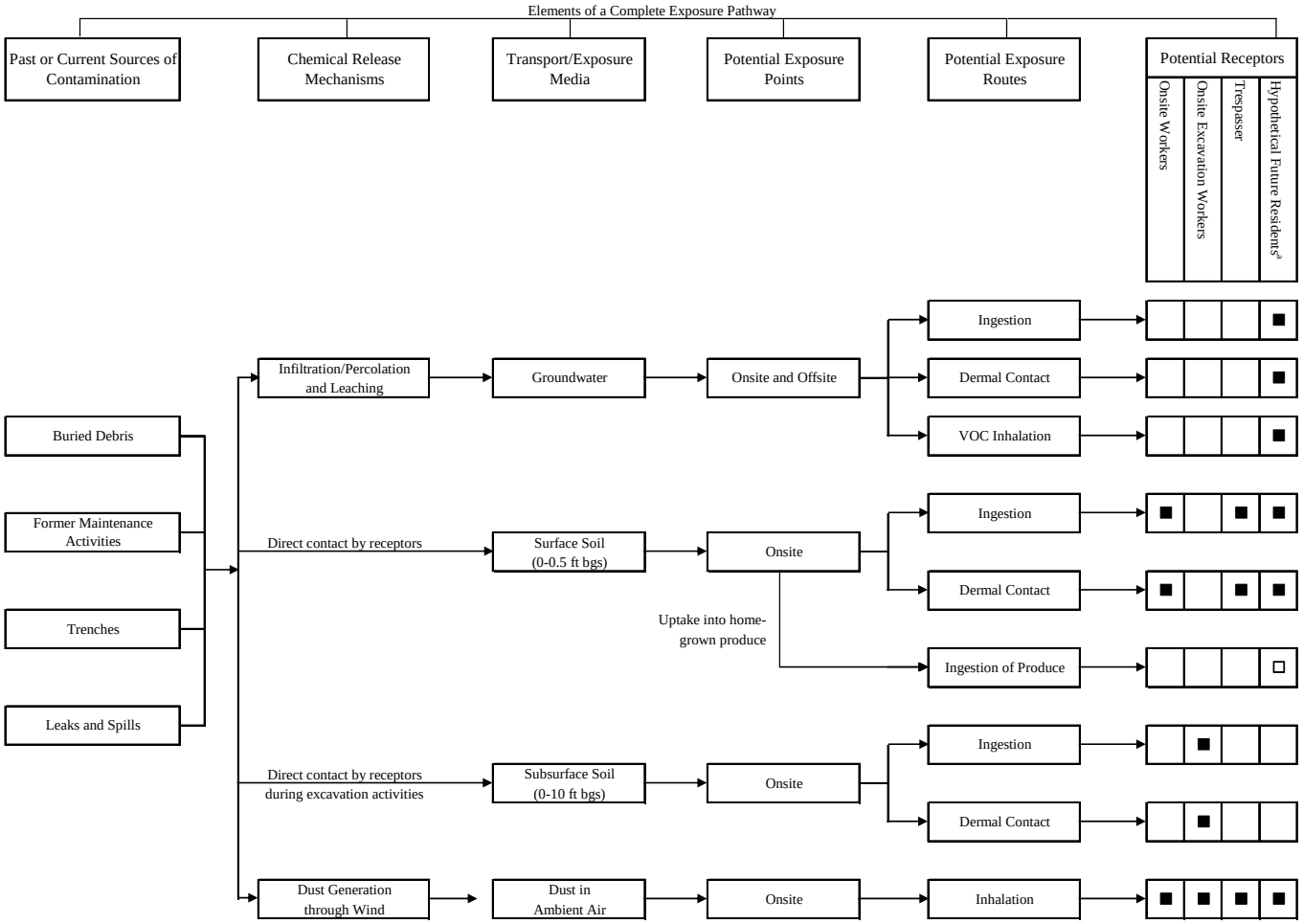
A baseline HHRA was performed for OUE using analytical data from surface soil (0 to 0.5 foot bgs), subsurface soil (0.5 to 10 feet bgs), and groundwater for the purpose of site characterization at the AVMA site. The purpose of the HHRA is to determine the potential for risk to human health under current and reasonably anticipated future land and water uses. The HHRA is considered "baseline" because it provides an assessment of the potential impacts of past releases to soil and groundwater on human populations under the assumption that no additional remediation will occur at the site.

7.1.1 Exposure Assessment

For the AVMA site, surface and subsurface soil samples were used to evaluate the entire site as a single exposure area. A CSM was developed to identify possible exposure pathways between site chemicals and different human populations. This model represents the current understanding of site characteristics at the AVMA (Figure 7-1).

7.1.1.1 Human Exposure Assumptions

Based on current understanding of land and groundwater beneficial use conditions at or near OUE, the most plausible exposure settings considered for characterizing human health risks are as follows:



a. Residents will not likely exist at the AVMA in the future. This hypothetical scenario is added to provide an indication of the potential significance of future land use changes.
■ = Potentially complete pathway
□ = Pathway considered insignificant (to be addressed qualitatively)

Blank = Incomplete pathway

Figure 7-1
Conceptual Site Model for Potential Human Exposures

- Current Site-Specific Worker Scenario. Under current site conditions, site-specific workers could potentially be exposed to soil during maintenance and military activities at the site. At the current time, the average rotation of job tenure at these sites is three years (Prieksat, 2003). Potential routes of exposure to surface soil (0 to 0.5 foot bgs) for the current site-specific worker include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated by wind.
- Future Onsite Industrial Worker Scenario. Under future site conditions, onsite industrial workers could potentially be exposed to soil during maintenance and military activities at the site. Potential routes of exposure to surface soil (0 to 0.5 foot bgs) for the onsite industrial worker include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated by wind.
- Onsite Trespasser Scenario. Although access to OUE is restricted, a trespasser scenario was evaluated assuming unauthorized access is gained to the AVMA. A trespasser who infrequently gains unauthorized access to OUE could potentially become exposed to surface soils at the site. Potential routes of exposure to surface soil (0 to 0.5 foot bgs) for the onsite trespasser include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated by wind.
- Onsite Excavation Worker Scenario. Under future site conditions, onsite excavation workers could potentially be exposed to subsurface soil during infrequent excavation activities at or near the site. These activities could include placement or repair of utilities or other construction activities involving digging. Potential routes of exposure to subsurface soil (0 to 10 feet bgs) for the onsite excavation worker include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated by wind or during excavation activities.
- Hypothetical Future Residential Scenario. Given the reasonably anticipated future land uses at Fort Richardson, it is unlikely that residents will live at OUE in the future. The results from evaluation of this scenario provided a frame of reference to indicate the potential significance of future land-use changes, if any. For soil, the plausible exposure routes for the hypothetical future onsite resident include incidental soil ingestion, dermal contact with soil, and inhalation of ambient vapors or dust generated by wind. For groundwater, the plausible exposure routes for the hypothetical future onsite resident include ingestion, dermal contact during showering, and inhalation of VOC vapors emanated during showering or other household uses.

7.1.1.2 Calculation of Well-Specific Groundwater Exposure Point Concentrations

Exposure point concentrations (EPCs) are estimated chemical concentrations that a receptor may contact and are specific to each exposure medium. For the incidental ingestion and dermal routes of exposure, EPCs are represented by concentrations directly measured groundwater. For the inhalation route, modeling estimated constituent concentrations in air from groundwater during a showering scenario.

A well-specific methodology was used to determine present risks due to groundwater at the site. The purpose of using a well-specific methodology is to identify which of the COPCs present in individual well samples exist at concentrations that could feasibly pose risk at relevant exposure points (where drinking wells could reasonably be placed in the future).

EPCs for individual monitoring wells were estimated using the average concentration of the latest two sampling rounds occurring in 2002 and/or 2003. Any chemical that was detected at least once during this time interval was identified as a COPC. (If only detected once during the last two rounds, a detected value was used as the EPC.) EPCs derived using this method estimate the most current exposure conditions.

Because only one groundwater sampling round was conducted in 2002 for certain monitoring wells, these results were used to evaluate risk for these wells. Any chemical that was detected in these individual groundwater samples at least once was identified as a COPC and carried forward into the HHRA. Although less representative of longer-term temporal conditions (seasonal fluctuations), EPCs derived for these wells are representative of the most current exposure conditions.

7.1.1.3 Calculation of Chemical Intake

Chemical intake is estimated, where possible, from direct chemical measurements in groundwater collected from OUE. For each area of interest, EPCs for COPCs in groundwater are calculated by using the best statistical estimate of an upper bound on the average exposure concentrations, in accordance with EPA guidance (EPA, 1992 and 2002a). The 95 percent upper confidence limit on the mean concentration is considered by these guidance documents as a conservative upperbound estimate that is not likely to underestimate, and most likely overestimates, the mean concentration. The procedure for identifying the statistical distribution type of each area of interest (normal, lognormal, or nonparametric) was conducted in accordance with *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (EPA, 2002a) (CH2M HILL, 2004b). Summary statistics for each medium were calculated for each area of interest. The equations that were used to calculate direct contact exposures to contaminants in groundwater can be found in the OUE risk assessment (CH2M HILL, 2004b).

7.1.2 Toxicity Assessment

The toxicity assessment evaluates the relationship between the magnitude of exposure to a chemical at OUE and the likelihood of adverse health effects to potentially exposed human populations. The assessment provides, where possible, a numerical estimate of the increased likelihood of adverse effects associated with chemical exposure (EPA, 1989).

Toxicity values (cancer slope factors [SF] and reference doses [RfDs]) used in the risk assessment were obtained from the following sources:

- 2003 Integrated Risk Information System (IRIS), an electronic database available through the EPA's National Center for Environmental Assessment in Cincinnati, Ohio. The IRIS database, prepared and maintained by the EPA, contains health risk and EPA regulatory information on specific chemicals (EPA, 2003)
- The Health Effects Assessment Summary Table (HEAST), provided by the EPA Office of Solid Waste and Emergency Response(OSWER), is a compilation of toxicity values published in health effects documents issued by the EPA and intended for use in SARA and RCRA programs (EPA, 1997)
- EPA Region IX Preliminary Remediation Goals (PRGs) Table (EPA, 2002b)

The primary source of toxicity values was the IRIS database. If a toxicity value was not available from IRIS, then the latest available values from HEAST were used. When a toxicity value was not available from either IRIS or HEAST, provisional toxicity values were obtained from the EPA Region IX PRGs toxicity factor tables (EPA, 2002b). In some cases, surrogate toxicity values were used in the risk assessment to evaluate chemicals without toxicity values. Surrogate compounds were based upon chemical structure and similar toxicological properties or metabolism.

The surrogate toxicity values used for the HHRA are as follows(s):

- Alpha-BHC was used as a surrogate for delta-BHC
- 1,3-dichloropropene was used as a surrogate for 1,1-dichloropropene, cis-1,3-dichloropropene, and trans-1,3-dichloropropene
- 1,2,4-trichlorobenzene was used as a surrogate for 1,2,3-trichlorobenzene
- 1,2-dichloropropane was used as a surrogate for 1,3-dichloropropane
- 2-chlorotoluene was used as a surrogate for 4-chlorotoluene
- Cumene (isopropylbenzene) was used as a surrogate for p-cymene (p-isopropyltoluene)
- Endrin was used as a surrogate for endrin aldehyde and endrin ketone
- Acenaphthene was used as a surrogate for acenaphthylene
- Anthracene was used as a surrogate for phenanthrene
- 3-methylphenol was used as a surrogate for 4-chloro-3-methylphenol
- Pyrene was used as a surrogate for benzo(g,h,i)perylene
- Endosulfan was used as a surrogate for endosulfan sulfate

Toxicity values or surrogate toxicity values were available for all COPCs, with the exception of TPH (including DRO and GRO and triphenylene). An appropriate surrogate was not identified for TPH.

Although TPH was not carried forward into the risk assessment, constituents (such as PAHs, benzene, toluene, ethylbenzene, and xylenes) that represent the greatest risk to human health were analyzed for and included in the quantitative risk assessment. Although the risks associated with TPH are not quantifiable, TPH could contribute to the total site risk if it is in fact toxic and present in toxic amounts.

The uncertainty assessment (CH2M HILL, 2004b) presents the potential impact on the risk assessment from use of surrogate toxicity factors.

7.1.3 Risk Characterization

The purpose of the risk characterization is to integrate the results of the exposure and toxicity assessments to estimate risk to humans from exposure to site contaminants. Risks were calculated for carcinogenic (cancer-causing) and noncarcinogenic (toxic) effects for both the average-exposure and reasonable-maximum-exposure scenarios.

For the risk evaluation, the potential for unacceptable human health risk was identified using the following risk thresholds:

- Excess lifetime cancer risk values are compared to the "point of departure" range of 10^{-6} to 10^{-4} that is generally used by regulatory agencies. Excess lifetime cancer risk values within or exceeding this EPA target risk range require a risk management decision that includes evaluating site-specific characteristics and exposure scenario factors to assess whether remedial action is warranted (EPA, 1991b).
- A ratio of chemical intake to the RfD for all constituents (HI) greater than one indicates that potential exists for adverse noncancer health effects associated with exposure to the contaminants of concern (EPA, 1991b).

Individual cancer risk was calculated as the product of exposure to a chemical (in milligrams per kilogram of body weight per day [mg/kg-day]) and the SF for that chemical (in $(mg/kg\text{-}day)^{-1}$. Cancer risk from exposure to multiple carcinogens and multiple pathways was assumed to be additive, based on the guidelines for carcinogen risk assessment (EPA, 1996).

The human health risk posed by each exposure area was determined using the following process:

- Calculate risk—either ELCR or hazard quotient (HQ)—from the exposure point concentrations for each contaminant
- Sum the risk estimates from all contaminants to estimate the total ELCR or HI for each exposure area

The potential for cancer effects was evaluated by estimating the ELCR. This risk is the incremental increase in the probability of developing cancer during one's lifetime, in addition to the background probability of developing cancer (if no exposure to site chemicals occurs).

Potential health risks associated with exposure to noncarcinogenic compounds is evaluated by calculating the HQ. The potential HQ was calculated as the ratio of the intake to the RfD. If the estimated daily intake for any single chemical is greater than its RfD, the HQ will exceed one. An HQ that exceeds one indicates that there is a potential for adverse health effects associated with exposure to that chemical.

An HI is calculated to assess the potential for noncancer effects posed by more than one chemical. The HI approach assumes that simultaneous subthreshold exposures to several chemicals could result in an adverse health effect. It also assumes that the magnitude of the adverse effect will be proportional to the sum of the ratios of the subthreshold exposures to the acceptable exposure (the RfD). The HI is equal to the sum of the HQs.

Cancer risks and noncancer health affects were characterized for each human population of interest at the AVMA. Risk summaries for the AVMA are presented in Tables 7-1 and 7-2, and are discussed in the following subsections.

7.1.4 Summary of Risk Estimates for the Armored Vehicle Maintenance Area

7.1.4.1 Soil

The noncancer HI and ELCR estimates for the AVMA site soils are summarized in Table 7-1 for each of the identified exposure scenarios. The ELCR estimates ranged from $3x10^{-7}$ for the onsite trespasser scenario to $1x10^{-5}$ for the hypothetical future residential scenario. These are all within or below the regulatory target risk range of $1x10^{-6}$ to $1x10^{-4}$. The noncancer HI estimates ranged from 0.02 for the onsite trespasser scenario to 0.6 for the hypothetical future residential scenario. These are all well below the regulatory threshold value of 1.0. Therefore, no COPCs were identified in soil for the AVMA.

TABLE 7-1
Summary of Risk Estimates for Soil at the AVMA

Exposure Area	Exposure Scenario	ELCR	HI
Entire AVMA	Current Site-Specific Worker	5.4E-07	0.17
	Onsite Industrial Worker	4.5E-06	0.17
	Onsite Trespasser	3.0E-07	0.019
	Hypothetical Future Resident	1.5E-05	0.56
	Excavation Worker	3.0E-06	0.038

7.1.4.2 Groundwater

The noncancer HI and ELCR estimates for the hypothetical future residential scenario at the AVMA wells are summarized in Table 7-2, along with the primary risk contributors for each well. The cumulative ELCR estimates at the AVMA site ranged from $3x10^{-7}$ to $3x10^{-3}$. Eight of 34 wells exceed the $1x10^{-4}$ regulatory target risk range. The primary contributors to risk (chemicals with ELCR more than 10^{-6}) for the hypothetical future residential scenario at these eight monitoring wells include the following:

- Arsenic (wells AP-3896, AP-4336, AP-4337, and AP-4338)
- Carcinogenic PAHs (well AP-3893)
- Bromodichloromethane (well AP-4336)
- Carbon tetrachloride (wells AP-3468, AP-4337, AP-4342, and AP-4413)
- PCE (wells AP-3468, AP-4342, and AP-4413)

The HIs ranged from 0.001 to 249. The HI at 11 of these wells (Table 7-2) exceeds the regulatory threshold value of 1.0. The primary contributors to the noncancer HI (chemicals with HQs more than 1.0) at these 11 wells include the following:

- Aluminum (wells AP-4336, AP-4338, and AP-4342)
- Antimony (well AP-3871)
- Arsenic (wells AP-3896, AP-4336, AP-4337, and AP-4338)

TABLE 7-2
Summary of Risk Estimates for Groundwater at the AVMA
Hypothetical Future Residential Scenario

Groundwater Well	Exposure Route	ELCR	HI	Primary Contributor to Total ELCR[a]	Primary Contributors to Total HI[a]
All AVMA Groundwater	Ingestion	5.1E-04	213	Arsenic ELCR=4.8E-04 (85%)	Iron HQ=139 (64%)
	Dermal	1.8E-05	4.4	Tetrachloroethylene (PCE) ELCR=6.1E-05	Manganese HQ=33 (15%)
	Inhalation	3.1E-05	0.48	(11%)	Aluminum HQ=21 (10%)
	Total	5.6E-04	218		
AP-2980	Ingestion	--	0.020	--	Chloroform HQ=1.1 (100%)
	Dermal	--	0.00027		
	Inhalation	--	1.1		
	Total	--	1.2		
AP-3441	Ingestion	6.7E-07	0.0081	Methlyene Chloride ELCR=1.4E-06 (100%)	--
	Dermal	4.8E-09	0.000092		
	Inhalation	7.3E-07	0.26		
	Total	1.4E-06	0.27		
AP-3467	Ingestion	5.4E-07	0.0086	--	--
	Dermal	2.4E-08	0.00030		
	Inhalation	9.4E-08	0.012		
	Total	6.6E-07	0.021		
AP-3468	Ingestion	6.6E-05	8.8	PCE ELCR=1.3E-04 (98%)	Chromium HQ=9.3 (88%)
	Inhalation	4.4E-06	1.3	Carbon Tetrachloride ELCR=3.0E-06 (2%)	
	Dermal	6.4E-05	0.36		
	Total	1.3E-04	11		
AP-3483	Ingestion	7.1E-06	0.0019	Dibenzo(a,h)anthracene ELCR=2.5E-05	--
	Dermal	1.9E-05	0.000014	(92%)	
	Inhalation	4.0E-07	0.00067	Benzo(b)fluoranthene ELCR=1.5E-06 (5%)	
	Total	2.7E-05	0.0026		
AP-3532	Ingestion	4.5E-06	0.11	Carbon Tetrachloride ELCR=1.3E-05 (96%)	--
	Dermal	1.4E-07	0.0036		
	Inhalation	9.0E-06	0.60		
	Total	1.4E-05	0.71		
AP-3534	Ingestion	3.0E-05	0.12	PCE ELCR=5.2E-05 (77%)	--
	Dermal	1.3E-05	0.008	Dibenzo(a,h)anthracene ELCR=1.4E-05	
	Inhalation	2.5E-05	0.034	(21%)	
	Total	6.7E-05	0.16	Indeno(1,2,3-c,d)pyrene ELCR=1.4E-06 (2%)	
AP-3650	Ingestion	7.3E-07	0.02	Carbon Tetrachloride ELCR=2.1E-06 (95%)	--
	Dermal	2.2E-08	0.001		
	Inhalation	1.4E-06	0.21		
	Total	2.2E-06	0.23		
AP-3772	Ingestion	8.8E-07	0.0028	Chloromethane ELCR=1.2E-06 (51%)	--
	Dermal	6.1E-09	0.000020	Methylene Chloride ELCR=1.1E-06 (49%)	
	Inhalation	1.4E-06	0.0046		
	Total	2.3E-06	0.0074		
AP-3774	Ingestion	5.5E-07	0.012	Carbon Tetrachloride ELCR=1.1E-06 (72%)	--
	Dermal	2.5E-08	0.00042		
	Inhalation	9.0E-07	0.13		
	Total	1.5E-06	0.14		
AP-3775	Ingestion	7.3E-07	0.0035	--	--
	Dermal	3.3E-08	0.00016		
	Inhalation	7.3E-07	0.0016		
	Total	1.5E-06	0.0053		

TABLE 7-2
Summary of Risk Estimates for Groundwater at the AVMA
Hypothetical Future Residential Scenario

Groundwater Well	Exposure Route	ELCR	HI	Primary Contributor to Total ELCR[a]	Primary Contributors to Total HI[a]
AP-3776	Ingestion	1.2E-06	1.0	Carbon Tetrachloride ELCR=2.1E-06 (66%)	Chromium HQ=1.1 (88%)
	Dermal	5.7E-08	0.16	Tetrachloroethylene (PCE) ELCR=1.1E-06	
	Inhalation	1.9E-06	0.13	(34%)	
	Total	3.1E-06	1.3		
AP-3789	Ingestion	6.4E-06	0.03	Tetrachloroethylene (PCE) ELCR=1.3E-05	--
	Dermal	4.3E-07	0.002	(100%)	
	Inhalation	6.2E-06	0.0088		
	Total	1.3E-05	0.04		
AP-3790	Ingestion	--	0.0056	--	--
	Dermal	--	0.00011		
	Inhalation	--	0.26		
	Total	--	0.27		
AP-3870	Ingestion	4.8E-07	0.015	Carbon Tetrachloride ELCR=1.5E-06 (100%)	--
	Dermal	1.6E-08	0.00049		
	Inhalation	9.8E-07	0.14		
	Total	1.5E-06	0.15		
AP-3871	Ingestion	1.6E-06	1.4	Carbon Tetrachloride ELCR=3.3E-06 (83%)	Antimony HQ=1.6 (63%)
	Dermal	5.7E-08	0.19		
	Inhalation	2.4E-06	0.87		
	Total	4.0E-06	2.5		
AP-3872	Ingestion	5.0E-07	0.01	--	--
	Dermal	2.4E-08	0.0005		
	Inhalation	4.7E-08	0.30		
	Total	5.7E-07	0.32		
AP-3893	Ingestion	4.9E-05	0.0002	Dibenzo(a,h)anthracene ELCR=1.1E-04	--
	Dermal	1.1E-04	0.00001	(64%)	
	Inhalation	--	0.00062	Benzo(a)pyrene ELCR=4.5E-05 (27%)	
	Total	1.6E-04	0.001	Indeno(1,2,3-c,d)pyrene ELCR=7.2E-06 (4%)	
				Benzo(b)fluoranthene ELCR=5.8E-06 (4%)	
AP-3894	Ingestion	1.2E-06	0.002	Chloromethane ELCR=3.0E-06 (81%)	--
	Dermal	8.1E-09	0.00002		
	Inhalation	2.5E-06	0.038		
	Total	3.7E-06	0.04		
AP-3895	Ingestion	7.2E-07	0.001	Chloromethane ELCR=1.6E-06 (75%)	--
	Dermal	4.9E-09	0.00001		
	Inhalation	1.4E-06	0.0055		
	Total	2.1E-06	0.007		
AP-3896	Ingestion	8.7E-04	4.5	Arsenic ELCR=8.7E-04 (100%)	Arsenic HQ=4.5 (100%)
	Dermal	1.8E-06	0.009		
	Inhalation	--	0.00049		
	Total	8.7E-04	4.5		
AP-4154	Ingestion	1.1E-07	0.001	--	--
	Dermal	8.0E-10	0.0001		
	Inhalation	1.7E-07	0.00090		
	Total	2.9E-07	0.002		
AP-4155	Ingestion	1.4E-07	0.49	--	--
	Dermal	9.9E-10	0.079		
	Inhalation	1.9E-07	0.0014		
	Total	3.3E-07	0.57		

TABLE 7-2
Summary of Risk Estimates for Groundwater at the AVMA
Hypothetical Future Residential Scenario

Groundwater Well	Exposure Route	ELCR	HI	Primary Contributor to Total ELCR[a]	Primary Contributors to Total HI[a]
AP-4336	Ingestion	4.9E-04	24	Arsenic ELCR=4.9E-04 (99%)	Iron HQ=14 (53%)
	Dermal	1.0E-06	0.46	Bromodichloromethane ELCR=2.3E-06 (<1%)	Aluminum HQ=3.8 (15%)
	Inhalation	2.5E-06	1.4		Arsenic HQ=2.6 (10%)
	Total	5.0E-04	26		Chromium HQ=2.6 (10%)
AP-4337	Ingestion	4.5E-04	3.3	Arsenic ELCR=4.5E-04 (98%)	Arsenic HQ=2.3 (60%)
	Dermal	1.0E-06	0.13	Carbon Tetrachloride ELCR=7.1E-06 (2%)	
	Inhalation	4.7E-06	0.47		
	Total	4.6E-04	3.9		
AP-4338	Ingestion	2.9E-03	243	Arsenic ELCR=2.9E-03 (100%)	Iron HQ=139 (56%)
	Dermal	5.9E-06	6.2		Manganese HQ=33 (13%)
	Inhalation	6.6E-07	0.65		Chromium HQ=23 (9%)
	Total	2.9E-03	249		Aluminum HQ=21 (8%)
					Arsenic HQ=15 (6%)
AP-4339	Ingestion	4.5E-07	7.3	--	Chromium HQ=7.4 (87%)
	Dermal	1.3E-08	1.0		
	Inhalation	9.3E-07	0.18		
	Total	1.4E-06	8.5		
AP-4341	Ingestion	2.2E-06	0.1	PCE ELCR=2.8E-06 (54%)	--
	Dermal	1.2E-07	0.003	Carbon Tetrachloride ELCR=2.2E-06 (43%)	
	Inhalation	2.9E-06	0.11		
	Total	5.2E-06	0.2		
AP-4342 (using total metals)	Ingestion	5.7E-05	19	PCE ELCR=1.1E-04 (95%)	Iron HQ=14 (68%)
	Dermal	3.7E-06	0.39	Carbon Tetrachloride ELCR=5.8E-06 (5%)	Aluminum HQ=2.5 (12%)
	Inhalation	5.6E-05	0.38		Chromium HQ=2.4 (12%)
	Total	1.2E-04	20		
AP-4342 (using dissolved metals)	Ingestion	5.7E-05	0.46	PCE ELCR=1.1E-04 (95%)	--
	Dermal	3.7E-06	0.025	Carbon Tetrachloride ELCR=5.8E-06 (5%)	
	Inhalation	5.6E-05	0.38		
	Total	1.2E-04	0.86		
AP-4411	Ingestion	1.2E-05	0.066	PCE ELCR=2.2E-05 (92%)	--
	Dermal	7.6E-07	0.0038	Carbon Tetrachloride ELCR=1.9E-06 (8%)	
	Inhalation	1.2E-05	0.10		
	Total	2.4E-05	0.17		
AP-4413	Ingestion	8.1E-05	0.44	PCE ELCR=1.6E-04 (94%)	--
	Dermal	5.3E-06	0.026	Carbon Tetrachloride ELCR=1.1E-05 (6%)	
	Inhalation	8.1E-05	0.64		
	Total	1.7E-04	1.1		
AP-4414	Ingestion	7.7E-08	0.00015	--	--
	Dermal	5.2E-10	0.000015		
	Inhalation	1.9E-07	0.019		
	Total	2.7E-07	0.019		
AP-4415	Ingestion	3.1E-07	0.0016	--	--
	Dermal	2.1E-08	0.00010		
	Inhalation	3.0E-07	0.0077		
	Total	6.3E-07	0.0094		
AP-4416	Ingestion	3.1E-07	0.0034	Benzene ELCR=1.1E-06 (100%)	--
	Dermal	9.5E-09	0.00010		
	Inhalation	8.2E-07	0.012		
	Total	1.1E-06	0.015		

Notes: [a] Primary contributors for groundwater are listed for constituents with ELCR > 10-6 or HQ > 1.0. The five primary contributors are listed, if more than five. See individual tables for all constituents.

- Chloroform (well AP-2980)
- Chromium (wells AP-3468, AP-3776, AP-4336, AP-4338, AP-4339, and AP-4342)
- Iron (wells AP-4336, AP-4338, and AP-4342)
- Manganese (well AP-4338)

A majority of the AVMA wells in the shallow, unconfined aquifer could not be developed using standard approaches due to the high silt load observed in water in the wells. Some were developed using a bailer because available pumps were not capable of carrying the high silt loads from the depths to water in the wells. Generally, the wells installed in the shallow, unconfined aquifer were turbid, contained little standing water, and yielded little water. Due to the presence of groundwater sample turbidity that could bias groundwater concentrations, the measured levels of metals in the groundwater are believed to be unrelated to site releases.

The COPCs identified, that were believed to be potentially site-related releases, included the following:

- Chloroform (well AP-2980)
- Bromodichloromethane (well AP-4336)
- Carbon tetrachloride (wells AP-3468, AP-4337, AP-4342, and AP-4413)
- PCE (wells AP-3468, AP-4342, and AP-4413)

7.1.5 Identification of Chemicals of Concern

Analytical sampling data were screened in a multi-step process to select a list of site-related COCs that potentially contribute to human health risks at the AVMA site. All data were initially compared against screening levels obtained from the EPA Region 9 PRGs (EPA, 2002b) or from the Alaska Water Quality Standards (ADEC, 2003). If chemical constituents in soil or groundwater exceeded screening levels, they were evaluated in the risk assessments. The risk assessments identified COPCs for soil and groundwater at the AVMA that resulted in unacceptable risk, and that were determined to be associated with site-related releases. These constituents were further evaluated in the FS to determine COCs for the site. If a constituent was identified as a COPC by the risk assessment, and was also detected at levels exceeding applicable or relevant and appropriate requirements (ARARs) it was considered to be a COC.

The HHRA concluded that, for a hypothetical future residential scenario, COPCs in the groundwater at the AVMA included carcinogenic PAHs (dibenzo[a,h]anthracene, benzo[a]pyrene, indeno[1,2,3-c,d]pyrene, and benzo[b]fluoranthene), chloroform, bromodichloromethane, carbon tetrachloride, and PCE. The following discussion describes the process for selecting COCs for groundwater at the AVMA.

- Because chloroform (a VOC) was detected in only one well and at the lowest limit of the HI, chloroform was not considered to be a COC.

- Bromodichloromethane (a VOC) was a contributor to the cumulative ELCR of 5.0 $x10^{-4}$ at well AP-4336. However, arsenic controlled the risk. That is, the ELCR for arsenic was $4.9x10^{-4}$, which accounted for 99 percent of the cumulative ELCR. (It is believed that the detected concentrations of arsenic were the result of naturally occurring levels of arsenic observed in the Anchorage area. The mean arsenic concentration detected at the AVMA was 5.32 mg/kg and the mean background concentration measured during a 1996 background study was 6 mg/kg (E&E, 1996)].The ELCR for bromodichloromethane was $2.3x10^{-6}$, which accounted for less than 1 percent of the ELCR. Therefore, bromodichloromethane was not considered a COC.
- There are four wells where concentrations of carbon tetrachloride (a VOC) were detected and cumulative ELCRs exceeded the regulatory target risk range of $1x10^{-6}$ to $1x10^{-4}$. In Wells AP-3468, AP-4342, and AP-4413, PCE controlled the risk. In well AP-4337, arsenic controlled the risk. (That is, the ELCR for arsenic accounted for 98 percent of the cumulative ELCR and carbon tetrachloride only accounted for 2 percent of the ELCR.) In addition, carbon tetrachloride concentrations (1.5 µg/L) did not exceed the MCL (5 µg/L). Therefore, carbon tetrachloride was not considered a COC.
- Concentrations of PCE (a VOC) in three wells (AP-3468, AP-4342, and AP-4413) resulted in ELCRs above $1x10^{-4}$. Therefore, PCE was considered a COC.

Based on the data collected during the RI, one COC was identified in groundwater at the AVMA that drives the need for remedial action. Table 7-3 lists the COC identified in groundwater at the AVMA site.

TABLE 7-3
Chemical of Concern in Groundwater at the AVMA

Chemical of Concern	Concentration Detected		Units	MCLs		Frequency of Detection	Exposure Point Concentration	Statistical Measure
	Min	Max		State	Federal			
PCE	0.26	120	µg/L	5	5	11/37	8.52	Average

Notes: PCE = tetrachloroethylene

7.2 Baseline Ecological Risk Assessment

The Baseline Ecological Risk Assessment (BERA) was performed for OUE using analytical data from surface soil (0 to 1 foot bgs) and subsurface soil (0 to 6 feet bgs) for the purpose of site characterization at the AVMA. The overall objective of the BERA is to define the existing risks to ecological receptors (that is, to determine if chemicals released by activities on the site are causing adverse effects to ecological receptors at or adjacent to the site) using all relevant available data for OUE. Surface and subsurface soil samples were used to evaluate each area as a single exposure area.

A CSM was developed to identify possible exposure pathways between site chemicals and different ecological receptors. This model represents the current understanding of site characteristics at the AVMA (Figure 7-2).

7.2.1 Potentially Complete Ecological Exposure Pathways

The focus of the OUE BERA was on direct or indirect exposure of ecological receptors to chemicals of potential ecological concern (COPECs) found in site soils. Potential exposure pathways for ecological receptors at the AVMA are summarized below:

- Direct uptake and dermal contact by terrestrial plants
- Ingestion and dermal contact by terrestrial invertebrates
- Incidental ingestion of soil by terrestrial vertebrates (birds and mammals)
- Food-chain transfer to terrestrial vertebrates via ingestion of contaminated plants, invertebrates, and wildlife

Except in the case of burrow-dwelling animals (such as pocket gophers), a receptor's exposure to contaminants by inhalation and dermal contact usually contributes little to its overall exposure. Receptors evaluated in the assessment did not include burrow-dwelling animals, because other receptors were determined to be more representative of receptors onsite, and no evidence of burrowing animals was observed at the site during the site visit. Therefore, dermal and inhalation exposures were considered negligible, and the emphasis of the OUE BERA was placed on exposure of ecological receptors through direct contact (terrestrial invertebrates), ingestion/uptake directly from contaminated soil (terrestrial plants, terrestrial invertebrates, and birds and mammals), or uptake of COPECs through the food chain (birds and mammals).

7.2.2 Ecological Management Goals, Assessment Endpoints, and Measures

The following ecological management goals were developed for OUE:

- Protection of communities of terrestrial plants and invertebrate animals that are characteristic of local habitats
- Protection of populations of vertebrate animals (birds and mammals) that are characteristic of local habitats

The assessment endpoint entities for OUE were selected based on the following principal criteria:

- Ecological relevance
- Political and societal relevance
- Susceptibility to known or potential stressors
- Consistency with ecological management goals

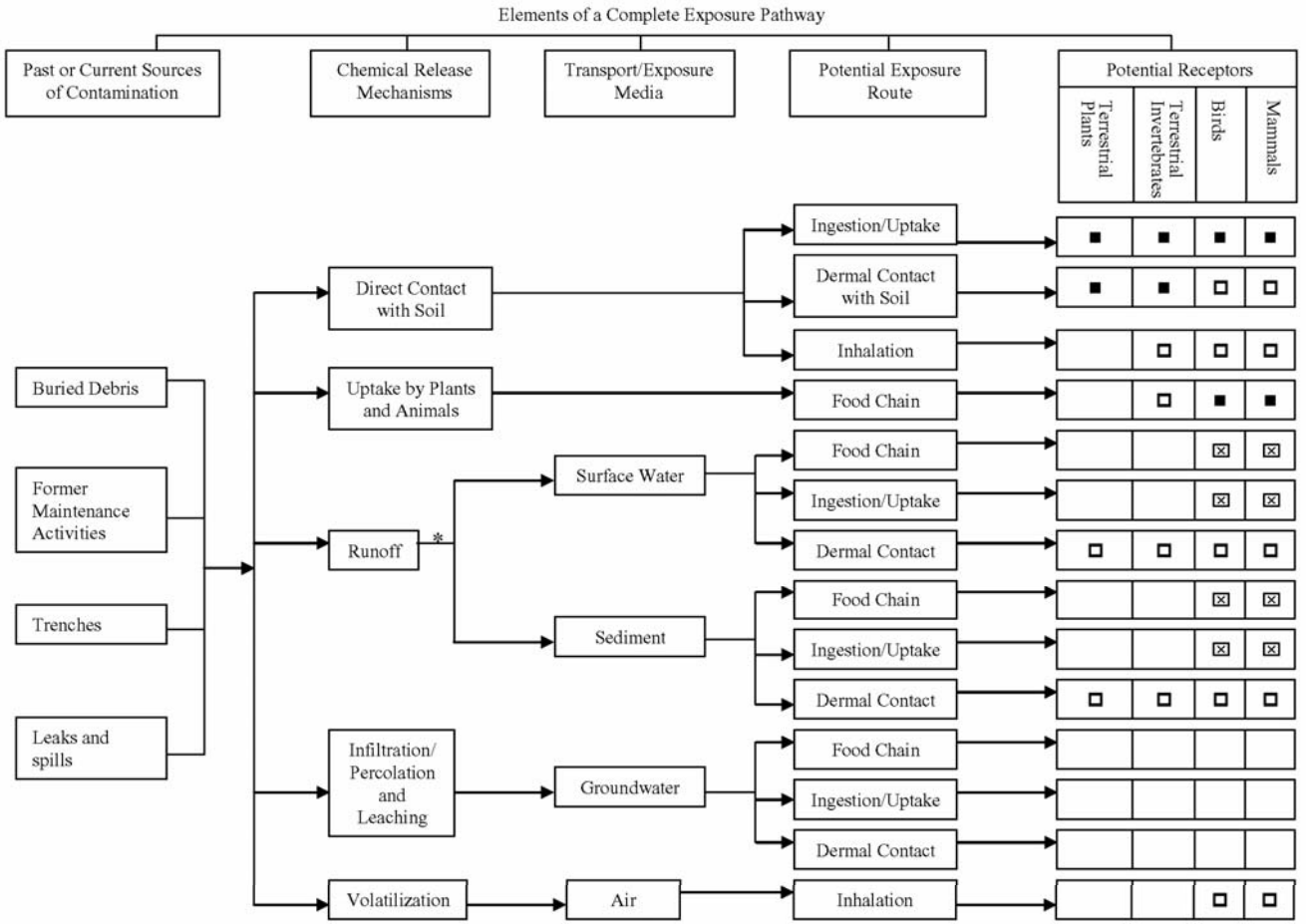


Figure 7-2
Conceptual Site Model for Potential Ecological Exposures

The maximum acceptable adverse effect level generally selected for the assessment endpoints is a 20 percent reduction in the measured attribute. Terrestrial plants and invertebrates were evaluated at the community level, while birds and mammals were evaluated at the population level. Measures of effect were identified for each group, as follows:

- Community-Level Measures
  - Effects on growth, reproduction, or survival that may affect terrestrial plant community composition, density, species diversity, or community structure
  - Effects on growth, reproduction, or survival that may affect terrestrial invertebrate community composition, density, species diversity, or community structure
- Population-Level Measures
  - Effects on growth, reproduction, or survival that may affect abundance of bird species
  - Effects on growth, reproduction, or survival that may affect abundance of mammalian species

7.2.3 Representative Species

Wildlife receptors for OUE include the American robin as an avian omnivore and the bald eagle as an avian carnivore, the red-backed vole and the moose as mammalian herbivores, and the masked shrew and the coyote as mammalian omnivores. While the Fort Richardson OUD Ecological Risk Assessment (ENSR, 1998b) used red fox as the mammalian omnivore, the coyote was selected for this evaluation because a coyote den was identified on the AVMA site and coyotes were considered more likely receptors.

7.2.4 Exposure Assessment

Terrestrial plants experience exposure primarily through the soil where they grow. Although other exposure pathways, such as water, may contribute to total exposure for this receptor group, exposure through the soil predominates. Consequently, estimates of exposure for terrestrial plants may be represented as the concentration of COPECs in the soil. Because plants are not mobile, their exposure is best represented by maximum COPEC concentrations in the soil. For the purposes of this assessment, plants were evaluated for COPECs in soils from 0 to 6 feet bgs.

Terrestrial invertebrates experience exposure primarily through the soil in which they reside. Although other exposure pathways may contribute to total exposure for this receptor group, exposure through soil predominates. Consequently, estimates of exposure for terrestrial invertebrates may be represented as the concentration of COPECs in the soil. Because mobility of invertebrates is limited or absent, their exposure is best represented by maximum COPEC concentrations in the soil. For the purposes of this assessment, invertebrates were evaluated for COPECs in soils from 0 to 6 feet bgs.

Birds and mammals experience exposure through multiple pathways, including ingestion of abiotic media (soil and surface water) and biotic media (food), as well as inhalation and dermal contact. To address this multiple pathway exposure, modeling is required. The

necessary input parameters to the exposure model are presented in Section 3.1.3 of the BERA (CH2M HILL, 2004b). Exposure estimates for bird and mammal receptors were generated based on model assumptions, life history parameters, and estimated concentrations in exposure media (soil) and food sources.

7.2.5 Ecological Effects Assessment

The ecological effects assessment consists of an evaluation of available toxicity or other effects information that can be used to relate the exposures to COPECs and adverse effects in ecological receptors. Data that can be used to evaluate ecological risks resulting from exposure to contaminants include literature-derived or site-specific single-chemical toxicity data, site-specific ambient-media toxicity tests, and site-specific field surveys (Suter et al., 2000). For this assessment, only single-chemical toxicity data from literature sources were available.

7.2.6 Summary of Risk Estimates

Both quantitative and qualitative evaluations were considered when developing risk conclusions for each receptor. Quantitative evaluations consisted of the hazard quotient (HQ = exposure measure/effects measure) approach. The qualitative evaluation considered factors such as magnitude of HQ, frequency of detection, incremental risk, and bioavailability of COPECs. Conclusions for the AVMA area are presented in Table 7-4 and described briefly below.

TABLE 7-4
Summary Table of Analytes and Receptors with LOAEL-based HQs Greater than One at the AVMA

Receptor	Analyte	HQ[a]	Qualitative Review	Overall Conclusion
Terrestrial Plants	Aluminum	522	Soluble aluminum is not expected to occur in AVMA soils	No significant risk
	Arsenic	1.10	Only 1 of the 16 detects (6%) was above background, low HQ	No significant risk
	Chromium, total	51.0	Only 2 samples (11%) were greater than background, low confidence in benchmark	No significant risk
	Manganese	1.70	Only 1 of 17 samples (6%) exceeded background, low HQ	No significant risk
	Nickel	2.07	Only 1 sample (6%) exceeded background, low HQ	No significant risk
	Selenium	11.0	All but one of the detected concentrations were estimated, unlikely to be 100% bioavailable	Low risk
	Vanadium	43.5	Toxicity benchmark is overly conservative (background exceeded benchmark)	Low risk
	Zinc	2.80	Only 2 samples (12%) exceeded the background value, low HQ	No significant risk
	Benzo(a)pyrene	1.55	Detected in just 30% (6) of the 20 samples, and just 1 of 6 samples (17%) exceeded the plant benchmark, low HQ	No significant risk

TABLE 7-4
Summary Table of Analytes and Receptors with LOAEL-based HQs Greater than One at the AVMA

Receptor	Analyte	HQ[a]	Qualitative Review	Overall Conclusion
Terrestrial Invertebrates	Barium	1.41	Toxicity value is less than background, low HQ	No significant risk
	Chromium, total	128	Low proportion of samples exceeding background and low confidence in the benchmark	No significant risk
American Robin	Selenium	1.12	Low HQ, spend only about 50% of the year in area	Low risk
	p,*p*'-DDT	1.94	Low HQ, spend only about 50% of the year in area	Low risk
	Di-n-butyl phthalate	1.14	Low HQ, spend only about 50% of the year in area	Low risk
Masked Shrew	Aluminum	48.6	Soluble aluminum is not expected to occur in AVMA soils	No significant risk
	Selenium	3.17	Unlikely to be 100% bioavailable, low HQ	Low risk
	Vanadium	1.27	Unlikely to be 100% bioavailable, low HQ	Low risk
Coyote	Aluminum	1.44	Soluble aluminum is not expected to occur in AVMA soils	No significant risk
Moose	Aluminum	1.54	Soluble aluminum is not expected to occur in AVMA soils	No significant risk
Red-backed Vole	Aluminum	5.20	Soluble aluminum is not expected to occur in AVMA soils	No significant risk
	Selenium	2.17	Unlikely to be 100% bioavailable, low HQ	Low risk

Notes: [a] HQ = hazard quotient; LOAEL-based HQs were presented only if the LOAEL TRV was exceeded.
LOAEL = Lowest Observed Adverse Effects Level
mg/kg = milligrams per kilogram
TRV = toxicity reference value

Risks to receptors at the AVMA are considered insignificant or unlikely for the terrestrial invertebrates, coyote, moose, and bald eagle. While some quantitative evaluations indicate risk, qualitative review suggests that risks are unlikely or insignificant for these receptors.

Risk to the terrestrial plant community from exposure to vanadium and selenium cannot be excluded, but the qualitative evaluation suggests that risk from selenium and vanadium is low.

Although risk to American robins from exposure to selenium, DDT, and di-n-butyl phthalate cannot be excluded, the qualitative evaluation (for example, low magnitude of toxicity reference value [TRV] exceedance, absence from the site during about half of the year, and non-contiguous areas of contamination that decrease the potential for exposure of robins foraging at the site to COPECs) indicates that this risk is low.

Risk to the masked shrew from selenium and vanadium cannot be excluded, but qualitative evaluation (that is, limited bioavailability, low magnitude of TRV exceedances) indicates that this risk is low.

Although aluminum was eliminated as a COPEC at the AVMA, risk to red-backed voles from exposure to selenium could not be excluded. However, this risk is expected to be low due to the limited bioavailability of selenium, the low magnitude of TRV exceedance, and the patchy distribution of contamination at the site.

7.3 Postwide Risk Assessments

Postwide risk assessments evaluate any cumulative risk effects posed by the combined total of contaminants throughout Fort Richardson. Postwide human health and ecological risk assessments were performed in 1998 for the OUD ROD (ENSR, 1998c). For the OUE ROD, a Postwide Ecological Risk Assessment (CH2M HILL, 2004d) was performed, in addition to the risk assessments for the OUE source areas described in the OUE Proposed Plan (CH2M HILL, 2004e).

7.3.1 Postwide Human Health Risk Assessment

Under OUD, a risk assessment was performed for the entire Fort Richardson Army Post (ENSR, 1998c) to supplement the individual human health risk assessments conducted for the sites in each of the four initial OUs and other designated source areas. The objectives related to human health were to evaluate potential risks from exposure to multiple sites and source areas, and to fill data gaps that became evident upon thorough review of all data collected during the RIs for each OU.

Human exposure scenarios and pathways were identified for an industrial worker, a future construction worker, and a trespasser. Contamination that posed the greatest risk to human health was identified at the Poleline Road Disposal Area (OUB); however, cleanup is underway at that source area. Estimated ELCRs from exposure to other chemicals detected on Fort Richardson were less than or within the target range specified by the EPA. Noncancer risks were also estimated to be less than the threshold HI. Therefore, there were no risks greater than acceptable levels for human health from the combined total of contaminants throughout Fort Richardson.

The Postwide Human Health Risk Assessment (ENSR, 1998c) was reassessed as part of OUE (CH2M HILL, 2004d). Guidance and procedural changes have occurred since the 1998 assessment, but the overall risk evaluation criteria have not changed. Changes to the guidance and procedures do not affect the technical determination of risk associated with contaminants at Fort Richardson. Therefore, the 1998 Postwide Human Health Risk Assessment still reflects overall conditions on the Post. The Postwide Human Health Risk Assessment will be reevaluated at the five-year review.

7.3.2 Postwide Ecological Risk Assessments

The Postwide Ecological Risk Assessment (CH2M HILL, 2004d) evaluates the potential for Postwide cumulative risk associated with environmental releases of chemicals from multiple sources at Fort Richardson, regardless of OU boundaries. Cumulative risk is

evaluated for selected wide-ranging terrestrial wildlife receptors including the bald eagle, coyote, and moose. Risk to aquatic receptors, such as the mallard and aquatic organisms living in Ship Creek, was addressed in a previous Postwide Ecological Risk Assessment (ENSR, 1998c) and was not reevaluated in the current Postwide Ecological Risk Assessment. The results of the updated Postwide Ecological Risk Assessment indicate that population-level risks to all wide-ranging receptors are still within acceptable ranges.

7.4 Uncertainties

7.4.1 HHRA

Risk assessment as a science is subject to uncertainty. The sources of uncertainty are generally associated with the following:

- Sampling and analysis
- Chemical fate and transport
- Exposure estimation
- Toxicological data
- Risk characterization

These sources of uncertainty are summarized in Table 7-5.

TABLE 7-5
Uncertainties Associated with Human Health Risk Estimations

Uncertainty Factor	Effects of Uncertainty	Comment
Environmental Sampling and Analysis		
Estimates of chemical concentrations	May under- or overestimate risk	Sampling errors, sample representativeness, and variability in chemical analyses will affect chemical concentrations. Available analytical data may not accurately reflect site conditions. Chemical concentrations may change as a result of migration or degradation.
Fate and Transport		
Source concentrations assumed constant over time	May underestimate or overestimate risk	Does not account for environmental fate, transport, or transfer, which may alter contaminant concentrations. Concentrations may decrease, but contaminated areas may increase.
Exposure Assessment		
Exposure point concentrations	May overestimate risks	Use of upper confidence limits and maximum detected concentrations will likely overestimate site risks.

TABLE 7-5
Uncertainties Associated with Human Health Risk Estimations

Uncertainty Factor	Effects of Uncertainty	Comment
Exposure assumptions	May under- or overestimate risk	Assumptions regarding media intake, population characteristics, and exposure patterns may not characterize exposures.
Use of applied dose to estimate risks	May over- or underestimate risks	Assumes that the absorption of the chemical is the same as it was in the study that derived the toxicity value. Assumes that absorption is equivalent across species (animal to humans). Absorption may vary with age and species.
Population characteristics	May over- or underestimate risks	Assumes weight, lifespan, and ingestion rate are potentially representative for a potentially exposed population.
Intake	May underestimate risks	Assumes all intake of COPCs is from the exposure medium being evaluated (no relative source contribution).
Toxicity Assessment		
Slope factor	May overestimate risks	Slope factors are upperbound upper confidence limits derived from a linearized model. In general, risks are likely to be overestimated. Dioxin risks are currently being reassessed, which may over- or underestimate risks.
Toxicity values derived from animal studies	May over- or underestimate risks	Extrapolation from animal to humans may induce error because of differences in pharmacokinetics, target organs, and population variability.
Toxicity values derived primarily from high doses (most exposures are at low doses)	May over- or underestimate risks	Assumes linearity at low doses. Tends to have conservative exposure assumptions.
Dermal toxicity values	May over- or underestimate risks	No dermal toxicity values are available, oral slope factors and reference doses are adjusted by a gastrointestinal absorption value to represent the absorption efficiency across the gastrointestinal tract.
Toxicity values	May over- or underestimate risks	Not all values represent the same degree of certainty. All are subject to change as new evidence becomes available.
Toxicity data not available for all constituents	Risks could not be estimated	Use of surrogate toxicity factors for structurally similar compounds may over- or underestimate risks.
Some toxicity values derived from short-term tests to predict chronic exposures	May over- or underestimate risks	Assumes that the dose-response observed from short-term exposure to high concentrations is similar to exposure to low concentration environmental exposures. Uncertainty factors are used to ensure protectiveness.

TABLE 7-5
Uncertainties Associated with Human Health Risk Estimations

Uncertainty Factor	Effects of Uncertainty	Comment
Toxicity values derived from homogeneous animal populations	May over- or underestimate risks	Human populations may have a wide range of sensitivities to a chemical.
Risk Estimation		
Estimation of risks across exposure routes	May under- or overestimate risk	Some exposure routes have greater uncertainty associated with their risk estimates than others.
Cumulative risk estimates	May under- or overestimate risk	Assumes additivity of risks from multiple chemicals; may have synergistic or antagonistic effects.
Cancer risk estimates (no threshold assumed)	May overestimate risks	Possibility that some thresholds do exist.
Cancer risk estimate (low dose) linearity	May overestimate risks	Response at low doses is not known.

7.4.2 Baseline ERA

Uncertainties are inherent in all risk assessments. The nature and magnitude of uncertainties depend on the amount and quality of data available, the degree of knowledge concerning site conditions, and the assumptions made to perform the assessment. A qualitative evaluation of the major uncertainties associated with this assessment, in no particular order of importance, is outlined below:

- Data concerning soil ingestion rates for bird and mammal receptors were not available. As a consequence, the soil ingestion rates were estimated based on assumed similarities to other species for which data were available. The suitability of these assumptions is unknown. Although this uncertainty may result in underestimation of exposure (and risk), it is more likely that exposure and risk are overestimated.
- No life history data specific to the OUE sites were available. Therefore, exposure parameters either were modeled on the basis of allometric relationships (e.g., food ingestion rates) or were based on data from the same species in other portions of its range. Because diet composition as well as food, water, and soil ingestion rates can differ among individuals and locations, published parameter values may not accurately reflect individuals present at OUE sites. As a consequence, risk may be either overestimated or underestimated.
- No site-specific data on COPEC concentrations in terrestrial plants, terrestrial invertebrates, and small mammals were available for wildlife exposure estimate calculations. Therefore, concentrations in these prey items were estimated from literature-reported bioaccumulation models (90th Percentile bioaccumulation factors [BAFs], regressions, or Kow-based). The suitability of these bioaccumulation models is

unknown. As a consequence, concentrations of COPECs in prey items of wildlife may be either greater or less than data used in this assessment.

- Literature-derived toxicity data based on laboratory studies were used to evaluate risk to all receptor groups. It was assumed that effects observed in laboratory species were indicative of effects that would occur in wild species. The suitability of this assumption is unknown. Consequently, risk may be either overestimated or underestimated.
- Toxicity data are not available for all COPECs considered in this assessment. As a consequence, COPECs for which toxicity data are unavailable were not evaluated. Exclusion of COPECs from evaluation underestimates aggregate risk.
- Bioaccumulation of VOCs in terrestrial plants, terrestrial invertebrates, and small mammals was calculated using Log Kow models from the literature. Because VOCs have very low Kow values, bioaccumulation was overestimated by these models. Therefore, exposure to and risk from VOCs was overestimated for birds and mammals.
- Bioavailability in the toxicity studies used for development of TRVs is generally high because many toxicity tests are performed using soluble salts of inorganic chemicals. Therefore, risk based solely on literature-derived toxicity values may be overestimated.
- Species-specific data were not available to estimate the bioavailability of lead to masked shrews and selenium to masked shrews and red-backed voles. For lead, human and rodent data were available, but only human data were available for selenium. Because shrews are more closely related to primates than to rodents, human studies are probably more appropriate for application to shrews, and it was assumed that bioavailability observed in humans is similar to that for shrews. However, the suitability of this assumption is unknown and risk may be either overestimated or underestimated. For voles, there is considerable uncertainty in the use of human data, but no other information was available for selenium bioavailability.
- Because toxicity data are not available for individual bird and mammal receptors, it was necessary to extrapolate toxicity values from test species to site receptor species. Although improved class-specific scaling factors were employed (Sample and Arenal, 1999), these factors are not chemical-specific and are based on acute toxicity data. As a consequence, risk may be either overestimated or underestimated.
- In this assessment, risks from COPECs were each considered independently (i.e., no ambient media toxicity data were available). Because chemicals may interact in an additive, antagonistic, or synergistic manner, evaluation of single-chemical risk may either underestimate or overestimate risks associated with chemical mixtures.

8.0 Description of Alternatives

8.1 Need for Remedial Action

Actual or threatened releases of hazardous substances from OUE, if not addressed by the response actions selected in this ROD, may present a threat to human health, welfare, or the environment. Remedial action is necessary for groundwater contamination at the AVMA to protect human health and the environment.

The HHRA concluded that concentrations of chemicals in the soil samples from the AVMA do not exceed a lifetime cancer risk of 1-in-10,000 or an HI of 1.0. Therefore, no COCs were identified. For further discussion of soil contamination at the AVMA, see Section 5.5.1.

The FS determined that the AVMA groundwater contains a primary COC that requires remedial action. The area of groundwater contamination that requires remedial action is indicated on Figure 8-1 and described below:

- PCE in groundwater at the AVMA site (indicated by wells AP-3468, AP-4342, and AP-4413) poses an unacceptable risk to potential groundwater users. PCE contamination at the AVMA exceeds MCLs and the aquifer is unacceptable as a drinking water source. Based on the locations where concentrations of PCE exceeded the cleanup levels, it is estimated that water in an area of over 150,000 square feet (about 3.5 acres) has been impacted and will require remedial action.

To provide a basis for developing remedial alternatives, an initial estimation of the extent of groundwater contamination at the AVMA was made. Estimates were based on data from the OUE RI Report (CH2M HILL, 2004a).

Groundwater was detected approximately 60 to 100 feet bgs, and was determined to flow in a north to northwesterly direction (CH2M HILL, 2004a). Groundwater contamination extended from upgradient of Building 732 to slightly past the junction of the confined and unconfined aquifers north of the Davis Highway (Figure 8-1). Contamination was not encountered in upgradient portions of the confined aquifer. Concentrations of PCE decreased in the merged, deep aquifer north of the Davis Highway.

8.2 Remedial Action Objectives

RAOs provide a general description of what the cleanup will accomplish. These goals serve as the design basis for the remedial alternatives presented in this ROD. RAOs provide a basis for evaluating the cleanup options for the site and an understanding of how the risks will be addressed by the response actions. A clear statement of the RAOs also facilitates the five-year review determination of protectiveness of human health and the environment.

RAOs were developed based on the following parameters:

- COCs in groundwater identified from the OUE Risk Assessment Report (CH2M HILL, 2004b) that exceeded acceptable risk levels and/or MCLs

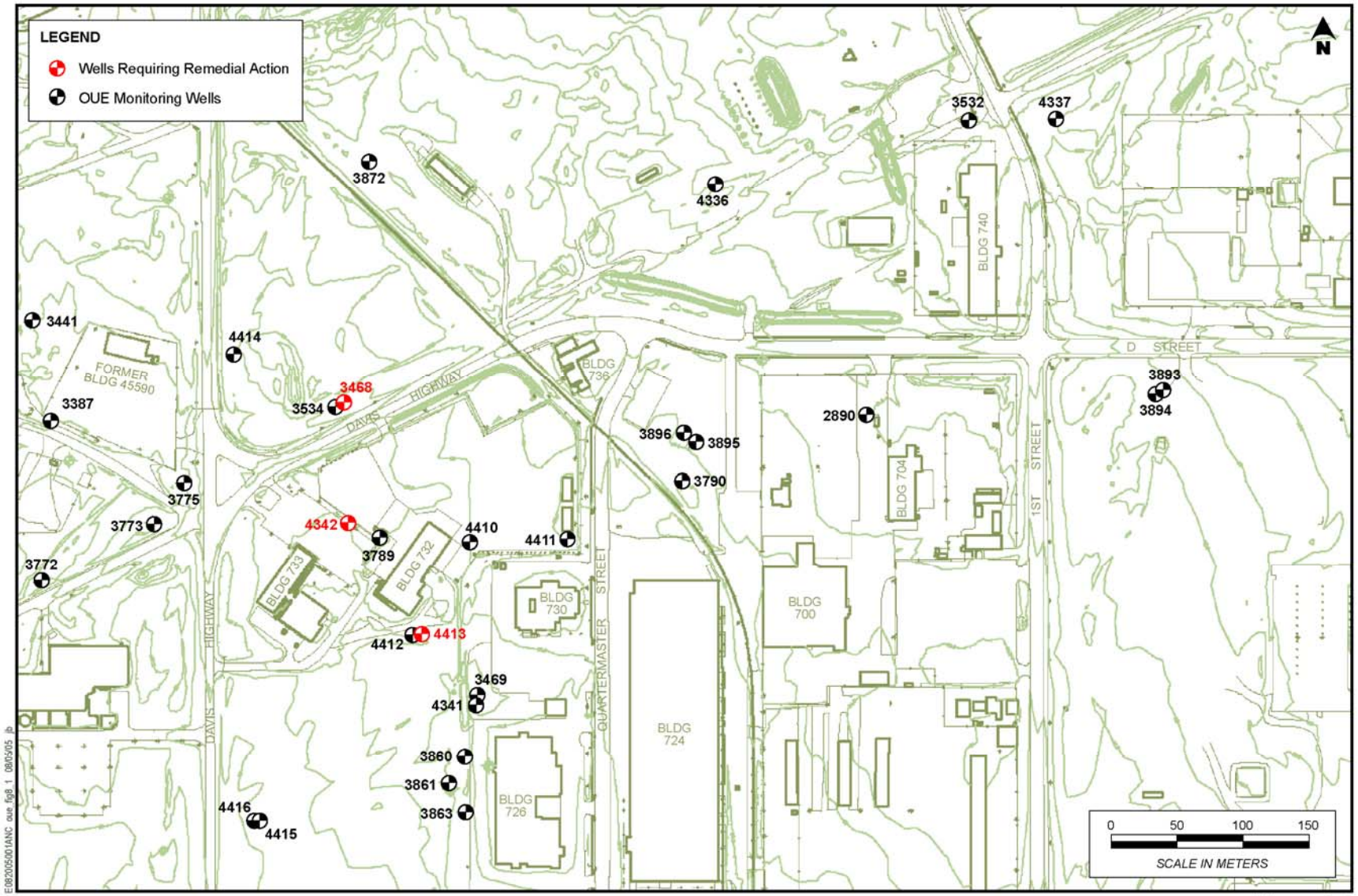


Figure 8-1
AVMA Wells Requiring Remedial Action

- Pathways of exposure and receptors (actual land use scenarios integrated with scenarios identified in the OUE Risk Assessment Report [CH2M HILL, 2004b])

The RAOs for groundwater at the AVMA are:

- Prevent exposure to and use of groundwater as a potential drinking water source where chemical concentrations that pose an unacceptable risk or exceed MCLs
- Return groundwater to beneficial use as a potential drinking water source within a reasonable time frame
- Monitor groundwater PCE concentrations within the contaminated area to establish concentration trends and provide an early warning if the downward concentration trend does not continue

8.3 Significant Applicable or Relevant and Appropriate Requirements

A full list of ARARs is provided in Section 9.1.2 and Table 9-3. The following ARARs are the most significant regulations that apply to the remedy selected for the AVMA.

The following significant requirements have been identified and are applicable to groundwater contamination at the AVMA:

- Federal Safe Drinking Water Act (40 CFR 141 and 40 CFR 143) and Alaska Drinking Water Regulations (18 AAC 80, ADEC, 2004a). The MCLs and nonzero maximum contaminant level goals (MCLGs) were established under the Safe Drinking Water Act and are relevant and appropriate for groundwater that is a potential drinking water source.
- Alaska Oil and Other Hazardous Substances Pollution Control Regulations (18 AAC 75, as amended through May 26, 2004, ADEC, 2004b). These regulations are applicable. Under these regulations, responsible parties are required to clean up oil and hazardous substance releases in Alaska, and are consistent with Alaska UST requirements.

8.4 Development of Remedial Alternatives

General response actions are media-specific actions that satisfy the RAOs (EPA, 1988). General response actions may include treatment, containment, excavation, disposal, land use actions, or a combination of these. s

The OUE FS (CH2M HILL, 2004c) evaluated many technologies for remediating the groundwater at the AVMA. For each of the general response actions identified, potentially applicable technologies were selected on the basis of technical implementability. Process options for these technologies were then screened for effectiveness, implementability, and relative cost.

The evaluation of effectiveness focused on:

- The potential effectiveness of the technology in handling the estimated areas or volumes of media and meeting the remediation goals identified in the RAOs

- The potential impacts to human health and the environment during the construction and implementation phases
- How proven and reliable the process is with respect to the contaminants and conditions at the site

The evaluation of implementability focused on:

- Whether the remedy could effectively treat contamination when a specific source area had not been identified
- The availability of treatment, storage, and disposal services
- The availability of necessary equipment and skilled workers to implement the technology

The evaluation of cost focused on the approximate cost relative to other technologies.

Experience gained from the previous four OUs helped focus the evaluation of alternatives. Technologies previously determined to be technically impracticable, ineffective, non-implementable, unsafe, or unusually costly were not further considered. The most favorable options were assembled into remedial alternatives addressing the RAOs established for groundwater in the AVMA. These remedial alternatives are described in Section 8.6.

8.5 Remedy Components

General response actions for groundwater should address human health risks related to groundwater exposure and/or compliance with ADEC standards and federal MCLs. General response actions for groundwater include no action, land use controls, natural attenuation, chemical oxidation, and monitoring. Land use controls limit exposure to the groundwater contaminants. Natural attenuation allows the contaminants to degrade over time. Chemical oxidation reduces contaminant concentrations and mineralizes chemical contaminants. Monitoring verifies the reduction of COC concentrations in groundwater and provides an overall indication of the potential problems with the remedy.

8.6 Remedial Alternatives

8.6.1 Background Information

8.6.1.1 No Action Alternative

The No Action general response action is included because it is required by CERCLA as a baseline for comparison. The No Action alternative differs from the Land Use Controls, Natural Attenuation, and Monitoring alternative. Actions taken to reduce the potential for exposure (for example, site fencing and deed restrictions) are not included as a component of No Action alternatives (EPA, 1988). Such institutional controls are included in Alternative 2 (Land Use Controls, Natural Attenuation, and Monitoring).

8.6.1.2 Cost Estimates

Cost estimates for the alternatives were developed from published estimating sources, vendor quotes, previous experience, and literature sources. Detailed cost analyses for implementing alternatives included:

- Estimating capital costs (those required to carry out the remediation, including the costs of design, construction, and treatment)
- Estimating annual O&M costs (to cover the labor and maintenance required to ensure remediation remains effective)
- Analyzing present-worth (30 years at a 7 percent discount rate)
- Analyzing cost sensitivity

8.6.2 AVMA Groundwater

Remedial alternatives developed for the AVMA source area address the PCE-contaminated groundwater plume.

The preliminary remedial alternatives considered to address groundwater contamination in the AVMA are:

- Alternative 1: No Action
- Alternative 2: Land Use Controls, Natural Attenuation, and Monitoring
- Alternative 3: Chemical Oxidation, Natural Attenuation, and Monitoring

8.6.2.1 Alternative 1: No Action

Capital Cost:	$0
O&M Cost:	$0
Total Cost:	$0

Expected Outcomes:

Groundwater use would remain the same (not presently or anticipated to be used at this site). However, there would be no monitoring to track changes in contaminant concentrations.

The NCP requires consideration of a No Action Alternative. The No Action Alternative serves as a baseline against which the other remedial alternatives can be compared. Under the No Action Alternative, no further action would be taken to monitor, control, or remediate the groundwater contamination. There would be no capital or operation and maintenance (O&M) costs associated with this alternative. However, five-year reviews of OUE would be required under CERCLA, so there would be very low periodic costs (which occur every five years). Because this alternative would not be protective of human health and the environment and would not comply with applicable or relevant and appropriate requirements (ARARs), this alternative is not further evaluated.

8.6.2.2 Alternative 2: Land Use Controls, Natural Attenuation, and Monitoring

Capital Cost:	$0
O&M Cost:	$465,000
Total Cost:	$465,000

Expected Outcomes:

Groundwater use would remain the same (not presently or anticipated to be used at this site). Implementation of Alternative 2 would prevent exposure to PCE contaminated groundwater. In addition, monitoring of the groundwater would allow the Army to determine if the contaminants were migrating from the site and to determine degradation rates. The groundwater would remain contaminated above federal and Alaska standards for an indeterminate time.

Land Use Controls/Institutional Controls

This alternative includes ICs that would be implemented to restrict the access to and use of groundwater at the AVMA until groundwater quality has been restored (contaminant concentrations are less than MCLs), thereby allowing for unrestricted use. The anticipated time frame to achieve remedial goals is anticipated to be about 30 years, but could be more or less depending upon site conditions. ICs proposed under this alternative are presented as a means of demonstration and as a means for cost estimating. The actual ICs to be implemented under this alternative will be finalized and implemented during remedial design or in a remedial action work plan.

Institutional controls would be used to prohibit installation and use of groundwater supply wells at the site (monitoring wells may be installed/replaced and groundwater extracted for monitoring purposes). Institutional controls would be implemented under the Fort Richardson Institutional Control Policy and Master Plan. ICs would be implemented to cover the PCE-contaminated groundwater area as designated on Figure 5-3. The IC Policy and Master Plan would be reviewed no less than annually and would be updated to accommodate new site-specific data obtained during monitoring.

As part of the IC Policy, the Army maintains a GIS database containing environmental data that have been collected at Fort Richardson. The GIS database contains a map outlining IC areas and specific descriptions of the ICs. The Army has already updated the GIS database and has incorporated land use restrictions specific to the AVMA.

An additional aspect of the IC policy at Fort Richardson is the requirement that all entities (including all Army personnel, civilians, and contractors) obtain an ECR prior to excavating to a depth of more than six inches bgs. The Environmental Department must review and sign each ECR prior to approval. Any conflicts with IC sites are noted on the ECR and the request will be denied if the activity impacts an IC site, unless the requesting entity develops a plan to safely handle and treat any materials excavated during the proposed operation.

The GIS database is an integral part of the Master Planning process. Information contained in the database (IC map and chemical data) alerts planners to areas where ICs have been established. This allows planners to make accommodations (avoid the site or provide a means to remediate in accordance with applicable requirements, decision documents, and

regulations) when designating land uses and/or planning future construction projects. It also notifies a planner that certain activities cannot be conducted at IC sites (e.g., no groundwater use). In addition, the Master Plan will be used to ensure that land use remains consistent with the reasonably anticipated future land use scenario considered in the risk assessment (industrial land use). The AVMA is located within an industrial area as recorded in the Post Master Plan.

Based on reasonably anticipated current and future land use scenarios, land use at OUE will remain industrial. The AVMA is located within an industrial area as recorded in the Post Master Plan. *Master Planning for Army Installations,* AR 210-20 (Army, 2005), serves as the guidance document for designing and planning Army installations and is the functional basis for the Post Master Plan. The land use categories presented in AR 210-20 denote major and significant land use. For example, an industrial land use area may contain administration, supply, and storage areas, but not residential areas, day care facilities, or recreational areas. Family and unaccompanied personnel housing and medical and community facilities are the land uses least compatible with industrial land use, and AR 210-20 recommends that industrial and residential land uses be widely separated.

A summary of the ICs that will be utilized to control exposure to PCE contaminated groundwater at the AVMA are presented below:

- The Army's Master Planning process will be utilized as a planning tool to ensure that land use at the AVMA remains industrial and that all facilities constructed in the area are connected to the water distribution system and will not utilize on-site potable groundwater wells.
- The site, and IC conditions, will be monitored using a GIS database that is used as a planning and tracking tool.
- Excavation Clearance Request (ECR) process will be utilized as a tool to review all projects that would potentially excavate at the AVMA site. The process would be another means of prohibiting installation of potable water supply wells or excavating into the subsurface.
- ICs and the site will be inspected/reviewed on an annual basis.
- US Army Garrison, Alaska, Directorate of Public Works will be responsible for maintaining and enforcing the ICs.

Natural Attenuation and Monitoring

Under this alternative, natural attenuation, degradation of contaminants without artificial stimuli (e.g., chemical degradation, biological transformation, dilution, sorption, etc.), would be allowed to occur at the site over time to reduce contaminant concentrations to levels less than MCLs. Periodic monitoring would be required until cleanup levels are met. Current data indicate that the concentration of PCE in groundwater is decreasing and that chemical degradation of the PCE contamination is occurring at a very slow rate. Over time, other chemicals such as TCE and vinyl chloride will be produced by chemical degradation of PCE in groundwater. However, current data indicate that chemical degradation is a minor part of the overall attenuation and that these daughter products will not be produced at levels exceeding MCLs. The basic process of natural attenuation occurring at the site

appears to be dilution. Section 5.5.2 provides a more detailed discussion of the natural attenuation pathway at this site.

Periodic monitoring will be conducted until cleanup levels are met. For cost estimating purposes it was assumed that existing monitoring wells will be sampled for GRO/benzene, toluene, ethylbenzene, and xylenes (BTEX), VOCs, and natural attenuation parameters. The proposed monitoring schedule is contained in the cost section. Monitoring will be discontinued when subsequent sampling events indicate that contaminant concentrations have dropped below MCLs. Specific details concerning monitoring and institutional controls would be specified in a remedial design/remedial action report developed upon completion of the ROD.

The alternative will be reviewed during the five-year review process to ensure that the remedy remains protective of human health and the environment. When combined with the five-year review process, the selected remedy will provide a mechanism to ensure that contaminants are not migrating off-site.

Cost

The wells that will be sampled and the actual frequency of sampling will be determined during remedial design, but for cost estimating purposes, monitoring for 30 years has been estimated. Fifteen existing monitoring wells would be sampled for GRO/BTEX, VOCs, and natural attenuation parameters. The wells would be sampled annually for four years, biennially for six years, and then every five years for the following 20 years. Monitoring would be discontinued when subsequent sampling events indicate that contaminant concentrations have dropped below MCLs. While natural attenuation may take more or less than 30 years, it is anticipated that it would require more time than Alternative 3 (Section 8.6.2.3).

There would be a minimal cost for implementing land use controls beyond the costs of the controls already in place at Fort Richardson. The cost includes reviewing land use controls annually to ensure that they remain protective of human health and the environment. Five-year reviews would also be conducted.

The estimated present worth cost of this alternative is $465,000. See Appendix D for the Cost Summary Tables.

8.6.2.3 Alternative 3: Chemical Oxidation, Natural Attenuation, and Monitoring

Capital Cost:	$335,000
O&M Cost:	$582,000
Total Cost:	$917,000

Expected Outcomes:

Groundwater use would remain the same (not presently or anticipated to be used at this site). Implementation of ICs under Alternative 3 would prevent exposure to PCE contaminated groundwater at the site. Active treatment of the contaminated groundwater using chemical oxidation should reduce contaminants in groundwater. However, due to the uncertainty of the source of groundwater contaminants, active treatment may not reduce contaminant concentrations below MCLs. Thus, residual contaminants in groundwater

would be allowed to naturally attenuate over time. Because this alternative incorporates active treatment to reduce the concentration of contaminants, the time for natural attenuation is expected to be shorter than for Alternative 2. Groundwater monitoring would be employed to determine if the contaminants were migrating from the site and to determine degradation rates. The groundwater would remain contaminated above federal and Alaska standards, but for a shorter time period than for Alternative 2.

Treatment Component

This alternative involves injecting a commercially prepared chemical oxidant to treat solvent contamination. For cost estimating purposes the following assumptions were made: 1) oxidant would be injected at approximately 30 locations and various depths in and around the area of PCE contamination, 2) six compliance wells would be selected for monitoring to verify the reduction of concentrations of PCE in the groundwater and to monitor for the presence of residual, unreacted chemical oxidants injected upgradient, 3) based on monitoring results, a second injection event of chemical oxidant could be needed, 4) monitoring of compliance wells would occur twice per year for 5 years, and 5) wells would be decommissioned as appropriate.

Land Use Controls/Institutional Controls

ICs would be the same as for Alternative 2.

Natural Attenuation and Monitoring

Following completion of active treatment, monitoring would be conducted as appropriate to track attenuation of residual groundwater contaminants remaining at the site. Periodic monitoring would be required until cleanup levels are met. Monitoring would be conducted using the same strategy under Alternative 2, with the exception that the time period would be shortened to 20 years by implementation of active treatment.

Cost

Costs related to chemical oxidation and long-term monitoring for the PCE-contaminated groundwater include selection of 6 compliance wells and installation of 30 borings for chemical oxidation injection. Based on monitoring results, a second injection event of chemical oxidant might be needed.

Monitoring would be conducted using the same strategy employed for Alternative 2 with the exception that the time period has been shortened to 20 years. Fifteen existing monitoring wells would be sampled for GRO/BTEX, VOCs, and natural attenuation parameters. The wells would be sampled annually for four years, biennially for six years, and then every five years for the following 10 years.

There would be a minimal additional cost for implementing land use controls beyond those already in place at Fort Richardson. The cost includes reviewing land use controls annually to ensure that they remain protective of human health and the environment. Five-year reviews would also be conducted.

The estimated present worth cost of this alternative is $917,000. See Appendix D for the Cost Summary Tables.

9.0 Summary of Comparative Analysis of Remedial Alternatives

The preferred alternative for remediation of groundwater contamination was selected on the basis of the nine remedial alternative evaluation criteria found in the NCP. The nine criteria are divided into three categories:

- Threshold Criteria
- Balancing Criteria
- Modifying Criteria

To be eligible for selection or further consideration, an alternative must meet the two "threshold criteria" of overall protection of human health and the environment and compliance with ARARs. The next five criteria are "balancing criteria" and are used to weigh trade-offs among alternatives. The final two criteria, "modifying criteria," measure acceptance of the remediation alternatives by the State and the community. These nine criteria are presented and explained in further detail in Table 9-1. Related to the modifying criteria, public comment was requested to evaluate community acceptance of the remedial alternative (see Section 3.0).

The following sections compare each of the alternatives to the threshold, balancing, and modifying criteria. The purpose of these analyses is to summarize the detailed evaluations and to identify the relative advantages and disadvantages of each alternative. The alternative selected is also identified. Table 9-2 summarizes the comparative analysis. The alternative selected is boxed and shaded.

For the AVMA, three remedial alternatives were retained to address contamination in groundwater.

- Alternative 1 (No Action) was retained to provide a baseline for comparison with the other alternatives.
- Alternative 2 (Land Use Controls, Natural Attenuation, and Monitoring) was retained to provide a relatively low-cost alternative.
- Alternative 3 (Chemical Oxidation, Natural Attenuation, and Monitoring) was retained to address and potentially treat contamination in groundwater.

TABLE 9-1
Criteria for Evaluation of Alternatives

THRESHOLD CRITERIA: Must be met by all alternatives.

1. **Overall protection of human health and the environment**. How well does the alternative protect human health and the environment, both during and after construction?

2. **Compliance with ARARs**. Does the alternative meet all applicable or relevant and appropriate state and federal laws?

BALANCING CRITERIA: Used to compare alternatives.

3. **Long-term effectiveness and permanence**. How well does the alternative protect human health and the environment after completion of remediation? What, if any, risks will remain at the site?

4. **Reduction of toxicity, mobility, and volume through treatment**. Does the alternative effectively treat the contamination to significantly reduce the toxicity, mobility, and volume of the hazardous substances?

5. **Short-term effectiveness**. What is the timeframe to implement an alternative? Are there potential adverse effects to either human health or the environment during construction or implementation of the alternative?

6. **Implementability**. Is the alternative both technically and administratively feasible? Has the technology been used successfully at similar areas?

7. **Cost.** What are the relative costs of the alternative?

MODIFYING CRITERIA: Evaluated as a result of public comments.

8. **State acceptance**. What are the state's comments or concerns about the alternatives considered and about the preferred alternative? Does the state support or oppose the preferred alternative?

9. **Community acceptance**. What are the community's comments or concerns about the alternatives considered and the preferred alternative? Does the community generally support or oppose the preferred alternative?

TABLE 9-2
Comparison of Alternatives for Groundwater Contamination at the AVMA

Criteria	Alternative 1. No Action	Alternative 2. Land Use Controls	Alternative 3. Chemical Oxidation
THRESHOLD CRITERIA *(Must be met by all alternatives)*			
1. Overall protection of human health and the environment	No	Yes	Yes
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)	No	Yes	Yes
BALANCING CRITERIA *(Used to compare alternatives)*			
3. Long-term effectiveness and permanence		●	●
4. Reduction of toxicity, mobility, and volume through treatment		○	◐
5. Short-term effectiveness		●	◐

TABLE 9-2
Comparison of Alternatives for Groundwater Contamination at the AVMA

Criteria	Alternative 1. No Action	Alternative 2. Land Use Controls	Alternative 3. Chemical Oxidation
6. Implementability		●	◐
7. Cost (reported as present-worth cost, that is, total project cost expressed in 2004 U.S. dollars)		$465,000 ●	$917,000 ◐
MODIFYING CRITERIA *(Evaluated as a result of public comments)*			
8. State acceptance		●	
9. Community acceptance		●	

Notes: ● = best satisfies criteria, ◐ = partially satisfies criteria, ○ = least satisfies criteria

9.1 Threshold Criteria

9.1.1 Overall Protection of Human Health and the Environment

This criterion determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Alternatives 2 and 3 would meet this threshold criterion, which requires that any cleanup remedy considered protects human health and the environment. The primary difference between these two alternatives, with respect to this criterion, is the length of time required to reach cleanup goals. Alternative 3 would be completed earlier than Alternative 2 because contaminated groundwater would be actively treated. Alternative 2 relies on natural processes to slowly decrease contaminant concentrations in groundwater and protects human health and the environment by requiring land use controls. Alternative 1 does not meet this threshold criterion because contaminants would remain in place with no method of determining a change in concentration.

9.1.2 Compliance with Applicable or Relevant and Appropriate Requirements

This criterion evaluates whether the alternative meets the federal and State environmental statutes, regulations, and other requirements that regulate the site and the actions in the alternative. These regulations are known as ARARs. Potential ARARs for OUE include State of Alaska Drinking Water Regulations, the Federal Safe Drinking Water Act, and Alaska Oil and Other Hazardous Substances Pollution Control Regulations.

Alternatives 2 and 3 are expected to meet ARARs. (See Table 9-3.) Alternative 3 includes active groundwater treatment and is expected to achieve State and federal standards more

TABLE 9-3
ARARs Screening of AVMA Groundwater Remedial Alternatives

ARARs and TBC	Alternative 1: No Action	Alternative 2: Land Use Controls, Natural Attenuation, and Monitoring	Alternative 3: Chemical Oxidation, Natural Attenuation, and Monitoring
Chemical-Specific ARARs			
Federal MCLs (40 CFR 141 and 40 CFR 143)	No	Yes	Yes
State MCLs (18 AAC 80, ADEC 2004a)	No	Yes	Yes
Oil and Other Hazardous Substances Pollution Control Regulations, Groundwater (18 AAC 75, ADEC, 2004b)	No	Yes	Yes
Action-Specific TBC			
Army Regulation, Real Property Master Planning for Army Installations (AR 210-20, Army, 2005)	No	Yes	Yes

Notes:
AAC = Alaska Administrative Code
ADEC = Alaska Department of Environmental Conservation
ARAR = applicable or relevant and appropriate requirement
AVMA = Armored Vehicle Maintenance Area
CFR = Code of Federal Regulations
MCL = maximum contaminant level
TBC = to be considered

No = ARAR not satisfied
Yes = ARAR satisfied

rapidly than Alternative 2. Alternative 2 is expected to require about 30 years of monitoring and Alternative 3 is expected to require about 20 years of monitoring following active treatment. Alternatives 1, 2, and 3 rely on natural processes to decrease groundwater contamination concentrations to acceptable levels for unrestricted use. However, it should be noted that under Alternative 1, no monitoring would be conducted to determine compliance with the ARARs. Since Alternative 1 does not meet either of the threshold criteria, it will not be discussed in the remaining evaluation of alternatives.

9.2 Balancing Criteria

9.2.1 Long-term Effectiveness and Permanence

This criterion considers the ability of an alternative to maintain protection of human health and the environment over time, including the adequacy and reliability of the alternatives' controls.

Alternatives 2 and 3 would involve permanent reduction of groundwater contamination and would achieve long-term effectiveness. Active treatment under Alternative 3 is expected to reduce contaminant levels more rapidly than under Alternative 2, but the degree of active treatment is uncertain because a source area was not detected during the RI. Therefore, Alternative 3 is expected to incorporate natural attenuation to achieve the RAOs.

However, both alternatives would achieve the long-term goal of reducing contaminant concentrations to acceptable levels.

9.2.2 Reduction of Toxicity, Mobility, and Volume Through Treatment

This criterion evaluates an alternative's use of treatment to reduce the harmful effects of contaminants, their ability to move in the environment, and the amount of contamination present.

Alternative 3 would involve a treatment technology that reduces the toxicity, mobility, or volume (TMV) of contaminated groundwater and accelerates the rate of natural attenuation. However, because the source of groundwater contamination was not detected during the RI, treatment under Alternative 3 may not completely remove all contaminants. Thus, residual contaminants would be allowed to naturally attenuate over a 20-year period following treatment. Alternative 2 would slowly reduce the TMV of the contaminated groundwater through natural attenuation. Because Alternatives 2 and 3 include monitoring, the rate and degree of contaminant reduction would be known.

9.2.3 Short-term Effectiveness

This criterion considers the length of time needed to implement an alternative. It also evaluates the risks the alternative poses to workers, residents, and the environment during implementation. In general, alternatives with the fewest construction or intrusive activities pose the lowest risk to site workers and the community.

Alternative 2 has the highest degree of short-term effectiveness. It can be implemented immediately and does not require the installation of monitoring wells or other treatment system components. Thus, risk to the community and the environment would be essentially non-existent.

Alternative 3 has a lower short-term effectiveness than Alternative 2. It would require a few months to a few years to implement, depending upon initial results. Under this alternative, oxidant injection wells would be installed at the AVMA site in an area near the suspected source of PCE contamination in groundwater (near Building 726). Risks to the community and the environment would be low, if controlled by limiting access to the area around the well installations.

Alternative 3 would pose some short-term potential risk to workers at the source area during the time required for construction and installation of the injection wells at the source area. In addition, oxidant would be used at the site over a two-year period and would pose short-term risks to workers during periods of injection. Risks to a small number of workers needed for implementation would also be low and could be controlled with personal protective equipment and good work practices.

Because Alternative 3 would actively treat groundwater contamination, it is expected to achieve State and federal standards more rapidly than Alternative 2. Alternative 2 would not actively treat groundwater contaminants; therefore, contaminant concentrations and any associated risks would slowly decrease over time through natural processes. Both alternatives could require at least 20 years to complete remediation.

9.2.4 Implementability

This criterion considers the technical and administrative feasibility of implementing the alternative. It evaluates such concerns as the relative availability of the goods and services needed to construct or operate the remedy.

Alternative 2 is the most easily implemented alternative. It would require the implementation of common elements (ICs and monitoring) like the other alternative, but does not involve any additional field work to install wells or a treatment system.

Alternative 3 would be moderately hard to implement because, along with the common elements (ICs and monitoring), it requires installation of injection wells and an injection system. The sampling contractor had a very difficult time installing wells during the RI, and drilling at the AVMA site has not been easy due to the large cobbles located in the subsurface.

Alternative 3 involves the use of available technology to inject a commercially prepared chemical oxidant at approximately 30 locations and at various depths. This alternative would involve the installation of injection wells and could require additional design work prior to implementation. In addition, the distribution of the contamination is expected to be quite variable and there is uncertainty about whether the oxidant would come into contact with all of the contamination present. The oxidant could still be successful at reducing contaminant levels in groundwater in areas where the oxidant contacts residual contamination. However, the treatment area may need to be expanded or additional oxidant injected to ensure overall effectiveness.

An additional problem with implementing Alternative 3 is that the unconfined aquifer underlying the site is essentially a series of pools formed in the low-lying topographical features of the upper surface of the confining layer. These pools do not form a continuous aquifer except during seasonal water level fluctuations. During a major portion of the year, inadequate water is present for sample collection. Additional data would be required to effectively implement Alternative 3.

9.2.5 Cost

This criterion evaluates the estimated capital and O&M costs as well as present worth costs. Present worth costs are the total cost of an alternative over time in terms of today's dollars (i.e., present worth costs corrected for expected inflation).

Costs for each alternative are calculated in terms of present-worth cost over a period of 30 years, although actual monitoring or cleanup goals may be met in more or less time. Capital costs are those required to carry out the remediation. Capital costs include the costs of design, construction, and treatment. Operating and maintenance costs cover the labor and maintenance required to ensure remediation remains effective.

The estimated costs for each alternative evaluated are based on the information available at the time the alternatives were developed. The estimated cost for Alternative 2 is $465,000 and the estimated cost for Alternative 3 is $917,000. These costs are shown in Table 9-4.

The only difference between the alternatives is the capital cost for injection of oxidant into groundwater at the site. While the difference may not be significant in terms of some

TABLE 9-4
Cost Comparison of Remedial Alternatives for Contaminated Groundwater at the AVMA

Alternative	Capital Cost ($)	O&M Cost ($)	30-Year Present Worth Total Cost ($)
1. No Action	0	0	0
2. Land Use Controls, Natural Attenuation, and Monitoring	0	$465,000	$465,000
3. Chemical Oxidation, Natural Attenuation, and Monitoring	$335,000	$582,000	$917,000

Notes:
1. Costs are based on a 30-year present worth analysis at a 7% discount rate.
2. Discount rate applied is 7%.

projects, Alternative 2 does represent a lower overall cost. Additionally, Alternative 3 may result in higher costs if the treatment system needed to be expanded or if additional design work was required prior to implementation. Monitoring costs are well established for work at Fort Richardson, but considerable uncertainty exits concerning design and implementation of chemical-oxidation. Cost estimates for chemical oxidation may vary widely depending upon design considerations.

9.3 Modifying Criteria

9.3.1 State Acceptance

This criterion considers whether the State agrees with the analyses and recommendations of the RI/FS and the Proposed Plan.

The ADEC has been involved with the development of remedial alternatives for OUE and supports the selection of Alternative 2. The State supports Alternative 2 because it meets the overall goals and is cost effective given the uncertainty involved with active treatment at this site.

9.3.2 Community Acceptance

This criterion considers whether the local community agrees with the analyses and preferred alternative. Comments received on the Proposed Plan are important indicators of community acceptance.

Comments were received from only one member of the public during the open comment period. The comments were generally supportive of the preferred alternative because it was the most cost-effective remedy. The individual commented that Alternative 1 should be the preferred alternative, and inferred that the Army had spent too much money investigating the site and that no further action should be taken. In general, the lack of response from the community and the support from the RAB indicates that the public is supportive of the process undertaken at OUE.

10.0 Principal Threat Wastes

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The reasonably anticipated future land use at a site is significant in defining principal threat waste areas. A general rule of thumb is to consider as a principal threat those source materials with toxicity and mobility characteristics that combine to pose a potential risk several orders of magnitude greater than the risk level that is acceptable for the current or reasonably anticipated future land use, given realistic exposure scenarios.

Contaminated groundwater is generally not considered a principal threat waste (EPA, 1991a). Since no source materials were identified at the AVMA that act as a reservoir for migration of contaminants to groundwater, no principal threat wastes are located at OUE.

11.0 Selected Remedy

The remedy selected was subject to public comment and participation. This alternative was not selected until after the public comment period ended and all comments were reviewed and addressed.

The selected remedy for groundwater at the AVMA was chosen on the basis of the nine remedial alternative evaluation criteria found in the EPA ROD Guidance as described in Section 8.0. The selected remedy is presented in this section.

ICs are a key element of the remedy selected. These ICs will remain in place until it is determined that they are no longer needed to protect the public and the environment, which will occur when the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

11.1 Rationale

Alternative 2 (Land Use Controls, Natural Attenuation, and Monitoring) was selected as the remedy for PCE-contaminated groundwater at the AVMA site. For the following reason, the Army, EPA, and ADEC believe Alternative 2 is the best alternative to return groundwater at the site to beneficial use:

- Alternative 2 will achieve overall protection of human health and the environment and meet compliance with ARARs. Monitoring will be used as a means to ensure that contaminants are naturally attenuating.
- The remedy provides the best balance among the balancing criteria and appears consistent with comments received from the public and the ADEC.
- Alternative 2 is easily implemented, is cost effective, and is both a short and long-term solution to remediate PCE contaminated groundwater at the site. Uncertainty involved with treating an unknown source makes Alternative 3 a less tenable remedy that may, for all practical purposes, end up being the same remedy as provided by Alternative 2.
- ICs prohibiting installation of wells and use of groundwater at the site will eliminate or minimize the potential for exposure to contaminated groundwater. Groundwater at the site is not currently used as a drinking water source, nor are there plans to develop the resource in the future. Potable water is readily available through a public distribution system that exists only hundreds of feet from the site.

11.2 Description

The preferred alternative was chosen after considering very conservative assumptions for determining human health risk. The following are the major components of the remedy:

- Land Use Controls/Institutional Controls
- Natural Attenuation
- Monitoring

Land Use Controls/Institutional Controls

ICs will be implemented, maintained, reported on, and enforced by the Army to restrict the access to and use of groundwater at the AVMA until groundwater quality has been restored (contaminant concentrations are less than MCLs), thereby allowing unrestricted use of the groundwater. The anticipated time frame to achieve remedial goals is anticipated to be about 30 years, but could be more or less depending upon site conditions.

The performance objectives of the ICs for the AVMA are:

- The installation or use of groundwater supply wells at the site is prohibited until the cleanup standards (which would allow for unrestricted use of the groundwater) are achieved throughout the groundwater plume.
- The integrity of any current or future monitoring wells will be maintained.

Monitoring wells may be installed/replaced and groundwater extracted for monitoring purposes.

The details regarding the implementation, monitoring, and periodic inspection, and maintenance of the ICs to attain these objectives will be placed in a remedial design document or in a remedial action work plan prepared by the Army. Within 90 days of ROD signature, the Army shall prepare and submit to EPA for review and approval an IC remedial design that shall contain implementation and maintenance actions, including periodic inspections. In general, the Army plans that all ICs will be implemented under the Fort Richardson Institutional Control Policy and Master Plan. ICs will be implemented to cover the PCE-contaminated groundwater area as designated on Figure 5-3.

The Army also commits that:

- Any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs will be addressed by the Army as soon as practicable, but in no case will the process be initiated later than 10 days after the Army becomes aware of the activity.
- The Army shall notify EPA and ADEC 45 days in advance of any proposed land use changes that are inconsistent with land use control objectives or the selected remedy.
- The Army will provide notice to EPA and ADEC at least six months prior to any transfer or sale of the AVMA so that EPA and ADEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the Army to notify EPA and ADEC at least six months prior to any transfer or sale, then the Army will notify EPA and ADEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, the Army further agrees to provide EPA and ADEC with similar notice, within the same time frames, as to federal-to-federal transfer of property. The Army shall provide a copy of executed deed or transfer assembly to EPA and ADEC.
- The Army shall not modify or terminate Institutional Controls or Land Use Controls, implementation actions, or modify land use without approval by EPA and ADEC. The

Army shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the ICs or any action that may alter or negate the need for ICs.

- Monitoring of the environmental use restrictions and controls will be conducted annually by the Army. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to EPA and ADEC. The annual monitoring reports will be used in preparation of the five-year review to evaluate the effectiveness of the remedy. The annual monitoring report, submitted to the regulatory agencies by the Army, will evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s), whether the owners and State and local agencies were notified of the use restrictions and controls affecting the property, and whether use of the property has conformed with such restrictions and controls.

Natural Attenuation and Monitoring

Natural attenuation is a component of the selected remedy for groundwater at the AVMA. Under the selected remedy, natural attenuation would be allowed to occur at the site over time to reduce contaminant concentrations to levels less than MCLs. Current data indicate that the concentration of PCE in groundwater is decreasing and that chemical degradation of the PCE contamination is occurring at a very slow rate. Over time, other chemicals such as TCE and vinyl chloride will be produced by chemical degradation of PCE in groundwater. However, current data indicate that chemical degradation is a minor part of the overall attenuation and that these daughter products will not be produced at levels exceeding MCLs. The basic process of natural attenuation occurring at the site appears to be dilution. Section 5.5.2 provides a more detailed discussion of the natural attenuation pathway at this site.

Periodic monitoring will be conducted until cleanup levels are met. The wells that will be sampled and the actual frequency of sampling will be determined during remedial design, but for cost purposes it is assumed that fifteen (15) existing monitoring wells will be sampled for GRO/BTEX, VOCs, and natural attenuation parameters and that the wells will be sampled annually for 4 years, biennially for 6 years, and then every 5 years for the following 20 years. Monitoring will be discontinued when at least three subsequent sampling events indicate that contaminant concentrations have consistently dropped below MCLs. If the monitoring results for any two consecutive sampling events indicate that contaminant concentrations are increasing, then EPA, ADEC, and the Army will reevaluate the remedy to ensure protectiveness.

The selected remedy uses ground water monitoring:

- To establish concentration trends and provide an early warning if the downward concentration trend does not continue
- To determine the effectiveness of the remedy

The alternative will be reviewed during the five-year review process to ensure that the remedy remains protective of human health and the environment.

11.3 Cost

The estimated cost to implement the Land Use Controls, Natural Attenuation, and Monitoring alternative is $465,000. Appendix D contains more detailed cost estimates for each alternative.

Capital Cost: $0
O&M Cost: $465,000
Total Cost: $465,000

The values in the cost estimate summary are based on the best available information regarding the expected scope of the remedy. Changes in the costs and changes in the various work items that were estimated are likely to occur as a result of new information and data collected during the design and implementation of the remedy. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences, or an amendment to this ROD. This estimate is an order-of-magnitude engineering cost estimate.

11.4 Expected Outcomes

It is expected that the selected remedy (Alternative 2) will meet the RAOs for groundwater at the AVMA site, and that groundwater contamination will be reduced to levels less than MCLs within a 30 year time period. The current and reasonable expected land and groundwater uses at the site are industrial/commercial. The facilities located at or near the site include a laundry, motor pool, commercial office building, and training area. The Fort Richardson land use plan (Master Plan) lists the area as an industrial/commercial zone and any potential uses would be required to fit within that land use designation. Land use will remain unchanged as a result of the selected remedy. The reasonably anticipated land and groundwater uses for the site are included in Table 11-1.

TABLE 11-1
Potential Land and Groundwater Uses Available at the AVMA after Remedial Action

Remedial Action Site	Land Use	Groundwater Use
Groundwater plume contaminated with PCE	Industrial	Institutional controls prohibit access to the groundwater as a source of drinking water

Notes: PCE = tetrachloroethylene

As discussed above, ICs will be used to prevent exposure to the contaminated groundwater and prevent development that would be inconsistent with the selected remedy. Currently, there is no human exposure to the contaminated groundwater from the AVMA, because the site is undeveloped and a potable water distribution system exists only hundreds of feet from the site. The groundwater will be monitored to ensure that the remedy is working and to ensure that the contaminant is not migrating to new areas.

11.5 Remediation Goals

The overall goal of a remedial action is to protect human health and the environment from contaminated media. Remedial action goals were developed for hypothetical residential use of groundwater. These goals will prevent the exposure of contaminants in groundwater to human receptors.

To facilitate selection of the most appropriate remedial action, specific cleanup objectives were developed for the source areas. These objectives specify the COCs in groundwater, exposure pathways and receptors, and acceptable regulatory levels.

The remediation goals for AVMA groundwater are presented in Table 11-2. These remediation goals were established for the specific COCs that were determined to require remedial action. These goals are intended for the areas where active remediation will occur.

The cleanup levels for COCs in groundwater are federal and State MCLs for drinking water and Alaska Water Quality Standards for protection of freshwater, aquatic resources. When federal or State standards are not available, the cleanup level is based on an RBC equivalent to an ELCR of $1x10^{-4}$ for a residential-exposure scenario.

Monitoring at the OUE source areas would be conducted to ensure that RAOs are achieved. The goals of this monitoring include, but are not limited to, the following:

- To ensure that migration of contaminated groundwater from the source areas to downgradient aquifers or surface waters is reduced or prevented
- To indicate contaminant concentrations and compliance with MCLs and Alaska Water Quality Standards
- To ensure that natural attenuation is occurring over time within the PCE contaminated groundwater area of the site to reduce concentrations of all contaminants and breakdown products to levels less than MCLs within a 30-year time period

TABLE 11-2
Remedial Action Objectives for AVMA Groundwater

Remedial Action Objective	Chemicals of Concern	Remedy Component	Cleanup Level	Basis
Prevent exposure to and use of groundwater with chemical concentrations that pose an unacceptable risk or exceed MCLs	PCE (monitoring will include a variety of chemicals including about 30 VOCs, petroleum products, and natural attenuation parameters)	Institutional controls will prohibit installation of groundwater supply wells in the contaminated area as long as contaminant concentrations exceeded MCLs	5 μg/L for PCE and MCLs for other contaminants of concern	ELCR exceeded acceptable risk and PCE exceeds federal Drinking Water MCL
Return groundwater to beneficial use as a drinking water source within a reasonable time frame	PCE (see note above)	Natural attenuation will be allowed to occur to reduce contaminant concentrations to levels less than MCLs	5 μg/L for PCE and MCLs for other contaminants of concern	Compliance with federal Drinking Water MCL
Monitor groundwater and establish a trend towards reduction in PCE levels within the contaminated area	PCE (see note above)	Groundwater monitoring will be conducted to ensure compliance with RAOs and to track contaminant trends	5 μg/L for PCE and MCLs for other contaminants of concern	Compliance with federal Drinking Water MCL

Notes: μg/L = micrograms per liter
ELCR = Excess Lifetime Cancer Risk
MCL= maximum concentration level
PCE = tetrachloroethylene
RAO = remedial action objective
VOC = volatile organic chemicals

12.0 Statutory Determinations

The main responsibility of the Army, EPA, and ADEC under their legal CERCLA authority is to select a remedial action that is protective of human health and the environment. In addition, Section 121 of CERCLA, as amended by SARA, provides several statutory requirements and preferences. The selected remedy must be cost-effective and use permanent treatment technologies or resource-recovery technologies to the maximum extent practicable. The statute also contains a preference for remedies that permanently or significantly reduce the TMV of hazardous substances through treatment. Finally, CERCLA requires that the selected remedial action for each source area comply with ARARs established under federal and State environmental laws, unless a waiver is granted.

12.1 Protection of Human Health and the Environment

The selected remedy for groundwater at the AVMA will provide long-term protection of human health and the environment and satisfy the requirements of Section 121 of CERCLA.

The selected remedy, which includes land use controls, natural attenuation, and monitoring, provides protection of human health and the environment. Residential development and access will continue to be restricted.

Natural attenuation of remaining contaminants in the groundwater will continue to occur. Groundwater monitoring and evaluation will track not only the protectiveness of the remedial approach presented in this ROD, but also the progress of natural attenuation.

12.2 Compliance with Applicable or Relevant and Appropriate Requirements and To-Be-Considered Guidance

The selected remedy for groundwater at the AVMA will comply with all ARARs of federal and State environmental and public health laws, including compliance with all the chemical-, action-, and location-specific ARARs listed below. The ARARs are summarized in Table 9-3.

12.2.1 Applicable or Relevant and Appropriate Description

An ARAR may be either "applicable" or "relevant and appropriate." Applicable requirements are those substantive environmental protection standards, criteria, or limitations promulgated under federal or State laws that specifically address hazardous substances, remedial actions, locations, or other circumstances at a CERCLA site. Relevant and appropriate requirements are those substantive environmental protection requirements promulgated under federal and State laws that, although not legally applicable to the circumstances at a CERCLA site, address situations sufficiently similar to those encountered at the CERCLA site so that the use of the requirements is well suited to the particular site. The three types of ARARs are the following:

- Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies that establish an acceptable amount or concentration of a chemical in the ambient environment
- Action-specific ARARs are usually technology- or activity-based requirements for remedial actions
- Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activity solely because the ARARs occur in special locations

The to-be-considered (TBC) requirements are nonpromulgated federal or State standards or guidance documents that are to be used as appropriate in developing cleanup standards. Because they are not promulgated or enforceable, TBCs do not have the same status as ARARs and are not considered required cleanup standards. They generally fall into three categories:

- Health effects information with a high degree of credibility
- Technical information about how to perform or evaluate site investigations or response actions
- State or federal agency policy documents

12.2.2 Chemical-Specific Applicable or Relevant and Appropriate Requirements

Chemical-specific ARARs are determined by comparing those chemicals found onsite to State and federal environmental statutes. If a chemical has more than one ARAR, the most stringent standard is generally applied by the regulatory agencies.

The following chemical-specific ARARs have been identified and are applicable:

- *Federal Safe Drinking Water Act* (40 CFR 141 and 40 CFR 143) *and Alaska Drinking Water Regulations* (18 AAC 80, ADEC, 2004a). The MCLs and nonzero MCLGs were established under the Safe Drinking Water Act and are relevant and appropriate for groundwater that is a potential drinking water source.
- *Alaska Oil and Other Hazardous Substances Pollution Control Regulations* (18 AAC 75, as amended through May 26, 2004; ADEC, 2004b). These regulations are applicable. Under these regulations, responsible parties are required to clean up oil and hazardous substance releases in Alaska and are consistent with Alaska UST requirements.

There are no chemical-specific TBCs for groundwater at the AVMA.

12.2.3 Action-Specific Applicable or Relevant and Appropriate Requirements

Action-specific ARARs and TBCs are activity-based requirements or limitations. These requirements are determined by the particular remedial activities that will be selected to accomplish cleanup. There are no action-specific ARARs for groundwater at the AVMA. There is one potential TBC, *Real Property, Master Planning for Army Installations,* AR 210-20 (Army, 2005). It serves as the guidance document for designing and planning Army installations and is the functional basis for the Post Master Plan. The land use categories

presented in AR 210-20 denote major and significant land use. For example, an industrial land use area may contain administration, supply, and storage areas, but not residential areas. Family and unaccompanied personnel housing and medical and community facilities are the land uses least compatible with industrial land use and AR 210-20 recommends that industrial and residential land uses be widely separated.

12.2.4 Location-Specific Applicable or Relevant and Appropriate Requirements

Location-specific ARARs take into account the proximity of a site to humans and ecosystems in the determination of appropriate remedial actions. There are no location-specific ARARs or TBCs for groundwater at the AVMA.

12.2.5 To-Be-Considered Information

No TBC information was used in remedy selection and implementation. . However, *the Real Property, Master Planning for Army Installations,* AR 210-20 (Army, 2005) will serve in part as a guidance document for implementation of institutional controls.

12.3 Cost Effectiveness

It is believed that the combination of remedial actions identified as the selected remedy for groundwater at the AVMA will reduce or eliminate the risks to human health and the environment at an expected cost of $465,000 (Alternative 2). The remedy is cost-effective. It provides an overall protectiveness proportional to its costs.

12.4 Use of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

It has been determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner at the AVMA. Of those alternatives that protect human health and the environment and comply with ARARs, it has been determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria (long-term effectiveness and permanence, reduction of TMV through treatment, short-term effectiveness, implementability, and cost) while also considering the statutory preference for treatment as a principal element and considering State and community acceptance.

Although the selected remedy does not actively treat the source materials constituting principal threats at the site, it satisfies the criteria for long-term effectiveness by allowing natural attenuation to reduce the PCE concentrations in groundwater. The selected remedy does not present short-term risks different from the other treatment alternatives. The selected remedy is more easily implemented than the other alternatives evaluated. Alterative 3 proposed the use of injected oxidant to treat contaminated groundwater at the AVMA site. However, the implementability and effectiveness of that alternative under the conditions at the AVMA site are unknown and therefore that remedy is questionable due to the uncertainty of treating groundwater when a specific source has not been identified.

12.5 Preference for Treatment as a Main Element

The selected remedy for groundwater at the AVMA does not include active treatment, but rather allows natural attenuation to reduce the groundwater contaminants over time to levels less than MCLs. The remedy is expected to be protective under existing and anticipated future land-use scenarios and prevents risk to human receptors. Under the current land use for the AVMA, the chosen alternative is preferred and will effectively provide protection for human health and the environment at the site.

In addition, there are no principal threat wastes at the AVMA. Therefore, the statutory preference for treatment of principal threats does not apply. However, the remedy does include an active component in the form of natural attenuation and monitoring.

12.6 Five-Year Review Requirements

The NCP requires a five-year review if the remedial action results in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure. This review evaluates whether a remedy currently is, or will be, protective of human health and the environment. Groundwater at the AVMA is subject to the five-year review requirement.

The five-year review will be conducted in accordance with the most current and applicable guidance in effect at the time of the review (EPA, 2001). The second post-wide five-year review must be completed by February 22, 2008. This is based on the statutory review trigger date for Fort Richardson's OUA and OUB.

The five-year review may result in a decision that the remedy selected in this ROD is no longer protective and that additional remedial action must be taken to ensure protection of public health and the environment. If monitoring results indicate that contaminant concentrations are increasing or that contaminants are migrating, then EPA, ADEC, and the Army will reevaluate the remedy to ensure protectiveness.

The five-year review for all source areas, will include, but not be limited to, the following components:

- Evaluation of whether the response action remains protective of public health and the environment. Evaluation will consider the effectiveness of the technology for the specific performance levels established in the ROD
- Evaluation of whether remedial action remains cost-effective and technically sound
- Review of remedial action to determine whether the remedy might be replaced by other more state-of-the-art remedies that would remain protective at less cost
- Assessment of current and reasonable future land use of the site and surrounding area to ensure that the ROD assumptions of land use are still reasonable and consistent with institutional controls specified in this ROD
- Evaluation of ecological exposure pathways to verify that the assumptions and ecological risk evaluations completed remain valid
- Addition of any new sampling data into the source area databases

13.0 Documentation of Significant Changes

The Proposed Plan for OUE was released for public comment on September 27, 2004. The Proposed Plan identified Alternative 2 – Land Use Controls, Natural Attenuation, and Monitoring as the preferred alternative. The Army reviewed all written and oral comments submitted during the public comment period. Public comment was limited, but was supportive of the actions put forth in the Proposed Plan.

- Several minor changes were made to the ROD following publication of the Proposed Plan. Dibenzo(a,h)anthracene (commonly associated with petroleum contamination) contamination detected at well AP-3893 was determined to have likely originated from a release of petroleum products at a cross-gradient location not associated with the PCE contaminated area. Therefore, the contaminant was not considered to be a part of the CERCLA decision for OUE and actions associated with dibenzo(a,h)anthracene contamination detected at well AP-3893 were transferred under the authority of the State – Fort Richardson Environmental Restoration Agreement (Two-Party Agreement) for petroleum products. Under the two-party agreement, the Army and State will address contamination at well AP-3893 in accordance with applicable State of Alaska regulations.
- In addition, the cost estimates were revised based on additional discussion between the Army, EPA, and ADEC. While the cost estimates have changed, the difference did not result in a change to the selected remedy.

With the exception of the changes noted above, the remedy selected in this ROD, Alternative 2, is the same as that listed in the Proposed Plan and presented to the public.

14.0 RCRA Hazardous Waste Sites

In 1991, the Army and EPA entered into a Federal Facilities Compliance Agreement (FFCA) that imposed obligations on the Army regarding closure of a number of waste management sites. Sites addressed under the FFCA, known as solid waste management units (SWMUs), include: Circle Road Drum Site (OUD), Building 700/718 (OUD), Building 704 (OUD), Building 955 (OUD), Building 35-752 (OUE), Building 45-590 (OUD), the OB/OD Pad, Building 755, and Building 986 (OUA). This section provides an update on RCRA units located at Fort Richardson. These units will be closed through the RCRA process and not under this ROD. Pursuant to the terms of the 1994 CERCLA Federal Facilities Agreement (FFA), the Army, ADEC, and EPA agreed that, where feasible, any RCRA corrective actions required at SWMUs at Fort Richardson would be integrated with any ongoing CERCLA response actions so that duplication of effort would not occur and the Army could realize cost savings. The 1994 FFA specified that such integration efforts would not obviate the need for the Army to meet its RCRA closure obligations under the 1991 FFCA. However, work performed at these sites under CERCLA was intended to meet or exceed the requirements of the RCRA corrective action program.

Closure plans were developed for many of the SWMUs and submitted to EPA for comment and review. As part of the CERCLA/RCRA integration effort under the 1994 FFA, the Army has completed investigative sampling, and in some cases performed removal work, at many of these SWMUs. Following submission of the closure plans, EPA requested that additional information be provided that would allow determination for closure. Pursuant to submission of additional information, three sites (Circle Road Drum Storage Area, Building 704, and Building 45-590) have been or will be considered closed under RCRA and the FFCA. The FFCA did not stipulate closure of the Building 700/718 site, and the Army conducted removal actions at Building 700/718 as part of OUD. The Building 700/718 site was closed and documented in the OUD ROD.

The Army is preparing closure documentation for four of the remaining sites (OB/OD Pad, Building 955, Building 35-752, Building 755, and Building 986) and anticipates that these sites will be closed under RCRA and the FFCA during 2005.

Pursuant to the requirements set out in the OUC ROD, the Army has submitted an interim closure plan for the OB/OD Pad. In accordance with the findings made in the OUC ROD, EPA and the Army agreed that the OB/OD Pad met the requirements for an extension of time for closure specified in 40 CFR 265.113(b)(1)(i). As such, final closure of the OB/OD Pad will occur simultaneously with final closure of the ERF firing range, or at any earlier time if the Army so chooses. No less often than during the CERCLA 5-year reviews, the Army will evaluate whether acceptable delay of closure by the EPA becomes no longer viable for one of the following reasons:

- The ERF is no longer operating
- The post is being closed
- Any other reason

The findings of this evaluation will be submitted to EPA for review and approval. If either the EPA or the Army believe that delay of closure is no longer viable, the OB/OD Pad will be closed under the substantive and procedural RCRA closure requirements in effect at that time, and at that time, the Army will revise and resubmit the interim closure plan for the OB/OD Pad to the EPA for review and approval. Upon approval of the final closure plan, the Army will close the OB/OD Pad in accordance with the terms and conditions of that final closure plan. In addition, the Army may elect to close the site under 40 CFR 265, Subparts G and P, at any earlier time. This closure will also require compliance with all substantive and administrative closure requirements, including EPA approval.

15.0 References

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Appendix A
Responsiveness Summary

Responsiveness Summary

Stakeholder Issues and Responses

During the public comment period for the Proposed Plan, written comments were received from one member of the public. The comments were in the form of statements and questions, and were supportive of the proposed action. The comments and the Army's response are listed below:

1) No action seems ideal for the following reasons: a) no cost, b) site is zoned for industrial use, and c) no danger to wildlife.

Response: The Army disagrees that this is ideal because contaminants exceed MCLs and the site would not be monitored to ensure protectiveness.

2) Under Alternative 2 there is a statement to the effect that "ICs require clearance to excavate and so on". This would seem to indicate that any future use of the land would have to be monitored and permission gained. However, the estimated present-worth cost is certainly attractive.

Response: Army does intend to monitor groundwater at the site for an estimated 30 years.

3) Under Alternative *3, chemical oxidation appears to just be a quick fix to what is essentially a non-problem.*

Response: The Army agrees that Alternative 3 does not represent the preferred alternative for remedial action at this site.

4) Was a combination of Alternatives 1 and 2 considered?

Response: Alternative 2 is essentially the same as Alternative 1 with the inclusion of institutional controls and monitoring.

5) Under Alternative 2 periodic monitoring is mentioned but not really defined. Once a year, summer only, or?

Response: Army has revised the text to indicate the proposed monitoring frequency and has defined parameters that would be monitored at the site.

6) In reference to "community acceptance" in this case the personnel who reside on post. What has been their input and/or comments?

Response: The Proposed Plan was made available to all members of the public and every effort was made to solicit input from Post occupants. However, no comments were received from any residents of Fort Richardson.

7) The 27 September 2004 briefing was very well conducted and informative. Those responsible for its contents and their efforts should be noted and commended.

Response: The Army agrees with this comment.

Appendix B
Administrative Record Index

FORT RICHARDSON CERCLA ADMINISTRATIVE RECORD INDEX

Page Numbers		OU	Date	Title	Abstract	Author
00001 - 00002	OU-A Book 1	A	31-Dec-89	DERP Program Review, Army Installation Restoration Program, FTW-D-007, Fort Richardson PRE78 PCB Spill	Description, history, list of contaminants, mode of cleanup, status, issues and concerns, milestones, and funding of the Roosevelt Road Transmitter Site.	Army
00003 - 00004	OU-A Book 1	A	31-Dec-89	DERP Program Review, Army Installation Restoration Program, WN-D-007, FTW-D-006, and GR-D-001, Fire Burn Pits	Description, history, list of contaminants, mode of cleanup, status, issues and concerns, milestones, and funding status of the two fire burn pits at Fort Richardson.	Army
00005 - 00007	OU-A Book 1	A	06-Jul-90	DERP Program Review, Army Installation Restoration Program, FTW-D-007, Fort Richardson PRE78 PCB Spill	Description, history, list of contaminants, mode of cleanup, status, issues and concerns, milestones, and funding status of the Roosevelt Road Transmitter Site.	Army
00008 - 00010	OU-A Book 1	A	06-Jul-90	DERP Program Review, Army Installation Restoration Program, WN-D-007, FTW-D-006, and GR-D-001, Fire Burn Pits	Description, history, list of contaminants, mode of cleanup, status, issues and concerns, milestones, and funding status of the two fire burn pits at Fort Richardson.	Army
00011 - 00049	OU-A Book 1	A	24-Jun-87	Roosevelt Road Transmitter Site Cleanup Plan	Background information for the site cleanup plan for the Roosevelt Road Transmitter Site.	USAED Alaska
00050 - 00095	OU-A Book 1	A	15-Apr-88	Sampling Plan for the Investigation of PCB-Contaminated Soil at the Roosevelt Road, Fort Richardson Transformer Site	General guidance for safe conduct while sampling hazardous and toxic wastes at the Roosevelt Road Transmitter Site.	USAED Alaska
00096 - 00159	OU-A Book 1	A	21-Aug-90	Final Roosevelt Road Transmitter Site, A/E QC Plan, Fort Richardson, Anchorage, Alaska	Describes monitoring procedures for sampling, field measurement, and sample analysis activities to be performed during the project to obtain defensible chemical data.	E & E
00160 - 00268	OU-A Book 1	A	15-Aug-92	Fire Training Pits Work Plan, Part I, Ft. Richardson and Ft. Greely	Part I includes the sampling and analysis plan and QA/QC plan for the Fire Training Pits investigation.	E & E
00269 - 00330	OU-A Book 1	A	15-Aug-92	Fire Training Pits Work Plan, Part II, Subsurface Exploration Plan, Ft. Richardson and Ft. Greely	Part II includes the procedures for drilling and collection of subsurface soil samples.	E & E
00331 - 00385	OU-A Book 1	A	26-Sep-86	Phase I, Hazardous Waste Study No. 37-26-0725-87, Evaluation of Fire Training Pits, Fort Richardson, Alaska	Evaluation of the existence and extent of contamination released to the soil at the Fire Training Pits at Fort Wainwright, Fort Richardson, and Fort Greely.	AEHA
00386 - 00387	OU-A Book 1	A	15-Jun-88	Report of the Field Investigation Conducted at the Roosevelt Road PCB Area	Includes a description of the Roosevelt Road Transmitter Site sampling investigation undertaken from April 26 through May 4, 1988.	Army
00388 - 00399	OU-A Book 1	A	15-Oct-90	Soil Quality Assessment, Building No. 986, Fort Richardson, Alaska	Presents results of soil quality assessment east of Building No. 986.	Shannon & Wilson

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00400	- 00710	OU-A Book 2	A	01-Apr-91	Roosevelt Road Transmitter Site Investigation, Project Report	Presents the results of a site investigation follow-up for the Roosevelt Road Transmitter Site and consists of the field investigation and remedial design. Construction plans and specifications for remediation of PCB contamination were developed based on	E & E
00711	- 00847	OU-A Book 2	A	15-May-91	Environmental Assessment and Finding of No Significant Impact, Army Installation Restoration Program, Roosevelt Road Transmitter Site, Fort Richardson, Alaska	The EA performed in accordance with NEPA determined that no significant impacts would occur from the removal and disposal of contaminated soil from the site.	USAED Alaska
00848	- 01038	OU-A Book 3	A	12-Feb-92	Progress Report for the Confirmation of Fire Training Pits at Fort Richardson, Fort Wainwright, and Fort Greely, Alaska	Results of the investigation confirming the presence of Fire Training Pits at Fort Richardson, Fort Wainwright, and Fort Greely.	USAED Alaska
01039	- 01076	OU-A Book 3	A	26-Feb-93	Summary of Fieldwork and Chemical Data Report from November 1992 Sampling Effort, POL Lab Tank, Fort Richardson, Alaska	Water and sludge samples were collected from the POL Laboratory Dry Well to determine the concentrations and types of contamination present.	USAED Alaska
01077	- 01114	OU-A Book 3	A	26-Feb-93	Summary of Fieldwork and Chemical Data Report from November 1992 Sampling Effort, POL Lab Tank, Fort Richardson, Alaska	Summary of fieldwork and chemical data collected from the POL Laboratory tank.	USAED Alaska
01115	- 01751	OU-A Books 4 & 5	A	15-Sep-93	Site Investigation Project Report for Fire Training Pits at Fort Richardson and Fort Greely, Alaska	Methods for and results of investigations of Fire Training Pits. Preliminary human health hazards are evaluated and remedial options presented.	E & E
01752	- 01754	OU-A Book 5	A	07-Jul-93	Comments, Site Investigation Report for Fire Training Pits	ADEC review comments on the draft site investigation report for the Fire Training Pits at Fort Richardson and Fort Greely.	ADEC
01755	- 01759	OU-A Book 5	A	12-Sep-91	Summary of Soil Chemical Data, POL Lab, Fort Richardson, Alaska	Summary of fieldwork and sampling results for the POL UST at POL Laboratory Building No. 986.	USAED Alaska
01760	- 01767	OU-A Book 5	A	24-Feb-88	Installation Restoration Program Work Planned for the Roosevelt Road Polychlorinated Biphenyl (PCB) Site on Fort Richardson	Includes remedial alternatives for the Roosevelt Road Transmitter Site.	USAED Alaska
01768	- 01768	OU-A Book 5	A	19-Jan-90	Comments, Roosevelt Road Transmitter Site QC Plan, Sampling and Analysis Plan, and Subsurface Exploration Plan	EPA comments on the work plan.	EPA
01769	- 01825	OU-A Book 5	A	04-Feb-91	Draft Work Plan, Part l, Sampling, Analysis, & QA/QC Plan for Petroleum Laboratory, Building 986, Fort Richardson, Alaska	Sampling, analysis, and QA/QC plans for determining soil contamination by POL products in the vicinity of the UST at the POL Laboratory.	USAED Alaska

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01826	- 01898	OU-A Book 5	A	15-Oct-95	Final Approach Document, Remedial Investigation/FS, OU-A, Fort Richardson, Alaska	Presents the overall approach for reporting RI and RA results and establishes a preliminary framework for post-RI activities, including the FS and ROD.	E & E
01899	- 02024	OU-A Book 5	A	15-Feb-90	Installation Restoration Program, Stage 1, Site No. 2, Roosevelt Road Transmitter Site, Final Report	Remediation process and confirmatory sampling and results for the Roosevelt Road Transmitter Site, Volume 2 of 6. The sampling and analysis plan for confirmatory sampling is included.	WWC
02025	- 02155	OU-A Book 6	A	15-Feb-90	Installation Restoration Program, Stage 1, Site No. 4, Fire Training Pits, Final Report	Soil gas investigation and qualitative RA of Fire Training Pits at Fort Wainwright, Fort Richardson, and Fort Greely; Volume 4 of 6.	WWC
02156	- 02187	OU-A Book 6	A	12-Sep-91	Summary of Soil Chemical Data, POL Lab, Fort Richardson, Alaska	Includes results of chemical analyses for soil samples collected from within the POL Laboratory vicinity.	USAED Alaska
02188	- 02360	OU-A Book 6	A	30-Oct-92	Laidlaw Environmental Services, Chemical QC Report, Roosevelt Road Transmitter Site, Phase II, PCB Remediation	Summary of soil excavation at the Roosevelt Road Transmitter Site Leachfield.	Sterling & Associates
02361	- 02362	OU-A Book 6	A	11-Apr-91	Remedial Options of Roosevelt Road Transmitter Site	Documents approval of the recommended remedial alternative of off-site landfilling of contaminated soil from the underground bunker at Roosevelt Road.	DEH
02363	- 02363	OU-A Book 6	A	13-Nov-95	Comments, October 1995 Approach Document for OU-A	Comments on the approach document for the OU-A RI/FS.	ADEC
02364	- 02365	OU-A Book 6	A	20-Nov-95	Comments, OU-A Approach Document	Comments on the OU-A approach document.	EPA
02366	- 02370	OU-A Book 6	A	07-Dec-95	Comments, Fort Richardson Background Study, and OU-A RI/FS Approach Document	Comments on the Fort Richardson background study and the OU-A approach document.	EPA
02371	- 02396	OU-A Book 6	A	04-Mar-91	Project Review Conference; Project No. FTW-D-007, Roosevelt Road Transmitter Site, Fort Richardson, Alaska, Pre-78 PCB Spill	Includes minutes of the February 8, 1991, subject review conference regarding Roosevelt Road.	USAED Alaska
28358	- 28367	OU-A Book 14	A	02-Jul-97	Submittal, 100% Design, POL Laboratory Dry Well	Remedial design analysis, delivery order, and construction cost estimate for the POL Laboratory Dry Well.	E & E
20282	- 20283	OU-A Book 9	A	07-Mar-96	Status report for the OU-A Remedial Investigation	Summarizes activities conducted by E & E during February and March 1996 and projects planned for the remainder of March and April 1996.	E & E
02397	- 02624	OU-A Books 7& 8	A	10-Apr-90	Roosevelt Road Transmitter Site Work Plan, Fort Richardson, Anchorage, Alaska	Includes the sampling and analysis plan, QA/QC plan, subsurface exploration plan, and site health and safety plan for the field investigation of the Roosevelt Road Transmitter Site to aid in remediation planning.	E & E

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02625	- 03029	OU-A Books 7& 8	A	15-Feb-95	Management Plan Documents, Remedial Investigation/FS, OU-A, Fort Richardson, Alaska	Management plan for the Fort Richardson OU-A RI/FS, including the sampling and analysis plan, QA project plan, site specific health and safety plan, and ARARs.	E & E
20284	- 20286	OU-A Book 9	A	08-Jan-96	Responses to Comments on the OU-A Approach Document	A response to comments prepared by CHPPM.	E & E
03030	- 03032	OU-A Book 8	A	08-Aug-97	Remedial Investigation, OU-A (OU-A) Ruff Road Fire Training Area; Proposed Changes to Sampling Strategy	Includes proposed changes to the sampling strategy at the Ruff Road Fire Training Area.	E & E
03033	- 03215	OU-A Book 8	A	17-Aug-92	Laidlaw Environmental Services, Chemical QC Report, Roosevelt Road Transmitter Site, PCB Remediation	Summary of soil sampling and contamination delineation at the Roosevelt Road Transmitter Site.	Sterling & Associates
03216	- 03241	OU-A Book 8	A	22-Jul-94	RI/FS Management Plan, OU-A: Review of Background Information	Review of background information for OU-A.	E & E
03242	- 03292	OU-A Book 8	A	18-Aug-94	RI/FS Management Plan: OU-A: Conceptual Site Models, Data Quality Objectives and Preliminary Applicable or Relevant and Appropriate Requirements, Letter Reports	Preliminary conceptual site models, data quality objectives, and ARARs for OU-A.	E & E
03293	- 03306	OU-A Book 8	A	04-Oct-95	OU-A Soil Stockpile Results/Disposal	Results from soil sampling at the POL Laboratory indicate that the drill cuttings are clean.	E & E
20287	- 20642	OU-A Book 9	A	15-Aug-96	Final Baseline Human Health and Ecological Risk Assessment, OU-A, Fort Richardson, Alaska	The RA determines whether site-related contamination present at OU-A is a risk to public health and the environment.	E & E
20643	- 21612	OU-A Books 9 -12	A	01-Nov-96	Final Remedial Investigation Report, OU-A, Fort Richardson, Alaska, Volume I: Report	Presents the results of the RI conducted at OU-A from May 1995 to October 1995 in accordance with the OU-A management plan.	E & E
03307	- 03307	OU-A Book 8	A	01-Aug-94	Comments, RI/FS Management Plan, OU-A	Comments on the OU-A RI/FS management plan.	ADEC
03308	- 03308	OU-A Book 8	A	09-Aug-94	Comments, RI/FS, OU-A Management Plan, Fort Richardson, Alaska	Review comments on the OU-A management plan.	EPA
03313	- 03314	OU-A Book 8	A	26-Sep-94	Comments, RI/FS Management Plan: OU-A, Fort Richardson	Review comments on the OU-A management plan.	ADEC
03309	- 03312	OU-A Book 8	A	26-Sep-94	Comments, RI/FS, Management Plan, Conceptual Site Model and ARARs	Review comments on the OU-A management plan conceptual site model and ARARs.	EPA
03315	- 03323	OU-A Book 8	A	03-Oct-94	Comments, RI/FS Management Plan: OU-A ARARs, Fort Richardson	Review comments on the OU-A management plan ARARs.	ADEC

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03324	- 03325	OU-A Book 8	A	07-Oct-94	Response to Comments, RI/FS Management Plan, OU-A	A response to ADEC and EPA comments on the OU-A RI/FS management plan.	E & E
03327	- 03330	OU-A Book 8	A	10-Nov-94	Comments, RI/FS Management Plan: OU-A ARARs, Fort Richardson	Review comments on the OU-A management plan ARARs.	ADEC
03326	- 03326	OU-A Book 8	A	10-Nov-94	Response to Comments, RI/FS Management Plan, OU-A	Response to ADEC's list of ARARs.	DPW
03331	- 03339	OU-A Book 8	A	02-Dec-94	Comments, OU-A, Remedial Investigation/FS Management Plan	Review comments on the OU-A management plan.	EPA
03340	- 03340	OU-A Book 8	A	22-Feb-95	Comments, draft-final Management Plan for OU-A	Review comments on the OU-A draft-final management plan.	EPA
03341	- 03341	OU-A Book 8	A	02-Mar-95	Management Plan: OU-A, Fort Richardson, February 1995	Documents the approval of the OU-A management plan.	ADEC
21613	- 21623	OU-A Book 12	A	28-Feb-96	OU-A RI/FS; Ecological Risk Assessment; Measurement Species and Assessment End Points, Fort Richardson, Alaska	Presents a summary of the ecological endpoints to be used for the OU-A ERA. The summary was prepared in response to comments on the OU-A approach document.	E & E
21624	- 21625	OU-A Book 12	A	19-Apr-96	Comments, Draft Remedial Investigation Report Plan, OU-A, March 1996	Review comments.	ADEC
21626	- 21628	OU-A Book 12	A	24-Apr-96	Comments, Draft OU-A Remedial Investigation, Fort Richardson, Alaska	Review comments.	EPA
21629	- 21635	OU-A Book 12	A	28-May-96	Draft OU-A RI Report Comments	Review comments.	CHPPM
21636	- 21643	OU-A Book 12	A	30-May-96	Comments, Draft Baseline Risk Assessment, OU-A, Fort Richardson, Alaska	Review comments.	EPA
21644	- 21644	OU-A Book 12	A	03-Jun-96	Comments, Draft Human Health and Ecological Risk Assessments, OU-A, April 1996, Fort Richardson, Alaska	Review comments.	ADEC
21645	- 21647	OU-A Book 12	A	02-Jul-96	Draft Baseline HHRA and ERA, OU-A, April 1996	Review comments.	Army
21648	- 21660	OU-A Book 12	A	01-Oct-96	Annotated review comments for OU-A, Draft-Final Remedial Investigation and Draft-Final Risk Assessment	Contains E & E's responses to the Army, EPA, and ADEC's comments on the draft-final versions of the RI and HHRA/ERA.	E & E

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21661	- 21677	OU-A Book 12	A	03-Jan-96	Statement of Work, OU-A FS, Fort Richardson, Alaska	Presents site background, contract objectives, description of tasks required from the contractor, completion schedule, discussion of the submittals, presentations required, the relationship of the contractor with the public, and the method of payment.	None Given
03342	- 03364	OU-A Book 8	A	15-Jun-91	Design Analysis for Remediation Project, Roosevelt Road Transmitter Site, Fort Richardson, Alaska	Summary of the design logic that forms the basis for decisions used in preparing the project plans and specifications for the site. The report contains information about engineering calculations, economic considerations, applicable standards of performan	E & E
21678	- 21837	OU-A Book 12	A	01-Nov-96	Final FS, OU-A, Ruff Road Fire Training Area, Fort Richardson, Alaska	Presents a summary of RI results, establishes remedial action objectives, identifies applicable remedial technologies, and provides a detailed analysis of remedial alternatives.	E & E
21854	- 21870	OU-A Book 13	A	23-Oct-96	Work Plan No.1, Proposed Plan for OU-A and OU-B	A draft presentation of cleanup alternatives for OU-A and OU-B.	E & E
21838	- 21853	OU-A Book 13	A	01-Jan-97	Proposed Plan for Remedial Action OU-A and OU-B, Fort Richardson, Alaska	The proposed plan presents cleanup strategies for OU-A and cleanup alternatives for OU-B at Fort Richardson. The Army, ADEC, and EPA have determined that the sites included within OU-A will be addressed under the Two-Party Agreement between the Army and	Army
21871	- 21885	OU-A Book 13	A	18-Jul-96	Technical Memorandum, OU-A FS, Task 2	Presents remedial action objectives, preliminary remediation goals, general response actions, technologies and process options, and remedial action alternatives for OU-A based on the RI and RA reports.	E & E
21886	- 21891	OU-A Book 13	A	23-Jul-96	Resampling Groundwater Monitoring Wells for Dioxins/Furans at Ruff Road Fire Training Area, Fort Richardson, Alaska	An amendment to the OU-A RI/FS Management Plan addressing the resampling of five monitoring wells for polychlorinated dibenzo-p-dioxins/polychlorinated dibenzo-p-furans analyses at the Ruff Road Fire Training Area.	E & E
21892	- 21892	OU-A Book 13	A	30-Jul-96	Comments, Technical Memorandum FS, Task 2, OU-A, Fort Richardson, Alaska	Review comments.	ADEC
21893	- 21895	OU-A Book 13	A	07-Aug-96	Comments, OU-A FS Technical Memorandum	Review comments.	EPA
21896	- 21897	OU-A Book 13	A	16-Sep-96	Comments, Draft FS, OU-A, Ruff Road Fire Training Area	Review comments.	ADEC
21898	- 21900	OU-A Book 13	A	30-Sep-96	Comments, Draft FS, OU-A, Ruff Road Fire Training Area	Review comments.	EPA

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21901	- 21917	OU-A Book 13	A	25-Nov-96	Annotated Comments to the Final FS Reports, OU-A; Fort Richardson, Alaska	E & E's responses to comments from the Army, ADEC, and EPA on the draft FS report.	E & E
23902	- 23917	OU-B Book 14	A	25-Nov-96	Annotated Comments to the Final FS Reports, OU-A; Fort Richardson, Alaska	E & E's responses to comments from the Army, ADEC, and EPA on the draft FS report.	E & E
21918	- 21919	OU-A Book 13	A	27-Nov-96	Comments, Working Draft No. 2 of Proposed Plan for OU-A and OU-B, November 4, 1996	Review comments.	ADEC
21920	- 21922	OU-A Book 13	A	06-Dec-96	Comments, Proposed Plan for OU-A and OU-B	Review comments.	EPA
21923	- 21923	OU-A Book 13	A	09-Dec-96	Comments, Proposed Plan for OU-A and OU-B	Review comments.	AEC
21924	- 21926	OU-A Book 13	A	10-Dec-96	Comments, OU-A FS, OU-B FS, OU A/B Proposed Plan	Review comments	CHPPM
21927	- 21930	OU-A Book 13	A	17-Dec-96	Comments, OU-A and OU-B Proposed Plan	Review comments.	Army
21931	- 21934	OU-A Book 13	A	24-Dec-96	Comments, OU-A and OU-B Proposed Plan	Review comments.	EPA
28368	- 28368	OU-A Book 14	A	13-Jan-97	Comments, draft-final Proposed Plan OU-A/B, January 1997	ADEC comments.	ADEC
28369	- 28370	OU-A Book 14	A	16-Jan-97	Comments, draft-final Proposed Plan OU-A/B, January 1997	Review comments.	Army
28371	- 28372	OU-A Book 14	A	31-Jan-97	Comments, Draft OU-A FS, draft-final OU-B FS, and Working Draft No. 2 Proposed Plan for OU-A/OU-B	Review comments.	CHPPM
28373	- 28521	OU-A Book 14	A	08-Aug-97	Final Record of Decision for Operable Units A and B, Fort Richardson, Anchorage, Alaska	Presents the selected remedial actions for OU-A and OU-B. The Army, EPA, and ADEC have determined that the sites included within OU-A will be addressed through removal actions under the conditions of the Two-Party Agreement between the Army and ADEC.	E & E
31516	- 31664	OU-A Book 15	A	08-Aug-97	Record of Decision for Operable Units A & B, Fort Richardson, Alaska	The ROD highlights the selected remedial actions for OUB and the rationale for addressing OUA under a clean-up agreement with the state of Alaska. (Refer to entry in OU-B, Category 5.1)	E & E
28522	- 28523	OU-A Book 14	A	31-Jan-97	Comments, Proposed Plan for OU-A and OU-B	Review comments.	CHPPM

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28524	- 28524	OU-A Book 14	A	04-Feb-97	Comments, draft-final OU-A and OU-B Proposed Plan	Review comments.	CHPPM
28525	- 28528	OU-A Book 14	A	02-Apr-97	Comments, Draft ROD for OU-A and OU-B	ADEC comments.	ADEC
28529	- 28539	OU-A Book 14	A	14-Apr-97	Comments, Draft ROD for OU-A and OU-B	EPA comments.	EPA
28540	- 28545	OU-A Book 14	A	30-May-97	Comments, Draft ROD for OU-A and OU-B	AEC comments.	AEC
28546	- 28547	OU-A Book 14	A	30-Jun-97	Comments, Draft ROD for OU-A and OU-B	CHPPM comments.	CHPPM
28548	- 28552	OU-A Book 14	A	23-Jan-97	Public Comment	A public comment letter concerning the OU-A/OU-B Proposed Plan.	Donald R. Ruskauff
28553	- 28603	OU-A Book 14	A	29-Jan-97	Minutes, Public Comment Period and Information Exchange	Meeting minutes from the public meeting at Russian Jack Chalet on January 29, 1997, concerning the OU-A /OU-B Proposed Plan and final Remedial Action Plan.	None Given
28604	- 28605	OU-A Book 14	A	16-Jan-97	Press Release: Army Seeks Public Input on Environmental Cleanup at Fort Richardson	An invitation for public comment on the OU-A/OU-B Proposed Plan.	Army
28606	- 28606	OU-A Book 14	A	17-Jan-97	Public Notice: Public Comment Period	A public notice requesting public comment on the OU-A/OU-B Proposed Plan for final remedial action at OU-A and OU-B.	Army
28607	- 28607	OU-A Book 14	A	25-Jan-97	Public Notice: OU-A/OU-B Proposed Plan	The Army invites the public to attend a meeting on the OU-A/OU-B Proposed Plan for final remedial action at OU-A and OU-B.	Army
28608	- 28608	OU-A Book 14	A	27-Nov-97	Cleanup Decision Reached, Final Remedial Action, OU-A and OU-B	Public notice appearing in the Chugiak-Eagle River Star that announces the availability of the final ROD at the listed information repositories.	Army
03365	- 03366	OU-B Book 1	B	05-Nov-90	Fact Sheet: Poleline Road Disposal Area (PRDA)	Discusses investigative efforts at the Poleline Road Disposal Area and potential further subsurface investigations.	DPW
03367	- 03371	OU-B Book 1	B	20-Oct-93	Chemical Event in Alaska	Information concerning the discovery of buried chemical warfare training materials at the Poleline Road Disposal Area.	Army
03372	- 03380	OU-B Book 1	B	27-Oct-93	Safety Concerns for PRDA Soil Storage	Presentation of chemical screening conducted to date and guidance regarding the chemical agents suspected at the site (mustard gas and lewisite).	DPW
03381	- 03460	OU-B Book 1	B	15-Aug-91	Poleline Road Disposal Area, Remedial Investigation Technical Plan	Presents the sampling design plan and the preliminary RA plan for the Poleline Road Disposal Area.	ESE

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03461	- 03489	OU-B Book 1	B	15-May-94	Reconnaissance Ground-Penetrating Radar and Electromagnetic Induction Surveys of the Poleline Road Site, Fort Richardson, Alaska	Evaluates subsurface conditions at the Poleline Road Disposal Area at Fort Richardson.	CRREL
03490	- 03710	OU-B Book 1	B	15-Dec-94	Poleline Road Disposal Area, draft-final Report, Phase I & II	Work performed and findings of investigations at the Poleline Road Disposal Area.	OHM
03711	- 03751	OU-B Book 1	B	15-Jul-90	Poleline Road Disposal Area, Expanded Site Investigation, Fort Richardson, Alaska, Draft Accident Prevention Safety Plan	Site-specific safety plans for the expanded site investigation of Fort Richardson.	ESE
03752	- 03966	OU-B Book 2	B	15-Feb-91	Poleline Road Disposal Area, Expanded Site Investigation, Fort Richardson, Alaska	Provides results of the investigation of source area contaminants and categorizes the nature of any releases and/or potential threats to human health and the environment.	ESE
03967	- 04028	OU-B Book 2	B	24-Sep-91	Poleline Road Disposal Area, Remedial Investigation, Fort Richardson, Alaska, Technical Plan	Plans for the initial investigation of contamination at the Poleline Road source areas to assess the potential threats to human health and the environment and to make recommendations regarding potential remedial actions.	ESE
04029	- 04055	OU-B Book 2	B	08-Aug-95	Geophysical Investigation of the PRDA	Draft-final report summarizing a series of geophysical investigations at the Poleline Road Disposal Area conducted to delineate the locations of suspected buried hazardous materials.	CRREL
04056	- 04081	OU-B Book 2	B	24-Aug-90	Surface Geophysical Investigation, United States Army Fort Richardson Facility, Anchorage, Alaska	Three surface geophysical investigative methods were used to help detect the possible presence of materials and/or objects buried in the shallow subsurface of the study area.	ESE
04082	- 04082	OU-B Book 2	B	14-Dec-89	Notification to USEPA of the Poleline Road Disposal Area	Written notification to EPA regarding the discovery of a possible past contamination site near Poleline Road.	USAED Alaska
04083	- 04083	OU-B Book 2	B	19-Jan-90	Review Comments on the Poleline Road Disposal Site, Expanded Site Investigation	Review comments on the Poleline Road Disposal Area expanded site investigation.	EPA
04084	- 04085	OU-B Book 2	B	24-Aug-90	Interview with Mr. Paul Roseland	Interview with Paul Roseland regarding the types and locations of chemicals disposed of at Poleline Road.	DPW
04086	- 04088	OU-B Book 2	B	03-Oct-93	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--9/23/93 through 10/3/93.	OHM
04089	- 04090	OU-B Book 2	B	17-Oct-93	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--10/10/93 through 10/17/93.	OHM
04091	- 04093	OU-B Book 2	B	24-Oct-93	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--8/21/93 through 8/24/93.	OHM
04094	- 04095	OU-B Book 2	B	23-Jul-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--7/5/94 through 7/23/94.	OHM

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04096	- 04098	OU-B Book 2	B	30-Jul-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--7/23/94 through 7/30/94.	OHM
04099	- 04101	OU-B Book 2	B	04-Aug-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--8/1/94 through 8/4/94.	OHM
04102	- 04106	OU-B Book 2	B	13-Aug-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--8/9/94 through 8/13/94.	OHM
04107	- 04111	OU-B Book 2	B	20-Aug-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--8/15/94 through 8/20/94.	OHM
04112	- 04116	OU-B Book 2	B	27-Aug-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--8/22/94 through 8/27/94.	OHM
04117	- 04120	OU-B Book 2	B	01-Sep-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--8/29/94 through 9/1/94.	OHM
04121	- 04123	OU-B Book 2	B	10-Sep-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--9/7/94 through 9/10/94.	OHM
04124	- 04127	OU-B Book 2	B	17-Sep-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--9/12/94 through 9/17/94.	OHM
04128	- 04131	OU-B Book 2	B	24-Sep-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--9/19/94 through 9/24/94.	OHM
04132	- 04133	OU-B Book 2	B	29-Sep-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--9/26/94 through 9/29/94.	OHM
04134	- 04138	OU-B Book 2	B	08-Oct-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--10/4/94 through 10/8/94.	OHM
04139	- 04140	OU-B Book 2	B	15-Oct-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--10/10/94 through 10/15/94.	OHM
04141	- 04143	OU-B Book 2	B	21-Oct-94	Rapid Response Weekly Report	Weekly report for the Poleline Road removal action--10/17/94 through 10/21/94.	OHM
04144	- 04145	OU-B Book 2	B	08-Oct-93	Letter with proposed plan for chemical warfare munitions cleanup at Poleline Road	Letter with proposed plan for chemical warfare munitions cleanup at Poleline Road.	Army
04146	- 04823	OU-B Book 3 & 4	B	15-May-94	Poleline Road Disposal Area, Field Operations Work Plan	Work plan for remedial activities to be performed at the Poleline Road Disposal Area.	OHM
04824	- 04825	OU-B Book 4	B	16-May-94	Poleline Road GPR Report	Summary of excavation plans for the Poleline Road Disposal Area.	DPW
04826	- 05462	OU-B Book 5	B	27-May-94	Poleline Road Disposal Area, Phase 2--Continuation of the Removal Action, Project Work Plan	Field operations work plan; site specific health and safety plan; environmental protection plan; sampling and analysis plan; and packaging, transportation, and storage plan for the removal action at the Poleline Road Disposal Area.	OHM

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05463	- 05467	OU-B Book 5	B	29-Sep-94	Additional Excavation at Poleline Road Disposal Area	Modifications in the site work and safety plan for additional removal work at the Poleline Road Disposal Area.	DPW
05468	- 05468	OU-B Book 6	B	03-Sep-93	Comments, Project Work Plan for Poleline Road Disposal Area	Approval of the work plan for the Poleline Road Disposal Area.	ADEC
05469	- 05470	OU-B Book 6	B	07-Sep-93	Comments, Project Work Plan, Rapid Response Removal Action, Poleline Road Disposal Area	EPA comments on the project work plan for the Poleline Road Disposal Area.	EPA
05471	- 05471	OU-B Book 6	B	22-Feb-94	Comments, Poleline Road Disposal Area Work and Health and Safety Plans	Review comments on the Poleline Road Disposal Area work and health and safety plans.	ADEC
05472	- 05474	OU-B Book 6	B	24-Feb-94	Comments, Poleline Road Disposal Area Work and Health and Safety Plans	Review comments on the Poleline Road Disposal Area work and health and safety plans.	EPA
05475	- 05480	OU-B Book 6	B	09-Mar-94	Comments, Poleline Road Disposal Area Work and Health and Safety Plans	Review comments on the Poleline Road Disposal Area work and health and safety plans.	ANSCM
05481	- 05481	OU-B Book 6	B	13-May-94	Review Comments on McLarn Hart's Low Temperature Thermal Desorption Process for the Excavated Soils at Poleline Road	Review comments on McLarn Hart's LTTD process for the excavated soils at the Poleline Road Disposal Area.	EPA
05482	- 05485	OU-B Book 6	B	13-May-94	Review Comments on the draft-final Workplan for the Poleline Road Disposal Area	Review comments on the Poleline Road Disposal Area draft-final work plan.	ANSCM
05486	- 05486	OU-B Book 6	B	13-Feb-95	Comments, PRDA, Phase I & II, draft-final, January 1995	Comments on the Poleline Road Disposal Area report.	ADEC
05487	- 05489	OU-B Book 6	B	17-Jun-95	Rapid Response Weekly Report	Weekly report for the Poleline Road Disposal Area removal action--June 1 through June 17, 1995.	OHM
05490	- 05491	OU-B Book 6	B	01-Jul-95	Rapid Response Weekly Report	Update of field activities from June 19 to July 1,1995, for the Poleline Road Disposal Area removal action.	OHM
05492	- 05504	OU-B Book 6	B	15-Jul-95	Response to Comments, Excavation of the Poleline Road Disposal Area	Response to EPA, Army, and ADEC comments on the excavation report.	OHM
21935	- 22162	OU-B Book 9	B	01-Aug-96	Draft EE/CA for the Treatment and Disposal of Chemical Agent Identification Sets Recovered from the PRDA, Fort Richardson, Alaska	An EE/CA to identify objectives of a removal action and to analyze various alternatives that may be used to satisfy these objectives for cost, effectiveness, and implementation.	USAED Alaska
28609	- 28611	OU-B Book 15	B	05-Feb-97	Comments, Engineering Evaluation/Cost Analysis, Poleline Road Disposal Area	EPA comments on the Poleline Road Disposal Area EE/CA.	EPA

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28612	- 28835	OU-B Book 15	B	15-May-97	Final, U.S. Army Program Manager for Chemical Demilitarization, EE/CA for the Treatment and Disposal of CAIS's Recovered from the PRDA	An EE/CA performed to satisfy the requirements of a focused FS for the implementation of an interim response action. The EE/CA identifies four alternatives for the treatment and disposal of the chemical agent identification sets (CAISs).	USAED Alaska
05505	- 05506	OU-B Book 6	B	26-Oct-93	Poleline Road Disposal Area, Fort Richardson, Alaska	Discussion of chemical agents at the Poleline Road Disposal Area.	DPW
05507	- 05508	OU-B Book 6	B	07-Oct-93	Suspect Chemical Warfare Material at Fort Richardson, Alaska	Guidance for proceeding with the soil removal at the Poleline Road Disposal Area.	ANSCM
05509	- 05509	OU-B Book 6	B	09-May-94	April 1994 draft-final Project Workplan Phase 2--Continuation of the Removal Action Poleline Road Disposal Site, OHM Project No. 14925RI	Documents approval of the April 1994 Draft-Final Project Workplan Phase 2--Continuation of the Removal Action at Poleline Road Disposal Site, OHM Project No. 14925RI.	ADEC
22184	- 22185	OU-B Book 9	B	22-Oct-96	Scope of Work Mod. #3, OU-B FS	Scope modification to delete production of the FS report and to add air sparging as an alternative for the OU-B FS.	None Given
05510	- 05906	OU-B Book 7	B	15-Mar-95	Remedial Investigation Management Plan, OU-B, Poleline Road Disposal Area, Fort Richardson, Alaska	Plans to conduct the RI to characterize the nature and extent of contamination, obtain data for the RA, and evaluate remedial alternatives.	WWC
05907	- 05939	OU-B Book 8	B	15-Aug-95	Ecological Risk Approach Document, OU-B, PRDA	An approach document for developing the OU-B Poleline Road Disposal Area ERA.	WWC
28836	- 28864	OU-B Book 15	B	15-May-97	Work Plan Technical Memorandum, Groundwater Characterization and Design Verification Study, OU-B	A work plan presenting those methods not already presented in the Final OU-B RI Management Plan or the Draft Treatability Study Work Plan. This memorandum discusses field procedures for installing six additional groundwater monitoring wells and conductin	WWC
28865	- 28938	OU-B Book 15	B	15-Sep-97	Final, Long-Term Groundwater Monitoring Work Plan, OU-B, Poleline Road Disposal Area, Fort Richardson, Alaska	A groundwater monitoring work plan to collect data regarding groundwater contaminant trends and to devise an appropriate long-term monitoring plan for the site. Includes a response to comments on the draft work plan.	WWC
28939	- 28941	OU-B Book 15	B	06-Oct-97	Soil "Hotspot" Delineation at OU-B, Fort Richardson, Alaska	Describes proposed boring locations to further delineate the soil hot spot at OU-B. Twenty-one samples for VOC analysis are proposed.	WWC
05940	- 05957	OU-B Book 8	B	15-Jun-94	Finding of No Significant Impact and Environmental Assessment, Poleline Road Removal Action, Fort Richardson, Alaska	FONSI and EA for the soil removal action at the Poleline Road Disposal Area.	USAED Alaska

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05958	- 05980	OU-B Book 8	B	19-Oct-94	Existing Data Report: OU-B Remedial Investigation Management Plan	Review of existing data for the Poleline Road Disposal Area.	WWC
05981	- 05990	OU-B Book 8	B	02-Nov-94	ARARs and TBCs Letter Report: OU-B Remedial Investigation Management Plan	ARARs and regulations to be considered for the Poleline Road Disposal Area.	WWC
05991	- 06021	OU-B Book 8	B	02-Nov-94	CSM and DQO Letter Report: OU-B Remedial Investigation Management Plan	Conceptual site models and data quality objectives for the Poleline Road Disposal Area.	WWC
06025	- 06032	OU-B Book 8	B	07-Dec-95	Human Health Risk Assessment Approach Document, OU-B	Planned approach for conducting the HHRA for OU-B.	WWC
22186	- 22193	OU-B Book 9	B	24-Jan-96	Quarter 1 Groundwater Elevation Report, OU-B Remedial Investigation	Presents results of first quarter monthly groundwater level measurements at the Poleline Road Disposal Area	WWC
22163	- 22183	OU-B Book 9	B	22-Apr-96	Technical Memorandum, Remedial Alternatives Development and Screening, OU-B, FS, Fort Richardson, Alaska	Presents draft remedial alternatives for the OU-B FS.	WWC
22195	- 22202	OU-B Book 9	B	23-Apr-96	Quarter 2 Groundwater Elevation Report, OU-B Remedial Investigation	Presents results of second quarter monthly groundwater level measurements at the Poleline Road Disposal Area.	WWC
22203	- 22424	OU-B Books 9 & 10	B	01-Sep-96	Final Remedial Investigation Report, OU-B, Poleline Road Disposal Area, Fort Richardson, Alaska, Volume I	This document summarizes the RI at the Poleline Road Disposal Area and describes the methodologies and results of field investigations conducted for soil and groundwater.	WWC
22425	- 23057	OU-B Books 10 - 12	B	01-Sep-96	Final Remedial Investigation Report, OU-B, Poleline Road Disposal Area, Fort Richardson, Alaska, Volume II, Appendices	Volume II contains the RI report that include field logs, boring logs and monitoring well completion logs; survey data; QA reports; analytical data; a statement of work on-site mustard gas screening, geophysical surveys and an investigation report; a grou	WWC
23058	- 23398	OU-B Book 12	B	01-Sep-96	Final Risk Assessment Report, OU-B, Poleline Road Disposal Area, Fort Richardson, Alaska	This report contains a baseline HHRA and ERA for the Poleline Road Disposal Area.	WWC
31666	- 31676	OU-B Book 16	B	28-Aug-97	Summary of Results, Six Phase Soil Heating, OUB, Poleline Road Disposal Area, Fort Richardson, Alaska	Data Summary of the treatment of the first array at OUB. Reviews soil, water, and air samples of soil vapor extraction system.	Woodward-Clyde
06033	- 06033	OU-B Book 8	B	09-Nov-94	Comments, Existing Documents Letter Report OU-B RI Management Plan	Review comments on the existing data letter reports for the Poleline Road Disposal Area.	ADEC
06043	- 06044	OU-B Book 8	B	10-Nov-94	Comments, ARARs and TBCs, CSM and DQO Letter Reports, OU-B RI Management Plan	Review comments on the conceptual site models, ARARs, and regulations to be considered for the Poleline Road Disposal Area.	EPA

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06034	- 06042	OU-B Book 8	B	10-Nov-94	Comments, ARARs and TBCs, CSM and DQO Letter Reports, OU-B RI Management Plan	Review comments on the ARARs and regulations to be considered, conceptual site model, and data quality objective letter reports for the Poleline Road Disposal Area.	ADEC
06045	- 06047	OU-B Book 8	B	06-Jan-95	Comments, OU-B, Remedial Investigation Draft Management Plan	Review comments on the management plan for the Poleline Road Disposal Area.	ADEC
06085	- 06096	OU-B Book 8	B	11-Jan-95	Comments, Poleline Road, Remedial Investigation, draft-final Management Plan	Review comments on the Poleline Road Disposal Area RI draft-final management plan.	EPA
06048	- 06061	OU-B Book 8	B	12-Jan-95	Comments, OU-B, Management Plan for the Remedial Investigation	Review comments on the management plan for the Poleline Road Disposal Area.	EPA
06062	- 06108	OU-B Book 8	B	21-Feb-95	Response to Comments, RI Management Plan, OU-B	Response to agency comments concerning the OU-B RI management plan.	WWC
06109	- 06112	OU-B Book 8	B	27-Mar-95	Comments, Poleline Road, Remedial Investigation, draft-final Management Plan	EPA comments on the Poleline Road Disposal Area draft-final management plan.	EPA
06113	- 06113	OU-B Book 8	B	27-Sep-95	Comments, Ecological Risk Approach Document, OU-B	United States Army CHPPM comments on the OU-B ecological risk approach document.	CHPPM
23399	- 23403	OU-B Book 12	B	10-Jan-96	Comments on OU-B Approach Document and OU-D Management Plan.	Includes review comments on the OU-D management plan, OU-B groundwater modeling approach document, and the OU-B baseline RA approach document.	EPA
23404	- 23405	OU-B Book 12	B	16-Jan-96	Comments, OU-B Eco-Risk Approach Document	Review comments by EPA on the OU-B ecological risk approach document.	EPA
23406	- 23409	OU-B Book 12	B	11-Apr-96	Meeting Minutes for OU-B FS Scoping Meeting	Minutes for meeting discussing remedial action objectives for OU-B.	WWC
23410	- 23411	OU-B Book 13	B	02-May-96	Comments on Draft OU-B Remedial Investigation Report and Risk Assessment Report, March 1996	Review comments.	ADEC
23412	- 23422	OU-B Book 13	B	03-May-96	Comments on OU-B Remedial Investigation and draft-final Management Plan	Review comments.	EPA
23423	- 23424	OU-B Book 13	B	15-May-96	Meeting Minutes, Pre Review Conference, OU-B RI	Meeting to review comments on the draft OU-B RI and RA reports before meeting with ADEC and EPA.	WWC
23425	- 23431	OU-B Book 13	B	21-May-96	Review Conference Minutes, Draft RI and RA Reports, OU-B, Fort Richardson, Alaska	Review conference concerning the draft RI and RA reports for OU-B.	USAED Alaska
23432	- 23447	OU-B Book 13	B	23-May-96	Comments on Technical Memo: Remedial Alternatives Development, OU-B, Fort Richardson, Alaska	Comments include a revised list of ARARs that should be considered.	ADEC

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23448	- 23459	OU-B Book 13	B	31-May-96	Comments on Draft OU-B Remedial Investigation Report and Risk Assessment Report, March 1996	Review comments.	CHPPM
23460	- 23474	OU-B Book 13	B	19-Jun-96	Responses to Comments by Army CHPPM, Draft Remedial Investigation and Risk Assessment Reports, OU-B, Fort Richardson, Alaska	Response to comments.	WWC
23475	- 23483	OU-B Book 13	B	18-Jul-96	Analytical Results, Poleline Road Stockpile, Fort Richardson, Alaska	A memorandum characterizing the sampling effort to determine whether remediation is required of a 403-cubic-yard stockpile at Poleline Road. The chlorinated solvent concentrations were below the site cleanup levels.	Army
23484	- 23488	OU-B Book 13	B	04-Oct-96	Comments on OU-B draft-final RI, draft-final RA, draft-final FS	Review comments.	CHPPM
23489	- 23491	OU-B Book 13	B	08-Oct-96	Response to Comments, Draft Treatability Study Work Plan, OU-B	Response to ADEC and USAED Alaska comments.	WWC
23492	- 23506	OU-B Book 13	B	09-Oct-96	Comments on the OU-B Technical Memo, Treatability Study Workplan	Review comments on the soil vapor extraction and air sparging technical memorandum.	EPA
28942	- 28943	OU-B Book 15	B	03-Jan-97	Comments, Draft Site Work Plan Stockpile Remediation Poleline Road	ADEC comments.	ADEC
28944	- 28948	OU-B Book 15	B	07-Jan-97	Comments, OU-B Soil Stock Pile Remediation Documents	EPA comments on the OU-B soil stock pile remediation documents.	EPA
28949	- 28950	OU-B Book 15	B	23-Apr-97	Review Conference Minutes, Comments to Draft Work Plan, Groundwater Characterization and Design Verification Study, OU-B	The minutes from a meeting to discuss comments on the draft groundwater characterization and design verification study work plan, and additions to the design verification study.	WWC
28951	- 28960	OU-B Book 15	B	28-Apr-97	Response to Comments Regarding the Draft Groundwater Characterization and Design Verification Study Work Plan, OU-B	Response to Comments provided by ADEC, EPA, and USAED Alaska concerning the draft groundwater characterization and design verification study work plan.	WWC
28961	- 28961	OU-B Book 15	B	23-Dec-97	Comments, OU-B Preliminary Remedial Design Plan, December 8, 1997	ADEC comments on the preliminary OU-B remedial design plan.	ADEC
23507	- 23519	OU-B Book 13	B	08-Oct-96	Final Work Plan Technical Memorandum, Treatability Study, Pump Test and Intrinsic Remediation Parameters, OU-B, Fort Richardson, Alaska	Presents the field procedures for conducting an aquifer pump test, and groundwater sampling for intrinsic remediation parameters.	WWC

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23520	- 23532	OU-B Book 13	B	30-Oct-96	Final Work Plan Addendum, Treatability Study Work Plan, Soil Vapor Extraction and Air Sparging	The OU-B draft FS identifies a number of remedial alternatives. This technical memorandum discusses the field procedures for conducting a soil vapor extraction and air sparging pilot test at OU-B.	WWC
28962	- 29021	OU-B Book 15	B	15-Mar-97	Final Treatability Study Report, OU-B, Poleline Road Disposal Area, Fort Richardson, Alaska	Presents the results of several tests conducted at OU-B to help reduce the uncertainty in the alternatives presented in the FS. Treatability tests were conducted to gather data concerning soil vapor extraction, air sparging, and hydraulic conductivity.	WWC
29022	- 28028	OU-B Book 15	B	15-Mar-97	Response to Comments, Draft Treatability Study Report, OU-B, Fort Richardson, Alaska	Presents a response to comments on the draft treatability study report for OU-B. Comments were provided by EPA, ADEC, and USAED Alaska.	WWC
29029	- 29033	OU-B Book 15	B	18-Jul-97	Work Plan Technical Memorandum, Addendum No. 2--Vapor Treatment, Design Verification Study	The addendum describes the vapor treatment system for the design verification study test at OU-B.	USAED Alaska
29034	- 29047	OU-B Book 15	B	17-Oct-97	Technical Memorandum, Six Phase Soil Heating, OU-B	Describes elements of the six-phase soil heating system, problems that occurred while the system was running, and preliminary results from the first array.	WWC
23533	- 23533	OU-B Book 13	B	01-Oct-96	Comments on OU-B Treatability Study Workplan, Sept. 23, 1996	Review comments.	ADEC
38053	- 38058		B	12-Mar-99	Draft High Vacuum Extraction Treatability Study, Poleline Road, OU-B, Ft. Richardson	EPA Comments to the Draft High Vacuum Extraction Treatability Study, Poleline Road, OU-B	EPA
38059	- 38059		B	29-Mar-99	Memorandum on status of OU-B HVE Treatability Study	Status report from Army on OU-B HVE Treatability Study.	DPW
38060	- 38060		B	22-Apr-99	Memorandum for System Evaluation at OU-B	ADEC's comments on status report of the system evaluation for OU-B	ADEC
38061	- 38063		B	21-May-99	Systems Evaluation; Operable Unit B, Ft. Richardson, AK	EPA's comments on status report of systems evaluation at OU-B	EPA
23534	- 23566	OU-B Book 13	B	17-Jun-96	Second Technical Memorandum, Detailed Analysis of Alternatives, OU-B, FS, Fort Richardson, Alaska	This document presents a detailed analysis of alternatives for the OU-B FS. The remedial action objectives are refined from Technical Memorandum No. 1 and are restated in this document.	WWC
23567	- 23791	OU-B Book 13	B	01-Jan-97	Final FS Report, OU-B, Poleline Road Disposal Area	Presents remedial action objectives and alternatives for cleanup.	WWC
21854	- 21870	OU-A Book 13	B	23-Oct-96	Work Plan No.1, Proposed Plan for OU-A and OU-B	A draft presentation of cleanup alternatives for OU-A and OU-B.	E & E

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21838	- 21853	OU-A Book 13	B	01-Jan-97	Proposed Plan for Remedial Action OU-A and OU-B, Fort Richardson, Alaska	The proposed plan presents cleanup strategies for OU-A and cleanup alternatives for OU-B at Fort Richardson. The Army, ADEC, and EPA have determined that the sites included within OU-A will be addressed under the two-party agreement between the Army and	Army
23792	- 23798	OU-B Book 14	B	10-Jan-96	Comments, OU-D Management Plan, OU-B Approach Document	Review comments.	EPA
23799	- 23802	OU-B Book 14	B	23-May-96	Comments on OU-B Technical Memorandum, FS	Review comments.	EPA
23803	- 23818	OU-B Book 14	B	23-May-96	Comments, Technical Memorandum, OU-B Remedial Alternatives Development, OU-B, May 1996	Review comments and a list of ARARs.	ADEC
23819	- 23827	OU-B Book 14	B	24-Jun-96	Comments on Technical Memorandum No. 1, OU-B FS	Review comments submitted by ADEC, EPA, and USAED Alaska.	Army
23828	- 23861	OU-B Book 14	B	24-Jun-96	Responses to Comments on Technical Memorandum No. 1, OU-B FS, Fort Richardson, Alaska	Response to comments submitted by ADEC, EPA, and USAED Alaska.	WWC
23862	- 23862	OU-B Book 14	B	25-Jun-96	Comments on Technical Memorandum #2: OU-B Detailed Analysis of Alternatives	Responses to EPA, ADEC, and Army comments on Technical Memorandum, No. 1, OU-B FS, Fort Richardson, Alaska.	ADEC
23863	- 23866	OU-B Book 14	B	22-Jul-96	Teleconference Minutes, OU-B FS, Fort Richardson	A meeting discussing the comments to the Second Technical Memorandum, OU-B FS, Fort Richardson, Alaska.	WWC
23867	- 23878	OU-B Book 14	B	07-Aug-96	Response to Comments on Technical Memorandum No. 2, OU-B FS	A response to comments from the Army, EPA, ADEC, and DPW.	WWC
23879	- 23883	OU-B Book 14	B	26-Aug-96	Comments on OU-B FS Report	Review comments.	EPA
23884	- 23886	OU-B Book 14	B	29-Aug-96	Comments on OU-B draft-final RI, draft-final RA, draft-final FS	Review comments.	ADEC
23887	- 23890	OU-B Book 14	B	19-Sep-96	Review Conference Minutes, Draft FS, OU-B, Fort Richardson, Alaska	Comments on the draft FS report, OU-B, Fort Richardson, Alaska, are discussed.	WWC
23891	- 23893	OU-B Book 14	B	01-Oct-96	Review Conference Minutes, Draft FS, OU-B	Review conference minutes.	WWC
23894	- 23901	OU-B Book 14	B	30-Oct-96	Response to Comments, OU-B Draft and Final Treatability Study Work Plan Addendum	Response to comments.	WWC

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23902	- 23917	OU-B Book 14	B	25-Nov-96	Annotated Comments to the Final FS Reports, OU-A; Fort Richardson, Alaska	E & E's responses to comments from the Army, ADEC, and EPA on the draft FS report.	E & E
21918	- 21919	OU-A Book 13	B	27-Nov-96	Comments to Working Draft No. 2 of Proposed Plan for OU-A and OU-B, November 4, 1996	Review comments.	ADEC
21920	- 21922	OU-A Book 13	B	06-Dec-96	Comments on Proposed Plan for OU-A and OU-B	Review comments.	EPA
21923	- 21923	OU-A Book 13	B	09-Dec-96	Comments on Proposed Plan for OU-A and OU-B	Review comments.	AEC
21924	- 21926	OU-A Book 13	B	10-Dec-96	Comments on OU-A FS, OU-B FS, OU A/B Proposed Plan	Review comments.	CHPPM
21927	- 21930	OU-A Book 13	B	17-Dec-96	Comments on OU-A and OU-B Proposed Plan	Review comments.	Army
23918	- 23921	OU-B Book 14	B	24-Dec-96	Comments on OU-A and OU-B Proposed Plan	Review comments.	EPA
28368	- 28368	OU-A Book 14	B	13-Jan-97	Comments, draft-final Proposed Plan OU-A/B, January 1997	ADEC comments.	ADEC
28369	- 28370	OU-A Book 14	B	16-Jan-97	Comments, draft-final Proposed Plan OU-A/B, January 1997	Review comments.	Army
29048	- 29049	OU-B Book 15	B	21-Jan-97	Alternative 6 Meeting Minutes, OU-B Poleline Road Disposal Area	Meeting minutes from a meeting between USAED Alaska and WWC concerning Alternative 6.	USAED Alaska
28371	- 28372	OU-A Book 14	B	31-Jan-97	Comments, Draft OU-A FS, draft-final OU-B FS, and Working Draft No. 2 Proposed Plan for OU-A/OU-B	Review comments.	CHPPM
29050	- 29052	OU-B Book 15	B	15-Feb-97	Heat Enhancement Alternatives for Operable Unit B	A summary of the information gathered by WWC while preparing Alternative 6 for the final FS. The information concerns various methods of heat enhancement that were considered for Alternative 6.	WWC
28373	- 28521	OU-A Book 14	B	08-Aug-97	Final Record of Decision for Operable Units A and B, Fort Richardson, Anchorage, Alaska	Presents the selected remedial actions for OU-A and OU-B. The Army, EPA, and ADEC have determined that the sites included within OU-A will be addressed through removal actions under the conditions of the Two-Party Agreement between the Army and ADEC.	E & E
29053	- 29056	OU-B Book 15	B	05-Dec-97	OU-B Remedial Design/Remedial Action Statement of Work	Describes the strategy for managing post-ROD activity and provides the implementation schedule for RD/RA at OU-B.	WWC

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28522	- 28523	OU-A Book 14	B	31-Jan-97	Comments, Proposed Plan for OU-A and OU-B	Review comments.	CHPPM
28524	- 28524	OU-A Book 14	B	04-Feb-97	Comments, draft-final OU-A and OU-B Proposed Plan	Review comments.	CHPPM
28525	- 28528	OU-A Book 14	B	02-Apr-97	Comments, Draft ROD for OU-A and OU-B	ADEC comments.	ADEC
28529	- 28539	OU-A Book 14	B	14-Apr-97	Comments, Draft ROD for OU-A and OU-B	EPA comments.	EPA
28540	- 28545	OU-A Book 14	B	30-May-97	Comments, Draft ROD for OU-A and OU-B	AEC comments.	AEC
28546	- 28547	OU-A Book 14	B	30-Jun-97	Comments, Draft ROD for OU-A and OU-B	CHPPM comments.	CHPPM
31677	- 31743	OU-B Book 16	B	14-Jan-98	Long-Term Groundwater Monitoring, November 1997 Sampling, for Operable Unit B, Poleline Road Disposal, Fort Richardson, Alaska	Summarizes the data gathered during the first round of groundwater monitoring at the Poleline Road Disposal Area at OUB.	Woodward-Clyde
31744	- 31771	OU-B Book 16	B	28-Sep-98	Final Chemical Quality Assurance Report, Operable Unit B, Fort Richardson, Alaska	Review of data usability and sample results of samples collected at OUB to determine extent of contamination	DOWL.Ogden Joint Venture
31772	- 31916	OU-B Book 16	B	29-Sep-98	Long-Term Groundwater Monitoring Technical Memorandum, June 1998 Sampling, Operable Unit B, Poleline Road Disposal Area, Fort Richardson, Alaska	Summarizes the sampling and findings of the second round of groundwater monitoring to evaluate contaminant trends.	Woodward-Clyde
31917	- 31925	OU-B Book 16	B	29-Sep-98	Soil Stockpile Remediation, Poleline Road Disposal Area, Fort Richardson, Alaska, Transmittal of Summary of 1998 Field Results	Summarizes the results of the treatment process.	OHM Remediation Services Cc
31926	- 32064	OU-B Book 16	B	29-Dec-98	Long-Term Groundwater Monitoring, October 1998 Sampling, for Operable Unit B, Poleline Road Disposal, Fort Richardson, Alaska	Summarizes the data gathered during the third round of groundwater monitoring at the Poleline Road Disposal Area at OUB.	Woodward-Clyde
32065	- 32069	OU-B Book 16	B	07-Oct-97	Operable Unit B Remedial Design/Remedial Action Statement of Work	Describes the strategy for managing pot-ROD activity and the schedule for remedial design/remedial action.	Woodward-Clyde
32070	- 32073	OU-B Book 16	B	01-Dec-97	Scope of Work for Design Verification Study, additional SVE Tests for OUB	USAED internal document summarizing the A/E's additional design verification studies for OUB.	USAED Alaska

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32074	- 32112	OU-B Book 16	B	09-Jul-98	Work Plan Technical Memorandum, Design Verification Study, Array 4, Operable Unit B, Poleline Road Disposal Area, Fort Richardson, Alaska	Discusses a design verification study based on OUB's Remedial Investigation and Treatability Study. Presents the procedures for implementing a heat enhanced soil vapor extraction system.	Woodward-Clyde
32113	- 32158	OU-B Book 16	B	28-Apr-99	Final Remedial Design Plan, Operable unit B, Poleline Road Disposal Area, Fort Richardson, Alaska	Presents the preliminary design criteria, approach, drawings, and monitoring/maintenance plan for a full scale remedial action at OUB.	Woodward-Clyde
38064	- 38164		B	30-Sep-99	System Evaluation, OU-B, Poleline Road Disposal Area	Comparison of various remedial technologies at the Poleline Road Disposal Area	URS Corporation
32159	- 32163	OU-B Book 16	B	11-May-98	Muffler Installation and additional work at Poleline Road, Fort Richardson, Alaska	Presents the plan and design for noise reduction on the soil vapor extraction system at OUB.	OHM Remediation Services Cc
32164	- 32180	OU-B Book 16	B	25-Jun-98	Work Plan Addendum - Soil Stockpile Remediation, Poleline Road Disposal Area, Fort Richardson, Alaska	Presents work plan changes for the remedial action system at OUB. Highlights the treatment of solvent and petroleum hydrocarbon-contaminated soil.	OHM Remediation Services Cc
32181	- 32181	OU-B Book 16	B	20-Jul-98	Destruction Plan for Chemical Agent Kits, June 1998, OU-B, Fort Richardson	EPA comments on Destruction Plan for Chemical Agent Kits at OU-B.	EPA
38165	- 38230		B	08-Sep-99	Final Work Plan Technical Memorandum, Operable Unit B, Poleline Road, DACA85-94-D-0005, Delivery Order 21, Fort Richardson, AK	Presents field procedures for conducting a design verification study for a heat-enhanced soil vapor extraction system.	URS Corporation
38231	- 38296		B	12-Nov-99	Technical Memorandum, OU-B, Poleline Road, Installation of Array 5 and Associated Soil Sampling, May 1999	Describes the field procedures used and analytical results obtained during installation of a six-phase soil heating, high-vacuum extraction soil remediation array.	USAED Alaska
32182	- 32183	OU-B Book 16	B	10-Nov-97	Remedial Design/Remedial Action Statement of Work, Operable Unit B, Fort Richardson, Alaska	USEPA comments to the Remedial Design/Remedial Action Statement of Work for OUB.	EPA
32184	- 32184	OU-B Book 16	B	23-Dec-97	OU B Preliminary Remedial Design Plan December 8, 1997	Alaska DEC comments to the design concepts of the Remedial Design Plan.	ADEC
32185	- 32188	OU-B Book 16	B	13-Jan-98	Preliminary Remedial Design Plan, OUB, Fort Richardson, AK	USEPA comments to the Preliminary Remedial Design Plan for OUB.	EPA
32189	- 32189	OU-B Book 16	B	13-Feb-98	Work Plan Technical Memorandum Design Verification Study, Additional Soil Vapor Extraction Tests OUB, Poleline Road Disposal Area, Fort Richardson, Alaska	Alaska DEC comments to the Design Verification study at OUB	ADEC

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32190	- 32192	OU-B Book 16	B	17-Feb-98	Work Plan Technical Memorandum, Design Verification Study, Additional Soil Vapor Extraction Test, OUB, Fort Richardson, Alaska	USEPA review of the design Verification Study for OUB.	EPA
32193	- 32193	OU-B Book 16	B	09-Mar-98	Draft Design Verification Study Feb. 6 1998 Poleline Road, Fort Richardson, Alaska	Alaska DEC comments to the Draft Design Verification Study for OUB.	ADEC
32195	- 32195	OU-B Book 16	B	09-Mar-98	Draft remedial action report soil stockpile remediation Poleline Road, Fort Richardson, Alaska	Alaska DEC comments to the Draft Remedial Action report for OUB.	ADEC
32194	- 32194	OU-B Book 16	B	09-Mar-98	Draft Remedial Action Report, Soil Piles, OU-B	USEPA comments to the Draft Remedial Action Report for OUB.	EPA
32196	- 32199	OU-B Book 16	B	10-Mar-98	Draft Design Verification Study, OUB, Fort Richardson; Comments on	USEPA comments on the Draft Design Verification study for OUB.	EPA
32200	- 32202	OU-B Book 16	B	10-Mar-98	Long Term Groundwater Monitoring, Nov. 1997, OU-B, fort Richardson	USEPA comments to the draft design Verification study for OUB, focusing on the proposal for long term groundwater monitoring.	EPA
32203	- 32203	OU-B Book 16	B	04-Jun-98	Final Remedial Design Plan, OU-B Poleline Road and (left blank)	USEPA comments to the Final Remedial Design Plan for OUB	EPA
32204	- 32204	OU-B Book 16	B	15-Jul-98	Draft Destruction Plan for Chemical Identification Sets (CAIS), Fort Richardson, Alaska	Alaska DEC comments on the draft destruction plan for chemical identification sets at OUB.	ADEC
38297	- 38407		B	25-Jun-99	Long-Term Groundwater Monitoring, March 1999 Sampling	Summarizes the fourth round of sampling conducted at OU-B.	URS Corporation
38408	- 38409		B	06-Aug-99	Memorandum on Magazine Inspection of D15	Summery of actions and status of Magazine D15	Ammo QA Branch
38410	- 38418		B	17-Dec-99	Summary of the Design Verification Study at OU-B, Ft Richardson, Deliver Orders No. 021 & 013, Contract No. DACA85-94-D-005	Presents the status of the Design Verification Study field activities	URS Greener Woodward Clyd
38419	- 40424		B	01-Apr-99	Final Remedial Action Report: Soil Stockpile Remediation, Poleline Road Disposal Area, Vol. I of II and Vol. II. of II	Reviews the results of remediating 3,600 cubic yards of contaminated stockpiled soil.	OHM Remediation Services Co
28548	- 28552	OU-A Book 14	B	23-Jan-97	Public Comment	A public comment letter concerning the OU-A/OU-B Proposed Plan.	
32205	- 32205	OU-B Book 16	B	15-Jun-98	Fort Richardson to Continue Soil Pile Remediation Announcement	Summarizes the remediation of the soil piles ongoing at Poleline Road Disposal Area.	Anchorage Daily News

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32206	- 32206	OU-B Book 16	B	05-Aug-98	Fort Richardson EE/CA Available for Public Comment	Public Announcement for the 30-day comment period on the EE/CA for the Poleline Road Disposal Area.	Anchorage Daily News
32207	- 32207	OU-B Book 16	B	13-Aug-98	Fort Richardson Restoration Advisory Board Meeting	Public announcement for August 13, 1998, RAB Meeting. Agenda includes discussion of destruction of "non-stockpile chemical materials" at Poleline Road Disposal Area.	Anchorage Daily News
28553	- 28603	OU-A Book 14	B	29-Jan-97	Minutes, Public Comment Period and Information Exchange	Meeting minutes from the public meeting held at Russian Jack Chalet on January 29,1997 concerning the OU-A/OU-B Proposed Plan and final Remedial Action Plan.	None Given
06122	- 06123	OU-B Book 8	B	13-Nov-89	Poleline Road Chemical Disposal Area	Background information about the Poleline Road Disposal Area.	Army
06124	- 06127	OU-B Book 8	B	06-Feb-90	Update on Eagle River Flats/Poleline Road Contaminated Site Studies, Fact Sheet	Includes a description of the initial identification of the Poleline Road Disposal Area.	DEH
06128	- 06129	OU-B Book 8	B	08-Feb-90	Army Investigating Possible Old Chemical Disposal Site	Background and plans for the Poleline Road Disposal Area.	Army
06130	- 06131	OU-B Book 8	B	30-Jun-90	Fort Richardson's Poleline Road Disposal Area Expanded Site Investigation	Background and action taken at Poleline Road.	IRD
06132	- 06132	OU-B Book 8	B	02-Oct-93	Metal Tubes Found at Chemical Disposal Site	Presents information about two metal tubes discovered during removal of decontamination products at the Poleline Road Disposal Area.	PAO
06133	- 06134	OU-B Book 8	B	04-Oct-93	Metal Tubes from Disposal Site to be Stored on Post	Disposition of two metal cylinders uncovered at the Poleline Road Disposal Area.	PAO
06135	- 06139	OU-B Book 8	B	06-Oct-93	Information Paper: Poleline Road Disposal Area	Current information regarding the Poleline Road Disposal Area remediation project.	DPW
06154	- 06155	OU-B Book 8	B	13-May-94	Information Paper on the Poleline Road Disposal Area, Fort Richardson, Alaska	Letter to Don Young with attached information paper. Overview of Poleline Road Disposal Area history, recent actions, and future RI efforts.	Army
06140	- 06153	OU-B Book 8	B	13-May-94	Information Paper on the Poleline Road Disposal Area, Fort Richardson, Alaska	Letter to Ted Stevens with attached information paper. Overview of Poleline Road Disposal Area history, recent actions, and future RI efforts.	Army
06156	- 06157	OU-B Book 8	B	13-May-94	Information Paper on the Poleline Road Disposal Area, Fort Richardson, Alaska	Letter to Frank Murkowski with attached information paper. Overview of Poleline Road Disposal Area history, recent actions, and future RI efforts.	Army
06158	- 06159	OU-B Book 8	B	26-May-94	Eagle River Closure Update	Closure of portions of Eagle River because of remediation at the Poleline Road Disposal Area.	Army

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06120	- 06120	OU-B Book 8	B	08-Jun-94	Public Notice for an Environmental Assessment for Removal of Contaminated Material from Poleline Road Disposal Area	Public notice for an EA for the removal of contaminated material from the Poleline Road Disposal Area.	Army
06114	- 06119	OU-B Book 8	B	15-Jun-94	Poleline Road Questions from the Anchorage Daily News	Questions and responses about the Poleline Road Disposal Area.	Anchorage Daily News
06160	- 06161	OU-B Book 8	B	15-Jun-95	Poleline Road Disposal Area, Fort Richardson, Alaska-Fact Sheet	Public comment announcement for the Poleline Road Disposal Area removal plan.	Army
06121	- 06121	OU-B Book 8	B	18-Jun-95	Public Notice, PRDA, EE/CA	USAED Alaska public notice soliciting public comment on the EE/CA for cleaning contaminated soil excavated from the Poleline Road Disposal Area.	PAO
28604	- 28605	OU-A Book 14	B	16-Jan-97	Press Release: Army Seeks Public Input on Environmental Cleanup at Fort Richardson	An invitation for public comment on the OU-A/OU-B Proposed Plan.	Army
28606	- 28606	OU-A Book 14	B	17-Jan-97	Public Notice: Public Comment Period	A public notice requesting public comment on the OU-A/OU-B Proposed Plan for final remedial action at OU-A and OU-B.	Army
28607	- 28607	OU-A Book 14	B	25-Jan-97	Public Notice: OU-A/OU-B Proposed Plan	The Army invites the public to attend a meeting regarding the Proposed Plan for final remedial action at OU-A and OU-B.	Army
32208	- 32208	OU-B Book 16	B	27-Nov-97	Cleanup Decision reached, Final Remedial Action Operable Units A and B, Fort Richardson, Alaska	Announcement of ROD for final remedial action at OUA and OUB. Summary includes OU descriptions, contaminants, and highlights of cleanup plans.	USAED Alaska
28609	- 28611	OU-A Book 14	B	27-Nov-97	Cleanup Decision Reached, Final Remedial Action, OU-A and OU-B	Public notice appearing in the Chugiak-Eagle River Star that announces the availability of the final ROD at the listed information repositories.	Army
06888	- 06897	OU-C Book 2	C	15-Feb-88	Memorandum of Understanding	Contained within the EA for the resumption of firing in the Eagle River Flats Impact Area; provides for formalization of the Eagle River Flats Task Force among the key agencies.	None Given
06163	- 06163	OU-C Book 1	C	10-Mar-92	Eagle River Flats Task Force Administrator Heads	Eagle River Flats Task Force administrative heads.	None Given
06162	- 06162	OU-C Book 1	C	10-Mar-92	Eagle River Flats Task Force Agencies	Eagle River Flats Task Force agencies.	None Given
06164	- 06167	OU-C Book 1	C	10-Mar-92	Eagle River Flats Task Force Participants	Eagle River Flats Task Force participants.	None Given
06168	- 06175	OU-C Book 1	C	31-Jul-92	Memorandum of Agreement Between the Army Toxic and Hazardous Materials Agency and the 6th Infantry Division (Light) and Army Garrison, Alaska	Establishes the respective responsibilities of the parties for delivering technical assistance, procurement, contract management, and related services.	None Given

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06176	- 06179	OU-C Book 1	C	26-Apr-93	Draft Memorandum of Understanding Between CRREL and Fort Richardson, Alaska	Establishes roles of CRREL in environmental studies conducted at Eagle River Flats.	None Given
06180	- 06191	OU-C Book 1	C	15-Aug-93	Distribution of White phosphorus Residues from the Detonation of 81-mm Mortar WP Smoke Rounds at an Upland Site	Determination of the spatial distribution and persistence of white phosphorus residues following detonation of 81 mm mortar rounds.	CRREL
06192	- 06192	OU-C Book 1	C	30-Jun-94	Eagle River Flats: An Army Environmental Rescue Operation	Describes the events leading to the decision to evaluate human health and ecological risks from exposure to white phosphorus at Eagle River Flats.	DPW
06193	- 06273	OU-C Book 1	C	15-Aug-89	Eagle River Flats Waterfowl Mortality Investigation, Progress Report	Progress report for the 1989 Eagle River Flats waterfowl mortality investigation.	ESE
06274	- 06300	OU-C Book 1	C	15-Mar-88	Eagle River Flats General Study Plan	Development of the study approach to be followed by the Eagle River Flats Task Force.	None Given
06301	- 06406	OU-C Book 1	C	14-Jul-89	Eagle River Flats Expanded Site Investigation, Fort Richardson, Alaska, Final Sampling Design Plan	Presents the sampling and analysis plan, schedule, and health and safety plan for the 1989 Eagle River Flats waterfowl mortality study.	ESE
06407	- 06426	OU-C Book 1	C	07-Feb-86	Water Quality Biological Study No. 32-24-1371-86, Waterfowl Die-Off Investigation, Eagle River Flats, Fort Richardson, Alaska	Surface water investigation of potential contaminants responsible for waterfowl die-offs	AEHA
06427	- 06441	OU-C Book 1	C	15-Jul-86	Cooperative Agreement for Management of Fish and Wildlife Resources on Army Lands in Alaska	Agreement for ADFG, USFWS, and the Army to work together to manage the Army lands.	None Given
06442	- 06450	OU-C Book 1	C	13-Feb-87	Eagle River Flats Waterfowl Die-Off	Summary of work done to date on the Eagle River Flats bird kill problem.	USFWS
06451	- 06458	OU-C Book 1	C	04-Feb-88	Investigation of Waterfowl Mortality, Eagle River Flats, Alaska, Draft	Review of 1983 through 1985 study results and proposed field and laboratory research.	USFWS
06459	- 06886	OU-C Book 2	C	15-Jun-90	Eagle River Flats, Expanded Site Investigation, Fort Richardson, Alaska, Final Technical Report	Presents the results of the 1989 investigation of the causes of waterfowl mortality at Eagle River Flats.	ESE
06899	- 06900	OU-C Book 2	C	12-Nov-91	Finding of No Significant Impact for Resumption of Firing into the Eagle River Flats	Contained within the EA for the resumption of firing in the Eagle River Flats Impact Area; describes the FONSI for the resumption of firing into Eagle River Flats.	Army
06887	- 07068	OU-C Books 2 & 3	C	15-Dec-91	Environmental Documents: Public Notice, Finding of No Significant Impact, and Environmental Assessment for Resumption of Firing in the Eagle River Flats Impact Area	A report containing the following documents: A memorandum of understanding; a notice of availability and public comment period; the FONSI for resumption of firing in Eagle River Flats; and the EA for the resumption of firing in the Eagle River Flats Impa	None Given

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06901	- 07068	OU-C Book 3	C	31-Dec-91	Environmental Assessment for Resumption of Firing into the Eagle River Flats Impact Area, Fort Richardson, Alaska	EA to address the resumption of live-fire artillery training in Eagle River Flats.	DPW
07069	- 07073	OU-C Book 3	C	02-Jun-89	Comments, Eagle River Flats Expanded Site Investigation--Draft Sampling Plan	Comments on the 1989 Eagle River Flats waterfowl mortality study draft sampling plan.	DEH
07074	- 07076	OU-C Book 3	C	06-Jun-89	Comments, Eagle River Flats Expanded Site Investigation--Draft Sampling Plan	Comments on the 1989 Eagle River Flats waterfowl mortality study draft sampling plan.	USFWS
07077	- 07079	OU-C Book 3	C	07-Jun-89	Comments, Eagle River Flats Expanded Site Investigation--Draft Sampling Plan	Comments on the 1989 Eagle River Flats waterfowl mortality study draft sampling plan.	ADFG
07080	- 07082	OU-C Book 3	C	09-Jun-89	Comments, Eagle River Flats Expanded Site Investigation--Draft Sampling Plan	Comments on the 1989 Eagle River Flats waterfowl mortality study draft sampling plan.	EPA
07083	- 07095	OU-C Book 3	C	15-Apr-93	EPA Closure Plan Comments, Demolition Area #1 (OB/OD Area) at Fort Richardson, Alaska	EPA review comments on the second draft of Closure/Post--Closure Plan for Demolition Area #1 (OB/OD Area).	EPA
07096	- 07115	OU-C Book 3	C	15-Apr-93	Secondary Hazards of White phosphorus to Bald Eagles, Draft Study Protocol	A study plan to determine the secondary hazards posed by white phosphorus-exposed ducks that are scavenged by bald eagles.	DWRC
07116	- 07122	OU-C Book 3	C	29-Apr-93	Comments, DERP OEW Ft. Richardson OB/OD Closure Plan Draft #4-145	Comments from several USAED Alaska reviewers on the second draft of Closure/Post-Closure Plan for Demolition Area #1 (OB/OD Area).	USAED Alaska
07123	- 07201	OU-C Book 3	C	15-Dec-93	Demolition Area Number One Closure Guidelines, Fort Richardson, Alaska	Report discussing guidelines for closure of Demolition Area #1 at Eagle River Flats in compliance with the Federal Facility Agreement and RCRA regulations.	EMCON
07202	- 07217	OU-C Book 3	C	20-Dec-93	Response to EPA and COE Comments, Demolition Area Number One Closure Guidelines, Fort Richardson, Alaska	Provides responses to EPA and USAED Alaska comments on the second draft of Closure/Post-Closure Plan for Demolition Area #1 (OB/OD Area).	EMCON
07218	- 07230	OU-C Book 3	C	22-Jan-93	Hazardous Waste Management Consultation No. 37-66-JR11-92, Soil Sampling Results, Fort Richardson, Alaska	Discusses results from soil samples collected from the explosive ordnance disposal burning grounds adjacent to Eagle River Flats in order to identify any potential soil surface contamination from explosives and propellants destruction operations.	USAEHA
07057	- 07060	OU-C Book 3	C	20-Dec-91	Review Comments on the Environmental Assessment for Eagle River Flats	Contained as an appendix to the EA for the resumption of firing in the Eagle River Flats Impact Area; comments on the EA for Eagle River Flats.	National Audubon Society
07055	- 07055	OU-C Book 3	C	20-Dec-91	Review Comments on the Environmental Assessment for Eagle River Flats	Contained as an appendix to the EA for the resumption of firing in the Eagle River Flats Impact Area; comments on the EA for Eagle River Flats.	Alaska Center for the Environm

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07056	- 07056	OU-C Book 3	C	20-Dec-91	Review Comments on the Environmental Assessment for Eagle River Flats	Contained as an appendix to the EA for the resumption of firing in the Eagle River Flats Impact Area; comments on the EA for Eagle River Flats.	Sierra Club Legal Defense Fun
23922	- 23929	OU-C Book 16	C	07-Mar-96	Proposed Approach to the Site Investigation at the OB/OD Pad	This memorandum outlines the estimated minimal level of effort required to delineate the site characteristics identified in the draft-final management plan.	CH2M Hill
23930	- 23932	OU-C Book 16	C	27-Jun-96	OU-C, Eagle River Flats, EPA Comments on OB/OD Pad Site Investigation Work Plan	Review comments	EPA
29057	- 29160	OU-C Book 20	C	15-Jul-97	Interagency Expanded Site Investigation, Evaluation of White phosphorus Contamination and Potential Treatability at Eagle River Flats, Alaska	A summary of work conducted at Eagle River Flats during 1996. Includes three RA reports, four treatability studies, and a discussion of the Eagle River Flats spatial database.	CRREL
23933	- 24323	OU-C Book 16	C	06-Feb-96	Interagency Expanded Site Investigation, FY 95 Final Report	The sixth annual report describing results of white phosphorus contamination studies at Eagle River Flats.	CRREL
32209	- 32234	OU-C Book 24	C	01-Dec-97	Special Report 97-30, Composite Sampling of Sediments Contaminated with White Phosphorus	Presents the methodology and summary of findings from composite sediment sampling for white phosphorus at the Eagle River Flats.	CRREL
40425	- 40552		C	01-Jul-99	Interagency Expanded Site Investigation - Evaluation of White Phosphorus Contamination and Potential Treatability at Eagle River Flats, Alaska (FY 98 Report)	Describes the results of white phosphorus contamination studies at the Eagle River Flats	CRREL
24324	- 24328	OU-C Book 17	C	27-Jun-96	OU-C, Eagle River Flats EPA comments on Interagency Expanded Site Investigation	Review comments.	EPA
32235	- 32256	OU-C Book 24	C	15-Jul-98	Response to Comments on the Site Investigation Work Plan, OB/OD Pad at OPC, Fort Richardson, Alaska, May through July 1996 Comments	Tabular summary of comments to the Site Investigation work plan and CH2M Hill responses to the comments.	CH2M Hill
32257	- 32257	OU-C Book 24	C	21-Apr-98	Update on Eagle River Flats Project	Summary of recent events and decisions for Eagle River Flats.	USAED Alaska
32258	- 32278	OU-C Book 24	C	01-Jun-98	Waiver Authority for Entry into Eagle River Flats (ERF) Impact Area for the Purpose of Environmental Remediation and Continued Site Investigation	Reviews general health and safety guidelines for entry to Eagle River Flats.	USAED Alaska
32279	- 32280	OU-C Book 24	C	05-Jun-98	Waiver Authority for Entry into Eagle River Flats (ERF) Impact Area	Documents the permission for entry to Eagle River Flats in support of environmental restoration.	USAED Alaska

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07231	- 07238	OU-C Book 3	C	28-Jun-49	phosphorus Poisoning in Waterfowl	Results of an investigation on the effects of poisoning from white phosphorus.	USFWS
07239	- 07264	OU-C Book 3	C	03-Mar-93	Laboratory Evaluation of a Methyl Anthranilate Bead Formulation on Mallard Feeding Behavior, Draft Study Protocol	Assesses the effectiveness of a methyl anthranilate bead formulation for reducing feeding by mallards.	DWRC
07265	- 07268	OU-C Book 3	C	08-Dec-93	White phosphorus Contamination of Wetlands: Effects and Options for Restoration	Presents the biogeochemical cycling of, waterfowl exposure to, and possible remediation options for white phosphorus contamination in wetlands.	
07269	- 07274	OU-C Book 3	C	11-Mar-94	Predation of Ducks Poisoned by White phosphorus: Exposure and Risk to Predators	Evaluation of P4 uptake at Eagle River Flats by species that prey on poisoned ducks.	Dartmouth Medical School
07399	- 07400	OU-C Book 3	C	17-Jun-93	On-Going and Planned 1993 Activities for Investigations on White phosphorus at Eagle River Flats	Summary results for identification of biomarkers and histopathological effects in birds, white phosphorus in food chains, and physiological effects in waterfowl.	DWRC
29161	- 29166	OU-C Book 20	C	18-Mar-97	Decision Document for a Removal Action at Eagle River Flats Racine Island Pond	Describes a time-critical removal action to be conducted at Racine Pond within Eagle River Flats. The proposed action is to drain Racine Island pond to remove white phosphorus contamination.	DPW
29167	- 29167	OU-C Book 20	C	12-Mar-97	Comments, Eagle River Flats Draft Decision Document	Comments on the draft decision document for Eagle River Flats.	DCSENG
07275	- 07277	OU-C Book 3	C	12-Apr-90	Preliminary Brief of Proposed FY90 Eagle River Flats Study	Summary of objectives and initial strategies for FY 1990 Eagle River Flats study as developed by ATHAMA and the Eagle River Flats Task Force during the April 10, 1990, meeting.	DEH
07278	- 07285	OU-C Book 3	C	03-Mar-93	Baseline Risk Assessment and FS for Eagle River Flats, Fort Richardson, Anchorage, Alaska	SOW to conduct a baseline RA and FS for the 2,500-acre Eagle River Flats Impact Area.	None Given
07286	- 07302	OU-C Book 3	C	03-Mar-93	Mission Statement for the 6th Infantry Division/Eagle River Flats Task Force	Goals for the Eagle River Flats investigation, responsibilities of each task force member, and plans to achieve desired goals.	None Given
07303	- 07335	OU-C Book 3	C	15-Apr-93	Eagle River Flats Task Force Briefing	Goals and responsibilities for the Eagle River Flats Task Force.	EPA
07336	- 07370	OU-C Book 4	C	14-Apr-94	Continued Evaluation of White phosphorus Effects on the Aquatic Ecosystem, Eagle River Flats, Fort Richardson, Alaska, Revised Scope of Work	Revised SOW for continued evaluation of white phosphorus effects on the aquatic ecosystem, Eagle River Flats.	AEHA

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07371	- 07388	OU-C Book 4	C	16-Mar-95	Scope of Work for Pilot Study of Dredging to Remove White phosphorus Contaminated Sediments from a Limited Area in Eagle River Flats, Alaska	Plans to confirm the feasibility of operating a small dredge in an area of Eagle River Flats with unexploded ordnance.	CRREL
07389	- 07398	OU-C Book 4	C	20-Nov-90	Summary of 1990 Eagle River Flats Waterfowl Mortality Work	Overview of 1990 work completed for the Eagle River Flats waterfowl mortality study.	DPW
07405	- 07422	OU-C Book 4	C	14-Oct-93	Progress Report for Fourth Quarter, 1993	Review of progress to date on CRREL studies at Eagle River Flats.	CRREL
07401	- 07404	OU-C Book 4	C	14-Oct-93	Protecting Waterfowl from Ingesting White phosphorus, Progress Report	Presents progress regarding waterfowl management techniques, responses of waterfowl to Concover and Bara-kade (brand names), and waterfowl distribution and movements in Eagle River Flats.	DWRC
07423	- 07467	OU-C Book 4	C	06-Dec-93	Eagle River Flats, Project Review Meeting, December 6-9, 1993	Summary report of previous investigations conducted at Eagle River Flats.	None Given
07468	- 07471	OU-C Book 4	C	15-Jun-94	Waterfowl Mortality at Eagle River Flats, Progress Report	Includes a comparison of 1994 mortality rates of ducks to those of previous years at Eagle River Flats.	NEILE
07472	- 07474	OU-C Book 4	C	15-Jun-95	Eagle River Flats Drilling/Coring Project, Progress Report	Progress report regarding the explosive ordnance disposal pad drilling and coring project and test bed machine.	CRREL
07475	- 07475	OU-C Book 4	C	12-Jul-95	DWRC Progress Report	Summary of activities conducted during spring 1995.	DWRC
07476	- 07478	OU-C Book 4	C	15-Jul-95	Eagle River Flats Dredge Project, Progress Report	Progress report on dredging operations at Eagle River Flats.	CRREL
07479	- 07490	OU-C Book 4	C	02-Feb-90	Eagle River Flats Study Proposal, Fiscal Year 1990	Draft plan for the 1990 field season at Eagle River Flats.	USFWS
07491	- 07500	OU-C Book 4	C	08-May-91	Proposed FY91 Eagle River Flats Remedial Investigations, Draft	Summary of proposed projects for investigating Eagle River Flats.	CRREL
07501	- 07514	OU-C Book 4	C	11-Jun-91	Elemental phosphorus as the Cause of Waterfowl Mortality in an Alaskan Salt Marsh, Draft	Results of investigation linking white phosphorus to waterfowl mortality at Eagle River Flats.	CRREL
07515	- 07518	OU-C Book 4	C	27-Sep-91	Action Plan for the Eagle River Flats Environmental Restoration Program	Action plan for assessment of the avian repellent methyl anthranilate and geotextile capping at Eagle River Flats.	
07519	- 07519	OU-C Book 4	C	31-Oct-91	Eagle River Flats Management Plan	Suggestion to Fort Richardson that the Eagle River Flats management plan may be facilitated best if the project is completed locally.	EPA
07520	- 07529	OU-C Book 4	C	10-Dec-91	Acute Toxicity Tests of Methyl Anthranilate for Aquatic Vertebrates	Plans for investigation of the effects of methyl anthranilate on waterfowl.	DWRC

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07530	- 07545	OU-C Book 4	C	15-Dec-91	Eagle River Flats Management Plan Outline	Discusses the technical and managerial approach to be used to accomplish the Eagle River Flats Installation Restoration Program.	USA THAMA
07546	- 07582	OU-C Book 4	C	02-Jan-92	Twenty-Ninth Report of the Interagency Testing Committee to the Administrator, Environmental Protection Agency, November 1991	Toxic Substances Control Act Interagency Testing Committee proposes that white phosphorus be tested because of the problems at Eagle River Flats.	USFWS
07583	- 07607	OU-C Book 4	C	10-Feb-92	Effects of Methyl Anthranilate Bead Formulation on Mallard Feeding Behavior in an Aqueous Environment, Study Protocol	Plans for investigation of methyl anthranilate effects on feeding behavior.	DWRC
07608	- 07610	OU-C Book 4	C	15-Feb-92	1992/1993 Comprehensive Work Plan for Eagle River Flats	Outlines plans for investigation of Eagle River Flats.	IRD
07611	- 07647	OU-C Book 4	C	15-Feb-92	Management Plan for the Eagle River Flats Remediation and Restoration Program, Fort Richardson, Alaska	Reviews the history of studies of Eagle River Flats and outlines the objectives and structure for long-term management of the remediation and restoration of Eagle River Flats.	Army
07648	- 07673	OU-C Book 4	C	10-Mar-92	Field Test of Formulated Methyl Anthranilate: Risk Reduction for White phosphorus Toxicity, Study Protocol	Determines the effectiveness of methyl anthranilate for reducing mortality of ducks exposed to white phosphorus in marsh sediment.	DWRC
07674	- 07690	OU-C Book 4	C	15-Apr-92	Study Protocols for FY92, Eagle River Flats Remediation Study	List and brief descriptions of planned investigations for Eagle River Flats.	CRREL
07691	- 07724	OU-C Book 4	C	03-Mar-93	Evaluation of a Formulated Methyl Anthranilate Bird Repellent at Eagle River Flats, Alaska, Draft Study Protocol	Determines effectiveness of a beaded formulation of methyl anthranilate at reducing foraging activity and area use by waterfowl at Eagle River Flats.	DWRC
07725	- 07732	OU-C Book 4	C	03-Mar-93	Management Plan Elements and Criteria for Eagle River Flats Management Plan	Management Plan Elements and Criteria for Eagle River Flats Management Plan as desired by ADEC.	ADEC
07733	- 07741	OU-C Book 5	C	03-Mar-93	Proposal to Monitor Environmental Conditions of Eagle River Flats, Alaska, Prior to Remediation of White phosphorus Contamination and Determine the Toxicological Hazards of White phosphorus	Plan to measure preremediation environmental conditions in sites targeted for remediation within Eagle River Flats and to produce toxicity data necessary to determine cleanup criteria.	USFWS
07742	- 07761	OU-C Book 5	C	03-Mar-93	Secondary Hazards of White phosphorus to Bald Eagles, Draft Study Protocol	Determines the secondary hazards of white phosphorus-exposed ducks scavenged by bald eagles on Eagle River Flats.	DWRC

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07762	- 07766	OU-C Book 5	C	03-Mar-93	Sedimentation, Erosion, and Sediment Transport in the Remediation and Treatment of White phosphorus Contamination in Eagle River Flats	Plan to conduct an analysis of rates of erosion, deposition, sediment transport, and white phosphorus particle transport within Eagle River Flats.	CRREL
07767	- 07801	OU-C Book 5	C	15-Mar-93	Draft Work Plan, Eagle River Flats, Fort Richardson, Alaska, Toxicological and Ecological Evaluation	Eagle River Flats work plan describing the history, cause, and plan to determine cleanup goals for major contaminant source areas and risks posed by white phosphorus.	AEHA
07802	- 07804	OU-C Book 5	C	02-Apr-93	Continuing Investigation of Waterfowl Mortality on Eagle River Flats, Fort Richardson, Alaska	Plan to continue and expand the index of waterfowl mortality on Eagle River Flats.	USAED Alaska
07805	- 07847	OU-C Book 5	C	23-Jul-93	Receiving Water Biological Study No. 32-24-H1ZV-93, Water, Sediment, Macroinvertebrate and Fish Sampling, Eagle River Flats, Protocol	Provides an overview of contractor plans for an investigation of contamination in Eagle River Flats.	AEHA
07848	- 07849	OU-C Book 5	C	18-Nov-93	Draft Proposal for USDA-APHIS-ADC Activities on Eagle River Flats in 1994	Requests permission for a waterfowl hazing program.	USDA ADC
07850	- 07851	OU-C Book 5	C	15-Dec-93	Field Study for Placement and Use of Geocomposite to Reduce Waterfowl Mortality in Eagle River Flats	Determines whether placement of geocomposite products over a contaminated area will reduce waterfowl mortality.	CRREL
07852	- 07859	OU-C Book 5	C	15-Dec-93	Report of USDA/APHIS/Animal Damage Control Activities for the Army at Eagle River Flats	Damage control activities for migratory waterfowl at Eagle River Flats.	USDA ADC
07860	- 07860	OU-C Book 5	C	15-Dec-93	White phosphorus Absorption in Ducks: Rate, Extent, and Completeness of Absorption of Particles in Relation to Development of Toxicity	Determines the location of white phosphorus absorption and factors controlling dissolution of white phosphorus from particles.	Dartmouth Medical School
07861	- 07862	OU-C Book 5	C	15-Dec-93	White phosphorus in Herring Gull (Larus argentatus) Eggs: Strategy for Monitoring the Effectiveness of Remediation at Eagle River Flats	Evaluation of distribution and bioaccumulation of white phosphorus in herring gull eggs.	Dartmouth Medical School
07863	- 07877	OU-C Book 5	C	31-Mar-94	Development and Analysis of the Eagle River Flats Spatial Database, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule for reviewing, refining, and updating the geographic information system database for Eagle River Flats.	CRREL

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07878	- 07912	OU-C Book 5	C	31-Mar-94	Evaluation of White phosphorus Effects on the Aquatic Ecosystem, Eagle River Flats, Fort Richardson, Alaska, Scope of Work	Presents the tasks, study plan, health and safety plan, QA/QC plan, and schedule for an investigation of the aquatic effects of white phosphorus at Eagle River Flats.	AEHA
07913	- 07929	OU-C Book 5	C	31-Mar-94	Index of Waterfowl, Eagle, and Shorebird Use and Mortality on Eagle River Flats, Fort Richardson, Anchorage, Alaska, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule for investigation of waterfowl, eagle, and shorebird use and mortality on Eagle River Flats.	NEILE
07930	- 07959	OU-C Book 5	C	31-Mar-94	Investigation of Natural Size Reduction of White phosphorus Particles in Eagle River Flats Sediments, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule for investigation of the natural size reduction process for white phosphorus at Eagle River Flats.	CRREL
07960	- 07980	OU-C Book 5	C	31-Mar-94	Physical System Dynamics, WP Fate and Transport, Remediation and Restoration, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule for investigation of the transport and fate of white phosphorus in Eagle River Flats sediments.	CRREL
07981	- 08000	OU-C Book 5	C	31-Mar-94	Pilot Study of Dredging to Remove White phosphorus Contaminated Sediments from a Limited Area in Eagle River Flats, AK, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule for a pilot study to assess the functionality of dredging sediments in Eagle River Flats to remove white phosphorus.	CRREL
08001	- 08022	OU-C Book 5	C	31-Mar-94	Pond Draining Treatability Study, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule to assess pond drainage as a viable remedial alternative of white phosphorus-contaminated areas at Eagle River Flats.	CRREL
08023	- 08045	OU-C Book 5	C	31-Mar-94	Screening Study of Barriers to Immobilize White phosphorus and Prevent Poisoning of Waterfowl in Eagle River Flats, Alaska, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule to evaluate the ability of physical barriers to limit the transport of white phosphorus particles in Eagle River Flats sediment.	CRREL
08046	- 08058	OU-C Book 5	C	31-Mar-94	White phosphorus Toxicity and Risk Assessment, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, and QA/QC plan to determine the extent of white phosphorus in waterfowl gastrointestinal tracts and test treatments for white phosphorus waterfowl toxicity.	Dartmouth Medical School
08059	- 08066	OU-C Book 5	C	01-Apr-94	Protecting Waterfowl from Ingesting White phosphorus, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, QA/QC plan, and schedule to frighten waterfowl from hazardous areas of Eagle River Flats.	DWRC
08067	- 08106	OU-C Book 5	C	01-Apr-94	Toxicological Studies on White phosphorus and Identification of Bioindicators, Scope of Work	Presents the tasks, sampling and analysis plan, health and safety plan, and QA/QC plan for toxicological studies on the effects of white phosphorus at Eagle River Flats.	DWRC

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08107	- 08138	OU-C Book 5	C	07-Apr-94	Scope of Work, Denver Wildlife Research Center	Presents the schedule, objectives, description of tasks, sampling and analysis plan, health and safety plan, and QA/QC plan for development of potential remediation measures to reduce the ingestion of white phosphorus by waterfowl.	DWRC
08139	- 08152	OU-C Book 5	C	04-Oct-94	Safety Plan for Pilot Study of Dredging to Remove White phosphorus Contaminated Sediments from a Limited Area in Eagle River Flats, Alaska	Includes the sampling and analysis plan and minimal health, safety, and emergency response activities involved with the Eagle River Flats site investigation.	CRREL
08153	- 08175	OU-C Book 5	C	27-Feb-95	Draft Technology Assessment of a Remotely Controlled Drill for Drilling Cased Water Sample Wells and a Remotely Controlled Sampler for Obtaining 1 m x 5 cm-Diameter Cores in Contaminated Areas at Eagle River Flats, Alaska, Sampling and Analysis Plan	Includes methods and procedures to drill monitoring wells safely and effectively on the explosive ordnance disposal pad in Eagle River Flats.	CRREL
08176	- 08200	OU-C Book 6	C	27-Feb-95	Dredging Treatability Study in Eagle River Flats, Sampling and Analysis Plan, Draft	Includes methods and procedures for removal of sediments from large, permanently flooded areas of Eagle River Flats that potentially contain lethal amounts of white phosphorus.	CRREL
08201	- 08210	OU-C Book 6	C	10-Mar-95	Eagle River Flats Spatial Database, Draft Workplan	Includes methods and procedures to develop a spatial database containing white phosphorus data, and information regarding fate and transport, monitoring sites, remediation sites, and ecological conditions in relation to physical, biological, and hydraulic	CRREL
08211	- 08285	OU-C Book 6	C	15-Mar-95	Remedial and Treatability Investigations of Physical System Dynamics and White phosphorus Fate and Transport, FY95 Workplan	The FY95 work plan includes remedial investigation and treatability study objectives for Eagle River Flats, a description of tasks, a detailed analysis plan, a health and safety plan, a QA plan, and a schedule.	None Given
08286	- 08319	OU-C Book 6	C	16-Mar-95	Attenuation of White phosphorus Particles in Eagle River Flats Sediments, Sampling and Analysis Plan, Revised Draft	Includes methods and procedures to monitor attenuation of white phosphorus particles in sediments at Eagle River Flats under natural and altered conditions.	CRREL
08320	- 08335	OU-C Book 6	C	16-Mar-95	Scope of Work for Pilot Study of Dredging to Remove White phosphorus Contaminated Sediments from a Limited Area in Eagle River Flats, Alaska	Includes the sampling and analysis plan and minimal health, safety, and emergency response activities involved with the Eagle River Flats site investigation.	CRREL

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08336	- 08510	OU-C Book 6	C	20-Mar-95	Evaluation of AquaBlok on Contaminated Sediments to Reduce Mortality of Foraging Waterfowl, Proposed Remedial Investigation/FS Workplan	Includes a plan to continue to evaluate the effectiveness of AquaBlok (trademark) application on contaminated sediments to provide a physical barrier to feeding waterfowl at Eagle River Flats.	DWRC
08511	- 08679	OU-C Book 7	C	20-Mar-95	Movements, Distribution and Relative Risk of Waterfowl and Bald Eagles Using Eagle River Flats, Fort Richardson, Alaska, Proposed Remedial Investigation/FS Workplan	Includes a plan to determine daily and seasonal movements of waterfowl at Eagle River Flats and to determine hazards that waterfowl poisoned by white phosphorus pose to bald eagles.	DWRC
08680	- 08691	OU-C Book 7	C	07-Apr-95	Proposal for 1995 ERF Field Season, Workplan, Draft	Includes methods and procedures for monitoring and measuring waterfowl mortality at Eagle River Flats.	NEILE
08692	- 08734	OU-C Book 7	C	10-Apr-95	Sampling and Analysis Plan, Pond Draining Treatability Study in Eagle River Flats	Sampling and analysis plan for samples to be collected during the pond draining treatability study in Eagle River Flats.	CRREL
08735	- 08736	OU-C Book 7	C	23-May-95	Program Plan, Drill and Core Project, Eagle River Flats, Alaska	Includes a revision in the original plan for deploying the drill rig and drilling wells on the explosive ordnance disposal pad.	CRREL
08737	- 09285	OU-C Books 7 & 8	C	15-Jun-95	Eagle River Flats Final 1995 Work Plan, Fort Richardson, Alaska	Includes the sampling and analysis plan, QA/QC plan, and site health and safety plan to identify data gaps to support key CERCLA decisions.	CH2M Hill
09296	- 09363	OU-C Book 8	C	15-Jun-95	Final QA Program Plan for 1995 Fieldwork, Eagle River Flats, Fort Richardson, Alaska	Describes the planned objectives of the 1995 field investigations, the data required to meet these objectives, and the procedures that will be followed to obtain the data.	CH2M Hill
09364	- 09411	OU-C Book 9	C	15-Jun-95	Sampling and Analysis Plan, Remedial and Treatability Investigations of Physical System Dynamics and White phosphorus Fate and Transport	Includes a plan to conduct RIs on the Eagle River Flats physical system, examining the hydrology, sedimentology and hydraulic processes controlling the erosion, transport, deposition, and burial of white phosphorus-bearing sediments.	USAED Alaska
09412	- 09417	OU-C Book 9	C	14-Jul-95	Eagle River Flats Decision Document	Describes the selected interim remedial action for the Eagle River Flats site in accordance with CERCLA.	None Given
24329	- 24494	OU-C Book 17	C	01-Sep-96	OU-C OB/OD Pad, Fort Richardson, Alaska, Site Investigation Work Plan	Sampling and QA procedures are presented for investigating potentially contaminated soil and groundwater at the OB/OD Pad.	CH2M Hill
09418	- 09422	OU-C Book 9	C	03-Aug-90	Ingestion of Munitions Compounds, Hypothesis for Waterfowl Mortality in Eagle River Flats, Alaska, Draft Interim Report	Hypothesis for waterfowl mortality in Eagle River Flats.	CRREL
09423	- 09425	OU-C Book 9	C	10-Sep-90	Waterfowl Mortality in Eagle River Flats Impact Area, Anchorage, Alaska	Includes a summary of field investigations at Eagle River Flats for the 1990 field season and recommendations for future studies.	CRREL

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09426	- 09543	OU-C Book 9	C	15-Jan-91	Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds	Presents investigation results regarding the presence of white phosphorus in Eagle River Flats sediments, and the effects on local waterfowl.	CRREL
06993	- 06994	OU-C Book 3	C	28-Jun-91	Waterfowl Deaths at Eagle River Flats (ERF): Possible Human Health Hazard, Preliminary Evaluation	Contained as an appendix to the EA for the resumption of firing in the Eagle River Flats Impact Area; summary of the potential for human health effects and recommendations for further study.	Army Toxicology Division
09544	- 09551	OU-C Book 9	C	15-Sep-91	Eagle River Flats Waterfowl Mortality Studies, 1991	Radio telemetry study of the fall use of Eagle River Flats by mallards and pintails.	DPW
09552	- 09565	OU-C Book 9	C	13-Nov-91	Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds	Presents investigation results regarding the presence of white phosphorus in sediments, and the effects of white phosphorus on waterfowl at Eagle River Flats, including human health RA information.	CRREL
09566	- 09571	OU-C Book 9	C	10-Mar-92	Preliminary Report, Ecological Assessment of Methyl Anthranilate	Preliminary report regarding ecological assessment of methyl anthranilate	DWRC
09572	- 09777	OU-C Book 9	C	15-Mar-92	Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, Final	Presents the results of the 1991 Eagle River Flats studies and investigation into the presence of white phosphorus in Eagle River Flats sediments and verification of white phosphorus' effects on waterfowl.	CRREL
09778	- 09821	OU-C Book 9	C	15-May-92	Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Residues	Presents results of investigation of white phosphorus in Eagle River Flats sediment and effects of phosphorus on waterfowl.	CRREL
09822	- 09923	OU-C Book 10	C	15-Jan-93	Army Eagle River Flats: Protecting Waterfowl from Ingesting White phosphorus, Technical Report 93-1	Contains three reports from 1992 studies regarding the effectiveness and toxicity of methyl anthranilate.	DWRC
09924	- 09948	OU-C Book 10	C	03-Mar-93	Responses of Waterfowl to Concover and Bara-kade, Draft Study Protocol	Evaluates feasibility of applying Concover and Bara-kade on contaminated sediments to provide a physical barrier to feeding waterfowl.	DWRC
09949	- 10181	OU-C Book 10	C	15-Jun-93	Phase II Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, Fiscal Year 1992, Final	Final 1992 report regarding the investigation into the cause and extent of annual waterfowl die-offs.	CRREL
10182	- 10211	OU-C Book 10	C	15-Dec-93	Preliminary Assessment of Sedimentation and Erosion in Eagle River Flats, South-Central Alaska, Report 93-23	Evaluation of the physical processes of sedimentation and erosion within tidal mud flats and salt marshes at Eagle River Flats.	CRREL

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10212	- 10246	OU-C Book 10	C	21-Dec-93	Nature and Extent of White phosphorus Contamination in Eagle River Flats Sediments, Draft	Presents the results of three years of sampling and analysis to determine the nature and extent of white phosphorus contamination at Eagle River Flats.	CRREL
10247	- 10293	OU-C Book 10	C	10-Jan-94	Toxicological Studies of White phosphorus in Waterfowl and Its Presence in Food Chain Organisms, Draft	Presents a summary of waterfowl research conducted during 1993 at Eagle River Flats.	DWRC
10294	- 10373	OU-C Book 11	C	15-Apr-94	Receiving Water Biological Study No. 32-24-H1ZV-93, Water, Sediment, Macroinvertebrate and Fish Sampling, Eagle River Flats, Fort Richardson, Alaska, Final Report	Presents the results of the 1993 field study to determine the effects of Eagle River Flats contaminants on aquatic species.	AEHA
10706	- 10713	OU-C Book 11	C	15-May-94	A Preliminary Literature List and Review for Salt Marsh Restoration as Applied to Eagle River Flats, Alaska	Contained in the Interagency Expanded Site Investigation FY93 Final Report; a review of a literature base on salt marshes to determine whether methods and techniques for restoration exist and how other salt marshes have responded to major alterations such	CRREL
10734	- 10742	OU-C Book 11	C	15-May-94	Analytical Method for White phosphorus in Water	Contained in the Interagency Expanded Site Investigation FY93 Final Report; a description of the analytical method for detecting white phosphorus in water.	CRREL
10471	- 10496	OU-C Book 11	C	15-May-94	Contaminant Inventory	Contained in the Interagency Expanded Site Investigation FY93 Final Report; provides the results of the analysis of sediment and water samples collected from 18 sites in Eagle River Flats and analyzed for multiple parameters.	AEHA
10680	- 10687	OU-C Book 11	C	15-May-94	Evaluation of Concover and Bentoballs on Contaminated Sediments to Reduce Mortality of Foraging Waterfowl	Contained in the Interagency Expanded Site Investigation FY93 Final Report; the results of Laboratory and field trials to evaluate the feasibility and performance of materials to provide a physical barrier between feeding waterfowl and contaminated sedime	USDA ADC
10656	- 10669	OU-C Book 11	C	15-May-94	Field Behavioral Response and Bead Formulations for Methyl Anthranilate Encapsulated Bird Repellents	Contained in the Interagency Expanded Site Investigation FY93 Final Report; a report on field tests using a bird repellent on waterfowl from study areas.	USDA ADC
10670	- 10673	OU-C Book 11	C	15-May-94	Field Evaluation: Mortality of Mallards Feeding in Areas Treated with Methyl Anthranilate	Contained in the Interagency Expanded Site Investigation FY93 Final Report; results of a test study to determine the mortality of mallards feeding in pens treated with a modified methyl anthranilate formulation.	USDA ADC
10688	- 10696	OU-C Book 11	C	15-May-94	Field Study of Air-Drying Contaminated Sediment	Contained in the Interagency Expanded Site Investigation FY93 Final Report; results of tests to air-dry contaminated sediments under field conditions to reduce the concentrations of white phosphorus.	CRREL

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10620	- 10636	OU-C Book 11	C	15-May-94	Food Chain Invertebrates and Fish: Sediment Bioassay	Contained in the Interagency Expanded Site Investigation FY93 Final Report; discusses the results of sediment samples and Laboratory studies to determine the effect of white phosphorus on benthic invertebrates and fish.	AEHA
10674	- 10679	OU-C Book 11	C	15-May-94	Geosynthetic Covering of Contaminated Sediment	Contained in the Interagency Expanded Site Investigation FY93 Final Report; conclusions from pilot field testing of four geosynthetic products to limit exposure of dabbling ducks to white phosphorus in Eagle River Flats.	CRREL
10393	- 10411	OU-C Book 11	C	15-May-94	Habitat and Vegetation	Contained in the Interagency Expanded Site Investigation FY93 Final Report; summarizes the zones of habitat and vegetation types occurring within Eagle River Flats.	CRREL
10644	- 10650	OU-C Book 11	C	15-May-94	Hazing Waterfowl in Eagle River Flats	Contained in the Interagency Expanded Site Investigation FY93 Final Report; discusses the methods and results of hazing waterfowl at Eagle River Flats to prevent white phosphorus poisoning.	USDA ADC
10374	- 10768	OU-C Book 11	C	15-May-94	Interagency Expanded Site Investigation: Evaluation of White phosphorus Contamination and Potential Treatability at Eagle River Flats, Alaska, Fiscal Year 1993, Final Report	A compilation of reports detailing 1993 field and laboratory work, performed by several groups, on white phosphorus at Eagle River Flats.	CRREL
10637	- 10640	OU-C Book 11	C	15-May-94	Invertebrates and Fish	Contained in the Interagency Expanded Site Investigation FY93 Final Report; sampling analysis results of white phosphorus in macroinvertebrates collected from ponded areas of Eagle River Flats.	DWRC
10651	- 10655	OU-C Book 11	C	15-May-94	Laboratory Evaluation of a Methyl Anthranilate Bead Formulation for Reducing Mallard Mortality and Feeding Behavior	Contained in the Interagency Expanded Site Investigation FY93 Final Report; results of a test to apply a bird repellent to bottom sediment in a simulated pond to determine effectiveness.	DWRC
10714	- 10720	OU-C Book 11	C	15-May-94	Method Documentation in USATHAMA (1990) Format: Analytical Method for White phosphorus in Soil or Sediment	Contained in the Interagency Expanded Site Investigation FY93 Final Report; details the analytical method suitable for determining white phosphorus in wet soil or sediment.	CRREL
10412	- 10470	OU-C Book 11	C	15-May-94	Physical System Dynamics	Contained in the Interagency Expanded Site Investigation FY93 Final Report; discusses the progressive, physical environment changes at Eagle River Flats from the interaction and response of various physical processes.	CRREL

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10697	- 10705	OU-C Book 11	C	15-May-94	Pond Draining Treatability Study	Contained in the Interagency Expanded Site Investigation FY93 Final Report; results of a field test to determine the insitu conditions of pond bottom sediments under drying conditions as a remediation option.	CRREL
10721	- 10733	OU-C Book 11	C	15-May-94	Preliminary Evaluation of the Analytical Holding Time for White phosphorus in Surface Water	Contained in the Interagency Expanded Site Investigation FY93 Final Report; information regarding determination of a suitable holding time under the analysis of white phosphorus dissolved in water.	CRREL
10497	- 10517	OU-C Book 11	C	15-May-94	Review of Chemical and Physical Properties of White phosphorus	Contained in the Interagency Expanded Site Investigation FY93 Final Report; a review of literature regarding the properties of white phosphorus to determine the factors that influence the persistence of white phosphorus in the environment.	CRREL
10743	- 10768	OU-C Book 11	C	15-May-94	Sediment Samples Collected and Analyzed from Eight Areas on Eagle River Flats, 1991 to 1993	Contained in the Interagency Expanded Site Investigation FY93 Final Report; a summary of sample results from Eagle River Flats from 1991 to 1993.	None Given
10518	- 10536	OU-C Book 11	C	15-May-94	Toxicological Studies of White phosphorus in Waterfowl	Contained in the Interagency Expanded Site Investigation FY93 Final Report; discusses the findings of studies to determine lethal dose and lowest observed effect level concentrations for waterfowl and related effects.	DWRC
10568	- 10572	OU-C Book 11	C	15-May-94	Water Sampling	Contained in the Interagency Expanded Site Investigation FY93 Final Report; discusses the results of water samples collected from Eagle River Flats in relation to the presence or absence of white phosphorus in sediment.	CRREL
10573	- 10585	OU-C Book 11	C	15-May-94	Waterbird Utilization of Eagle River Flats: April to October 1993	Contained in the Interagency Expanded Site Investigation FY93 Final Report; provides the results of a bird census taken at Eagle River Flats.	USFWS
10607	- 10613	OU-C Book 11	C	15-May-94	Waterfowl Distribution and Movements in Eagle River Flats	Contained in the Interagency Expanded Site Investigation FY93 Final Report; discusses the movement, distribution, turnover rate, and site-specific exposure of waterfowl species most susceptible to white phosphorus poisoning at Eagle River Flats during fal	DWRC
10586	- 10606	OU-C Book 11	C	15-May-94	Waterfowl Mortality at Eagle River Flats	Contained in the Interagency Expanded Site Investigation FY93 Final Report; results of a study conducted to assess the relative amount of waterfowl mortality in order to detect year-to-year changes as white phosphorus exposure decreases because of remedia	NEILE

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10641	- 10643	OU-C Book 11	C	15-May-94	White phosphorus in Plants at Eagle River Flats	Contained in the Interagency Expanded Site Investigation FY93 Final Report; provides the results of analyzing for white phosphorus in plants collected from sites where white phosphorus was detected previously in the sediment.	CRREL
10537	- 10567	OU-C Book 11	C	15-May-94	White phosphorus in Sediments	Contained in the Interagency Expanded Site Investigation FY93 Final Report; summarizes the results of sampling efforts to determine the distribution and concentrations of white phosphorus in Eagle River Flats.	CRREL
10614	- 10619	OU-C Book 11	C	15-May-94	White phosphorus Poisoning of Waterfowl in Eagle River Flats	Contained in the Interagency Expanded Site Investigation FY93 Final Report; the results of necropsies performed on waterfowl found dead at Eagle River Flats and a comparison of conditions between birds found dead in the flats and those that died from labo	DWRC
10769	- 10797	OU-C Book 12	C	14-Jul-94	Eagle River Flats Potential ARARs Evaluation	Review of ARARs for Eagle River Flats in preparation of future CERCLA remedial activities.	CH2M Hill
10798	- 11028	OU-C Book 12	C	15-Jul-94	Eagle River Flats Comprehensive Evaluation Report, Fort Richardson, Alaska	Summarizes information obtained from Eagle River Flats investigations and is designed to determine practical, implementable, and effective remedial actions.	CH2M Hill
11029	- 11032	OU-C Book 12	C	17-Feb-95	Report of USDA/APHIS/Animal Damage Control for the Army at Eagle River Flats, May to October, 1994	Includes damage control activities for migratory waterfowl at Eagle River Flats from May through October 1994.	USDA ADC
11033	- 11078	OU-C Book 12	C	15-Mar-95	Initial Analysis of Eagle River Flats Hydrology and Sedimentology, Fort Richardson, Alaska, Report 95-5	Presents the initial analysis of the physical system of Eagle River Flats, focusing on the inter-relationships of the hydrological and sedimentological processes.	CRREL
11079	- 11091	OU-C Book 12	C	25-Apr-95	Fort Richardson Multi-Agency Site Investigation	Includes background information and a summary of past investigations for Eagle River Flats.	DPW
11347	- 11368	OU-C Book 13	C	15-May-95	Analysis of the Eagle River Flats White phosphorus Concentration Database	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; presents results of the white phosphorus concentration database for sediment and water at Eagle River Flats.	CRREL
11728	- 11793	OU-C Book 14	C	15-May-95	Appendix A, Eagle River Flats Map Atlas	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; a compilation of maps documenting all sampling, monitoring, and remediation test sites during studies from 1991 to 1994.	CRREL
11506	- 11517	OU-C Book 13	C	15-May-95	Chemical Hazing of Free-Ranging Ducks in Eagle River Flats: Field Evaluation of Rejex-It W1-05	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; discusses the results of field testing of a chemical waterfowl repellent at Eagle River Flats.	DWRC

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11280	- 11293	OU-C Book 13	C	15-May-95	Climate and Tides	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; describes the results of meteorological studies and tide predictions for Eagle River Flats.	CRREL
11658	- 11727	OU-C Book 14	C	15-May-95	Dredging as a Remediation Strategy for White phosphorus-Contaminated Sediments at Eagle River Flats, Alaska	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; a discussion of the preparation and initiation of the dredging operations as part of the study of remediation strategies.	CRREL
11121	- 11148	OU-C Book 13	C	15-May-95	Ecological Inventory of Eagle River Flats, Alaska	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; provides the results of an ecological evaluation of Eagle River Flats to characterize the ecosystem; to help evaluate white phosphorus distribution, persistence and ec	CRREL
11524	- 11539	OU-C Book 13	C	15-May-95	Evaluation of AquaBlok on Contaminated Sediments to Reduce Mortality of Foraging Waterfowl	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; results of a study of the AquaBlok barrier system in preventing waterfowl exposure to white phosphorus.	DWRC
11426	- 11493	OU-C Book 13	C	15-May-95	Evaluation of White phosphorus Effects on the Aquatic Ecosystem, Eagle River Flats, Fort Richardson, Alaska	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; discusses the results of studies to determine whether white phosphorus has an adverse impact on the aquatic biota or is bioaccumulating in the food chain, and to deter	AEHA
11518	- 11523	OU-C Book 13	C	15-May-95	Hazing at Eagle River Flats	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; discusses the results of various hazing methods applied at Eagle River Flats to keep migratory waterfowl from being poisoned by white phosphorus.	USDA ADC
11494	- 11501	OU-C Book 13	C	15-May-95	Integrated Risk Assessment Model (IRAM) for Determining White phosphorus Encounter Rate by Waterfowl	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; includes a model that provides a method for RA for the white phosphorus encounter rate by waterfowl feeding at Eagle River Flats.	DWRC
11092	- 11793	OU-C Books 13 & 1	C	15-May-95	Interagency Expanded Site Investigation, Evaluation of White phosphorus Contamination and Potential Treatability at Eagle River Flats, Alaska, Fiscal Year 1994, Final Report, Volumes 1 and 2	Two-volume compilation of reports detailing FY94 CRREL studies of Eagle River Flats.	CRREL

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11566	- 11623	OU-C Book 13	C	15-May-95	Investigation of Natural Size Reduction of White phosphorus Particles in Eagle River Flats Sediments	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; includes an investigation of natural decontamination of Eagle River Flats sediments.	CRREL
11412	- 11425	OU-C Book 13	C	15-May-95	Movements, Distribution and Relative Risk of Waterfowl, Bald Eagles and Dowitchers Using Eagle River Flats	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; provides results of daily and seasonal movements of waterfowl at Eagle River Flats.	DWRC
11149	- 11279	OU-C Book 13	C	15-May-95	Physical System Dynamics, WP Fate and Transport, Remediation and Restoration, Eagle River Flats, Alaska	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; presents the results of an analysis of the physical processes of erosion, sedimentation and sediment transport, and fate and transport of white phosphorus within Eagle	CRREL
11624	- 11657	OU-C Book 13	C	15-May-95	Pond Draining Treatability Study	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; presents results of the pond draining study conducted at Eagle River Flats.	CRREL
11540	- 11565	OU-C Book 13	C	15-May-95	Screening Study of Barriers to Prevent Poisoning of Waterfowl in Eagle River Flats, Alaska	Contained in Volume 2 of the Interagency Expanded Site Investigation FY94 Final Report; describes procedures and results of the use of barriers to prevent waterfowl from eating white phosphorus at Eagle River Flats.	CRREL
11327	- 11346	OU-C Book 13	C	15-May-95	Toxicological Properties of White phosphorus: Comparison of Particle Sizes on Acute Toxicity and the Biotransfer of White phosphorus from Hen to Eggs	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; provides results of the comparison of particle sizes of white phosphorus on acute toxicity in birds and transfer from hen to egg.	Dartmouth Medical School
11369	- 11380	OU-C Book 13	C	15-May-95	Waterbird Utilization of Eagle River Flats: April-October 1994	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; provides the results of a water bird survey for the reported period.	USFWS
11381	- 11411	OU-C Book 13	C	15-May-95	Waterfowl Use and Mortality at Eagle River Flats	Contained in Volume 1 of the Interagency Expanded Site Investigations FY94 Final Report. Presents results of waterfowl mortality studies at Eagle River Flats.	NEILE
11294	- 11326	OU-C Book 13	C	15-May-95	White phosphorus Toxicity and Bioindicators of Exposure in Waterfowl and Raptors	Contained in Volume 1 of the Interagency Expanded Site Investigation FY94 Final Report; presents results of efforts to identify indicators of white phosphorus exposure in waterfowl at Eagle River Flats.	DWRC
11794	- 11803	OU-C Book 14	C	16-May-95	1995 Eagle River Flats Spatial Database Project	Includes types and locations of data to be input into the Eagle River Flats database.	CRREL

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11804	- 11945	OU-C Book 14	C	05-Jun-95	Receiving Water Biological Study No. 32-24-H37Y-94, Evaluation of White phosphorus Effects on the Aquatic Ecosystem, Eagle River Flats, Fort Richardson, Alaska, Final Report	Provides results of white phosphorus movement in the aquatic food chain at Eagle River Flats and the derivation of a no observed effect level concentration of white phosphorus in sediment.	AEHA
11946	- 11976	OU-C Book 14	C	28-Jun-95	Potential Assessment and Measurement Endpoints for Eagle River Flats, Draft	Presents the selection of assessment and measurement endpoints for the ERA of Eagle River Flats.	CH2M Hill
11977	- 11977	OU-C Book 14	C	12-Jul-95	Eagle River Flats Waterfowl Hazing, Spring 1995 Summary	Summarizes waterfowl hazing operations at Eagle River Flats for spring 1995.	USDA ADC
11978	- 12086	OU-C Book 14	C	15-Dec-95	Army Eagle River Flats: Protecting Waterfowl from Ingesting White phosphorus, Final, Technical Report 95-1	Final report on Eagle River Flats 1995 studies; contains two reports.	DWRC
12037	- 12086	OU-C Book 14	C	15-Dec-95	Evaluation of AquaBlok on Contaminated Sediment to Reduce Mortality of Foraging Waterfowl	Contained in Army Eagle River Flats: Protecting Waterfowl from Ingesting White phosphorus, Final, Technical Report 95-1; describes tests on the performance of a physical barrier material to prevent waterfowl from accessing contaminated sediment.	DWRC
11980	- 12036	OU-C Book 14	C	15-Dec-95	Movement, Distribution and Relative Risk of Waterfowl and Bald Eagles Using Eagle River Flats	Contained in Army Eagle River Flats: Protecting Waterfowl from Ingesting White phosphorus, Final, Technical Report 95-1; summarizes the dynamics of the waterfowl population in Eagle River Flats and the estimated risk of exposure to white phosphorus and mo	DWRC
12087	- 12110	OU-C Book 14	C	16-Dec-95	Waterfowl Use and Mortality at Eagle River Flats, FY 1995	Summary of FY95 activities and findings.	NEILE
24495	- 24656	OU-C Book 17	C	01-Jul-96	Draft Risk Assessment Report, OU-C, Fort Richardson, Alaska	An analysis of current and potential future adverse environmental and human health effects caused by release of and exposure to OU-C-related chemicals.	CH2M Hill
24657	- 24880	OU-C Book 18	C	11-Jul-96	Draft Remedial Investigation Report, Fort Richardson, Alaska	Presents the results of the OU-C RI.	CH2M Hill
24881	- 24908	OU-C Book 18	C	15-Jul-96	Draft Natural Resources Appraisal of Damage on Eagle River Flats, OU-C, Fort Richardson, Alaska	Evaluation of level of the natural resource damage for determining natural resource compensation.	CH2M Hill
29168	- 29242	OU-C Book 20	C	15-Dec-96	Physical Processes and Natural Attenuation Alternatives for Remediation of White phosphorus Contamination, Eagle River Flats, Fort Richardson, Alaska	Describes the results of a study on the role of tidal flat physical systems in the natural attenuation of white phosphorus.	CRREL

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29243	- 29278	OU-C Book 20	C	15-Jan-97	Movement, Distribution and Relative Risk of Waterfowl and Bald Eagles Using Eagle River Flats	Results of a study to determine daily and seasonal movement, distribution, turnover, and mortality rates of mallards. Determines the hazard that a mallard poisoned by white phosphorus poses to bald eagles. Establishes baseline mallard and bald eagle dat	DWRC
29279	- 29829	OU-C Book 20 & 21	C	15-May-97	Final Remedial Investigation Report, OU-C, Fort Richardson, Alaska	Presents the results of the RI of OU-C, including the primary ordnance impact area at Eagle River Flats and the adjacent gravel pad used for open burning and open detonation (OB/OD Pad).	CH2M Hill
12111	- 12115	OU-C Book 14	C	05-Jun-89	Eagle River Flats Expanded Site Investigation--Draft Sampling Plan, Comments	Comments on the Hunter/ESE sampling design plan for Eagle River Flats.	DEH
12116	- 12117	OU-C Book 14	C	09-Apr-90	Eagle River Flats Expanded Site Investigation, Comments	Review comments on the Eagle River Flats expanded site investigation draft technical report.	EPA
12118	- 12122	OU-C Book 14	C	27-Apr-90	Eagle River Flats Expanded Site Investigation Fort Richardson, Alaska Draft Technical Report, Comments	Review comments on the Eagle River Flats expanded site investigation draft technical report, data item A011.	ADEC
12123	- 12128	OU-C Book 14	C	30-Apr-90	Eagle River Flats Expanded Site Investigation, Draft Technical Report, Fort Richardson, Alaska, Comments	Review comments on the Eagle River Flats expanded site investigation draft technical report.	USFWS
12129	- 12131	OU-C Book 14	C	01-May-90	Eagle River Flats Expanded Site Investigation, Comments	Review comments on the Eagle River Flats expanded site investigation draft technical report.	EPA
12132	- 12134	OU-C Book 14	C	02-May-90	Eagle River Flats Expanded Site Investigation and Scope of Work, Comments	Review comments on the Eagle River Flats expanded site investigation draft technical report and SOW.	EPA
12135	- 12141	OU-C Book 15	C	17-May-90	Eagle River Flats Expanded Site Investigation, Fort Richardson, Alaska Draft Technical Report, Comments	Review comments on the Eagle River Flats expanded site investigation draft technical report, data item A011.	ADFG
12142	- 12143	OU-C Book 15	C	27-Dec-90	Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds, Comments	Review comments on Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds.	ADFG
12144	- 12145	OU-C Book 15	C	28-Dec-90	Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds, Draft Report, Comments	Includes recommendations for the 1991 proposed SOW.	ADEC

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12146	- 12148	OU-C Book 15	C	04-Jan-91	Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds, Comments	Review comments on the draft Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds.	USFWS
12149	- 12150	OU-C Book 15	C	19-Mar-91	Waterfowl Mortality Study, Comments	USFWS comments on the proposed 1991 fieldwork for the Eagle River Flats waterfowl mortality study.	USFWS
12151	- 12153	OU-C Book 15	C	31-Jan-92	Review Comments on the Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, January 14, 1992, Draft Report	Review comments on Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, January 14, 1992, Draft Report.	ADEC
12154	- 12155	OU-C Book 15	C	04-Feb-92	Review Comments on the Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, January 14, 1992, Draft Report	Review comments on Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, January 14, 1992, Draft Report.	CRREL
12156	- 12163	OU-C Book 15	C	09-Mar-92	Review Comments on the 1992/1993 Comprehensive Workplan for Eagle River Flats	Review comments on 1992/1993 Comprehensive Workplan for Eagle River Flats.	EPA
12164	- 12165	OU-C Book 15	C	09-Mar-92	Review Comments on the Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, January 14, 1992, Draft Report	Review comments on Remedial Investigation Report: White phosphorus Contamination of Salt Marsh Sediments at Eagle River Flats, Alaska, January 14, 1992, Draft Report.	EPA
12166	- 12170	OU-C Book 15	C	10-Mar-92	Eagle River Flats 1992/1993 Comprehensive Workplan	Review comments on Eagle River Flats 1992/1993 Comprehensive Workplan.	ADEC
12171	- 12175	OU-C Book 15	C	02-Apr-92	Comprehensive Work Plan for Eagle River Flats, Response to Comments	Responses to EPA, Region X, comments on the comprehensive work plan for Eagle River Flats.	USA THAMA
12176	- 12178	OU-C Book 15	C	19-Apr-92	Comprehensive Work Plan for Eagle River Flats, Comments	USFWS comments on the comprehensive work plan for Eagle River Flats.	USFWS
12179	- 12180	OU-C Book 15	C	22-Feb-93	Response to Comments on the Draft Scope of Work for Baseline Risk Assessment and FS	Responses to comments on the draft baseline RA and FS for Eagle River Flats.	AEC
12181	- 12182	OU-C Book 15	C	22-Feb-93	Responses to Eagle River Flats Task Force Comments and Concerns in Regard to CERCLA	Responses to Eagle River Flats Task Force comments and concerns in regard to CERCLA.	None Given
12183	- 12187	OU-C Book 15	C	22-Feb-93	Responses to Eagle River Flats Task Force Conference Call	Responses to Eagle River Flats Task Force conference call.	AEC

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12188	- 12191	OU-C Book 15	C	14-Apr-93	Comments and Recommendations, Draft Remedial Investigations for Eagle River Flats, Report I	Review comments and recommendations on draft Report I, RIs for Eagle River Flats.	AEC
12192	- 12192	OU-C Book 15	C	14-Apr-93	Comments and Recommendations, Draft Remedial Investigations for Eagle River Flats, Report II	Review comments on the report II, treatability studies for Eagle River Flats.	AEC
12193	- 12197	OU-C Book 15	C	14-Apr-93	Comments on the Draft Phase II Remedial Investigation Report for Eagle River Flats	Review comments on the draft phase II RI report for Eagle River Flats.	AEC
12198	- 12199	OU-C Book 15	C	15-May-94	USCOE Review of the draft-final Comprehensive Evaluation Report for Eagle River Flats, Fort Richardson, Alaska	Review comments on the comprehensive evaluation report for Eagle River Flats.	USAED Alaska
12200	- 12203	OU-C Book 15	C	31-May-94	Comprehensive Evaluation Report and Potential ARARs Evaluation for Eagle River Flats, draft-final	Review comments on the draft-final comprehensive evaluation report and potential ARARs evaluation for Eagle River Flats.	ADEC
12204	- 12208	OU-C Book 15	C	06-Jun-94	Description of Items Not Addressed in ERF Fieldwork QAPP	Includes a description of items not addressed in the Eagle River Flats fieldwork QA project plan.	CH2M Hill
12209	- 12210	OU-C Book 15	C	21-Jun-94	Comments on ERF Comprehensive Evaluation Report and ARARs Evaluation	Review comments on the Eagle River Flats draft-final comprehensive evaluation report and ARARs evaluation.	USFWS
12211	- 12217	OU-C Book 15	C	21-Jun-94	Review of the draft-final Comprehensive Evaluation Report for Eagle River Flats, Fort Richardson, Alaska	Review comments on the draft-final comprehensive evaluation report for Eagle River Flats.	AEHA
12218	- 12224	OU-C Book 15	C	08-Feb-95	Draft 1994 Project Meeting Summary for Eagle River Flats	Recommended changes for Donald Sparling's portion of the draft 1994 project meeting summary for Eagle River Flats.	DWRC
12225	- 12235	OU-C Book 15	C	28-Mar-95	Eagle River Flats 1995 Field Work Proposals	Recommendations from the Biological Technical Assistance Group for Eagle River Flats regarding 1995 fieldwork proposals.	USFWS
12236	- 12237	OU-C Book 15	C	24-May-95	Review Comments on the Draft 1995 QAPP	Review comments on the draft 1995 QA program plan.	CRREL
12238	- 12240	OU-C Book 15	C	23-Jul-95	Comments on "Potential Assessment and Measurement Endpoints for Eagle River Flats"	ADFG comments on the technical memorandum Potential Assessment and Measurement Endpoints for Eagle River Flats.	ADFG
12244	- 12246	OU-C Book 15	C	26-Jul-95	Comments on "Potential Assessment and Measurement Endpoints for Eagle River Flats"	CRREL comments on the technical memorandum Potential Assessment and Measurement Endpoints for Eagle River Flats.	CRREL
12241	- 12243	OU-C Book 15	C	26-Jul-95	Comments on "Potential Assessment and Measurement Endpoints for Eagle River Flats"	Biological Technical Assistance Group comments on the technical memorandum, Potential Assessment and Measurement Endpoints for Eagle River Flats.	USFWS

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24909	- 24922	OU-C Book 18	C	01-Jan-96	Response to November 1995 Comments on Draft RI/FS Documents, OU-C, Eagle River Flats	CH2M Hill's response to comments made by EPA, the New England Institute for Landscape Ecology, USFWS, CRREL, the USDA Animal and Plant Health Inspection Service, USAED Alaska, and Dartmouth-Hitchcock Medical Center.	None Given
24923	- 24941	OU-C Book 18	C	30-Jan-96	Response to January 1996 Comments on Draft RI/FS Documents, OU-C, Eagle River Flats	CH2M Hill's response to comments made by USAED Alaska, CRREL, EPA and CHPPM.	None Given
24942	- 24949	OU-C Book 18	C	18-Mar-96	Review of CH2M Hill Documents	Response to January 1996 comments on the draft-final RI/FS management plan.	CRREL
24950	- 24953	OU-C Book 18	C	19-Aug-96	Eagle River Flats Draft RI	Review comments.	EPA
24954	- 24955	OU-C Book 18	C	23-Aug-96	ADEC comments on ARAR's and RI	Review comments.	ADEC
24956	- 24960	OU-C Book 18	C	23-Aug-96	CHPPM Comments on Draft RI and RA, OU-C, July 1996	Review comments.	CHPPM
29830	- 29834	OU-C Book 21	C	23-Aug-96	Comments on Draft RI and RA, OU-C	Comments by the Army CHPPM.	CHPPM
24961	- 24974	OU-C Book 18	C	29-Aug-96	EPA Comments on Draft RI and Baseline RA	Review comments.	EPA
29835	- 29868	OU-C Book 21 & 22	C	25-Mar-97	Comments, draft-final Remedial Investigation Report, OU-C	Review comments.	Army
12247	- 12247	OU-C Book 15	C	03-Mar-93	Guidelines for Remediation Experiments on Eagle River Flats, 1993	USFWS encourages the most expeditious means to resolve the water bird mortality problem at Eagle River Flats without compromising the long-term health of the wetlands.	USFWS
12248	- 12248	OU-C Book 15	C	11-Mar-93	Eagle River Flats Remediation Alternatives	ADEC supports implementation of the treatability analysis of the remediation measures for Eagle River Flats discussed at Hanover, New Hampshire, December 1992.	ADEC
24975	- 27979	OU-C Book 18	C	23-Feb-96	Revised SOW, Hydraulic Dredging, Eagle River Flats	An SOW to perform remote-controlled hydraulic dredging of Eagle River Flats for removal of white phosphorus-contaminated sediments.	Army
29869	- 29919	OU-C Book 22	C	15-Sep-96	Dredging in an Active Artillery Impact Area, Eagle River Flats, Alaska	A study to investigate the feasibility of using a small, remote-controlled dredge to remove white phosphorus-contaminated sediments from ponded areas and to treat the spoils in an open retention basin.	CRREL

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29920	- 29962	OU-C Book 22	C	15-Jan-97	Eagle River Flats Technology Screening	An evaluation of all potential treatment technologies on the basis of implementability, effectiveness, and cost. Also identifies which retained technologies may be applicable to ponds presenting the greatest threat of white phosphorus acute toxicity to w	CH2M Hill
32281	- 32303	OU-C Book 24	C	15-Apr-98	Scope of Work for Treatability Study of Pond Pumping for Enhancement of In-Situ White Phosphorus Attenuation in Eagle River Flats, AK	Determines the feasibility of pumping out select permanently-ponded areas to enhance the natural attenuation of white phosphorus from the ponds.	CRREL
32304	- 32307	OU-C Book 24	C	05-Jun-98	Spill Prevention and Control for Eagle River Flats Pumping Treatability Study	Presents the spill prevention, control, countermeasures, and notification procedures for the portable pumping and generator systems at Eagle River Flats.	CH2M Hill
32308	- 32431	OU-C Book 24	C	01-Aug-98	Interagency Expanded Site Investigation, Evaluation of White Phosphorus Contamination and Potential Treatability at Eagle River Flats, Alaska	Highlights the treatability studies of remediation procedures for white phosphorus contamination at Eagle River Flats for OUC. (Please note that blank pages were left out intentionally to conserve paper.)	CRREL
12249	- 12251	OU-C Book 15	C	04-Dec-89	Eagle River Flats Task Force Study	Request, on behalf of the Eagle River Flats Task Force, for ATHAMA's action, comments, and assistance on issues from the FY89 study and direction for the FY90 study.	USAED Alaska
12252	- 12256	OU-C Book 15	C	29-Jan-90	Eagle River Flats Task Force Study	Includes information addressing concerns expressed by Fort Richardson on behalf of the Eagle River Flats Task Force.	USA THAMA
12257	- 12268	OU-C Book 15	C	08-Feb-90	Eagle River Flats Task Force Meeting Minutes	Eagle River Flats Task Force meeting minutes, February 8, 1990.	None Given
12269	- 12295	OU-C Book 15	C	09-Apr-90	Eagle River Flats Task Force Meeting Minutes	Eagle River Flats Task Force meeting minutes, April 9, 1990.	None Given
12296	- 12296	OU-C Book 15	C	24-Aug-90	Reply to Senator Frank Murkowski's Letter Concerning Eagle River Flats Dated August 14, 1990	Reply to Senator Frank Murkowski's letter concerning Eagle River Flats.	USAED Alaska
12297	- 12312	OU-C Book 15	C	10-Dec-90	Minutes of the 10 December 1990 Eagle River Flats Task Force Meeting	Eagle River Flats Task Force meeting minutes, December 10, 1990.	DPW
12313	- 12313	OU-C Book 15	C	18-Dec-90	Eagle River Flats Waterfowl Mortality Study at Fort Richardson, Alaska	Summary of findings in the draft report, waterfowl Mortality on the Eagle River Flats Impact Area: The Role of Munitions Compounds.	CRREL
12314	- 12315	OU-C Book 15	C	21-Mar-91	Eagle River Flats Remedial Investigation	Concerns that need to be considered in the proposed FY91 Eagle River Flats RI.	EPA

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12316	- 12316	OU-C Book 15	C	08-Oct-91	Concurrence on Environmental Assessment for the Resumption of Firing into the Eagle River Flats, Memorandum for Record	Office of the Assistant Secretary of the Army concurs with the EA for Eagle River Flats and offers no comments.	Army
12317	- 12317	OU-C Book 15	C	12-Nov-91	Comprehensive Management Plan for Remediation of Eagle River Flats	Endorses the strategy of developing a comprehensive management plan for remediation of Eagle River Flats.	USFWS
12318	- 12318	OU-C Book 15	C	15-Dec-91	Eagle River Flats Waterfowl Die-Off Abstract, Memorandum for Record	Memorandum describing 1991 fieldwork regarding waterfowl die-offs and white phosphorus.	DPW
12319	- 12321	OU-C Book 15	C	13-Jan-92	Eagle River Flats Update	Update on past, current, and future field investigations at Eagle River Flats.	DPW
12322	- 12322	OU-C Book 15	C	19-Mar-92	Fiscal Year 1992 Eagle River Flats Study of Bird Hazing Activities	Reaffirms the position of the Eagle River Flats Task Force and the 6th Infantry Division regarding the integration of bird hazing and repellent operations in the FY92 study.	DPW
12323	- 12324	OU-C Book 15	C	10-Feb-93	ERF	Request that the project to investigate and remediate white phosphorus contamination at Eagle River Flats be transferred from AEC to the Army Garrison, Alaska.	DPW
12325	- 12325	OU-C Book 15	C	11-Feb-93	Performance of AEC at Eagle River Flats	Concern that the AEC has not performed satisfactorily in executing studies needed for remediation at Eagle River Flats.	USFWS
12326	- 12328	OU-C Book 15	C	08-Mar-93	Remediation Measures at Eagle River Flats in Regards to Intertidal Wetlands	ADFG supports proceeding with remediation measures at Eagle River Flats as long as intertidal wetlands are unaffected.	ADFG
12329	- 12330	OU-C Book 15	C	17-Mar-93	Eagle River Flats Alternatives	USFWS supports implementation of treatability studies of potential remediation measures for Eagle River Flats in FY93.	USFWS
12331	- 12332	OU-C Book 15	C	19-Mar-93	Eagle River Flats Project Management	Response to a request by Fort Richardson that management of Eagle River Flats be transferred from AEC to USAED Alaska.	AEC
12333	- 12335	OU-C Book 15	C	25-Mar-93	Eagle River Flats Environmental Cleanup	Concern about AEC's interpretation of the State of Alaska's legal requirements relating to the investigation and cleanup of contamination at Eagle River Flats.	ADOL
12336	- 12339	OU-C Book 15	C	21-Apr-93	Comments, Eagle River Flats Draft Workplan, Fort Richardson, Alaska	Review comments on the Eagle River Flats draft work plan.	EPA
12340	- 12342	OU-C Book 15	C	28-Apr-93	White phosphorus Lowest Observed Effect Level	Review of waterfowl toxicity data for white phosphorus.	Geo-Centers, Inc.
12343	- 12346	OU-C Book 15	C	18-Aug-93	Eagle River Flats Task Force Meeting Minutes	Eagle River Flats Task Force meeting minutes.	None Given
12347	- 12347	OU-C Book 15	C	29-Mar-94	Telephone Conversation with State Historic Preservation Office	Contact report regarding the need for State Historic Preservation Office review of work to be conducted at Eagle River Flats.	DPW

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12348	- 12350	OU-C Book 15	C	01-Aug-94	Eagle River Flats FY94, Memorandum for Public Federal Facilities Agreements Office	Describes how FY94 fieldwork for Eagle River Flats relates to remedial treatability studies and the development of an RA.	DPW
12351	- 12352	OU-C Book 15	C	07-Mar-95	Eagle River Flats, Roles of Remedial Project Managers and the Biological Technical Assistance Group at Eagle River Flats	Letter explaining the roles of remedial project managers and the Biological Technical Assistance Group for Eagle River Flats.	ADFG
12353	- 12353	OU-C Book 15	C	29-Mar-95	Eagle River Flats, Role of the Biological Technical Assistance Group at Eagle River Flats	Letter explaining the role of the Biological Technical Assistance Group at Eagle River Flats.	DPW
12354	- 12355	OU-C Book 15	C	04-Apr-95	Eagle River Flats, Roles of Remedial Project Managers and the Biological Technical Assistance Group at Eagle River Flats	Letter explaining the roles of remedial project managers and the Biological Technical Assistance Group for Eagle River Flats.	USFWS
12356	- 12357	OU-C Book 15	C	15-Apr-95	Eagle River Flats, Role of the Biological Technical Assistance Group at Eagle River Flats	Letter explaining the role of the Biological Technical Assistance Group at Eagle River Flats.	Army
12358	- 12471	OU-C Book 15	C	15-Dec-95	Eagle River Flats, Final 1994 Project Meeting Summary	Eagle River Flats meeting minutes--December 12 through 14, 1994	CH2M Hill
24980	- 25007	OU-C Book 18	C	01-Mar-96	Eagle River Flats GIS Database Review and Evaluation of Assessment End Points Approach	This technical memorandum summarizes CH2M Hill's efforts to obtain, quality check, and test the Army CRREL Eagle River Flats geographic information system. A summary of the QC review status on the geographic information system and a trial application for	CH2M Hill
29963	- 29965	OU-C Book 22	C	20-Feb-97	Endpoint for Eagle River Flats	Discusses activities of the Biological Technical Assistance Group with regard to endpoints, and preparation of the technical screening of remedial alternatives for Eagle River Flats.	USFWS
32432	- 32433	OU-C Book 24	C	26-Mar-98	Operable Unit C/Eagle River Flats Draft/Final RI/FS Management Plan	USEPA approval of Army responses to their comments for the OUC RI/FS.	EPA
12472	- 12472	OU-C Book 15	C	31-Jul-95	Pilot Study of Dredging to Remove White phosphorus Contaminants from Sediments in a Limited Area of Eagle River Flats, Alaska	Discussion of preliminary test results from the use of an experimental remote-controlled dredging system in Eagle River Flats.	CRREL
25008	- 25364	OU-C Book 19	C	01-Apr-96	Final Remedial Investigation/FS Management Plan	The management plan documents the approach and methodologies used to conduct the RI for OU-C.	CH2M Hill
29966	- 30302	OU-C Book 22 & 23	C	15-Sep-97	Final FS Report, OU-C, Fort Richardson, Alaska	Presents the results of the FS for OU-C. The FS is intended to provide remedial project managers and the public with an assessment of remedial alternatives.	CH2M Hill

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12473	- 12480	OU-C Book 15	C	31-Aug-95	Eagle River Flats (OU-C) Decision Document	Describes the treatment alternatives being evaluated by the Army to select a removal action for Eagle River Flats in accordance with CERCLA.	None Given
25365	- 25392	OU-C Book 19	C	01-Apr-96	Evaluation of Field Studies to Support Assessment Endpoints Approach	This technical memorandum summarizes the results of an evaluation of ongoing avian studies conducted at Eagle River Flats to determine whether endpoints have been reached. The objective of the evaluation was to assess the adequacy of studies performed to	CH2M Hill
30303	- 30320	OU-C Book 23	C	24-Dec-97	Final Proposed Plan, OU-C	Presents cleanup alternatives considered by the Army, EPA, and ADEC to the public.	Army
25393	- 25402	OU-C Book 19	C	23-Feb-96	SOW Modification to the OU-C RI/FS Management Plan	A modification to perform an RI, HHRA, ERA, and Natural Resources Damage Assessment Plan.	None Given
25403	- 25403	OU-C Book 19	C	15-Mar-96	Comments on OU-C RI/FS Management Plan	Review comments.	CRREL
25404	- 25407	OU-C Book 19	C	30-Oct-96	OU-C FS Schedule	Presents an outline of dates for documents to be prepared by CH2M Hill. Presents data gaps in the FS.	CH2M Hill
25408	- 25412	OU-C Book 19	C	30-Oct-96	OU-C Technical Memo, Draft FS Data Needs	Summary of current information available and remaining data needed for researchers and principal investigators.	CH2M Hill
30321	- 30328	OU-C Book 23	C	15-Jan-97	Hot Pond Screening, Draft Method	Discussion of a method for identifying the hot areas and ponds at Eagle River Flats.	CH2M Hill
30329	- 30334	OU-C Book 23	C	30-Jan-97	Meeting Minutes: Eagle River Flats Technology Screening	A memorandum presenting the minutes from a January 22, 1997, meeting to discuss the results of the Eagle River Flats technology screening for the upcoming draft OU-C FS.	CH2M Hill
30335	- 30337	OU-C Book 23	C	27-May-97	Comments, ERF Draft FS, April 1997	EPA comments on the draft FS for Eagle River Flats.	EPA
30338	- 30347	OU-C Book 23	C	30-May-97	Comments, OU-C Draft FS	Review comments.	EPA
30348	- 30395	OU-C Book 23	C	15-Oct-97	Response to Comments on Draft Proposed Plan, OU-C	A response to comments presented by EPA, CRREL, CHPPM, USFWS, ADFG, and USAED Alaska. The original comments are attached.	CH2M Hill
32434	- 32620	OU-C Book 24	C	01-Sep-98	Record of Decision for Operable Unit C, Fort Richardson, Alaska	Presents the selected remedial actions chosen for OUC. (There are no pages 2-4, they were blank in the original document.)	CH2M Hill
32621	- 32810	OU-C Book 24	C	03-Dec-98	Final Record of Decision (with signature), Operable Unit C, Fort Richardson, Alaska.	Presents the selected remedial actions for the two source areas at OUC.	CH2M Hill

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30396	- 30396	OU-C Book 23	C	11-Mar-97	Review of Decision Document, Eagle River Flats	Comments on the decision document for Eagle River Flats' Racine Island Pond. CHPPM has no comments and concurs with the remedial action.	CHPPM
30397	- 30397	OU-C Book 23	C	28-Mar-97	Review and Comments to Draft Decision Document	Review comments on the Draft Decision Document for Eagle River Flats' Racine Island Pond.	Army
32811	- 32858	OU-C Book 25	C	30-Sep-97	Responses to comments on Draft Proposed Plan, Operable Unit C, Fort Richardson, Alaska	Tabular summary of comments to the Draft Proposed Plan, Operable Unit C, and CH2M Hill responses to the comments.	CH2M Hill
32859	- 32916	OU-C Book 25	C	14-Apr-98	Responses to comments on Draft Record of Decision, Operable Unit C, Fort Richardson, Alaska	Tabular summary of comments to the Draft ROD and CH2M Hill responses to comments.	CH2M Hill
32917	- 32921	OU-C Book 25	C	06-May-98	Record of Decision (ROD) for Operable Unit C, Fort Richardson, March 1998	U.S. Army Center for Health Promotion and Preventive Medicine's comments to the ROD for OUC.	Army
32922	- 32922	OU-C Book 25	C	13-May-98	Draft Final Record of Decision (ROD) for Operable Unit C, Fort Richardson, Alaska, April 1998 and Accompanying Response to Comments	U.S. Army Center for Health Promotion and Preventive Medicine's acceptance of responses to their comments to the final draft ROD for OUC.	Army
32923	- 32926	OU-C Book 25	C	01-Jun-98	Draft Final Record of Decision for Operable Unit C, Fort Richardson, Alaska	USAED -Engineering's comments to the draft final ROD.	Army
32927	- 32957	OU-C Book 25	C	09-Sep-98	Responses to Comments on Draft Final Record of Decision, Operable Unit C, Fort Richardson, Alaska	Tabular summary of comments to the Draft Final ROD and CH2M Hill responses to comments.	CH2M Hill
40553	- 40556		C	07-Jun-99	Contract Number DACA85-95-D-0015, Delivery Order 22, Modification 2, Task 5, Operable Unit C, Fort Richardson, AK	Contains the authorizing signatures necessary for approval of the work plan.	Joint Agency
40557	- 40918		C	08-Jun-99	Operable Unit C, Remedial Action Work Plan and Final Design for Eagle River Flats	Presents strategy for implementing remedial plans at the Eagle River Flats	CH2M Hill
32958	- 32982	OU-C Book 25	C	10-Dec-98	OB/OD Pad, Interim Closure Plan Approach Document, Operable Unit C, Fort Richardson, Alaska	Presents general approach for development of an interim closure plan for the former OB/OD Pad.	CH2M Hill
32983	- 92990	OU-C Book 25	C	24-Nov-98	Responses to Comments; Draft OU-C RD/RA Statement of Work	Review of responses to comments submitted by R. Matthew Wilkening of the USEPA.	CH2M Hill
32991	- 32994	OU-C Book 25	C	02-Feb-99	Responses to Comments: OB/OD Pad Interim Closure Plan Approach Document.	Review of responses to comments that were submitted by USEPA.	CH2M Hill
40919	- 41074		C	08-Jun-99	Operable Unit C, 1999 Field Work Plan, Eagle River Flats	Presents guidelines for contractor field support to CRREL during remedial activities in 1999.	CH2M Hill

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25413	- 25414	OU-C Book 19	C	15-Mar-96	Memorandum of Agreement Between the USDA Animal Damage Control, Animal and Plant Health Inspection Service and the USAED Alaska	USAED Alaska entered an MOA to acquire waterfowl mortality reduction services.	None Given
32995	- 33010	OU-C Book 25	C	20-Apr-98	Potential ARARs	Tabular summary of potential ARARs for the Eagle River Flats.	ADEC
25415	- 25415	OU-C Book 19	C	16-Dec-96	Review of Draft Natural Resources Appraisal of Damage on ERF, July 1996	Review comments	CHPPM
33011	- 33037	OU-C Book 25	C	12-Feb-98	Public Meeting Proposed Plan for Clean Up Action at OUC, Fort Richardson, Alaska	Presents the minutes of the February 12, 1998, public meeting on the proposed plans for clean-up action at OUC.	Anchorage Transcriptions
12482	- 12485	OU-C Book 15	C	05-Oct-88	Current Status of Eagle River Flats	Description of current, past, and planned activities for the Eagle River Flats investigation.	DPW
12486	- 12488	OU-C Book 15	C	30-Jan-89	Current Status of Eagle River Flats Waterfowl Investigation	Summary of progress, action taken, and action required for Eagle River Flats investigations.	DPW
12489	- 12492	OU-C Book 15	C	31-Jul-89	Current Status of Eagle River Flats Investigation	Presents the status of the 1989 Eagle River Flats waterfowl mortality investigation and lists actions taken and required.	Army
12493	- 12496	OU-C Book 15	C	06-Feb-90	Update on Eagle River Flats/Poleline Road Contaminated Site Studies	Summary of progress, action taken, and action required for Eagle River Flats FY89 investigations.	DPW
12497	- 12498	OU-C Book 15	C	29-Jun-90	Eagle River Flats Waterfowl Investigation Update	Review and update of the waterfowl investigation at Eagle River Flats.	DPW
12499	- 12500	OU-C Book 15	C	05-Nov-90	Eagle River Flats Waterfowl Investigation, Fact Sheet	Fact sheet about the Eagle River Flats waterfowl investigation.	DEH
12501	- 12503	OU-C Book 15	C	09-Jan-91	Eagle River Flats Waterfowl Investigation	Review of historical waterfowl investigations at Eagle River Flats.	DPW
12504	- 12506	OU-C Book 15	C	07-Feb-91	Eagle River Flats Waterfowl Investigation	Review of historical waterfowl investigations at Eagle River Flats.	DPW
06933	- 06935	OU-C Book 3	C	21-Feb-91	Press Release: Eagle River Flats Report Released	Contained as an appendix to the EA for resumption of firing in the Eagle River Flats Impact Area. Release of the results of the report, Waterfowl Mortality in Eagle River Flats, Alaska: The Role of Munitions Compounds.	PAO
12481	- 12481	OU-C Book 15	C	15-Mar-91	Fact Sheet: Eagle River Flats Waterfowl Mortality	Information about waterfowl mortality at Eagle River Flats and investigations to date.	None Given
12507	- 12508	OU-C Book 15	C	21-Mar-91	Eagle River Flats Study-Progress Report	Assessment of 1990 study and discussion about resumption of firing at Eagle River Flats.	DPW

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06940	- 06944	OU-C Book 3	C	25-Sep-91	Press Release: Eagle River Flats Studies Continue	Contained as an appendix to the EA for resumption of firing in the Eagle River Flats Impact Area; describes earlier and ongoing investigation results at Eagle River Flats.	PAO
06898	- 06898	OU-C Book 2	C	12-Nov-91	Notice of Availability and Public Comment Period	A notice of the availability of the EA and FONSI for the resumption of live-fire artillery and mortar training in Eagle River Flats.	Army
12509	- 12510	OU-C Book 15	C	19-Dec-91	Eagle River Flats Update	Summarizes 1991 fieldwork, projections for 1992 fieldwork, and preparation of an EA to evaluate the resumption of firing into Eagle River Flats.	DPW
12511	- 12512	OU-C Book 15	C	03-Jan-92	Press Release; FONSI Signed, Firing Resumes on Eagle River Flats	General information concerning the signing of the FONSI for the resumption of firing into Eagle River Flats.	Army
12513	- 12514	OU-C Book 15	C	09-Jan-92	Press Release: Eagle River Flats Test Results	Provides preliminary results of test firing munitions in Eagle River Flats.	Army
12515	- 12515	OU-C Book 15	C	13-May-92	Eagle River Flats Update	Brief summary of Army actions and plans to date.	DPW
12516	- 12516	OU-C Book 15	C	23-Mar-94	Eagle River Flats Waterfowl Mortality	Brief explanation of past, current, and future research at Eagle River Flats.	DPW
12517	- 12517	OU-C Book 15	C	18-May-95	Fact Sheet: White phosphorus Contamination of Eagle River Flats, Fort Richardson, Alaska	Brief summary of historical findings at Eagle River Flats.	CRREL
25416	- 25419	OU-C Book 19	C	27-Feb-96	Fact Sheet: Eagle River Flats Remediation Project	A fact sheet presenting a brief history of waterfowl deaths at Eagle River Flats.	DPW
33038	- 33054	OU-C Book 25	C	01-Feb-98	Proposed Plan for Cleanup Action at Operable Unit C, Fort Richardson, Alaska	Presents the proposed cleanup alternatives for the Eagle River Flats and OB/OD grounds at OUC.	USAED Alaska
12518	- 12518	OU-C Book 15	C	14-Aug-90	Letter from Senator Frank Murkowski Concerning Eagle River Flats	Letter from Senator Frank Murkowski expressing concern about contamination at Eagle River Flats.	U.S. Senate
33055	- 33062	OU-C Book 25	C	25-Mar-97	Different Susceptibilities to White Phosphorus poisoning among five species of ducks	Technical reference used form remediation study at Eagle River Flats	NEILE
33063	- 33070	OU-C Book 25	C	22-Jul-97	Toxicology of White Phosphorus to Ducks and Risk for their Predators: Effects of Particle Size	Technical reference used form remediation study at Eagle River Flats	Dartmouth Medical School
12519	- 12522	OU-D Book 1	D	20-Sep-90	Site Discovery, Circle Road Drum Site	Description of the abandoned drums discovered in a wooded area near Circle Drive on Fort Richardson.	DEH
12523	- 12524	OU-D Book 1	D	12-Jul-88	Waste Disposal Pits, Landfill Site	Description of waste disposal pits at the Fort Richardson landfill area.	

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12525	- 12526	OU-D Book 1	D	05-Oct-94	Initial Project Schedule	Initial project schedule for the OU-D PSEs.	ENSR
12527	- 12530	OU-D Book 1	D	10-Apr-95	Monthly Progress Report, OU-D	Report of work accomplished for each assigned subtask, March 1 through 31, 1995.	ENSR
12531	- 12879	OU-D Book 1	D	15-Sep-94	PSE, OU-D, Final Work Plan and Health and Safety Plan	Work and health and safety procedures for the PSE for OU-D.	ENSR
12880	- 13818	OU-D Books 1 - 3	D	15-Apr-95	Analytical Data for PSE 2, OU-D, Volume I of III	Presents analytical data for Building Nos. 35-752, 700/718, and 704, and the storm water outfall to Ship Creek.	ENSR
13819	- 14679	OU-D Books 3 & 4	D	15-Apr-95	Analytical Data for PSE 2, OU-D, Volume II of III	Presents analytical data for Building Nos. 796 and 955, the dust palliative roadways, and the Fire Training Pit.	ENSR
14680	- 15495	OU-D Books 5 & 6	D	15-Apr-95	Analytical Data for PSE 2, OU-D, Volume III of III	Presents analytical data for the grease pits, background, and decontamination water.	ENSR
25420	- 25420	OU-D Book 12	D	19-Jun-96	Comments on draft-final PSE-2, OU-D, Fort Richardson, Alaska	Review comments.	EPA
25421	- 25421	OU-D Book 12	D	24-Jun-96	Comments on draft-final PSE-2, OU-D, Fort Richardson, Alaska	Review comments.	ADEC
25422	- 25422	OU-D Book 12	D	09-Jul-96	Comments on draft-final PSE-2, OU-D, Fort Richardson, Alaska	Review comments.	Army
25423	- 26068	OU-D Books 12 & 1	D	16-Oct-96	Final PSE-2, OU-D, Fort Richardson, Alaska	This document presents the field investigation results for the PSE-2 conducted at nine OU-D sites.	ENSR
15496	- 15497	OU-D Book 6	D	15-Nov-93	Comments, Building 726 Sampling and Analysis Plan	Review comments on the draft sampling and analysis plan for Building No. 726.	ADEC
15498	- 15499	OU-D Book 6	D	19-Nov-93	Comments, Building 726 Sampling and Analysis Plan	Review comments on the draft sampling and analysis plan for Building No. 726.	EPA
15500	- 15506	OU-D Book 6	D	28-Jul-94	Work Plan for Preliminary Evaluation of Building 726--Post Laundry, OU-D, Fort Richardson, Alaska	Review comments on the draft work plan for Building No. 726.	EPA
15507	- 15509	OU-D Book 6	D	11-Aug-94	OU-D PSE 2 Draft Work Plan, Comments	Review comments on the draft PSE-2 work plan.	DPW
15777	- 15778	OU-D Book 7	D	19-Aug-94	Work Plan for the Preliminary Site Evaluations, OU-D, Fort Richardson, Comments	Review comments on the draft PSE-2 work plan.	EPA
15779	- 15781	OU-D Book 7	D	22-Aug-94	Draft July 1994 OU-D PSE 2 Work Plans, Comments	Review comments on the draft PSE-2 work plan.	ADEC

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15782	- 15784	OU-D Book 7	D	01-May-95	OU-D Draft PSE 2, Comments	Review comments on the draft PSE-2.	ADEC
15785	- 15786	OU-D Book 7	D	01-Jun-95	PSE 2, OU-D, Building 726, Comments	Review comments on the draft PSE-2 for Building No. 726.	ADEC
15787	- 15795	OU-D Book 7	D	13-Jun-95	PSE 2, OU-D, Comments	Review comments on the draft PSE-2.	EPA
15796	- 15797	OU-D Book 7	D	19-Jun-95	PSE 2, Building 45-590, OU-D, Comments	Review comments on the PSE-2, Building No. 45-590.	ADEC
15798	- 15800	OU-D Book 7	D	20-Jun-95	PSE 2, Building 45-590, OU-D, Comments	Review comments on the PSE-2, Building No. 45-590.	EPA
15510	- 15776	OU-D Book 7	D	15-Jul-95	Final Report, PSE, Building 726--Post Laundry, Fort Richardson, Alaska	Discusses results of the PSE in which subsurface contamination was detected but did not appear to be migratory or to pose a significant threat.	USAED Alaska
15801	- 15832	OU-D Book 7	D	15-Sep-94	Draft Field Report/Site Assessment for Circle Road Drum Site	A summary of soil screening conducted at the Circle Road Drum Site.	EMI
15833	- 15835	OU-D Book 7	D	02-Nov-94	New Information for OU-D Sites	Summary of new information for the grease pits, fire training areas, and Building No. 955.	ENSR
15836	- 15844	OU-D Book 7	D	13-Dec-93	Disposal of IDW, UST Investigation, Site 4, Building 35-752	Contamination information concerning IDW resulting from the Building No. 35-752 UST investigation.	USAED Alaska
15845	- 15867	OU-D Book 7	D	24-Aug-95	Chemical Data Results from 8/10/95 Sampling at Building 45-590	Results of a sample collected during the demolition of Building No. 45-590. The sample was of an unknown liquid located in a well discovered under the building's floor slab.	USAED Alaska
30398	- 30461	OU-D Book 16	D	15-Mar-97	OU-D Risk Assessment Approach Document, Fort Richardson, Alaska	As part of the RI/FS for OU-D, this is an approach document presenting the methodologies to be used in the HHRA and ERA for evaluation of the contaminants detected in environmental media at the individual sites and source areas.	ENSR
30462	- 30466	OU-D Book 16	D	29-Jan-97	OU-D RI/FS Monthly Progress Report No. 3	Progress report for November 1 to December 31, 1996, on implementation of the RI/FS at OU-D.	ENSR
15982	- 16099	OU-D Book 7	D	15-Mar-93	Closure Plan for the Circle Road Drum Site	A closure plan to bring the drum site into compliance with RCRA and closure plan regulations.	EMCON
16100	- 16197	OU-D Book 8	D	23-Jun-93	Sampling/Analysis and QA/QC Plan, Circle Road Drum Site	Work plan to define the presence and extent of contamination at the Circle Road Drum Site.	EMCON
16198	- 16381	OU-D Book 8	D	03-Aug-93	Sampling and Analysis Plan, Site 4, Building 35-752, High Frequency Transmitter Site, Fort Richardson, Alaska	Presents the plans to guide field and laboratory operations for the UST site assessment/RI at Building No. 35-752.	HLA

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16382	- 16435	OU-D Book 8	D	24-Sep-93	Sampling and Analysis Plan, PSE, Building 726, Post Laundry	Work plan to perform a PSE of the plume of chlorinated dry-cleaning solvents.	USAED Alaska
16436	- 16585	OU-D Book 8	D	15-Dec-93	Closure Plan for Building 704, Fort Richardson, Alaska	Presents the procedures and analytical guidelines to be used during the closure activities at Building No. 704 (central storage building for Army vehicles and heavy equipment).	ENSR
16586	- 16697	OU-D Book 8	D	14-Jan-94	Closure Plan for Building 700, Fort Richardson, Alaska	Presents the procedures and analytical guidelines to be used during the closure activities at Building Nos. 700 and 718 (general storage buildings).	ENSR
16698	- 16750	OU-D Book 9	D	15-Jan-94	Draft QA Project Plan for the Closure of Building 704	Presents the procedures and analytical guidelines to be used during the course of closure activities at the Building No. 704 (vehicle storage area) closure area.	ENSR
16751	- 16802	OU-D Book 9	D	15-Jan-94	QA Project Plan for the Closure of Building 700	Presents the procedures and analytical guidelines to be used during the course of closure activities at Building No. 700, within the facility engineering complex.	ENSR
15868	- 15981	OU-D Book 7	D	15-Feb-94	Closure Plan for Building 35-752	Presents the procedures and analytical guidelines to be used during the course of closure activities at Building No. 35-752 (former generator building).	None Given
16803	- 16906	OU-D Book 9	D	15-Feb-94	Closure Plan for Building 45-590	Presents the plan for final closure of Building No. 45-590 at Fort Richardson.	ENSR
16907	- 16956	OU-D Book 9	D	15-Feb-94	Draft QA Project Plan for the Closure of Building 35-752	Presents the procedures and analytical guidelines to be used during the course of closure activities at Building No. 35-752 (generator building).	ENSR
16957	- 17010	OU-D Book 9	D	15-Feb-94	Draft QA Project Plan for the Closure of Building 45-590	Presents the procedures and analytical guidelines to be used during the course of closure activities at the Building No. 45-590 (auto craft shop) closure area.	ENSR
17011	- 17115	OU-D Book 9	D	15-Oct-95	Closure Plan for the Landfill, Fort Richardson, Alaska	Describes the Fort Richardson landfill; surroundings; and previous investigations, closure plans, the recommended closure design, and the sampling and analysis plan for the required monitoring.	E & E
30467	- 30483	OU-D Book 16	D	14-Aug-97	Field Sampling Plan, OU-D Modification 2	An addendum to the management plan for the RI/FS ENSR will conduct at OU-D. Sampling pertains to Building 45-590, Building 726, and the fish hatchery.	ENSR
17116	- 17124	OU-D Book 9	D	28-Apr-91	Review of Available Data and Site Visit, Circle Road Drum Site	Summary of a field visit and available background data for the Circle Road Drum Site.	America North
17125	- 17149	OU-D Book 9	D	30-Sep-91	Chemical Data Report, Circle Road Drum Site	Summary of fieldwork and sample data results for summer 1991 field activities at the Circle Road Drum Site.	USAED Alaska
17150	- 17322	OU-D Book 10	D	15-Feb-93	Draft Site Investigation Report (RI/FS), Circle Road Drum Site	Report of findings of a subsurface investigation in support of RI/FS and closure actions at the Circle Road Drum Site.	EMCON

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17323	- 17333	OU-D Book 10	D	04-Nov-93	Additional Information Regarding OU-D Sites	Background information for battery acid handling at Building No. 796 and oiling practices for the dust palliative area.	DPW
17334	- 17340	OU-D Book 10	D	15-Nov-93	Chemical Data Report, Circle Road Drum Site	Results of soil sampling conducted to identify contamination discovered during a removal action at the Circle Road Drum Site.	USAED Alaska
17341	- 17341	OU-D Book 10	D	23-Nov-93	Synopsis of Findings: Draft Interim Site Assessment/RI, Site 4, Building 35-752	Summary of significant field results, Building No. 35-752.	DPW
17342	- 17351	OU-D Book 10	D	15-Dec-93	RCRA Closure Status for Buildings 700, 704, and 755	Site history and closure costs for Building Nos. 700, 704, and 755.	ENSR
17352	- 17567	OU-D Book 10	D	13-Apr-94	Final Site Assessment/Release Investigation and Corrective Action Plan, Site 4, Building 35-752, High Frequency Transmitter Site, Fort Richardson, Alaska	Presents the results of the UST release investigation.	HLA
17568	- 17722	OU-D Book 11	D	15-Oct-94	Final Closure Report, Building 45-590, Fort Richardson, Alaska	Results of the investigation to verify that an area of hazardous waste storage near Building No. 45-590 was categorized as "clean closed" according to RCRA.	EMCON
17723	- 17754	OU-D Book 11	D	03-Nov-94	Federal Facilities Agreement Meeting Summary, OU-D, November 3, 1994	A summary of all actions taken at those sites within OU-D.	None Given
17755	- 17889	OU-D Book 11	D	15-Mar-95	Draft Quarterly Groundwater Monitoring Report, July 1995 Sampling Event, Building 45-590	Presents results of groundwater sampling at Building No. 45-590.	EMCON
17890	- 17990	OU-D Book 11	D	15-Mar-95	Draft Quarterly Groundwater Monitoring Report, March 1995 Sampling Event, Building 45-590	Presents results of groundwater sampling at Building No. 45-590.	EMCON
17991	- 17991	OU-D Book 11	D	15-Aug-95	Comments, PSE, Building 726, OU-D	Comments on the final PSE for Building No. 726.	EPA
17992	- 18121	OU-D Book 11	D	15-Aug-95	Final PSE-2, Building 45-590	Review of existing data and documents, and a recommended course of action for the site.	EMCON
30484	- 30523	OU-D Book 16	D	11-Feb-97	Draft Chemical Data Quality Review Report, Remedial Investigation, OU-D, Fort Richardson, Alaska	An evaluation of the quality of laboratory analytical results for environmental samples collected by ENSR as part of the RI for OU-D.	HLA
30524	- 30557	OU-D Book 16	D	09-Jul-97	Final OU-D Field Sampling Plan, Addendum 2	Includes comments and responses to comments on the draft (Addendum 1). As part of the postwide RA, this plan was prepared as an addendum to the management plan for the RI/FS to be conducted at OU-D.	ENSR
30558	- 30717	OU-D Book 16	D	15-Aug-97	Draft Remedial Investigation Report, Operable Unit D	Presents the results of the RI for OU-D. The RI included Buildings 35-752, 45-590, 726, and 796.	ENSR

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30718	- 31184	OU-D Book 16 & 17	D	23-Sep-97	Risk Assessment Report, OU-D, Draft	Provides HHRA and ERA results based on analytical data collected under previous investigations and the RI.	ENSR
31185	- 31189	OU-D Book 17	D	13-Oct-97	Building 35-752 Laboratory Analysis Report	Analytical results for three soil samples collected at Building 35-752. Analysis was for PCBs only.	CT&E Environmental Services
18122	- 18123	OU-D Book 11	D	14-Feb-92	Comments, Sampling/Analysis and QA/QC Plan, Draft Closure Plan, Circle Road Drum Site	Concerns and comments on the Circle Road Drum Site sampling and analysis and QA/QC plans, and the Circle Road Drum Site draft closure plan.	ADEC
18124	- 18140	OU-D Book 11	D	16-Jun-93	Comments, Circle Road Drum Site and Building 700 Closure Plans	EPA comments on the Circle Road Drum Site closure plan, and the Building No. 700 closure plan.	EPA
18141	- 18144	OU-D Book 11	D	06-Jul-93	Comments, Fort Richardson Landfill Closure Plan	ADEC comments on the February 1992 Fort Richardson landfill closure plan.	ADEC
18145	- 18170	OU-D Book 11	D	23-Aug-93	Comments, Closure Plans for Buildings 35-752, 45-590, and 704	Transmittal of EPA's comments on the Building No. 35-752 closure plan, Building No. 45-590 closure plan, and Building No. 704 closure plan.	DPW
18171	- 18172	OU-D Book 11	D	30-Nov-93	Draft Interim Site Assessment/Remedial Investigation, Site 4, Building 35-752, High Frequency Transmitter Site, Comments	Review comments on Draft Interim Site Assessment/Remedial Investigation Site 4, Building 35-752, High Frequency Transmitter Site.	ADEC
18173	- 18178	OU-D Book 11	D	24-Feb-94	Draft Interim Site Assessment/Remedial Investigation, Site 4, Building 35-752, High Frequency Transmitter Site, Comments	Review comments on Draft Interim Site Assessment/Remedial Investigation Site 4, Building 35-752, High Frequency Transmitter Site.	EPA
18179	- 18184	OU-D Book 11	D	07-Mar-94	Comments, Ft. Richardson Landfill Closure Plan	ADEC comments on the Fort Richardson landfill closure plan.	ADEC
18185	- 18191	OU-D Book 11	D	08-Aug-94	Response to Comments, Building 726 PSE-2 Work Plan	Response to EPA comments on the PSE-2 work plan for Building No. 726.	DPW
18192	- 18196	OU-D Book 11	D	09-Sep-94	Response to Comments, OU-D Work Plan	A response to EPA and ADEC comments on the OU-D work plan.	ENSR
18197	- 18198	OU-D Book 11	D	15-Jan-95	Response to Comments, Ft. Richardson Landfill Closure Plan	Response to ADEC comments of March 7, 1994.	E & E
18199	- 18201	OU-D Book 11	D	10-Mar-95	Meeting Request/Meeting Notes, Ft. Richardson Landfill Closure Plan	A letter requesting a meeting concerning the landfill and an attached summary of the meeting with personnel from DPW, USAED Alaska, ADEC, and E & E.	DPW
18202	- 18202	OU-D Book 11	D	25-Oct-95	Comments, Ft. Richardson Fourth Quarterly Report, 1995	Comments concerning the Army's delay of the OU-D RI/FS management plan pending a Federal Facilities Agreement project managers' determination of which sites will be included in the plan.	ADEC

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18203	- 18203	OU-D Book 11	D	31-Oct-95	Comments, Ft. Richardson Fourth Quarterly Report, 1995	Comments concerning the Army's delay of the OU-D RI/FS management plan pending a Federal Facilities Agreement project managers' determination of which sites will be included in the plan.	EPA
18204	- 18205	OU-D Book 11	D	14-Nov-95	Response to Comments, OU-D RI/FS Management Plan	A response to EPA's letter of October 31, 1995, concerning preparation of the OU-D RI/FS management plan, and the OU-D redlined final PSE-2.	DPW
23399	- 23403	OU-D Book 13	D	10-Jan-96	Comments on OU-B Approach Document and OU-D Management Plan	Includes review comments on the OU-D management plan, OU-B groundwater modeling approach document, and the OU-B baseline RA approach document.	EPA
26069	- 26085	OU-D Book 13	D	14-Jun-96	draft-final RI/FS Management Plan Transmittal Letter Plus Annotated Comments	Response to comments.	ENSR
31190	- 31190	OU-D Book 17	D	29-Apr-97	Comments, Draft Approach Document Risk Assessment, OU-D	Comments on the draft approach document and RA report for OU-D.	ADEC
31191	- 31191	OU-D Book 17	D	06-May-97	Comments, Draft Field Sampling Plan, Addendum 1, OU-D	CHPPM comments on the draft OU-D field sampling plan, Addendum 1.	CHPPM
31192	- 31197	OU-D Book 17	D	06-May-97	Comments, OU-D Risk Assessment Approach Document	EPA comments on the OU-D risk assessment approach document.	EPA
31198	- 31199	OU-D Book 17	D	28-May-97	Comments, OU-D, Draft Field Sampling Plan, Addendum 1	EPA comments on the draft OU-D field sampling plan.	EPA
31200	- 31200	OU-D Book 17	D	29-May-97	Comments, OU-D, Draft Field Sampling Plan, Addendum 1	ADEC comments on the draft OU-D field sampling plan.	ADEC
31201	- 31201	OU-D Book 17	D	04-Jun-97	Comments, OU-D, Risk Assessment Approach Document	CHPPM comments on the draft OU-D RA approach document.	CHPPM
31202	- 31202	OU-D Book 17	D	06-Jun-97	Comments, Draft Field Sampling Plan, Addendum 1, OU-D	CHPPM comments on the draft OU-D field sampling plan.	CHPPM
31203	- 31203	OU-D Book 17	D	18-Aug-97	Comments, OU-D, Draft Field Sampling Plan, Addendum 2	ADEC comments on the draft OU-D field sampling plan, Addendum 2.	ADEC
31204	- 31205	OU-D Book 17	D	18-Aug-97	Comments, OU-D, Draft Remedial Investigation Report	ADEC comments on the draft OU-D RI report, dated August 26, 1997.	ADEC
31206	- 31207	OU-D Book 17	D	30-Oct-97	Comments, Draft OU-D, Risk Assessment, September 1997	Review comments.	ADEC
31208	- 31224	OU-D Book 17	D	31-Oct-97	Comments, OU-D, Draft RI and Baseline RA	Review comments.	EPA

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31225	- 31230	OU-D Book 17	D	12-Dec-97	Comments, Draft Risk Assessment Report, OU-D, September 1997	Review comments.	CHPPM
26086	- 26115	OU-D Book 13	D	15-Jan-96	Draft Pilot Bioventing Remediation System One Year Shut Down Test Summary Report, Building 45-590, Fort Richardson, Alaska	Presents results of a December 1995 and May 1995 shutdown of the Building 45-590 bioventing system.	EMCON
31231	- 31270	OU-D Book 17	D	21-Jan-97	Draft Pilot Bioventing Remediation System, Fourth Semiannual Shutdown Test Summary Report, Building 45590	As part of the corrective action plan for Building 45-590, this report presents a history of the program and results of the December 1996 respiration tests.	EMCON
18206	- 18214	OU-D Book 11	D	08-Jun-95	Clean Soils and Water from Field Investigation on Fort Richardson	Summary of "clean" IDW from OU-D.	ENSR
18215	- 18215	OU-D Book 11	D	12-Jun-95	Disposal of IDWs from Field Investigation at Fort Richardson	No need for further treatment required for IDW to be disposed of onsite.	ADEC
33071	- 33191	OU-D Book 18	D	30-Sep-97	OUD Field Sampling Plan Addendum 2 - Final	Review of proposed sampling plan for the postwide risk assessment at OUD.	ENSR
33192	- 33197	OU-D Book 18	D	31-Oct-97	Draft Risk Assessment Report, Operable Unit D, Fort Richardson, Alaska, September 1997	U.S. Army Center for Health Promotion and Preventive Medicine's review and comments of Draft Risk Assessment Report for OUD	Army
33198	- 33203	OU-D Book 18	D	12-Dec-97	Draft Risk Assessment Report, Operable Unit D, Fort Richardson, Alaska	Review and comments of Draft Risk Assessment Report for OUD.	Army
33204	- 33214	OU-D Book 18	D	03-Jun-98	Operable Unit D, Draft Post Wide Risk Assessment	USEPA comments on the draft postwide Risk Assessment for OUD.	EPA
33215	- 33222	OU-D Book 18	D	22-Jun-98	Draft Postwide Risk Assessment, Fort Richardson, Alaska, April 1998	U.S. Army Center for Health Promotion and Preventive Medicine's comments to the Draft Postwide Risk Assessment for OUD.	Army
33223	- 33244	OU-D Book 18	D	24-Dec-97	Remedial action objectives technical Memorandum for Operable Unit d, Feasibility Study, Fort Richardson, Alaska	Highlights ARARs based on status of the RI and RA for OUD.	ENSR
31271	- 31292	OU-D Book 17	D	24-Dec-97	Remedial Action Objectives Technical Memorandum for the FS for OU-D	Technical memorandum includes draft ARARs, and demonstrated effective treatment technologies for sites within OU-D.	ENSR
33245	- 36909	OU-D Books 19-25	D	23-Nov-98	Final RI/FS Operable Unit D, Fort Richardson, Alaska	Presents the findings of the RI/FS in six volumes. Includes all pertinent data to support all RI, FS, and risk assessments for all sites in OUD. (Vol. 1a: 33245-34018 (Book 19); Ib: 34019-35563 (Book 20) ; II a & b: 34564-36705 (Books 20 - 25), III:	ENSR

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26116	- 26958	OU-D Books 13 -15	D	15-Aug-96	Final Management Plan, OU-D, RI/FS, Fort Richardson, Alaska	Presents the approach and methodologies to be used to conduct the RI for OU-D.	ENSR
36910	- 36918	OU-D Book 26	D	09-Dec-97	Overview Letter and Schedule for Operable Unit D, Feasibility Study, Fort Richardson, Alaska	Provides a description of each area in OUD that the Feasibility Study will investigate. Highlights the objectives of the feasibility study.	ENSR
41075	- 41107		D	01-Apr-99	The Proposed Plan for Remedial Action at Operable Unit D	Presents the cleanup strategies for Operable Unit-D	Joint Agency
41108	- 41124		D	13-May-99	Proposed Plan for Remedial Action at Operable Unit D, Ft. Richardson, AK	Transcription of the presentation for the proposed plan for OU-D	DPW
26959	- 26960	OU-D Book 15	D	24-Sep-96	Proposed Amendment to the OU-D Field Sampling Plan	This letter modifies the field sampling plan to include tissue analysis of pond macrophytes and benthic macroinvertebrates, and drops the single sediment toxicity test and replaces it with a quantitative and qualitative evaluation of the benthic macroinve	ENSR
36919	- 36927	OU-D Book 26	D	07-May-98	Draft Final Remedial Investigation/Feasibility Study, Operable Unit D, Fort Richardson, Alaska, February 1998: Volumes I, II, III	Review and comments of Draft Final Remedial Investigation/Feasibility Study for OUD.	Army
26963	- 26964	OU-D Book 15	D	05-Jan-96	ADEC Comments on Draft CSMs, DQOs, ARARs, OU-D, December 1995	Review comments.	ADEC
26961	- 26962	OU-D Book 15	D	05-Jan-96	Comments, Draft OU-D Management Plan	Review comments.	ADEC
26965	- 26966	OU-D Book 15	D	29-Jan-96	Comments, OU-D Draft CSMs, DQOs, and ARARs, December 1995	Review comments.	ADEC
26967	- 26968	OU-D Book 15	D	22-Mar-96	Comments, OU-D Draft Management Plan, February 1996	Review comments.	ADEC
26969	- 26974	OU-D Book 15	D	28-Mar-96	Comments, OU-D Draft Management Plan, February 1996	Review comments.	EPA
26975	- 26976	OU-D Book 15	D	10-Apr-96	Comments, OU-D Draft Management plan, February 1996	Review comments.	CHPPM
26977	- 26983	OU-D Book 15	D	10-Oct-96	Monthly Progress Report No. 1-August 1-Sept. 30, 1996 for OU-D RI/FS	This letter outlines the work accomplished during the reporting period.	ENSR
36928	- 36928	OU-D Book 26	D	14-Jan-98	Remedial Action Objectives Technical Memorandum for OUD, Fort Richardson, Alaska dated December 30, 1997.	Alaska DEC comments to Remedial Action Objectives Technical Memorandum for OUD.	ADEC

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36929	- 36931	OU-D Book 26	D	27-Jan-98	Operable Unit D, Remedial Action Objectives Technical Memorandum	USEPA comments on the remedial action objectives, as part of the Feasibility study for OUD.	EPA
36932	- 36941	OU-D Book 26	D	23-Mar-98	Operable Unit D, Draft Remedial Investigation/Feasibility Study Report	USEPA comments on the draft Remedial Investigation/Feasibility Study for OUD.	EPA
36942	- 36944	OU-D Book 26	D	24-Mar-98	Draft final RI/FS Volumes I Remedial Investigation, II Risk Assessment, and III Feasibility Study for Operable Unit D, Fort Richardson, Alaska, February 1998	Alaska DEC comments to the Draft Final RI/FS for OUD.	ADEC
36945	- 36947	OU-D Book 26	D	08-Oct-98	OUD Remedial Investigation/Feasibility Study Draft Final, Fort Richardson, Alaska, September 1998	Alaska DEC comments to the Draft Final Remedial Investigation/ Feasibility Study for OUD	ADEC
36948	- 36955	OU-D Book 26	D	23-Oct-98	Operable Unit D, Draft Final Remedial Investigation/Feasibility Study Report and Tech Memo	USEPA comments to the draft final RI/FS for OUD.	EPA
41125	- 41131		D	07-Jan-99	Memorandum on Draft ROD, OU-D	Environmental Center's comments on Draft ROD for OU-D	AEC
36956	- 36957	OU-D Book 26	D	15-Jan-99	Draft Final Feasibility Study, Volume III, RI/FS Operable Unit D, Fort Richardson, Alaska, November 1998	The U.S. Army Center for Health Promotion and Preventive Medicine's comments to the draft final RI/FS for OUD.	Army
41132	- 41140		D	22-Feb-99	Comments to the Draft Proposed Plan for OU-D	EPA comments to the Draft Proposed Plan for OU-D	EPA
41141	- 41142		D	03-Mar-99	Comments to the Final Feasibility Study, Volume III, RI/FS OU-D and Draft Proposed Plan, OU-D	Health Promotion and Preventive Medicine's comments to Volume III of OU-D's Final Feasibility Study and OU-D's Draft Proposed Plan.	CHPPM
41143	- 41143		D	19-Apr-99	Memorandum for Request of Schedule Change for OU-D	ADEC's agreement to extend Draft ROD due date.	ADEC
41144	- 41146		D	27-Apr-99	Draft Record of Decision, OU-D	Letter from DPW describing schedule changes for draft ROD	DPW
41147	- 41148		D	29-Apr-99	OU-D Enforceable Schedule Extension Request	EPA's agreement to extend Draft ROD due date.	EPA
41149	- 41151		D	22-Jun-99	Draft Record of Decision Operable Unit D Ft, Richardson, AK, May 28, 1999	ADEC's comments on Draft ROD for OU-D	ADEC
41152	- 41154		D	07-Jul-99	Draft Record of Decision, Operable Unit D, Ft. Richardson, AK	Planning and Environmental Division's comments on Draft ROD for OU-D	HQ USA Pacific

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41155	- 41166		D	07-Jul-99	Memorandum on Draft ROD, OU-D	EPA's comments on Draft ROD for OU-D	EPA
41167	- 41167		D	16-Jul-99	Memorandum on Draft ROD, OU-D	Environmental Health's comments for Draft ROD, OU-D	CHPPM
41168	- 41170		D	31-Aug-99	Schedule Change for Operable Unit D, Fort Richardson, AK	Army's request for extension on delivery of Draft ROD for OU-D	DPW
36958	- 36960	OU-D Book 26	D	01-Jun-98	Schedule Change for Operable Unit D, Fort Richardson, Alaska	Request by the U.S. Army for an extension to the delivery date of the draft ROD for OUD.	USAED Alaska
36961	- 36961	OU-D Book 26	D	11-Jun-98	Request for Schedule Change for Operable Unit D, Fort Richardson, Alaska	Alaska DEC agreement to Army's request for extension on the draft ROD delivery date.	ADEC
36962	- 36963	OU-D Book 26	D	19-Jun-98	Operable Unit D Enforceable Schedule Extension Request	USEPA agreement to the Army's request for extension on the draft ROD delivery date.	EPA
36964	- 36965	OU-D Book 26	D	16-Jul-98	Draft Proposed Plan for Operable Unit D, Fort Richardson, Alaska July 1, 1998	Alaska DEC comments on the draft Proposed Plan for Operable Unit D.	ADEC
36966	- 36968	OU-D Book 26	D	31-Aug-98	Schedule Change for Operable Unit D, Fort Richardson, Alaska.	Request by the Army for an extension to the delivery date for the Draft ROD.	USAED Alaska
36969	- 36969	OU-D Book 26	D	04-Sep-98	Request for Schedule Change for Operable Unit-D, Fort Richardson, Alaska, August 1998	Alaska DEC agreement to the Army's request for an extension to the draft ROD delivery date.	ADEC
36970	- 36971	OU-D Book 26	D	17-Sep-98	OUD Enforceable Schedule Extension Request	USEPA agreement to the Army's request for an extension to the draft ROD delivery date.	EPA
41171	- 41171		D	24-Aug-99	Letter re Draft Final ROD, OU-D	ADEC's comments for Draft Final ROD, OU-D	ADEC
41172	- 41179		D	27-Aug-99	Operable Unit D, Draft Final Record of Decision	EPA's comments for Draft Final ROD, OU-D	EPA
41180	- 41182		D	03-Sep-99	Memorandum re Draft Final Record of Decision, Operable Unit D, Fort Richardson, AK	Planning & Environmental Division's comments on Draft Final ROD for OU-D	HQ USA Pacific
41183	- 41184		D	13-Sep-99	Letter re Status of ROD, OU-D, Ft. Richardson, AK	Army's revised schedule four OU-D, ROD	DPW
41185	- 41185		D	20-Sep-99	MEMO re Draft Final ROD, OU-D	Health Promotion and Preventive Medicine's comments on Draft Final ROD for OU-D	CHPPM

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41186	- 41226		D	01-Jul-99	Vapor Extraction System Operational Status Report, Bldg. 986 Remedial Action, DACA85-94-D-0016, Delivery Order 8, Fort Richardson, AK	Presents a summary of VE system performance from 1/13/98 to 4/19/99	EMCON Alaska
41227	- 41239		D	23-Aug-99	Contract #DACA85-98-D-0017, Delivery Order 12, Technical Memorandum, Groundwater Monitoring, OU-D, Ft. Richardson, AK	Identifies data gaps for groundwater after the completion of the RI/FS and ROD for OU-D.	USAED Alaska
18216	- 18239	FTR Book 1	FTR	28-Oct-83	Evaluation of Solid Waste Disposal Practices, Fort Richardson and Wainwright, Alaska	Evaluation of solid waste disposal practices and facilities with regard to protection of environmental quality and compliance with current regulations as they relate to sanitary landfill permitting and groundwater monitoring.	AEHA
18240	- 18241	FTR Book 1	FTR	06-Jul-90	DERP Program Review, Army Installation Restoration Program, FTW-D-001, Ft. Richardson Landfill Plume Investigation	Description, history, list of contaminants, mode of cleanup, status, issues and concerns, milestones, and fund status of an unlined landfill at Fort Richardson.	None Given
18242	- 18243	FTR Book 1	FTR	06-Jul-90	DERP Program Review, Army Installation Restoration Program, WN-D-008, All Fort Assessment, GW Monitoring, and All Well Installation	Description, history, list of contaminants, mode of cleanup, status, issues and concerns, milestones, and fund status of the existing monitoring wells at Fort Richardson.	None Given
18244	- 18257	FTR Book 1	FTR	15-Jan-92	Installation Action Plan for Fort Richardson	Review of each OU's condition and funding.	USAED Alaska
20281	- 20281	FTR Book 1	FTR	14-Jul-92	Closure of Solid Waste Landfill at Ft. Richardson	Discussion of current situation at the landfill.	DPW
18258	- 18328	FTR Book 1	FTR	08-Apr-94	Sampling and Analysis Plan, Groundwater Monitoring, Fort Richardson, Alaska	Outlines the procedures for chemical contamination monitoring in the groundwater of Fort Richardson.	USAED Alaska
26984	- 27086	FTR Book 5	FTR	06-Nov-96	Final Landfill Closure Baseline Study, June-July 1996	Analytical results of groundwater sampling performed in June and July 1996	USAED Alaska
18329	- 18336	FTR Book 1	FTR	08-Jul-93	Fort Richardson Landfill, June 17, 1993 Inspection	Summary of site conditions reported by ADEC after its inspection of the landfill.	ADEC
18337	- 18400	FTR Book 1	FTR	15-Feb-90	Sampling, Analysis, & QA/QC Plan for Groundwater Monitoring at Fort Richardson, Alaska	Sampling and data quality procedures to be used in the assessment of groundwater from existing supply wells, monitor wells, and piezometers at Fort Richardson.	USAED Alaska
18401	- 18571	FTR Book 1	FTR	03-Apr-90	Fort Richardson Landfill Work Plan, Part I & II	Methods to be employed for completion of the Fort Richardson landfill hydrogeological investigation; includes the sampling and analysis plan, site safety and health plan, and subsurface exploration plan.	E & E

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36972	- 36972	FTR Book 9	FTR	26-Oct-98	Environmental Noise Management Plans, Fort Richardson and Fort Wainwright	Notification to U.S. Army Center for Promotion and Preventative Medicine of noise management plan delivery order.	USAED Alaska
18572	- 18580	FTR Book 1	FTR	01-Dec-89	Results of Chemical Analyses, Fort Richardson Landfill, Groundwater Monitoring	QA report and groundwater results, a report from USAED Alaska, cooler receipts and chain-of-custody forms, and diskettes with all reported data for the landfill wells at Fort Richardson.	USAED Alaska
18581	- 18712	FTR Book 1	FTR	15-Aug-90	Draft of the Fort Richardson Landfill Geophysical Surveys Report	The principal goal of the geophysical surveys is to help select the location and number of monitoring wells needed to efficiently characterize the groundwater in the landfill area.	E & E
18713	- 18784	FTR Book 2	FTR	28-Jun-91	Geotechnical Report for Groundwater Monitoring Network, Fort Richardson, Alaska	1990 chemical and hydrogeological data from two sampling events during spring and fall 1990.	USAED Alaska
18785	- 18792	FTR Book 2	FTR	13-Aug-91	Basewide Groundwater Monitoring Study and Landfill, Chemical QA Data Report	Chemical QA report for the Fort Richardson basewide groundwater study and landfill data.	USAED Alaska
18793	- 18947	FTR Book 2	FTR	20-Feb-92	Fort Richardson Landfill Report	An investigation and report on the hydrogeology of, and leaching from, the landfill at Fort Richardson.	E & E
18948	- 19118	FTR Book 2	FTR	16-Jul-92	Geotechnical Report for Groundwater Monitoring Network, Fort Richardson, Alaska	1991 chemical and hydrogeological data from two sampling events in May and November 1991.	USAED Alaska
19119	- 19128	FTR Book 2	FTR	27-Jan-93	Fort Richardson and Fort Greely Groundwater Monitoring Well Network Sampling Results	Results of groundwater sampling conducted at Fort Richardson in October and November 1992.	ENSR
19129	- 19197	FTR Book 2	FTR	15-Apr-94	Geotechnical Report for Groundwater Monitoring Network, Fort Richardson, Alaska	Number and state of groundwater wells present at Fort Richardson in 1994 and recommendations for new wells; boring logs are provided.	USAED Alaska
19198	- 19330	FTR Book 3	FTR	19-Jul-94	Chemical Data Report, Groundwater Study (Spring 1994)	Results of a groundwater quality investigation for Fort Richardson.	USAED Alaska
19331	- 19484	FTR Book 3	FTR	15-May-95	Final Addendum to the Fort Richardson Landfill Report, Anchorage, Alaska	As a result of the recommendations presented in the 1992 Fort Richardson landfill report, USAED Alaska directs E & E to sample, log, and monitor the installation of three additional monitoring wells at the Fort Richardson landfill and to complete a report	E & E
19485	- 19508	FTR Book 3	FTR	09-Oct-90	Final Phase, Results of the Analysis of Solid Waste Samples, Hazardous Waste Study No. 37-26-0474-91	Summary of the sampling and analysis of more than 200 containers of potentially hazardous waste located at four sites on Fort Richardson.	AEHA

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19509	- 19564	FTR Book 3	FTR	09-Oct-90	Phase I, Results of the Analysis of Solid Waste Samples, Hazardous Waste Study No. 37-26-0474-91	Summary of the sampling and analysis of more than 200 containers of potentially hazardous waste located at four sites on Fort Richardson.	AEHA
19565	- 19595	FTR Book 3	FTR	09-Oct-90	Phase II, Results of the Analysis of Solid Waste Samples, Hazardous Waste Study No. 37-26-0474-91	Summary of the sampling and analysis of more than 200 containers of potentially hazardous waste located at four sites on Fort Richardson.	AEHA
36973	- 36981	FTR Book 9	FTR	30-Oct-98	Building 45-070, July 1998 GW sampling Memorandum, UST Release Investigation, Fort Richardson, Alaska	Reviews July 1998 sampling episode of five monitoring wells at Building 45-070.	DOWL/Ogden Joint Venture
36982	- 36994	FTR Book 9	FTR	17-Nov-98	Final Letter Report, Well Installation, Building No. 762, Fort Richardson, Alaska,	Summarizes monitor well installation and sampling activities at Building 762.	DOWL/Ogden Joint Venture
36995	- 37004	FTR Book 9	FTR	27-Jul-98	Install/Replace Oil-Water Separators (FTR115), Narrative Changes to Drawings, Building 995, Fort Richardson, Alaska	Summary of procedures and standards for construction of oil-water separator.	USAED Alaska
19596	- 19635	FTR Book 3	FTR	15-Jan-94	Sampling Report for Groundwater Monitoring Network at Fort Richardson, Alaska	Summarizes new groundwater data collected from the monitoring well network on the main containment as well as water supply wells located on various training ranges.	ENSR
37005	- 37014	FTR Book 9	FTR	25-Jun-98	PCB Annual Document Logs 1997, Fort Richardson, Alaska	Summary of PCB storage and disposal during 1997.	CH2M Hill
37015	- 37063	FTR Book 9	FTR	04-Sep-98	IDW Water Treatment System Design and Implementation/Soil ISDW Staging facility operation, Fort Richardson, Alaska	Summaries the amount of IDW water and soil treated and discharged or disposed of during current reporting period.	ENSR
37064	- 37272	FTR Book 9	FTR	11-Jan-99	700/718 Remedial Action Report, Fort Richardson, Alaska	Presents the findings of the remedial action to treat contaminated soil near Building 700/718.	EMCON Alaska
19636	- 19717	FTR Book 3	FTR	15-Apr-95	Areawide Community Relations Plan, Fort Richardson, Anchorage, Alaska	Identifies current issues of community concern regarding known and potential contamination at Fort Richardson and includes proposals for community involvement activities to address these concerns.	E & E
27087	- 27341	FTR Book 5	FTR	18-Apr-96	Final Environmental Staging Facility Work Plan, Fort Richardson, Alaska	The work plan describes the design and operation of a contractor staging facility for support of environmental investigations and restoration at Fort Richardson. The proposed facility includes an equipment decontamination area and a liquid IDW treatment	ENSR

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31293	- 31319	FTR Book 8	FTR	23-Sep-97	Work Plan and Site Safety and Health Plan, Fort Richardson Methane Gas Survey	A work plan to perform a methane gas survey to meet the requirements of the landfill closure plan. A general overview of known site conditions, a description of the sampling equipment and methods to be used, and a description of the survey approach are p	Hart Crowser
19718	- 19731	FTR Book 4	FTR	16-Jul-92	Groundwater Monitoring Network, Fort Richardson	As part of the Fort Richardson basewide groundwater monitoring program begun in 1990, groundwater samples are collected and analyzed twice a year; this report summarizes the 1991 data.	USAED Alaska
19732	- 19744	FTR Book 4	FTR	15-Apr-94	Installation Restoration Program FY94 Second Quarter Update	Includes FY94 second quarter updates for the OU-A RI/FS management plan, OU-D, groundwater monitoring, Poleline Road Disposal Area, and Eagle River Flats Impact Area.	Army
19751	- 19751	FTR Book 4	FTR	10-May-94	Compliance of Containerized Purge Water with AWWU Discharge Limitations	Containerized purge water resulting from the fall 1991 groundwater study is cleared for disposal in the Fort Richardson sewer system without violating the Fort's Anchorage Water and Waste Water Utility permit.	USAED Alaska
19752	- 19763	FTR Book 4	FTR	15-Jun-94	Installation Restoration Program, FY94, Fourth Quarter Update	Project summaries for each OU at Fort Richardson.	Army
19746	- 19750	FTR Book 4	FTR	15-Sep-94	Installation Restoration Program FY94 Third Quarter Update	Includes FY94 third quarter updates for the Poleline Road Disposal Area, USTs, and Eagle River Flats.	Army
19764	- 19769	FTR Book 4	FTR	15-Dec-94	Installation Restoration Program FY94 Third Quarter Update	Includes FY94 third quarter updates for the OU-A RI/FS management plan, OU-D groundwater monitoring, Poleline Road Disposal Area, and Eagle River Flats Impact Area.	Army
19770	- 19782	FTR Book 4	FTR	15-Jun-95	Installation Restoration Program FY95 Second Quarter Update	Includes FY94 second quarter updates for the OU-A management plan, OU-D groundwater monitoring, Poleline Road Disposal Area, and Eagle River Flats Impact Area.	Army
19783	- 19845	FTR Book 4	FTR	15-Oct-95	Draft Background Data Analysis Report	A study performed to determine the background concentrations of various chemicals at Fort Richardson, using previously existing data for soil and groundwater.	E & E
19846	- 20036	FTR Book 4	FTR	15-Nov-95	Chemical Data Report, Groundwater Study, Fall 1994 and Spring 1995	Data results from two sampling events conducted to continue a basewide groundwater quality study.	USAED Alaska
27342	- 27463	FTR Book 6	FTR	01-Apr-96	Final Background Data Analysis Report, Fort Richardson, Alaska	An analysis of analytical data at Fort Richardson to determine background levels of various inorganic compounds and pesticides in soil and groundwater.	E & E
31320	- 31359	FTR Book 8	FTR	15-May-97	Landfill Closure Study, Fort Richardson, Alaska	Presents analytical results for groundwater sampling performed by the Technical Engineering Section of USAED Alaska. Water samples were collected from nine of 13 monitoring wells located around the landfill.	USAED Alaska

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31360	- 31371	FTR Book 8	FTR	15-Dec-97	Installation Restoration Program FY97 Fourth Quarter Update	Presents a summary of environmental restoration projects at Fort Richardson.	Army
37273	- 37414	FTR Book 9	FTR	01-Feb-98	Final Risk Assessment, Building 47-203, Fort Richardson, Alaska	Evaluates the potential risks to human health and environment from POL substances in the soils and their potential for migration.	DOWL Ogden Joint Venture
37415	- 37594	FTR Book 10	FTR	25-Mar-98	Final site Investigation Report, UST Remedial Investigation Buildings 772, 35610, 35620, and 59000, Fort Richardson, Alaska	Discusses the release investigation conducted at each building. Identifies, characterizes, and categorizes environmental impacts for each building.	DOWL/Ogden Joint Venture
37595	- 37694	FTR Book 10	FTR	01-Oct-98	Landfill Closure Study, Fort Richardson, Alaska	Presents the analytical results of GW sampling for the landfill closure study. Analysis includes potential contaminants and water quality parameters.	USAED Alaska
20037	- 20037	FTR Book 4	FTR	16-Nov-95	Comments, Background Data Analysis Report, October 1995	Comments on the background data analysis report.	ADEC
20038	- 20041	FTR Book 4	FTR	07-Dec-95	Comments on the Background Study for Fort Richardson	Comments on the background data analysis report.	EPA
27464	- 27476	FTR Book 6	FTR	01-Jan-97	Installation Restoration Program, FY 96, Third and Fourth Quarter Updates	Includes FY96 third and fourth quarter updates for OU-A, OU-B, OU-C, and OU-D; UST; and community relations plan.	USAED Alaska
27477	- 27841	FTR Book 6	FTR	01-Feb-96	Geotechnical Report for Groundwater Monitoring Network, Fort Richardson, Alaska	A study to provide additional information and understanding of the groundwater regime at Fort Richardson.	USAED Alaska
27842	- 28204	FTR Book 6	FTR	10-May-96	Chemical Data Report, Groundwater Study, Fall 1995, Fort Richardson, Alaska	Presents sample results for 60 wells sampled during October 1995 as part of the biannual postwide groundwater study.	USAED Alaska
37695	- 37763	FTR Book 10	FTR	27-Jul-98	Progress Reports, April 6, 1998 through May 8, 1998 and May 8, 1998 through June 2, 1998, Soil Vapor Extraction System Installation, Maintenance and Monitoring, Building 987, Fort Richardson, Alaska	Update on the treatability study for the removal of volatile fuel components from soils north of Building 987.	DOWL/Ogden Joint Venture
37764	- 37798	FTR Book 10	FTR	13-Aug-98	Memorandum - Progress Report, June 2, 1998 through July 2, 1998, Soil Vapor Extraction System Installation, Maintenance and Monitoring - Building 987, Fort Richardson, Alaska	Update on the treatability study for the removal of volatile fuel components from soils north of Building 987.	DOWL/Ogden Joint Venture

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37799	- 37833	FTR Book 10	FTR	25-Sep-98	Progress Reports, July 2, 1998 through August 5, 1998, Soil Vapor Extraction System Installation, Maintenance and Monitoring, Building 987, Fort Richardson, Alaska	Update on the treatability study for the removal of volatile fuel components from soils north of Building 987.	DOWL/Ogden Joint Venture
28205	- 28212	FTR Book 7	FTR	23-May-96	Memorandum: Final Background Data Analysis Report, Fort Richardson, Alaska	Minor errors were found on a few pages of the final Background Data Analysis Report, Fort Richardson, Alaska. The errata sheets have the correct information and should be included in the report.	USAED Alaska
37834	- 37834	FTR Book 10	FTR	05-Jun-98	Draft Postwide Risk Assessment, Fort Richardson, Alaska, April 1998	Alaska DEC comments on the draft Postwide Risk Assessment.	ADEC
28213	- 28242	FTR Book 7	FTR	24-Dec-96	Draft Approach Document, Postwide Risk Assessment	Presents a proposed methodology for generating a basewide RA based on RAs conducted for all OUs and sites addressed under the Federal Facilities Agreement.	Army
41240	- 41252		FTR	12-Nov-99	Contract No. DACA85-99-D-0003, Delivery Order No. 00009; Site Summit Risk Assessment; Fort Richardson	Presents a records search, evaluation of existing data, and update of existing conceptual site model.	E & E
37835	- 37836	FTR Book 10	FTR	01-Oct-98	Funding for Rapid Response System Operations at Fort Richardson, Alaska	Denial for funding of the Rapid Response System deployment and operations during fiscal year 1999.	USAED Alaska
41253	- 41394		FTR	09-Apr-99	Landfill Closure Study Fall 1998	Presents results of groundwater sampling at the Fort Richardson Landfill.	USAED Alaska
20042	- 20066	FTR Book 4	FTR	28-Mar-94	Fort Richardson Environmental Restoration Agreement	Executed Two-Party Agreement between the Army and ADEC.	Alaska Attorney General
20067	- 20144	FTR Book 4	FTR	20-Dec-94	Federal Facility Agreement Under CERCLA	Presents the EPA requirements for hazardous waste site investigation and remediation work to be completed at Fort Richardson.	EPA
37837	- 37938	FTR Book 10	FTR	20-Dec-94	Federal Facility Agreement Under CERCLA	Presents the EPA requirements for hazardous waste site investigation and remediation work to be completed at Fort Richardson. (This document supersedes pages 20067-20144 and 20170-20259 in FTR, due to administrative content error.)	EPA
20145	- 20152	FTR Book 4	FTR	01-Feb-95	ATSDR Site Summary and Site Ranking	ATSDR site summary and site ranking for Fort Richardson.	PHS
28243	- 28272	FTR Book 7	FTR	23-Jul-96	Public Health Assessment for Fort Richardson, CERCLIS No. AK6214522157	A Public health assessment was conducted for each site within each OU. The public health assessment compiles and analyzes relevant health and environmental data, community health concerns, and contaminant exposure pathways.	Army Toxicology Division

41395	- 41972		FTR	01-Apr-99	Subsurface Geologic Investigations of the Ft. Richardson Cantonment Area, Alaska	Presents lithologic and subsurface data for Fort Richardson area	CRREL
20153	- 20154	FTR Book 4	FTR	13-Jul-95	Administrative Record Review Meeting Minutes	Meeting minutes concerning the approach for the administrative record for Fort Richardson.	E & E
20159	- 20161	FTR Book 4	FTR	03-Mar-95	Comments, Community Relations Plan, Fort Richardson	Review comments on the Fort Richardson community relations plan.	EPA
20155	- 20155	FTR Book 4	FTR	21-Sep-95	Comments, Administrative Record	ADEC comments concerning documents in the administrative record for Fort Richardson.	ADEC
20156	- 20158	FTR Book 4	FTR	10-Oct-95	Comments, Administrative Record	EPA comments concerning documents in the administrative record.	EPA
41973	- 41973		FTR	21-Dec-99	Membership on the Ft. Richardson Restoration Advisory Board (RAB)	Letter to Party interested in joining the Ft. Richardson RAB	DPW
20162	- 20162	FTR Book 4	FTR	25-Oct-94	Fort Richardson Community Relations Plan Interview Questions, Draft	Interview questions for the public regarding the CERCLA/Superfund process at Fort Richardson.	E & E
20166	- 20166	FTR Book 4	FTR	15-May-94	National Priorities List, Fort Richardson, Anchorage, Alaska	Brief summary of proposed sites for the NPL.	EPA
37939	- 37939	FTR Book 10	FTR	08-Feb-98	Forth Richardson Restoration Advisory Board Meeting Announcement	Public Notice for the February 12, 1998 RAB meeting. Discusses the agenda, including OUC proposed plan, OUB & D documents for review.	Anchorage Daily News
37940	- 37940	FTR Book 10	FTR	10-Feb-98	The U.S. Army announces a Public Comment Period Advertisement	Public announcement for comments on the final remedial action at OUC.	Anchorage Daily News
37941	- 37941	FTR Book 10	FTR	01-May-98	Fort Richardson Advisory Board Meeting	Public announcement of May 7, 1998, RAB Meeting. Highlights the planned agenda for the meeting.	Anchorage Daily News
37942	- 38007	FTR Book 10	FTR	15-Jul-95	Summary Report of the Fort Richardson Information Meeting Held June 29, 1995, Anchorage, Alaska	Summary of the public meeting regarding the status of environmental cleanup at Fort Richardson.	E & E
20170	- 20259	FTR Book 4	FTR	15-Jul-95	Summary Report of the Fort Richardson Information Meeting Held June 29, 1995, Anchorage, Alaska	Summary of the public meeting regarding the status of environmental cleanup at Fort Richardson.	E & E
20170	- 20259	FTR Book 4	FTR	15-Jul-95	Summary Report of the Fort Richardson Information Meeting Held June 29, 1995, Anchorage, Alaska	Summary of the public meeting regarding the status of environmental cleanup at Fort Richardson.	E & E
20170	- 20259	FTR Book 4	FTR	15-Jul-95	Summary Report of the Fort Richardson Information Meeting Held June 29, 1995, Anchorage, Alaska	Summary of the public meeting regarding the status of environmental cleanup at Fort Richardson.	E & E

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28280	- 28357	FTR Book 7	FTR	14-Mar-96	Summary Report, Fort Richardson Public Meeting, March 14, 1996, Anchorage, Alaska	Summarizes the March 14, 1996, public meeting to inform citizens of Anchorage and Fort Richardson about the progress at the four OUs at Fort Richardson.	E & E
31372	- 31448	FTR Book 8	FTR	19-Mar-97	Meeting Minutes, Fort Richardson Restoration Advisory Board Public Information Meeting	Meeting minutes and support documents from a March 19, 1997 public meeting held at Russian Jack Chalet.	Army
31449	- 31465	FTR Book 8	FTR	09-Oct-97	Restoration Advisory Board Meeting Minutes	Minutes from the October 9, 1997, meeting of the Fort Richardson Restoration Advisory Board.	USAED Alaska
31466	- 31482	FTR Book 8	FTR	19-Nov-97	Draft Meeting Minutes from October 9, 1997 Restoration Advisory Board Meeting.	Contains meeting minutes and other documentation from the October 9, 1997, Restoration Advisory Board meeting conducted at the Russian Jack Chalet.	DPW
38008	- 38019	FTR Book 10	FTR	07-May-98	Fort Richardson Restoration Advisory Board Meeting Minutes	Review of the May 7, 1998 meeting of the RAB.	E & E
38020	- 38035	FTR Book 10	FTR	30-Jun-98	Fort Richardson Restoration Advisory Board Meeting Minutes for May 7, 1998.	Review of old business and new issues for Fort Richardson's operable units.	E & E
38036	- 38051	FTR Book 10	FTR	30-Jun-98	Fort Richardson Restoration Board Advisory Board Meeting Minutes	Presents the minutes of the May 7, 1998, RAB meeting.	E & E
41974	- 41982		FTR	13-May-99	Ft Richardson RAB Meeting Minutes	Outlines the minutes of the May 1999 RAB Meeting	E & E
20163	- 20165	FTR Book 4	FTR	18-Jun-93	EPA News: National Priorities List Proposal	Press release reporting the proposal of Fort Richardson on the NPL.	EPA
20260	- 20263	FTR Book 4	FTR	01-Jun-94	Draft Press Release: Fort Richardson on the National Priorities List	Fort Richardson is placed on the NPL.	Army
20167	- 20167	FTR Book 4	FTR	01-Jun-94	EPA News Release: Fort Richardson on the National Priorities List	Fort Richardson is placed on the NPL.	EPA
20168	- 20168	FTR Book 4	FTR	30-Oct-94	Fort Richardson Schedule for Superfund Investigation	List of OUs and due dates for associated RI/FS management plans.	EPA
20169	- 20169	FTR Book 4	FTR	05-Jun-95	Public Meeting Notice for Fort Richardson, in Environmental Restoration News	Public meeting notice for Fort Richardson.	DPW
20264	- 20264	FTR Book 4	FTR	06-Jun-95	Fort Richardson Public Meeting	Background, action taken, and action required for a public meeting to describe the Fort Richardson Federal Facilities Agreement.	DPW
20265	- 20272	FTR Book 4	FTR	15-Jun-95	Environmental Restoration News, Vol. 1, No. 1	Review of the Superfund process at Fort Richardson and announcement of the public meeting.	Army
20273	- 20280	FTR Book 4	FTR	15-Oct-95	Environmental Restoration News, Vol. 1, No. 2	Provides the status of the OUs, and discusses the June 29, 1995, public meeting and remediation technologies.	Army

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31483 - 31488	FTR Book 8	FTR	15-Jan-96	Environmental Restoration News, Vol. 2, No.1	This document provides an update on OU-A, OU-B, OU-C, and OU-D. Includes a questionnaire to determine public interest regarding formation of a Restoration Advisory Board. Defines what a PSE is.	Army
28273 - 28273	FTR Book 7	FTR	01-Apr-96	Public Notice, Establishment of Administrative Record	The notice announces the establishment of the Fort Richardson administrative record at Fort Richardson and the information repositories.	USAED Alaska
31489 - 31492	FTR Book 8	FTR	15-Apr-96	Environmental Restoration News, Vol. 2, No. 2	This document provides an update on OU-A, OU-B, OU-C, and OU-D. Presents results of the Restoration Advisory Board questionnaire. Also discusses the Fort Richardson background data analysis study; the UST restoration compliance agreement; and informatio	Army
28274 - 28274	FTR Book 7	FTR	01-May-96	Public Notice: Public Health Assessment for Fort Richardson	The notice announces availability of the public health assessment for Fort Richardson as completed by the ATSDR.	ATSDR
28275 - 28278	FTR Book 7	FTR	01-Jul-96	Environmental Restoration News, Vol. 2, No. 3	This document provides an update on the Restoration Advisory Board and information about the Two-Party Agreement sites at Fort Richardson. Also, explains the Superfund process and provides updates on OU-A, OU-B, OU-C, and OU-D.	Army
28279 - 28279	FTR Book 7	FTR	22-Sep-96	Public Notice: Fort Richardson Advisory Board Membership	The Army invites the public to participate in the decision-making process for the environmental cleanup of Fort Richardson by completing and mailing Restoration Advisory Board interest forms. All names received will be added to the Fort Richardson Restor	Army
31493 - 31496	FTR Book 8	FTR	15-Oct-96	Environmental Restoration News, Vol. 2, No. 4	This document provides an update on OU-A, OU-B, OU-C, OU-D, and the Restoration Advisory Board.	Army
31497 - 31500	FTR Book 8	FTR	07-Mar-97	Fact Sheet: Establishment of Restoration Advisory Board	An information packet to invite the Fort Richardson and Anchorage communities to participate in the decision-making process during environmental investigation and cleanup activities at Fort Richardson.	Army
31501 - 31506	FTR Book 8	FTR	15-Mar-97	Environmental Restoration News, Vol. 3, No. 4	This document provides an update on OU-A, OU-B, OU-C, and OU-D, and information about a public meeting on January 29, 1997, at the Russian Jack Chalet. Also defines the Superfund process and what a proposed plan is.	Army

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31507	- 31510	FTR Book 8	FTR	19-Mar-97	Public Notice: Establishment of a Restoration Advisory Board	Public notice placed in the Anchorage Daily News and Alaska Star concerning a public meeting to establish a Restoration Advisory Board.	DPW
31511	- 31514	FTR Book 8	FTR	15-Sep-97	Environmental Restoration News, Vol. 3, No. 2	This document provides an update on the Restoration Advisory Board and information about a public meeting on March 19, 1997, at the Russian Jack Chalet. Also defines the Superfund process and provides updates on OU-A, OU-B, OU-C, and OU-D.	Army
31515	- 31515	FTR Book 8	FTR	04-Oct-97	You Are Invited to Discuss Fort Richardson Environmental Cleanup Issues	A public notice that appeared in the Anchorage Daily News inviting the public to a Restoration Advisory Board meeting at the Russian Jack Chalet on Thursday, October 9, 1997.	Army
41983	- 41988		FTR	15-Jan-98	Environmental Restoration News - January 1998, Volume 4, No. 1	Fact Sheet presenting highlights of October 1997 RAB meeting and status of the OU's.	Army
41989	- 41992		FTR	01-Jun-98	Environmental Restoration News - June 1998, Volume 4, No. 2	Fact sheet presenting highlights of February and May 1998 RAB meeting and status of the OU's.	Army
41993	- 41996		FTR	15-Aug-98	Environmental Restoration News - August 1998, Volume 4, No. 3	Fact sheet presenting highlights of June 1998 RAB Meeting and status of OU's and public outreach, including two sites tours in June.	Army
41997	- 42004		FTR	15-Feb-99	Environmental Restoration News - February 1999, Volume 5, No. 1	Fact Sheet presenting highlights of November 1998 RAB Meeting and status of the OU's.	Army
42005	- 42012		FTR	15-Jul-99	Environmental Restoration News - July 1999, Volume 5, No. 2	Fact sheet presenting highlights of May 1999 RAB meeting and status of the OU's.	Army
42013	- 42020		FTR	15-Oct-99	Environmental Restoration News - October 1999, Volume 5, No. 2	Fact sheet presenting highlights of August 1999 RAB meeting and status of the OU's.	Army
42021	- 42024		FTR	15-Feb-00	Environmental Restoration News - FEB 2000 - VOL 6, Number 1	Fact Sheet presenting highlights of November 1999 RAB Meeting and status of the OU's.	Army
38052	- 38052	FTR Book 10	FTR	09-Mar-98	Fort Richardson Restoration Advisory Board (RAB)	Letter to Pam Miller - Alaska Community Action on Toxins - concerning her selection to the RAB.	USAED Alaska

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42025 - 42044 OU-A Book 16	ALL	01/22/2004	Administrative Record Index Update for 2003	A list of documents included in the administrative record index update, including documents dated January 1999 through July 2003.	ENSR
42045 - 42141 OU-A Book 16	A	11/01/1999	Confirmation Soil Sampling Report, Ruff Road Fire Training Area, Fort Richardson, Alaska	CONFIRMATION SOIL SAMPLING REPORT RUFF ROAD FIRE TRAINING AREA	COE
42142 - 42200 OU-A Book 16	A	12/01/1999	Final 1998 System Monitoring Report, Treatment System Demonstrations and Design Verification Study, Ruff & Roosevelt Road, Fort Richardson, Alaska	OUA-TREATMENT SYSTEM DESIGN VERIFICATION STUDY-FINAL-1998	COE/DOWL-OGDEN JV.
42201 - 42237 OU-A Book 16	A	03/01/2001	VOC Emission Tracking Program for Treatability Study Systems, Fort Richardson, Alaska	VOC EMISSION TRACKING PROGRAM FOR TREATABILITY STUDY SYSTEMS AT FORT RICHRDSON	USACE/ENSR
42238 - 42238 OU-A Book 16	A	03/22/2000	Memorandum - VOC Emissions - January 1 through June 30, 1999, Fort Richardson Treatability Study Systems	VOC EMISSIONS-JANUARY 1 THROUGH JUNE 30, 1999 FT RICHARDSON TREATABILITY STUDY SYSTEMS	COE/CH2MHILL
42239 - 42239 OU-A Book 16	A	03/22/2000	Memorandum - VOC Emissions - July 1 through December 31, 1999, Fort Richardson Treatability Study Systems	VOC EMISSIONS-JULY 1 THROUGH DECEMBER 31, 1999 FT RICHARDSON TREATABILITY STUDY SYSTEMS	COE/CH2MHILL
42240 - 42250 OU-A Book 16	A	04/17/2000	Second Operational Status Report Under Task 8G, Vapor Extraction System, Building 986 Remedial Action, Fort Richardson, Alaska	SECOND OPERATIONAL STATUS REPORT UNDER TASK 8G VAPOR EXTRACTION SYSTEM BUILDING 986 REMEDIAL ACT FRA	EMCON
42251 - 42285 OU-A Book 16	A	05/01/2000	Air Emissions from Existing AS/SVE Sites at Fort Richardson	AIR EMISSIONS FROM FORT RICHARDSON AS/SVE SITES	COE/CH2MHILL
42286 - 42303 OU-A Book 16	A	06/01/2000	Operable Unit A, Update, Site Summary, Information Repository, Administrative Record, Fort Richardson, Alaska	OUA OPERABLE UNIT A SITE SUMMARY, INFORMATION REPOSITORY ADMINISTRATIVE RECORD	USAED/E&E INC.
42304 - 42319 OU-A Book 16	A	09/05/2000	Addendum to Serial Letter No. DO008-042, Building 986 Remedial Action, Fort Richardson, Alaska	ADDENDUM TO SERIAL LETTER NO DO008-042 BUILDING 986 REMEDIAL ACTION FRA	EMCON
42320 - 42331 OU-A Book 16	A	07/19/2000	Third Operational Status Report Under Task 8G, Vapor Extraction System, Building 986 Remedial Action, Fort Richardson, Alaska	THIRD OPERATIONAL STATUS REPORT UNDER TASK 8G VAPOR EXTRACTION SYS BUILDING 986 REMEDIAL ACTION FRA	EMCON
42332 - 42415 OU-A Book 16	A	08/01/2000	Final 1999 System Monitoring Report, Treatment System Demonstrations and Design Verification Study, Ruff Road, Fort Richardson, Alaska	FINAL 1999 SYSTEM MONITORING REPORT TREATMENT SYSTEM DEMONSTRATIONS AND DESIGN VERIFICATION RUFF ROAD FRA	DOWL/OGDEN

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42416 - 42512 OU-A Book 16	A	12/01/2000	Confirmation Soil Sampling Report, Ruff Road Fire Training Area, Fort Richardson, Alaska, November 1999	CONFIRMATION SOIL SAMPLING REPORT RUFF RD FIRE TRAINING AREA FRA NOV 1999	USACE
42513 - 42535 OU-A Book 16	A	11/01/2000	Site-Specific Health and Safety Plan, Site Investigation Armored Vehicle Wash Area, Fort Richardson, Alaska, Draft	SITE SPECIFIC HEALTH AND SAFETY PLAN SITE INVESTIGATION ARMORED VEHICLE WASH AREA FRA	USACE
42536 - 42557 OU-A Book 16	A	03/01/2001	VOC Emission Tracking Program for Treatability Study Systems at Fort Richardson, Alaska (Calendar Year 2000 with Estimate for Calendar Year 2001)	VOC EMISSION TRACKING PROGRAM FOR TREATABILITY STUDY SYSTEMS AT FORT RICHRDSON	USACE/ENSR
42558 - 42829 OU-A Book 17	A	06/01/2001	Final Design Verification Study Report for the Treatment System Demonstrations and Design Verification Study, Ruff Road, Fort Richardson, Alaska	OUA FINAL DESIGN VERIFICATION REPORT TREAT SYS DEMO/DESIGN VERIFICATIONSTUDY RUFF RD	USACE/DOWL-OGDEN JV
42830 - 42839 OU-A Book 17	A	07/01/2001	Mid-Year Report, VOC Emission Tracking Program for Treatment Systems at Fort Richardson, Alaska (January through June 2001 with Estimate for Full Year 2001)	FRA MID YEAR REPORT VOC EMISSION TRACKING PROGRAM FOR TREATMENT SYSTEMS AT FRA	USACE/ENSR
42840 - 42997 OU-A Book 17	A	10/01/2001	Draft Site Safety and Health Plan, Building 986 POL Laboratory, Soil Vapor Extraction and Bio-Venting Operations and Maintenance, Fort Richardson, Alaska	DRAFT SITE SAFETY & HEALTH PLAN BUILDING 986 POL LAB SOIL VAPOR EXTRACTION & BIO-VENTING OP & MAINT	AGVIQ
42998 - 43058 OU-A Book 17	A	11/16/2001	Letter Report - Limited PCB Investigation, Roosevelt Road Transmitter Site	OUA-LIMITED PCB INVESTIGATION ROOSEVELT ROAD TRANSMITTER SITE	
43059 - 43098 OU-A Book 17	A	12/01/2001	Final Sampling and Analysis Plan, Building 986 POL Laboratory, Soil Vapor and Bio-Venting Operations and Maintenance, Fort Richardson, Alaska	FINAL SAMPLING & ANALYSIS PLAN BUILDING 986 POL LABORATORY SOIL VAPOR & BIO-VENTING OPERATION AND MAINTENANCE	AGVIQ
43099 - 43312 OU-A Book 17	A	01/01/2002	Final Workplan, Building 986 POL Laboratory, Soil Vapor Extraction and Bio-Venting Operations and Maintenance, Fort Richardson, Alaska	FINAL WORKPLAN BUILDING 986 POL LABORATORY SOIL VAPOR EXTRACTION AND BIO-VENTING OPERATIONS FRA	AGVIQ
43313 - 43329 OU-A Book 17	A	07/01/2002	Semi-Annual Report VOC Emission Tracking Program for IRP Treatment Systems, Fort Richardson, Alaska	SEMI-ANNUAL REPORT VOC EMISSION TRACKING PROGRAM FOR IRP TREATMENT SYSTEMS	USACE/ENSR
43330 - 43538 OU-B Book 22	B	01/14/2000	Long-Term Groundwater Monitoring, October 1999 Sampling, Operable Unit B, Poleline Road Disposal Area, Fort Richardson, Alaska, Final	OUB LONG-TERM GROUNDWATER MONITORING OCT. 1999 SAMPLING FINAL	USACE/URS WOODWARD-CLYDE
43539 - 43580 OU-B Book 22	B	04/01/2000	Fort Richardson Remediation, Air Emissions, Fort Richardson, Alaska	REM AIR EMISSIONS POLELINE RD RUFF RD FIRE TRAINING AREA BUILDING 908S 986/7 47811	USACE/CH2MHILL
43581 - 43633 OU-B Book 22	B	11/28/2000	Final Report, Operable Unit B, Poleline Road Disposal Area, Long-Term Groundwater Monitoring Report	FINAL REPORT OUB POLELINE RD DISPOSAL AREA OCTOBER 2000 LONG-TERM GROUNDWATER MONITORING REPORT	URS

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43634 - 43686 OU-B Book 22	B	11/28/2000	Final Report, Operable Unit B, Poleline Road Disposal Area, Long-Term Groundwater Monitoring Report	OUB LONG-TERM GROUNDWATER MONITORING REPORT, PRDA	USACE/URS
43687 - 43748 OU-B Book 22	B	12/01/2000	Draft Remedial Action Work Plan, Operable Unit B, Poleline Road Disposal Area, Fort Richardson, Alaska	DRAFT REMEDIAL ACTION WORK PLAN OUB POLELINE ROAD DISPOSAL AREA	URS
43749 - 44186 OU-B Book 22	B	12/01/2000	Final Report, Design Verification Study, Arrays 4 5 and 6, Poleline Road Disposal Area, Fort Richardson, Alaska	OUB FINAL REPORT DESIGN VERIFICATION STUDY ARRAYS 4 5 AND 6 POLELINE ROAD DISPOSAL AREA	URS
44187 - 44631 OU-B Book 23	B	03/01/2001	Revised Final Report, Design Verification Study, Arrays 4 5 and 6, Poleline Road Disposal Area, Fort Richardson, Alaska	OUB REVISED FINAL REPORT DESIGN VERIFICATION STUDY ARRAYS 4,5,AND 6 POLELINE ROAD	COE/URS
44632 - 44750 OU-B Book 23	B	07/20/2001	Final Report, Operable Unit B, Poleline Road Disposal Area, July 2001 Long-Term Groundwater Monitoring Report	OUB LONG-TERM GROUNDWATER MONITORING REPORT	USACE/URS
44751 - 44869 OU-B Book 23	B	07/20/2001	Final Report, Operable Unit B, Poleline Road Disposal Area, July 2001 Long-Term Groundwater Monitoring Report	OUB POLELINE RD DISPOSAL AREA JULY 2001 LONG-TERM GROUNDWATER MONITORING REPORT	URS
44870 - 44910 OU-B Book 23	B	12/01/2001	Operable Unit B, Poleline Road Disposal Area, Final Technical Memorandum Updating Long-Term Groundwater Monitoring Results, Volume I	OUB FINAL TECHNICAL MEMORANDUM UPDATING LONG-TERM GROUNDWATER MONITORING RESULTS VOL 1	USACE/URS
44911 - 44954 OU-B Book 23	B	12/01/2001	Operable Unit B, Poleline Road Disposal Area, Final Technical Memorandum Updating Long-Term Groundwater Monitoring Results, Volume I	OUB POLELINE RD DISPOSAL AREA FRA FINAL TECH MEMO UPDATING LONG TERM GROUNDWATER MONITORING RESULTS VOL 1	URS
44955 - 44955 OU-B Book 23	B	05/30/2002	Technical Memorandum - Groundwater Sampling at Operable Unit B, Poleline Road, March 2002	OUB POLELINE ROAD	
44956 - 44993 OU-B Book 23	B	10/01/2002	Historical Aerial Photographic Analysis of the Poleline Road Disposal Area, OUB, Fort Richardson, Alaska	HISTORICAL AERIAL PHOTOGRAPHIC ANALYSIS OF THE POLELINE ROAD DISPOSAL AREA, OUB	CRREL
44994 - 45220 OU-B Book 23	B	10/01/2002	U.S. Army Progam Manager for Chemical Demilitarization, Engineering Evaluation/Cost Analysis for the Treatment and Disposal of Chemical Agent Identification Sets at Fort	US ARMY PROGAM MANAGER FOR CHEMICAL DEMILITARIZATION ENGINEERING EVALUATION-COST ANALYSIS	
45221 - 45288 OU-C Book 27	C	09/27/1999	Site Safety and Health Plan for Site Visit to Eagle River Study Area; Comments on "Open Burning/Open Detonation Pad Interim Closure Plan" (many small documents)	OUC EAGLE RIVER FLATS OB/OD PAD FILE DICK NENAHLO	
45289 - 45311 OU-C Book 27	C	12/06/1999	Movement, Distribution, and Relative Risk of Mallards Using Eagle River Flats: 1999	OUC MOVEMENT DISTRIBUTION AND RELATIVE RISK OF MALLARDS USING EAGLE RIVER FLATS 1999	

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45312 - 45435 OU-C Book 27	C	07/01/2000	Remediating and Monitoring White Phosphorous Contamination at Eagle River Flats (Operable Unit C), Fort Richardson, Alaska, FY 1999 Report	REMEDIATING AND MONITORING WHITE PHOSPHOROUS CONTAMINATION AT EAGLE RIVER FLATS OUC FRA	CRREL
45436 - 45441 OU-C Book 27	C	11/01/2000	Addendum to FY 00 Report Remediating and Monitoring White Phosphorus Contamination at Eagle River Flats (Operable Unit C), Fort Richardson, Alaska	OUC EAGLE RIVER FLATS ADDENDUM TO FY00 REPORT WHITE PHOSPHORUS CONTAMINATION	
45442 - 45467 OU-C Book 27	C	12/05/2000	ERF Annual Project Planning Meeting Notes, 5 Dec. 00	OUC EAGLE RIVER FLATS ANNUAL PROJECT PLANNINC MEETING NOTES	
45468 - 45475 OU-C Book 27	C	02/21/2001	Closure of Resource Conservation and Recovery Act Units under Federal Facility Compliance Agreement EPA Docket No. 1090-05- 29-6001 ("FFCA"), EPA ID# AK1210022157	OUC CLOSURE OF RCRA SWMU UNDER FFCA INCLUDING OB/OD	
45476 - 45476 OU-C Book 27	C	05/01/2001	Description of Eagle River Flats Activities in 2001	OUC DESCRIPTION OF EAGLE RIVER FLATS ACTIVITIES IN 2001	
45477 - 45480 OU-C Book 27	C	08/24/2001	USARK Response to ADEC Letter Regarding Waterfowl Mortality Counts and Memorandum for Operable Unit C	OUC EAGLE RIVER FLATS USARAK RESPONSE TO ADEC LETTER REGARDING WATERFOWL MORTALITY	
45481 - 45481 OU-C Book 27	C	10/02/2001	Eagle River Flats Winter Firing Restrictions	OUC EAGLE RIVER FLATS WINTER FIRING RESTRICTIONS	
45482 - 45484 OU-C Book 27	C	10/09/2001	Record of Environmental Consideration - Modified Firing Regime for the Eagle River Flats Impact Area, Fort Richardson, Alaska	OUC MODIFIED FIRING REGIME FOR THE EAGLE RIVER FLATS IMPACT AREA	
45485 - 45486 OU-C Book 27	C	10/22/2001	Memorandum - Mortar and Artillery Firing on ERF - Fall 2001	OUC MORTAR AND ARTILLERY FIRING ON EAGLE RIVER FLATS FALL 2001	
45487 - 45617 OU-C Book 27	C	01/01/2002	Field Work & Pond Drainage, Eagle River Flats, Safety & Health Plan, Field Year #3 (2002)	OUC FIELD WORK & POND DRAINAGE EAGLE RIVER FLATS SAFETY & HEALTH PLAN FIELD YEAR #3	USACE/WELDIN
45618 - 45729 OU-C Book 27	C	04/08/2002	Remediating and Monitoring White Phosphorus Contamination at Eagle River Flats (Operable Unit C), Fort Richardson, Alaska, FY 01 Draft Report	OUC REMEDIATING & MONITORING WHITE PHOSPHORUS CONTAMINATION AT EAGLE RIVER FLATS FY 01 DRAFT REPORT	CRREL
45730 - 45783 OU-C Book 27	C	05/01/2002	2002 Remediation and Monitoring Work Plan, Operable Unit C - Eagle River Flats	OUC 2002 REMEDIATION & MONITORING WORK PLAN EAGLE RIVER FLATS	CRREL
45784 - 45847 OU-C Book 27	C	06/03/2002	Field Summary Report, 2001 Work Season, Field Work and Pond Drainage Eagle River Flats, Fort Richardson, Alaska	OUC FIELD SUMMARY REPORT 2001 WORK SEASON FIELD WORK & POND DRAINAGE EAGLE RIVER FLATS	USACE/WELDIN

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45848 - 45880 OU-C Book 27	C	07/01/2002	2001 Remedial Progress Report, Operable Unit C - Eagle River Flats, FY 01 Report	OUC 2001 REMEDIAL PROGRESS REPORT OPERABLE UNIT C EAGLE RIVER FLATS FY 01 REPORT	CRREL
45881 - 46117 OU-D Book 28	D	11/08/1999	Draft Remedial Design/Remedial Action Report - Building 35-752, Building 45-590, and Building 796	OUD DRAFT REMEDIAL DESIGN/REMEDIAL ACTION REPORT BUILDING 35-752 BUILDING 45-590 & BUILDING 796	ENSR
46118 - 46153 OU-D Book 28	D	06/01/2000	Operable Unit D, Update, Site Summary, Informatin Repository, Administrative Record, Fort Richardson, Alaska	OUD UPDATE, SITE SUMMARY INFORMATION REPOSITORY, AND ADMINISTRATIVE RECORD	USACE/E&E INC.
46154 - 46290 OU-D Book 28	D	06/30/2000	Record of Decision, Operable Unit D, Fort Richardson, Alaska	OUD RECORD OF DECISION OPERABLE UNIT D	USARAK
46291 - 46304 OU-D Book 28	D	07/13/2000	Revised Proposal for OUD Sampling, Fort Richardson, Alaska	REVISED PROPOSAL FOR OUD SAMPLING FRA	ENSR
46305 - 46315 OU-D Book 28	D	09/14/2000	Delivery of Draft Sampling Memos, 2000 Sampling Program, OUD, Fort Richardson, Alaska	DELLIVERY OF DRAFT SAMPLING MEMOS 2000 SAMPLING PROGRAM OUD FRA	ENSR
46316 - 46380 OU-D Book 28	D	03/23/2001	Draft Post-RI Sampling Report - Buildings 796 and 955	DRAFT POST-RI SAMPLING REPORT - BUILDINGS 796 AND 955	COE/ENSR
46381 - 46467 OU-D Book 28	D	12/01/2002	Fort Richardson, Landfill Closure Monitoring, April 2002 Sampling Event	FORT RICHARDSON LANDFILL CLOSURE MONITORING APRIL 2002 SAMPLING EVENT	DPW/CH2MHILL
46468 - 46468 OU-D Book 28	D	01/07/2003	Old Fort Richardson Landfill Monitoring	OLD FORT RICHARDSON LANDFILL MONITORING	
46469 - 46469 OU-D Book 28	D	01/27/2003	Receipt of December 2001 Landfill Closure Monitoring and the April 2002 Sampling Event Report	RECEIPT OF DECEMBER 2001 LANDFILL CLOSURE MONITORING AND APRIL 2002 SAMPLING EVENT	
46470 - 46535 OU-E Book 1	E	09/01/2000	Geophysical Investigation Around Buildings 35-750 AND 35-752, Fort Richardson Alaska	GEOPHYSICAL INVESTIGATIONS AROUND BUILDINGS 35-750 AND 35-752 FRA	CRREL
46536 - 46574 OU-E Book 1	E	09/01/2000	Ground Water Data from Fort Richardson, Alaska, for the Period April 1997 to March 2000	GROUND WATER DATA, FORT RICHARDSON, APRIL 1997 TO MARCH 2000	DPW/CRREL
46575 - 46581 OU-E Book 1	E	10/01/2000	Preliminary Geophysical Investigations at the Armored Vehicle Maintenance Area, OUE	OUE PRELIMINARY GEOPHYSICAL INVESTIGATIONS AT THE ARMORED VEHICLE MAINTENANCE AREA	COE/CRREL

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Page Numbers	OU	Date	Title	Abstract	Author
46582 - 46604 OU-E Book 1	E	11/01/2000	Site specific Health and Safety Plan, Site Investigation, Armored Vehicle Wash Area, Fort Richardson, Alaska, Draft	SITE SPECIFIC HEALTH AND SAFETY PLAN SITE INVESTIGATION ARMORED VEHICLE WASH AREA FRA	USACE
46605 - 46629 OU-E Book 1	E	01/01/2001	Site-Specific Health and Safety Plan, Site Investigation, Armored Vehicle Wash Area, Fort Richardson, Alaska, Draft	NOVEMBER 2000 DRAFT SITE SPECIFIC HEALTH AND SAFETY PLAN, ARMORED VEHICLE WASH AREA INVEST FRA	USACAE
46630 - 46655 OU-E Book 1	E	01/18/2001	Sampling and Analysis Plan, Site Investigation, Armored Vehicle Wash Area, Fort Richardson, Alaska, Revison 1	SAMPLING AND ANALYSIS PLAN (REV 1) ARMORED VEHICLE WASH AREA INVESTIGATION FRA	USACE
46656 - 46885 OU-E Book 1	E	02/01/2001	Laboratory Analysis Report (Building 796 Groundwater)	LABORATORY ANALYSIS REPORT	DPW/ENSR
46886 - 47056 OU-E Book 1	E	06/01/2001	Chemical Data Report, Armored Vehicle Wash Area, Fort Richardson, Alaska	CHEMICAL DATA REPORT ARMORED VEHICLE WASH AREA FRA	USACE
47057 - 47101 OU-E Book 1	E	09/01/2001	Final Draft, Operable Unit E - CSMs, DOQs, ARARs, and TBCs, Fort Richardson, Alaska	FINAL DRAFT OUE CSMS DQOS ARARS AND TBCS FRA	ENSR
47102 - 47105 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package A (part 1 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES A (1 of 6 PARTS)	CH2MHILL
47106 - 47106 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package A (part 2 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES A (2 of 6 PARTS)	CH2MHILL
47107 - 47110 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package A (part 3 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES A (3 of 6 PARTS)	CH2MHILL
47111 - 47118 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package A (part 4 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES A (4 of 6 PARTS)	CH2MHILL
47119 - 47119 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package A (part 5 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES A (5 of 6 PARTS)	CH2MHILL
47120 - 47120 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package A (part 6 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES A (6 of 6 PARTS)	CH2MHILL

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Page Numbers	OU	Date	Title	Abstract	Author
47121 - 47124 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package B (part 1 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES B (1 of 6 PARTS)	CH2MHILL
47125 - 47125 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package B (part 2 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES B (2 of 6 PARTS)	CH2MHILL
47126 - 47152 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package B (part 3 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES B (3 of 6 PARTS)	CH2MHILL
47153 - 47269 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package B (part 4 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES B (4 of 6 PARTS)	CH2MHILL
47270 - 47270 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package B (part 5 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES B (5 of 6 PARTS)	CH2MHILL
47271 - 47280 OU-E Book 1	E	10/01/2001	Groundwater Sampling Data Package B (part 6 of 6)	FRA GROUNDWATER SAMPLING DATA PACKAGES B (6 of 6 PARTS)	CH2MHILL
47281 - 47650 OU-E Book 2	E	10/22/2001	Fort Richardson GW Seward Rec Camp Sept 2001 Project (Laboratory Analytical Data, OUE Part III)	OUE GROUNDWATER SAMPLING AT OUE PART III	USACE/CH2MHILL
47651 - 48161 OU-E Book 2	E	10/22/2001	Technical Memorandum - Groundwater Sampling at Operable Unit E, September 2001	TECHNICAL MEMO GROUNDWATER SAMPLING AT OUE SEPTEMBER 2001	CH2MHILL
48162 - 48684 OU-E Book 3	E	10/22/2001	Technical Memorandum - Groundwater Sampling at Operable Unit E, September 2001	TECHNICAL MEMO GROUNDWATER SAMPLING AT OUE SEPTEMBER 2001	CH2MHILL
48685 - 48696 OU-E Book 3	E	04/01/2002	Environmental Staging Facility, Progress, Status, and Management Report, Fort Richardson, Alaska, April 2002	OUE ENVIRONMENTAL STAGING FACILITY PROGRESS STATUS & MANAGEMENT REPORT	USACE/PLATT
48697 - 49061 OU-E Book 3	E	04/22/2002	Technical Memorandum - Groundwater Sampling at Operable Unit E, March 2002 (volume 1)	OUE GROUNDWATER SAMPLING AT OUE MARCH 2002 VOL 1	USACE/CH2MHILL
49062 - 49611 OU-E Book 4	E	04/22/2002	Technical Memorandum - Groundwater Sampling at Operable Unit E, March 2002 (volume 2)	OUE GROUNDWATER SAMPLING AT OUE MARCH 2002 VOL 2	USACE/CH2MHILL

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Page Numbers	OU	Date	Title	Abstract	Author
49612 - 50104 OU-E Book 4	E	04/22/2002	Technical Memorandum - Groundwater Sampling at Operable Unit E, March 2002 (volume 3)	OUE GROUNDWATER SAMPLING AT OUE MARCH 2002 VOL 3	USACE/CH2MHILL
50105 - 50659 OU-E Book 5	E	04/22/2002	Technical Memorandum - Groundwater Sampling at Operable Unit E, March 2002 (volume 4)	OUE GROUNDWATER SAMPLING AT OUE MARCH 2002 VOL 4	USACE/CH2MHILL
50660 - 50669 OU-E Book 5	E	05/01/2002	Environmental Staging Facility Progress, Status, and Management Report, Fort Richardson, Alaska, May 2002	OUE ENVIRONMENTAL STAGING FACILITY PROGRESS STATUS & MANAGEMENT REPORT	USACE/PLATT
50670 - 50836 OU-E Book 5	E	06/01/2002	Fort Richardson Groundwater Sampling Program, Health and Safety Plan, Final	FORT RICHARDSON GROUNDWATER SAMPLING PROGRAM HEALTH AND SAFETY PLAN	CH2MHILL
50837 - 50872 OU-E Book 5	E	06/01/2002	Fort Richardson Groundwater Sampling Program, Sampling and Analysis Plan, Final	FORT RICHARDSON GROUNDWATER SAMPLING PROGRAM SAMPLING AND ANALYSIS PLAN	CH2MHILL
50873 - 50883 OU-E Book 5	E	06/01/2002	Environmental Staging Facility Progress, Status, and Management Report, Fort Richardson, Alaska, June 2002	OUE ENVIRONMENTAL STAGING FACILITY PROGRESS STATUS & MANAGEMENT REPORT	USACE/PLATT
50884 - 50904 OU-E Book 5	E	06/01/2002	Environmental Staging Facility Work Plan, Fort Richardson, Alaska, June 2002	OUE ENVIRONMENTAL STAGING FACILITY WORK PLAN	USACE/PLATT ENV
50905 - 50925 OU-E Book 5	E	07/01/2002	Environmental Staging Facility Work Plan, Fort Richardson, Alaska, June 2002	OUE FRA ENVIRONMENTAL STAGING FACILITY WORK PLAN FRA	USACE/PLATT ENV
50926 - 51652 OU-E Book 6	E	11/05/2002	Technical Memorandum - Groundwater Sampling at Operable Unit E, August 2002	GROUNDWATER SAMPLING AT OUE AUGUST 2002	CH2MHILL
51653 - 52375 OU-E Book 7	E	01/01/2003	Revised Final Managemnet Plan, Operable Unit E, Remedial Investigation/Feasibility Study, Fort Richardson, Alaska	OUE REVISED FINAL MANAGEMNET PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY	USACE/ENSR
52376 - 52497 OU-E Book 7	ALL	02/01/2003	Five-Year Review Report, First Five-Year Review Report, Fort Richardson, Alaska	FIRST FIVE-YEAR REVIEW REPORT FORT RICHARDSON ALASKA	
52498 - 53183 Misc. Book 12	2PTY	01/27/1999	Vapor Extraction System Operational Status Report, Building 986 Remedial Action, Fort Richardson, Alaska	POL LABORATORY DRYWELL REMOVAL BUILDING 986 ADDENDUM TO FINAL REMEDIAL ACTION REPORT	COE/EMCON
53184 - 53222 Misc. Book 12	2PTY	12/01/1999	Building 5900 July 1999 Groundwater Monitoring Report, UST Release Investigation, Fort Richardson, Alaska	JULY 1999 GROUNDWATER MONITORING REPORTS, UST RELEASE INVESTIGATION AT BUILDING 59000	USACE/DOWL-OGDEN JV

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Page Numbers	OU	Date	Title	Abstract	Author
53223 - 53264 Misc. Book 12	2PTY	01/31/2000	Vapor Extraction System First Operational Status Report Under Task 8G, Building 986 Remedial Action, Fort Richardson, Alaska	VAPOR EXTRACTION SYSTEM FIRST OPERATIONAL STATUS REPORT UNDER TASK 8G REMEDIAL ACTION	USACE/EMCON AK INC.
53265 - 53481 Misc. Book 12	2PTY	02/01/2000	Sampling and Analysis Plan, Site Summit, Fort Richardson, Alaska, Draft	DRAFT SAMPLING AND ANALYSIS PLAN SITE SUMMIT	USAED, E & E
53482 - 53614 Misc. Book 13	2PTY	02/01/2000	Risk Assessment Work Plan, Site Summit, Fort Richardson, Alaska	RISK ASSESSMENT WORK PLAN SITE SUMMIT	USAED/E&E INC.
53615 - 53876 Misc. Book 13	2PTY	02/01/2000	Sampling and Analysis Plan Site Summit, Fort Richardson, Alaska	SAMPLING & ANALYSIS PLAN 2 SITE SUMMIT	USAED/E & E INC.
53877 - 53953 Misc. Book 13	2PTY	04/01/2000	Installation, Operation, and Maintenance Manual, Anchorage Tank, Model ATAGOWS-100, Oil Water Separator for Weldin Construction, Inc., Fort Richardson, Alaska	OPERATION & MAINTENANCE MANUAL, INSTAL/REPLACE OIL WATER SEPARATORS AT BUILDING 975	USACE/WELDIN CONST. INC
53956 - 54189 Misc. Book 13	2PTY	08/09/2000	Summary Report for Thermal Treatment of Soil Stockpiled at Circle Road. Removal, Treatment, and Placement of POL Soils, Fort Richardson Alaska	SUMMARY REPORT FOR THERMAL TREATMENT OF SOIL STOCKPILED AT CIRCLE ROAD POL SOILS	USACE/EMCON
54190 - 54328 Misc. Book 13	2PTY	09/01/2000	Risk Assessment Work Plan, Site Summit, Fort Richardson, Alaska	RISK ASSESSMENT WORK PLAN SITE SUMMIT	COE/ECOLOGY AND ENVIROMEN
54329 - 54473 Misc. Book 13	2PTY	09/01/2000	Risk Assessment Work Plan, Site Summit, Fort Richardson, Alaska	ADEC-SITE SUMMIT RISK ASSESSMENT	
54474 - 54627 Misc. Book 14	2PTY	10/01/2000	Draft Work Plan, Investigation of the Nature and Extent of Contamination in the Vicinity of Building 28-008, Fort Richardson, Alaska	DRAFT INVESTIGATION OF THE NATURE & EXTENT OF CONTAMINATION IN THE VICINITY OF BUILDING 28-008	ENSR
54628 - 54673 Misc. Book 14	2PTY	11/01/2000	Building 59000 July 1999 Groundwater Monitoring Report, UST Release Investigation, Fort Richardson, Alaska	BUILDING 59000 JULY 1999 GROUNDWATER MONITORING REPORT UST RELEASE INVESTIGATION	COE/DOWL/OGDEN
54674 - 54823 Misc. Book 14	2PTY	11/01/2000	Draft Work Plan, Building 762	DRAFT WORK PLAN BUILDING 762	CH2MHILL
54824 - 54978 Misc. Book 14	2PTY	11/01/2000	Final Work Plan, Building 762	FINAL WORK PLAN BUILDING 762	CH2M HILL
54979 - 55044 Misc. Book 14	2PTY	11/01/2000	Final Work Plan, Building 762, Quality Assurance Program Plan	FRA BUILDING 762 FINAL WORK PLAN, HEALTH AND SAFETY PLAN, QUALITY ASSURANCE PROGRAM PLAN (3 PARTS)	DPW-CH2MHILL

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55045 - 55047 Misc. Book 14	2PTY	11/01/2000	Final Work Plan, Building 762, Quality Assurance Program Plan	FRA- FINAL WORK PLAN BUILDING 762 (3 PARTS)	DPW-CH2MHILL
55048 - 55212 Misc. Book 14	2PTY	01/01/2001	Final Work Plan, Groundwater Sampling and Limited Feasibility Study, Building 28-008, Fort Richardson, Alaska	FINAL WORK PLAN GROUNDWATER SAMPLING AND LIMITED FEASIBILITY STUDY BUILDING 28-008 PDF FILE	DPW/ENSR
55213 - 55248 Misc. Book 14	2PTY	02/02/2001	Chemical Data Quality Assesment Report, Groundwater Monitoring (Fall 2000), Building 45-070 Site, Fort Richardson, Alaska	CHEMICAL DATA QUALITY ASSESMENT REPORT GROUNDWATER MONITORING FALL 2000 BUILDING 45070 FRA	ETHIX
55249 - 55315 Misc. Book 14	2PTY	02/02/2001	Chemical Data Report, Groundwater Monitoring (Fall 2000), Building 45-070 Site, Fort Richardson, Alaska	CHEMICAL DATA REPORT, BUILDING 45-070 SITE	DPW/COE
55316 - 55365 Misc. Book 14	2PTY	03/02/2001	Environmental Restoration Program, Bravo Road Removal Action Report, Elmendorf Air Force Base, Alaska	BRAVO ROAD REMOVAL ACTION REPORT ENVIRONMENTAL RESTORATION PROGRAM ELMENDORF AIR FORCE	USACE/JACOBS
55366 - 55410 Misc. Book 14	2PTY	04/01/2001	Bryant Army Arifield Bulk Fuel Facility Study, Final Report	BRYANT ARMY ARIFIELD BULK FUEL FACILITY STUDY FINAL REPORT	USACE/ENTERPRISE ENG INC.
55411 - 55434 Misc. Book 14	2PTY	04/11/2001	Building 59000 - February 2001 Groundwater Sampling Memorandum, Underground Storage Tank Release Investigation, Fort Richardson	BUILDING 59000 UNDERGROUND STORAGE TANK RELEASE INVESTIGATION	COE/DOWL/OGDEN
55435 - 55800 Misc. Book 15	2PTY	06/01/2001	Final Report, Additional Relaese Investigation, Building 762	FINAL ADDITIONAL RELEASE INVESTIGATION BUILDING 762	USACE/CH2MHILL
55801 - 56155 Misc. Book 15	2PTY	06/01/2001	Final Report, Additional Relaese Investigation, Building 762	FINAL RELEASE INVESTIGATION BUILDING 762	CH2MHILL
56156 - 56214 Misc. Book 15	2PTY	07/17/2001	Building 702 - June 2001 Groundwater Sampling Memorandum Underground Storage Tank Release Investigation, Fort Richardson	FRA SUBJECT 702 JUNE 2001 GROUNDWATER SAMPLING MEMO UST RELEASE INVESTIGATION FRA	USACE/DOWL OGDEN
56215 - 56281 Misc. Book 15	2PTY	08/01/2001	Building 987 Site Investigation Chemical Report, Fort Richardson, Alaska, Summer 2001	BUILDING 987 SITE INVESTIGATION CHEMICAL REPORT FRA SUMMER 2001	USACE
56282 - 57026 Misc. Book 16	2PTY	08/01/2001	Final Report, Release Investigation, Building 47-220, Fort Richardson, Alaska	FINAL REPORT RELEASE INVESTIGATION BUILDING 47-220	USACE/MWH
57027 - 57048 Misc. Book 17	2PTY	09/01/2001	Addendum to Workplan Dated July 1998 for Removal, Treatment, and Placement of POL Soil, Fort Richardson, Alaska	ADDENDUM TO WORKPLAN DATED JULY 1998 FOR REMOVAL TREATMENT AND PLACEMENT OF POL SOIL FRA	EMCON

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Page Numbers	OU	Date	Title	Abstract	Author
57049 - 57075 Misc. Book 17	2PTY	09/01/2001	Final Work Plan, Building 762/786 Site Investigation, Fort Richardson, Alaska	FINAL WORK PLAN BUILDING 762/786 SITE INVESTIGATION	COE/CH2MHILL
57076 - 57284 Misc. Book 17	2PTY	09/01/2001	Health and Safety Plan, Building 762/786 Site Investigation, Fort Richardson, Alaska	HEALTH AND SAFETY PLAN BUILDING 762/786 SITE INVESTIGATION FRA	CH2MHILL
57285 - 58023 Misc. Book 17	2PTY	09/24/2001	Groundwater Sampling at Buildings 35-610 and 35-620, July 2002	GROUNDWATER SAMPLING AT BUILDING 35-610 AND 35-620, AUGUST 2001	DPW/CH2M HILL
58024 - 58337 Misc. Book 18	2PTY	12/01/2001	Draft Groundwater Sampling Report for Cctober 2001, Building 28-008, Fort Richardson, Alaska	DRAFT GROUNDWATER SAMPLING REPORT FOR OCTOBER 2001 BUILDING 28-008 FRA	USARAK/ENSR
58338 - 58396 Misc. Book 18	2PTY	02/01/2002	Draft Remedial Action Work Plan, Building 28-008, Fort Richardson, Alaska	DRAFT REMEDIAL ACTION WORK PLAN BUILDING 28-008 FRA	USACE/ENSR
58397 - 58616 Misc. Book 18	2PTY	02/01/2002	Draft Report Building 762/786 Site Investigation, Fort Richardson, Alaska	DRAFT REPORT BUILDING 762/786 SITE INVESTIGATION FRA	CH2MHILL
58617 - 58756 Misc. Book 18	2PTY	02/12/2002	Groundwater Sampling at Building 59000, December 2001 (Part I - Technical Memorandum)	GROUNDWATER SAMPLING AT BUILDING 59000, DECEMBER 2001 PART I	DPW/CH2M HILL
58757 - 59311 Misc. Book 19	2PTY	02/12/2002	Groundwater Sampling at Building 59000, December 2001 (Part II, Data Validator's Package)	GROUNDWATER SAMPLING AT BUILDING 59000, DECEMBER 2001 PART II	DPW/CH2M HILL
59312 - 59323 Misc. Book 19	2PTY	04/01/2002	Final Quarterly Respirometer Test 1 of 5, Building 986 POL Laboratory, Soil Vapor Extraction and Bio-venting Operations and Maintenance	FINAL QUARTERLY RESPIROMETER TEST 1 OF 5 BUILDING 986 POL LAB SOIL VAPOR EXTRACTION & BIO-VENT	USACE/AGVIQ
59324 - 59474 Misc. Book 19	2PTY	04/12/2002	Final Work Plan, Building 45-070 Groundwater Monitoring, Fort Richardson, Alaska	2002 GROUNDWATER MONITORING BUILDING 45-070	DACA85-02-P-0019
59475 - 59489 Misc. Book 19	2PTY	04/22/2002	Final Work Plan, Building 45-070 Groundwater Monitoring, Fort Richardson, Alaska	GROUNDWATER MONITORING BUILDING 45070 FINAL WORK PLAN & SAMPLING & ANALYSIS PLAN	USACE/PAUG-VIK
59490 - 59522 Misc. Book 19	2PTY	04/22/2002	Final Health and Safety Plan, 2002 Quarterly Groundwater Monitoring Project at Building 45-070, Fort Richardson, Alaska	GROUNDWATER MONITORING BUILDING 45070 FINAL WORK PLAN & SAMPLING & ANALYSIS PLAN	USACE/PAUG-VIK

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59523 - 59584 Misc. Book 19	2PTY	04/22/2002	Final Quality Assurance Project Plan for Site: Building 45-070, Fort Richardson, Alaska	GROUNDWATER MONITORING BUILDING 45070 FINAL WORK PLAN & SAMPLING & ANALYSIS PLAN	USACE/PAUG-VIK
59585 - 59593 Misc. Book 19	2PTY	04/22/2002	Final Field Sampling Plan, Building 45-070 Groundwater Monitoring, Fort Richardson, Alaska	GROUNDWATER MONITORING BUILDING 45070 FINAL WORK PLAN & SAMPLING & ANALYSIS PLAN	USACE/PAUG-VIK
59594 - 59618 Misc. Book 20	2PTY	07/01/2002	Final Quarterly Respirometer Test 2 of 5, Building 986 POL Laboratory, Soil Vapor Extration and Bio-venting Operations and Maintenance	FINAL QUARTERLY RESPIROMETER TEST 2 OF 5 BUILDING 986 POL LAB SVE & BIO-VENTING OPERATIONS & M	USACE/AGVIQ
59619 - 59657 Misc. Book 20	2PTY	08/19/2002	Final Tech Memo, Q1 2002 Monitoring Event, Quarterly Groundwater Monitoring, Building 45-070 - Fort Richardson, Alaska	FRA FINAL TECH MEMO Q1 2002 MONITORING EVENT QUARTERLY GROUNDWATER MONITORING BUILDING 45070	USACE/PAUGVIK
59658 - 59892 Misc. Book 20	2PTY	08/27/2002	Final Work Plan and SAP, Circle Drive Stockpiles and Building 47-220 Excavation, Assessment, and Treatment - Fort	FINAL WORK PLAN AND SAP CIRCLE DR STOCKPILES & BUILDING 47220 EXCAVATION ASSESSMENT & TREAT	USACE/PAUGVIK DEV CORP
59893 - 60099 Misc. Book 20	2PTY	09/01/2002	Final Groundwater Sampling Report for May 2002, Building 28-008, Fort Richardson, Alaska	FINAL GROUNDWATER SAMPLING REPORT FOR MAY 2002 BUILDING 28-008	ENSR
60100 - 60609 Misc. Book 20	2PTY	09/16/2002	Groundwater Sampling at Buildings 35-610 and 35-620, August 2001	GROUNDWATER SAMPLING AT BUILDINGS 35610 AND 35620 JULY 2002	CH2MHILL
60610 - 60726 Misc. Book 21	2PTY	09/16/2002	Tech Memo, Circle Drive Stockpile Assessment, Fort Richardson, Alaska	TECH MEMO CIRCLE DRIVE STOCKPILE ASSESSMENT	USACE/PAUG-VIK
60727 - 60761 Misc. Book 21	2PTY	09/23/2002	Tech Memo, Q3 2002 Monitoring Event Quarterly Groundwater Monitoring, Building 45-070 - Fort Richardson, Alaska	TECH MEMO Q3 2002 MONITORING EVENT QUARTERLY GROUNDWATER MONITORING BUILDING 45070	USACE/PAUG-VIK
60762 - 60789 Misc. Book 21	2PTY	10/01/2002	Quarterly Respirometer Test 3 of 5, Building 986 POL Laboratory, Soil Vapor Extraction and Bio-venting Operations and Maintenance	QUARTERLY RESPIROMETER TEST 3 OF 5 BUILDING 986 POL LAB SOIL VAPOR EXTRACTION & BIOVENTING OP	USACE/AGVIQ
60790 - 60853 Misc. Book 21	2PTY	10/03/2002	Excavation at Former Building 47-220, Fort Richardson, Alaska	EXCAVATION AT FORMER BUILDING 47-220 & POST REMOVAL ASSESSMENTS AT CIRCLE DRIVE STOCKPILES	
60854 - 60895 Misc. Book 21	2PTY	11/25/2002	Tech Memo, Q4 2002 Monitoring Event, Quarterly Groundwater Monitoring, Building 45-070 - Fort Richardson, Alaska	TECH MEMO Q4 2002 MONITORING EVENT QUARTERLY GROUNDWATER MONITORING BUILDING 45070	USACE/PAUG-VIK
60896 - 60927 Misc. Book 21	2PTY	12/01/2002	Quarterly Respirometer Test 4 of 5, Building 986 POL Laboratory Soil Vapor Extraction and Bio-venting Operations and Maintenance	QUARTERLY RESPIROMETER TEST 4 OF 5 BUILDING 986 POL LAB SOIL VAPOR EXTRACTION & BIOVENTING OPERATIONS	USACE/AGVIQ

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60928 - 60963 Misc. Book 21	2PTY	12/09/2002	Site Assessment Report, UST Removal at Building 55295, Fort Richardson, Alaska / Site Assessment Report, UST Removal at Building 605, Fort Richardson, Alaska	SITE ASSESSMENT REPORTS 2002 UST REMOVALS AT BUILDINGS 604 AND 55295	USACE/PAUG-VIK
61004 - 61233 Misc. Book 21	2PTY	01/01/2003	Final Groundwater Sampling Report for October 2002, Building 28-008, Fort Richardson, Alaska	FINAL GROUNDWATER SAMPLING REPORT FOR OCTOBER 2002 BUILDING 28-008	ENSR
61234 - 61375 Misc. Book 21	2PTY	01/22/2003	Final 2002 Annual Report, Quarterly Groundwater Monitoring, Building 45-070 - Fort Richardson, Alaska	FINAL 2002 ANNUAL REPORT QUARTERLY GROUNDWATER MONITORING BUILDING 45-070	USACE/PAUG-VIK
61376 - 61429 Misc. Book 21	2PTY	01/29/2003	Final Excavation and Treatment Report, Building 47-220, Fort Richardson, Alaska	FINAL EXCAVATION & TREATMENT REPORT BUILDING 47-220	USACE/PAUG-VIK
61430 - 61462 Misc. Book 22	2PTY	02/15/2003	Fort Richardson Building 47-220 Leachability and SESOIL Modeling Report	FORT RICHARDSON BUILDING 47-220 LEACHABILITY AND SESOIL MODELING REPORT CEPOA-EN-EE-B MCKEAN	USACE
61463 - 61647 Misc. Book 22	2PTY	03/01/2003	Revised Work Plan, Monitoring Wells at Fort Richardson, Building No. 762, Building No. 786, and Building No. 59000, Fort Richardson, Alaska	REVISED WORK PLAN MONITORING WELLS AT FORT RICHARDSON BUILDING 762, BUILDING 786, AND BUILDING 59000	USACE/ICRC
61648 - 61650 Misc. Book 22	2PTY	03/11/2003	TTHM Results for CL Site 28003 and 28004, A305655 and 5656	REVISED TTHM RESULTS FOR CL SITE 28003, 28004, A305655, AND 5656	NTL
61651 - 61830 Misc. Book 22	2PTY	04/01/2003	Final Work Plan, Monitoring Wells at Fort Richardson Building No. 762, Building No. 786, and Building No. 59000, Fort Richardson, Alaska	FINAL WORK PLAN MONITORING WELLS AT FORT RICHARDSON BUILDING 762, BUILDING 786, AND 59000	USACE/ICRC
61831 - 61923 Misc. Book 22	2PTY	04/01/2003	Historical Photographic Analysis of the Building 786 Site, Fort Richardson, Alaska	HISTORICAL PHOTOGRAPHIC ANALYSIS OF THE BUILDING 786 SITE	CRREL
61924 - 61962 Misc. Book 23	MISC	04/01/2000	Glacial Geology and Stratigraphy of Fort Richardson, Alaska, A Review of Available Data on the Hydrogeology	GLACIAL GEOLOGY AND STRATIGRAPHY OF FORT RICHARDSON REVIEW OF AVAILABLE	USACE/ERDC/CRREL
61963 - 61986 Misc. Book 23	MISC	08/01/2000	Review Comments and Final Work Plan for POL Laboratory Dry Well Removal at Building 986	FRA ADMINISTRATIVE RECORD INDEX UPDATE FOR 2000	COE/E+E
61987 - 62119 Misc. Book 23	MISC	08/01/2000	Installation Action Plan for Fort Richardson, August 2000	FRA INSTALLATION ACTION PLAN FOR FRA AUGUST 2000	USARAK
62120 - 62253 Misc. Book 23	MISC	08/01/2000	Installation Action Plan for Fort Richardson, August 2000	INSTALLATION ACTION PLAN FOR FRA	USACE

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62254 - 62555 Misc. Book 23	MISC	03/01/2001	Final Environmental Staging Facility Standard Operating Procedures, Fort Richardson, Alaska	FINAL ENVIRONMENTAL STAGING FACILITY STANDARD OPERATING PROCEDURES FRA	ENSR

Appendix C
Disposition of Source Areas at Fort Richardson

TABLE C-1

Disposition of Source Areas at Fort Richardson Identified in the Original Federal Facility Agreement[1]

Record of Decision

Operable Unit E, Fort Richardson, Alaska

OU	BLDG/ LOC.	SITE DESCRIPTION	POTENTIAL COCs	STATUS	COMMENTS	WC REPORT SITE #	1990 RFA SWMU	NOTES & REFS.
A	986	POL LABORATORY DRYWELL	WASTE OIL, LUBRICANTS, AVIATION FUELS, SOLVENTS, ACID, ALCOHOL, REAGENTS, POL SOIL	CLOSED WITH ICs	SITE CLOSURE IN 2004 WITH ICs	W020	60	
A	67630	ROOSEVELT ROAD TRANSMITTER SITE LEACHFIELD	PCB'S IN TRANSFMR OIL	TRANSFERRED TO 2PTY -NFA WITH ICs	CONTAMINATED SOIL WAS EXCAVATED PRIOR TO ROD AND SITE WAS NFA IN ROD. SITE HAS SINCE BEEN SAMPLED AND CAPPED WITH 6 FEET OF SOIL.	W010	118	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
A	FMR LNDFIL#9 (RUFF ROAD)	RUFF ROAD FORMER FIRE TRAINING AREA	CONSTRUCTION RUBBLE, JP-4, CHLORINATED & NONCHLOR. SOLVENTS	TRANSFERRED TO 2PTY -NFA WITH ICs	SITE UNDERWENT SVE TREATMENT AS PART OF 2PTY AGREEMENT AND HAS SINCE BEEN NFRAP WITH ICs	W040	97	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
B	POLELINE ROAD DISPOSAL AREA	POLELINE ROAD DISPOSAL AREA	DECON. SOLVENTS, SMOKE CANNISTERS, CW TRAINING MATERIAL	LTM WITH ICs	CURRENTLY PERFORMING GROUNDWATER MONITORING AND DEVELOPING GROUNDWATER CONTAMINANT MODEL.	N087		NONE
C	EAGLE RIVER FLATS	EAGLE RIVER FLATS IMPACT AREA	WHITE PHOSPHORUS	RAO	STARTING 5TH YEAR OF ACTIVE REMEDIAL ACTION WITH PONDING PUMPING TO DRY SEDIMENTS AND ELIMINATE WP.	W006	117	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
C	EAGLE RIVER FLATS	OPEN BURN/OPEN DEMO AREA	POWDER BAGS, FUZES, TNT, GRENADES,ROCKET MOTORS, PROJECTILES, ASH	RCRA CLOSURE	NFA UNDER CERCLA AND REFERRED TO RCRA FOR CLOSURE.	W025	99	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
D	700	FORMER DRUM/PCB STORAGE AREA	POL	NFA UNDER CERCLA AND 2PTY	NFA IN OUD ROD. GROUNDWATER SAMPLING INDICATED THAT SITE WAS CLEAN AND NFRAP UNDER 2PTY.	W009	1, 91	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
D	704	FORMER ROADS AND GROUNDS DRUM STORAGE & WASTE ACCUMULATION	WASTE SOLVENT	NFA UNDER CERCLA AND 2PTY	NFA IN OUD ROD. SAMPLING INDICATED THAT SITE WAS CLEAN AND NFRAP UNDER 2PTY.	R053	3, 4	1990 RFA
D	726	FORMER LAUNDRY & DRYCLEANING USTs	PERCHLORETHYLENE, SLUDGE	NFA	NFA IN OUD ROD. LOW LEVEL CONTAMINATION AT DEPTH NOT CONSIDERED A RISK.	W016	9, 10, 11, 12, 13, 14, 15, 120	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
D	796	DOL MAINT, AREA --FORMER BATTERY ACID DISPOSAL SITE	NEUTRALIZED BTRY ACID, HEAVY METALS	NFA	GROUNDWATER AT THE SITE WAS SAMPLED POST OUD ROD. NO CONTAMINANTS EXCEEDED MCLs SO SITE WAS DESIGNATED NFA UNDER THE OUE ROD.	R059	37	1990 RFA
D	955	USED OIL TRANSFER AREA (SLUDGE BIN)	PESTICIDES, USED OIL/FUEL	NFA UNDER CERCLA IN OUE ROD WITH RCRA CLOSURE	CONTAMINATED SOIL DISPOSED OF AT PERMITTED DISPOSAL FACILITY. SOIL SAMPLES COLLECTED POST OUD ROD. NO CONTAMINANTS EXCEEDED CLEANUP LEVELS OR RBCs SO SITE WAS DESIGNATED NFA UNDER THE OUE ROD.	R060	41	1990 RFA
D	45590	MOTOR POOL	WASTE OIL, LUBRICANTS, ANTIFREEZE, ACID, SOLV.	NFA UNDER CERCLA WITH RCRA CLOSURE	NFA UNDER CERCLA. NO EVIDENCE OF CONTAMINANT RELEASE THAT POSES AN UNACCEPTABLE RISK. GROUNDWATER IS MONITORED AS PART OF CLOSURE PLAN FOR FORT RICHARDSON LANDFILL.	W002	83	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
D	FRA LANDFILL (EAST SIDE)	LANDFILL FORMER FIRE TRAINING AREA	OIL, SOLVENT, TRANSM./BRAKE/HYDRAULIC FLUID, WATER CONTAM. DIESEL, JP-4	NFA	NFA UNDER CERCLA. NO EVIDENCE OF CONTAMINANT RELEASE THAT POSES AN UNACCEPTABLE RISK. GROUNDWATER IS MONITORED AS PART OF CLOSURE PLAN FOR FORT RICHARDSON LANDFILL.	W015	98	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA

TABLE C-1

Disposition of Source Areas at Fort Richardson Identified in the Original Federal Facility Agreement[1]

Record of Decision

Operable Unit E, Fort Richardson, Alaska

OU	BLDG/ LOC.	SITE DESCRIPTION	POTENTIAL COCs	STATUS	COMMENTS	WC REPORT SITE #	1990 RFA SWMU	NOTES & REFS.
D	FRA LANDFILL (EAST SIDE), approx. 1000' sw of FF PIT #2	GREASE PIT #1	COOKING GREASE, PETROLEUM, GREASE/OIL, O/W SEDIMENT SEPARATOR BOTTOMS, FUEL TANK WATER, ETHYL GLYCOL	NFA	NFA UNDER CERCLA. NO EVIDENCE OF CONTAMINANT RELEASE THAT POSES AN UNACCEPTABLE RISK. GROUNDWATER IS MONITORED AS PART OF CLOSURE PLAN FOR FORT RICHARDSON LANDFILL.	R072	92	1990 RFA
D	FRA LANDFILL (EAST SIDE), approx. 1000' sw of FF PIT #2	GREASE PIT #2	COOKING GREASE, PETROLEUM, GREASE/OIL, O/W SEDIMENT SEPARATOR BOTTOMS, FUEL TANK WATER, ETHYL GLYCOL	NFA	NFA UNDER CERCLA. NO EVIDENCE OF CONTAMINANT RELEASE THAT POSES AN UNACCEPTABLE RISK. GROUNDWATER IS MONITORED AS PART OF CLOSURE PLAN FOR FORT RICHARDSON LANDFILL.	R073	93	1990 RFA
D	CIRCLE ROAD DRUM SITE	CIRCLE ROAD DRUM SITE	POL	NFA WITH RCRA CLOSURE	CONTAMINATION REMOVED FROM SITE AND CONFIRMATION SAMPLING INDICATED NO EVIDENCE OF CONTAMINATION REMAINING AT THE SITE THAT POSED UNACCEPTABLE RISK	N090		NONE
D	FRA	STORM DRAINAGE OUTFALL TO SHIP CREEK	OILS, FUELS, SOLVENTS	NFA	NFA UNDER CERCLA. NO EVIDENCE OF CONTAMINANT RELEASE THAT POSES AN UNACCEPTABLE RISK. GROUNDWATER IS MONITORED AS PART OF CLOSURE PLAN FOR FORT RICHARDSON LANDFILL.	R075	115	1990 RFA
D	FRA ROADs	DUST PALLIATIVE	WASTE OIL, SOLVENT	NFA	SAMPLING INDICATED NO EVIDENCE OF CONTAMINATION THAT POSES UNACCEPTABLE RISK	W028		USATHAMA 1991 PROPERTY REPORT
E	35752	PCB SITE/UST (ANTENNA BLDG)	PCBs	NFA WITH RCRA CLOSURE		W023	90	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
E	AVMA	GROUNDWATER PLUME UPGRADIENT OF 45590 SITE	PCE, DIBENZ(A,H)ANTHRACENE, DIESEL-RANGE ORGANIC COMPOUNDS	RA WITH ICs	REMEDIAL ACTION FOR GROUNDWATER. NFA FOR SOIL.			
	604	MEDICAL LAB	FIXATIVE W/SILVER, METHYL METHACRYLATE, REAGENTS	NFA	NO REPORTED SPILLS. WASTE GENERATED INSIDE BLDG. MEDICAL LAB REAGENT DISCHARGES INTO SANITARY SEWER SYSTEM.	W004		USATHAMA 1991 PROPERTY REPORT
	700	PAINT SHOP SPRAY BOOTH	WASTE PAINT	NFA	RELEASES TO SOIL, SURFACE WATER, OR GROUND WATER UNLIKELY; UNIT LOCATED INDOORS ON THIRD FLOOR; FILTERS CAPTURE AIR RELEASES.	R051	2	1990 RFA
2PTY	704	ROADS AND GROUNDS WASH RACK SUMP AND OIL/WATER SEPARATOR	WASHWATER W/OIL, GREASE, DIRT	NFA	SOIL SAMPLING INDICATD THAT NO RELEASE HAD OCCURRED.	R054	5, 6	1990 RFA
	706	SELF-HELP SHOP	POL, WASTE PAINT, SOLVENTS	NFA	NO REPORTED RELEASES TO SOIL, AIR, OR GROUND WATER.	N082		NONE
	710	AAFES SERVICE STATION	WASTE OIL	NFA	UNIT IN GOOD CONDITION WITH LOW POTENTIAL FOR RELEASES.	R056	7	1990 RFA
	721	PESTICIDE STORAGE AREA	INSECTICIDES, HERBICIDES, AVICIDES, RODENTICIDES, PAINT, DDT, RINSATE	NFA	NO REPORTED SPILLS. WASTE GENERATED INSIDE BLDG. WASTE WATER DISCHARGES INTO SANITARY SEWER SYSTEM.	W007	8	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
2PTY	732	MOTOR POOL	WASTE OIL, LUBRICANTS, ANTIFREEZE, ACID, SOLV.	NFA	UST TWO-PARTY SITE; NO OTHER REPORTED RELEASES TO AIR, SOIL, OR GROUND WATER	W002	16, 71	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	740	FORMER PAINT BOOTH	WASTE PAINTS, SOLVENTS	NFA	NO REPORTED RELEASES TO SOIL, AIR, OR GROUND WATER.	N095		DRAFT ECAR, DEC '93
	740	MAINTENANCE SHOP, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	17, 18, 19	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA

TABLE C-1

Disposition of Source Areas at Fort Richardson Identified in the Original Federal Facility Agreement[1]

Record of Decision

Operable Unit E, Fort Richardson, Alaska

OU	BLDG/ LOC.	SITE DESCRIPTION	POTENTIAL COCs	STATUS	COMMENTS	WC REPORT SITE #	1990 RFA SWMU	NOTES & REFS.
	750	MOTOR POOL, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	20, 21, 22, 23, 24	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	750	MOTOR POOL, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	20, 21, 22, 23, 24	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	754	O/W SEPARATOR	WASH WATER W/OIL, GREASE, FUEL	NFA	UNIT IN GOOD CONDITION WITH LOW POTENTIAL FOR RELEASES.	R093	25	1990 RFA
2PTY	755	AUTO & CRAFT SHOP	WASTE PAINTS, GREASE, MINERAL SPIRITS, OIL	NFA	PETROLEUM CONTAMINATION AT DEPTH NOT LEACHING TO GROUNDWATER. SITE CLOSED WITH NFRAP AND ICs .	R057	27, 72	1990 RFA
	756	MOTOR POOL, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	28, 29, 73	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	764	MOTOR POOL	WASTE OIL, LUBRICANTS, ANTIFREEZE, ACID, SOLV.	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	N084		NONE
	770	MOTOR POOL	WASTE OIL, LUBRICANTS, ANTIFREEZE, ACID, SOLV.	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W002	75	
	772	IN-SERVICE TRANSFORM.	PCB'S IN TRANSFMR OIL	NFA	TRANSFORMER INSIDE SECURE BUILDING. SUFFICIENT CONCRETE CURBING AROUND TRANSFORMER TO CONTAIN SPILLS. NO FLOOR DRAIN	W008		USATHAMA 1991 PROPERTY REPORT
	778	MOTOR POOL, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	31, 76	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	782	VEH. WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018		USATHAMA 1991 PROPERTY REPORT
	784	MOTOR POOL, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	32, 77	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	789	DS/GS MAINTENANCE FACILITY	TCE, WASTE SOLVENT/OIL, GREASE, PAINT, ACID	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W001	78	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
2PTY	794	CANNIBILIZATION YARD	POL, SOLVENTS	NFA	SAMPLING INDICATED THAT CONTAMINANTS ARE NOT PRESENT ABOVE RISK LEVELS	N096		DRAFT ECAR, DEC '93
	796	VEH.WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	UNIT IN GOOD CONDITION WITH LOW POTENTIAL FOR RELEASES.	W018	34	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	796	SPRAY PAINT BOOTH AND VEHICLE & WEAPONS SHOP	ENAMEL/CARC PAINT FUME	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	R058	36	1990 RFA
	798	DS/GS MAINTENANCE	TCE, WASTE SOLVENT/OIL, GREASE, PAINT, ACID	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W001	79	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	802	SUPPLY WAREHOUSE	SOLVENTS,WASTE OIL, REAGENTS, PHOTO FIXATIVE, WASTE PAINT/LITHIUM BATTERIES, HVY METALS	NFA	NO REPORTED SPILLS. WASTE GENERATED INSIDE BLDG. WASTE WATER DISCHARGES INTO SANITARY SEWER SYSTEM.	W011		USATHAMA 1991 PROPERTY REPORT

TABLE C-1

Disposition of Source Areas at Fort Richardson Identified in the Original Federal Facility Agreement[1]

Record of Decision

Operable Unit E, Fort Richardson, Alaska

OU	BLDG/ LOC.	SITE DESCRIPTION	POTENTIAL COCs	STATUS	COMMENTS	WC REPORT SITE #	1990 RFA SWMU	NOTES & REFS.
	802	RAD. MATRL. STORAGE	PDR-27, KRYPTON-85, PROMETHIUM-147, TRITIUM, RADIUM	NFA	NO REPORTED SPILLS. WASTE GENERATED INSIDE BLDG. WASTE WATER DISCHARGES INTO SANITARY SEWER SYSTEM.	W012		USATHAMA 1991 PROPERTY REPORT
	804	SUPPLY WAREHOUSE	SOLVENTS,WASTE OIL, REAGENTS, PHOTO FIXATIVE, WASTE PAINT/LITHIUM BATTERIES, HVY METALS	NFA	NO REPORTED SPILLS. WASTE GENERATED INSIDE BLDG. WASTE WATER DISCHARGES INTO SANITARY SEWER SYSTEM.	W011		USATHAMA 1991 PROPERTY REPORT
	804	RAD. MATRL. STORAGE	PDR-27, KRYPTON-85, PROMETHIUM-147, TRITIUM, RADIUM	NFA	NO REPORTED SPILLS. WASTE GENERATED INSIDE BLDG. WASTE WATER DISCHARGES INTO SANITARY SEWER SYSTEM.	W012		USATHAMA 1991 PROPERTY REPORT
	812	MOTOR POOL, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	40, 80	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	908	PRINT SHOP/PHOTO LAB	GREASE,MINERAL SPIRITS, OIL, SOLV, INK, SILVER, RAGS	NFA	NO REPORTED SPILLS. WASTE GENERATED INSIDE BLDG. WASTE WATER DISCHARGES INTO SANITARY SEWER SYSTEM.	W003		USATHAMA 1991 PROPERTY REPORT
	974	SPER SHOP -- WASTE SOLVENT (TCE) ACCUMULATION AREA	TCA	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER.	R062	45	1990 RFA
	974	SPER SHOP	USED OIL/SOLVENTS, CHLORINATED SOLV, ANTIFREEZE, GREASE, POTASSIUM HYDROXIDE, WASTE WATER, TRICHLOROETHANE, BRAKE FLUID, CONTAM.	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER.	R061	44	1990 RFA
	974	VEH.WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	UNIT IN GOOD CONDITION WITH LOW POTENTIAL FOR RELEASES.	W018	49	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	974	FUEL BLIVET CLNG AREA	WASHWATER W/FUEL, DETERG.	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER; SURFACE OF CLEANING AREA IS COATED CONCRETE W/CURB.	R091	46, 47	1990 RFA
	975	ELECTRONICS MAINTENANCE SHOP, VEH.WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	50, 51, 52	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	976	MAINT SHOP,ACID BATH/TK	WASTE ACIDS	NFA	UNIT LOCATED INSIDE BUILDING; NO REPORTED RELEASES TO SOIL, AIR, OR GROUND WATER; UNIT INACTIVE SINCE 1974; UNIT HAS BEEN REMOVED.	R065	56	1990 RFA
	976	MAINT SHOP, FIB.GLAS FILT.	FIBERGLASS PARTICLES	NFA	FILTERS LOCATED INSIDE ALUMINUM BOX INSIDE BUILDING; NO REPORTED RELEASES SOIL, AIR, OR GROUND WATER.	R066	57	1990 RFA
	978	PHOTO LAB, SILVER RECOV.	HYPO SOLUTION	NFA	SELF-ENCLOSED UNIT INSIDE BUILDING; NO REPORTED RELEASES TO SOIL, AIR, OR GROUND WATER.	R067	58	1990 RFA
	978	TASC PAINT SPRAY BOOTH	WASTE PAINTS	NFA	UNIT LOCATED INSIDE BUILDING; NO REPORTED RELEASES TO SOIL, AIR, OR GROUND WATER.	R068	59	1990 RFA
	988	RETAIL FUEL STORAGE YD	DIESEL FUEL, GASOLINE	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER;	W031		USATHAMA 1991 PROPERTY REPORT
	27006	MOOSE RUN GOLF CRSE	GREASE, OIL	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	R078	81	1990 RFA
	28002	WATER TREATMENT PLANT	FILTER BACKWASH WATER., SETTLED SLUDGE, FUEL OIL	NFA	SUBJECT TO NPDES PERMIT MONITORING	W046		USATHAMA 1991 PROPERTY REPORT

TABLE C-1

Disposition of Source Areas at Fort Richardson Identified in the Original Federal Facility Agreement[1]

Record of Decision

Operable Unit E, Fort Richardson, Alaska

OU	BLDG/ LOC.	SITE DESCRIPTION	POTENTIAL COCs	STATUS	COMMENTS	WC REPORT SITE #	1990 RFA SWMU	NOTES & REFS.
	36012	CENT.HEAT & PWR PLANT/WASTE ACCUM. AREA	DIESEL FUEL, COAL, FLY ASH	NFA	SINCE UNIT IS COVERED, PAVED, AND HANDLED SMALL QUANTITIES OF WASTE, RELEASE TO GROUND WATER OR SURFACE WATER UNLIKELY.	W026	62, 104-114	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	36013	CLASSIFIED WASTE INCIN.	CLASSIFIED WASTE, ASH	NFA	DUE TO ABSENCE OF HAZARDOUS CONSTITUENTS IN WASTES, NO POTENTIAL FOR HARMFUL	W027	103	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
2PTY	39600	FORMER NIKE MISSILE SITE (UPPER SITE SUMMIT), & LOWER SITE SUMMIT	WATER W/RESIDUAL SOLV, FUELS, RADIOACTIVE MATERIAL, ASBESTOS	ACTIVE 2PTY SITE	SITE WILL UNDERGO ADDITIONAL INVESTIGATION STARTING IN FY05	W048		USATHAMA 1991 PROPERTY REPORT
	45040	BOAT SHOP	ANTIFREEZE, DRYCLEAN SOLVENT, OIL, PAINT THINNER	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	R079	82	1990 RFA
	45125	HAZ WASTE STORAGE FAC.	WASTE SOLVENT/OIL/PAINT FUEL, PCB-CONTAM. MATERIAL	NFA	INVESTIGATE IAW RCRA PERMITTING PROCESS	W022	88	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	45133	HAZ WASTE STORAGE AREA	CONTAM. SOILS (OIL/FUEL)	NFA	INVESTIGATE IAW RCRA PERMITTING PROCESS	R071	89	1990 RFA
	45703	176 EOD MAINT FAC		NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	N081		NONE
	45726	23 EN CO MAINTENANCE FACILITY, WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	DUE TO SUFFICIENT CONTROLS & SMALL QUANTITIES GENERATED, UNLIKELY FOR RELEASES TO GW, SW, OR AIR.	W018	64, 65	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
2PTY	47203	AIRCRAFT MAINTENANCE FACILITY	WASTE JP-4, JET FUEL, OIL, HYDRAULIC FLUID, PETROL. NAPTHA, HEAVY METALS	NFA	ACLs FOR dro CONTAMINATION AT SITE. NFRAP WITH ICs.	N095		NONE
	47427	AIRCRAFT MAINTENANCE FACILITY	WASTE JP-4, JET FUEL, OIL, HYDRAULIC FLUID, PETROL. NAPTHA, HEAVY METALS	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER.	W021	86, (1990 RFA MISTAKENLY LISTS AS BLDG	USATHAMA 1991 PROPERTY REPORT, 1990 RFA
	47430	AIRCRAFT MAINTENANCE FACILITY	WASTE JP-4, JET FUEL, OIL, HYDRAULIC FLUID, PETROL. NAPTHA, HEAVY METALS	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER.	W021		USATHAMA 1991 PROPERTY REPORT
	47430	A/C WASHRACK & O/W SEP.	OIL/GREASE FROM WASH	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER;	W019		USATHAMA 1991 PROPERTY REPORT
	47431	AIRCRAFT MAINTENANCE FACILITY	DRYCLEAN SOLV, GREASE, HYDRAULIC FLUID, METHYL ETHYL KETONE, NAPTHA, WASTE FUELS/OIL	NFA UNDER FFA	NO EVIDENCE OF CONTAMINANT RELEASE AND SITE WAS NFA IN THE FFA.	W021	67	USATHAMA 1991 PROPERTY REPORT
	47432	AIRCRAFT MAINTENANCE FACILITY	WASTE JP-4, JET FUEL, OIL, HYDRAULIC FLUID, PETROL. NAPTHA, HEAVY METALS	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER;	R070	84	
	47433	AIRCRAFT MAINTENANCE FACILITY	WASTE JP-4, JET FUEL, OIL, HYDRAULIC FLUID, PETROL. NAPTHA, HEAVY METALS	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER;	W021		USATHAMA 1991 PROPERTY REPORT
	47641	AIRCRAFT MAINTENANCE FACILITY	WASTE FUEL, GREASE, OIL	NFA	NO EVIDENCE OF RELEASE TO SOIL, AIR, OR GROUND WATER;	R094	85	1990 RFA
	47811	VETERANARY INCIN.	ANIMAL CARCASSES, INFECTIOUS WASTE, ASH	NFA	DUE TO NATURE OF HAZARDOUS WASTES AND UNIT CONSTRUCTION, LITTLE POTENTIAL FOR HARMFUL RELEASES.	W027	102	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	55295	AMMO DEACTIV. FURNACE	WASTE SMALL CAL. AMMO, CARTRIDGES, ASH, HVY METALS, PROPELLANT, PRIMERS, FUZES	NFA UNDER CERCLA; RCRA CLOSURE	PENDING RCRA CLOSURE	W024	101	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	59000	AK ARNG VEH MAINT FAC	WASTE FUEL, GREASE, OIL, SOLVENTS, ANTIFREEZE; OIL/GREASE FROM WASH	NFA	STATE OF THE ART UNIT LOCATED INSIDE BUILDING; NO REPORTED RELEASES TO SOIL, AIR, OR GROUND WATER.	N086		NONE

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Disposition of Source Areas at Fort Richardson Identified in the Original Federal Facility Agreement[1]

Record of Decision

Operable Unit E, Fort Richardson, Alaska

OU	BLDG/ LOC.	SITE DESCRIPTION	POTENTIAL COCs	STATUS	COMMENTS	WC REPORT SITE #	1990 RFA SWMU	NOTES & REFS.
	AMMO AREA	RAD. MATRL. DISPOSAL	RADIOACTIVE WASTES	NFA	INACTIVE SITE WITH NO KNOWN RELEASES.	W013		USATHAMA 1991 PROPERTY REPORT
	AMMO HOLDING AREA	AMMO SUPPLY POINT	AMMUNITION	NFA	AMMO SECURED INSIDE CONCRETE BUNKERS. NO KNOWN RELEASES WITHIN ASP COMPOUND.	W029		USATHAMA 1991 PROPERTY REPORT
	FIELD LOC	SEPTIC TANKS/LEACH FLDS	SAN. WASTE WATER, INDUSTRIAL	NFA	NO EVIDENCE OF PAST RELEASES	W017		USATHAMA 1991 PROPERTY REPORT
	FIELD LOC	SPILL AREAS	DIESEL, MOGAS, JP-4	NFA	ALL KNOWN SPILL SITES REMEDIATED.	W049		USATHAMA 1991 PROPERTY REPORT
	FRA	ABOVE GND STORAGE TNKS	DIESEL, GASOLINE, HTNG OIL	NFA	SUFFICIENT CONTROLS IN PLACE; NO EVIDENCE OF PAST RELEASES	W041		USATHAMA 1991 PROPERTY REPORT
	FRA	ABOVE GND STORAGE TNKS	DIESEL, GASOLINE, HTNG OIL	NFA	SUFFICIENT CONTROLS IN PLACE; NO EVIDENCE OF PAST RELEASES	W042		USATHAMA 1991 PROPERTY REPORT
	FRA	UNDERGROUND STOR.TNKS	DIESEL, MOGAS, WASTE OIL,	NFA	SUBJECT TO UST TWO-PARTY AGREEMENT	W043	7, 16, 19, 23, 24, 26, 29, 30, 35, 38, 39, 42, 43, 48, 53, 61, 63, 66, 68	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	FRA	FORMER USTs	DIESEL, MOGAS, FUEL OIL,	NFA	SUBJECT TO UST TWO-PARTY AGREEMENT	W044		USATHAMA 1991 PROPERTY REPORT
	FRA	FORMER USTs	WASTE OIL, FUEL OIL	NFA	SUBJECT TO UST TWO-PARTY AGREEMENT	W045		USATHAMA 1991 PROPERTY REPORT
	FRA	SANITARY SEWER SYSTEM	SANITARY/INDUSTRIAL WASTEWATER W/OILS, GREASE	NFA	SUBJECT TO NPDES PERMIT MONITORING	R076	116	1990 RFA
	LANDFILL #1, east sector of FRA LF, 400 acres	LANDFILL	SANITARY WASTE, WASTE OIL/BRAKE FLUID, PESTICIDES	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W032	94, 95	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	LANDFILL #2, north-central sector of FRA LF; 338 acres	LANDFILL	SAN. WASTE, UNKNOWN	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W033		USATHAMA 1991 PROPERTY REPORT
	LANDFILL #3, south-central sector of FRA LF; 60 acres	LANDFILL	SAN. WASTE, UNKNOWN	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W034		USATHAMA 1991 PROPERTY REPORT
	LANDFILL #4, southwest sector of FRA LF; 3 acres	LANDFILL	CONSTRUCTION DEBRIS	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W035		USATHAMA 1991 PROPERTY REPORT
	LANDFILL #5, northwest sector FRA LF; 3 acres	LANDFILL	CONSTR. DEBRIS, SANITARY WASTE, METAL, WOOD, ASBESTOS, EXPLOSIVES, INFECTIOUS WASTE	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W036		USATHAMA 1991 PROPERTY REPORT
	LANDFILL #6, west edge of FRA LF; unk. size	LANDFILL	UNKNOWN	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W037		USATHAMA 1991 PROPERTY REPORT

TABLE C-1

Disposition of Source Areas at Fort Richardson Identified in the Original Federal Facility Agreement[1]

Record of Decision

Operable Unit E, Fort Richardson, Alaska

OU	BLDG/ LOC.	SITE DESCRIPTION	POTENTIAL COCs	STATUS	COMMENTS	WC REPORT SITE #	1990 RFA SWMU	NOTES & REFS.
	LANDFILL #7, adjacent to old Davis Highway (vic. Anchorage LF)	LANDFILL	SANITARY WASTE	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W038		USATHAMA 1991 PROPERTY REPORT
	LANDFILL #8, adj. to old Davis/Glenn Highways, approx. 3 km south of the Eagle River; 3 acres	LANDFILL	CARS W/WASTE OIL, JUNK	NFA UNDER CERCLA	CLOSED UNDER SOLID WASTE REGS WITH LONG-TERM GW MONITORING	W039		USATHAMA 1991 PROPERTY REPORT
	UC553983	RT BRAVO TRANSFORMER SITE (VIC. GWEN LAKE)	PCBs, METALS	NFA	CONTAMINANTS BELOW EPA ACTION LEVELS.	N089		USAPACEHEA REPORT, 31 JAN 94
	VARIOUS FIELD LOCATIONS	OPEN BURNING SITES AND FIRING RANGES/IMPACT AREAS	LEAD, MUNITIONS WASTE FROM MORTAR, SMALL ARMS, GRENADES, ROCKETS	NFA	ACTIVE TRAINING FACILITIES FOR MARKSMANSHIP/GUNNERY TRAINING WITH NO EVIDENCE OF ADVERSE ENVIRONMENTAL EFFECTS.	W005	100	USATHAMA 1991 PROPERTY REPORT AND 1990 RFA
	VIC. UC577959	TRANSFER STATION	FRA SOLID WASTE, ASBESTOS	NFA	NO REPORTED RELEASES TO SOIL, AIR, OR GROUND WATER.	R074	96	1990 RFA

Notes:

[1]Modification of Table 3-1 from *Five Year Review Report, First Five Year Review Report for Fort Richardson, Alaska* (DPW, 2003)

Appendix D
OUE Cost Estimates for Remedial Alternatives

OUE Cost Estimates for Remedial Alternatives

Baseline costs for the remedial alternatives presented in this Record of Decision (ROD) were originally developed based on assumptions presented in the Final Operable Unit E (OUE) Feasibility Study (FS), Fort Richardson, Alaska (CH2M HILL, 2004d). These estimated costs are expected to provide an accuracy of +50 percent to - 30 percent.

The capital and operations and maintenance costs for the selected alternatives have since been refined to incorporate new information that has become available since the preparation of the FS. These revised costs are summarized in the table below. They also are presented in this appendix. Cost summary tables for each subarea are presented first, followed by capital cost assumptions, then monitoring cost assumptions.

TABLE D-1
Detailed Cost Estimates for AVMA Groundwater Remedial Alternatives
Record of Decision
Operable Unit E, Fort Richardson, Alaska

Groundwater Remedial Alternative	Design Criteria		Cost Components		Capital Costs					Operation and Maintenance								
		Units	Description	Specifications	Rate	Qty	Units	Cost		Description	Specifications		Rate	Qty	Units	Cost	PV Cost	Subtotal PV
Alternative 1																		
No Action No further action with regards to groundwater would be completed on site.	**No design criteria**		*No cost associated with no action*							*No Operations and Maintenance Cost*								
Alternative 2																		
Land Use Controls 1) Evaluate land use controls in place										**Land Use Controls** 1) Review and report		Annually	$ 9,000	1	ls	$ 9,000	$ 111,681	**$ 111,681**
Natural Attenuation and Monitoring 1) Replace one monitoring well each 5 years (maintenance) 2) Monitor 7 wells once every 5 years for 30 years	Number of monitoring wells 15 Depth of wells 90 ft				*No Capital Cost*					**Monitoring of Natural Attenuation** 1) Work plan and groundwater monitoring plan			$ 13,000	1	ls	$ 13,000	$ 13,000	**$ 13,000**
										2) Groundwater monitoring report a) Effectiveness assessment report	Per Event	Annually for 4 years	$ 20,000	1	ls	$ 20,000	$ 67,744	**$ 157,786**
												Biennially for 6 years	$ 20,000	1	ls	$ 20,000	$ 47,665	
												Every 5 years for 20 years	$ 20,000	1	ls	$ 20,000	$ 42,376	
	Treatment levels **Risk Based Limit** O&M time frame **30** yr																	
										3) Long-term groundwater monitoring a) Field work		Annually for 4 years	$ 10,000	1	ea	$ 10,000	$ 33,872	$ 78,893 **$ 182,887**
												Biennially for 6 years	$ 10,000	1	ea	$ 10,000	$ 23,833	
												Every 5 years for 20 years	$ 10,000	1	ea	$ 10,000	$ 21,188	
										b) Laboratory		Annually for 4 years	$ 6,713	1	ea	$ 6,713	$ 22,738	$ 52,961
												Biennially for 6 years	$ 6,713	1	ea	$ 6,713	$ 15,999	
												Every 5 years for 20 years	$ 6,713	1	ea	$ 6,713	$ 14,224	
										c) Planning/prep	$1,750 per event	Annually for 4 years	$ 1,750	1	ea	$ 1,750	$ 5,928	$ 13,806
												Biennially for 6 years	$ 1,750	1	ea	$ 1,750	$ 4,171	
												Every 5 years for 20 years	$ 1,750	1	ea	$ 1,750	$ 3,708	
										d) Replace 1 well each 5 years	$10,000 per event + $5,000 oversight		$ 15,000	1	ea	$ 15,000	$ 37,227	$ 37,227
																Total Operation and Maintenance Cost		
																Total O&M PV		**$ 465,354**
																Total Cost	**$ 465,354**	**$ 465,000**
Alternative 3																		
Chemical Oxidation 1) Install 6 monitoring wells 2) Install 30 borings for chemical oxidation injection 3) Two injection events 4) Monitor semi-annually for 5 years	Number of monitoring wells 6 Depth of wells 90 ft Number of borings 30 Depth of borings 70-100 ft Injection events 2		1) Mobilization a) Air rotary rig for borings b) Hollow stem auger		$ 1,500 $ 1,500	1 0	ls ls	$ 1,500 $ -	**$ 1,500**	**Chemical Oxidation** 1) Second injection event			$ 15,880	1	ls	$ 15,880	$ 15,880	**$ 15,880**
			2) Health & safety							1)Compliance Monitoring	Field Work		$ 5,000	1	ls	$ 5,000	$ 41,002	**$ 145,147**
											Laboratory		$ 2,700	1	ls	$ 2,700	$ 22,141	
											Reporting		$ 10,000	1	ls	$ 10,000	$ 82,004	
			a) H&S plan	40 hrs of ES3 time	$ 75	40	hr	$ 3,000	**$ 4,780**	3) Groundwater monitoring report								
			b) Spill containment		$ 500	1	ea	$ 500		a) Effectiveness assessment report			$ 20,000	1	ls	$ 20,000	$ 20,000	**$ 20,000**
	Treatment levels **Risk Based Limit**		c) Spill kits		$ 500	1	ea	$ 500										
	O&M time frame **5** yr		d) PPE (beyond level D)		$ 15	12	days	$ 180										
			e) Air monitoring		$ 50	12	days	$ 600		**Land Use Controls**								
Natural Attenuation and Monitoring										1) Review and report		Annually	$ 9,000	1	ls	$ 9,000	$ 95,346	**$ 95,346**
			3) Install monitoring wells															
1) Install 3 groundwater monitoring wells	Number of monitoring wells 15		a) Hollow stem auger		$ 10,000	0	ea	$ -	**$ -**									
2) Monitor 9 wells annually for 30 years	Depth of wells 90 ft																	
			4) Install borings		$ 5,000	30	ea	$ 150,000	**$ 150,000**									
			5) Chemical oxidant							**Monitoring of Natural Attenuation**								
	Treatment levels **Risk Based Limit**		a) Chemical oxidant - $NaMnO_4$		$ 2.79	2000	lbs	$ 5,580	**$ 15,880**	1) Work plan and groundwater monitoring plan			$ 13,000	1	ls	$ 13,000	$ 13,000	**$ 13,000**
	O&M time frame **20** yr		b) Injection equipment		$ 4,300	1	month	$ 4,300										
			c) Labor		$ 75	80	hr	$ 6,000		2) Groundwater monitoring report								
										a) Effectiveness assessment report		Annually for 4 years	$ 20,000	1	ls	$ 20,000	$ 67,744	**$ 143,504**
												Biennially for 6 years	$ 20,000	1	ls	$ 20,000	$ 47,665	
												Every 5 years for 10 years	$ 20,000	1	ls	$ 20,000	$ 28,094	
										b) Project management				1	ls	$ -	$ -	
			6) Field coordination and oversight							3) Long-term groundwater monitoring								
			a) Borings		$5,000	3	days	$ 15,000	**$ 15,000**	a) Field work		Annually for 4 years	$ 10,000	1	ea	$ 10,000	$ 33,872	**$ 149,539**
			b) Monitoring well installation		$5,000	0	days	$ -				Biennially for 6 years	$ 10,000	1	ea	$ 10,000	$ 23,833	
												Every 5 years for 10 years	$ 10,000	1	ea	$ 10,000	$ 14,047	
										b) Laboratory		Annually for 4 years	$ 6,713	1	ea	$ 6,713	$ 22,738	
												Biennially for 6 years	$ 6,713	1	ea	$ 6,713	$ 1,280	
												Every 5 years for 10 years	$ 6,713	1	ea	$ 6,713	$ 9,430	
			7) Demobilization							c) Reporting / planning		Annually for 4 years	$ 1,750	1	ea	$ 1,750	$ 5,928	
					$ 13,000	1	ea	$ 13,000	**$ 14,250**			Biennially for 6 years	$ 1,750	1	ea	$ 1,750	$ 4,171	
			a) Transport and disposal of wastes generated for all drilling									Every 5 years for 10 years	$ 1,750	1	ea	$ 1,750	$ 2,458	
			b) Disposal of purge water		$ 1,000	1	ea	$ 1,000		d) Replace 1 well each 5 years	$10,000 per event + $5,000 oversight		$ 15,000	1	ea	$ 15,000	$ 31,782	
			c) Permanganate drum disposal		$ 250	1	ls	$ 250										
			SUBTOTAL						**$ 201,410**									
			Contingency		$ 25	%			$ 50,353									
			SUBTOTAL						**$ 251,763**									
			Project management		$ 8	%			$ 20,141									
			Remedial design		$ 15	%			$ 37,764									
			Construction management		$ 10	%			$ 25,176									
							Total Capital Cost		**$ 334,844**									
																Total O&M PV		**$ 582,416**
																Total Cost	**$ 917,260**	**$ 917,000**

Notes:
AVMA = Armored Vehicle Maintenance Area
ea. = each
ft = foot/feet
H&S = health and safety
lbs. = pounds
LF = linear feet
ls = lump sum
NPV = net present value
O&M = operations and maintenance
PPE = personal protective equipment
yr. = year

TABLE D-2
Assumptions for Costing AVMA Groundwater Remedial Alternatives
Record of Decision
Operable Unit E, Fort Richardson, Alaska

Task 2)	d)Additional PPE will include Tyvek and specialized gloves for permanganate handling
	d,e) Assumes 12 days of using equipment (3 days for boring and 9 days for augering)
Task 3)	a) Assumes 6 wells for chemical oxidation and 3 wells for monitored natural attenuation
	(RS Means, 2003) Groundwater Monitoring Wells 4" PVC, Schedule 40, Well Casing, Safety Level C. Assumes drillers injecting permanganate.
Task 4)	Assumes drill rig can bore 300 ft/day or approximately 3 borings
Task 5)	a) Per pound prices from Carus Chemicals Quote November 6, 2003
	Permanganate mass estimate includes an average PCE concentration of 120 ug/L
	b) Costs for electrical hookup of injection system not included
	Price of injection system from quote from previous permanganate site
Task 6)	a,b) Assumes CH2M HILL personnel onsite to oversee all drilling activities
	a,b) Includes cost of coordinating with Army to implement system
Task 7)	a,b) Assumes waste is non-hazardous
	c) Includes disposal of drums with residual permanganate, spill pads, and cost of neutralizing agent for excess
	Price of disposals from quote from previous permanganate site
O & M)	Assumes 7% real discount rate

Sodium Permanganate Estimate

$$\frac{0.96\ g\ M_NO_4^-}{1\ g\ PCE^1} \times \frac{1\ m\ M_NO_4^-}{118.9\ g\ M_NO_4^-} \times \frac{1\ m\ NaM_NO_4}{1\ m\ M_NO_4^-} \times \frac{141.9\ g\ NaM_NO_4}{1\ m\ NaM_NO_4} = \frac{1.15\ g\ NaM_NO_4}{1\ g\ PCE} \times 2.3\ \text{Safety Factor} = \mathbf{\frac{2.6\ g\ NaM_NO_4}{1\ g\ PCE}}$$

$$\frac{2.6\ g\ NaM_NO_4}{1\ g\ PCE} \times \frac{120\ ug\ PCE}{1\ L} \times \frac{1\ g}{1E{+}06\ ug} \times \frac{1000\ L}{1\ m^3} \times 480{,}000\ (m^3)^{\text{Note 1}} = 151{,}783\ g\ NaM_NO_4 = \mathbf{152\ kg\ NaM_NO_4}$$

$$152\ kg\ NaM_NO_4 \times \frac{100\ kg\ 40\ \%\ soln}{40\ kg\ NaM_NO_4} = \mathbf{379.5\ kg\ 40\ \%\ soln} \times \frac{2.205\ lbs\ 40\%\ soln}{1\ kg\ 40\%\ soln} = \mathbf{837\ lbs\ 40\%\ soln} = \mathbf{2000\ lbs\ 40\%\ soln^3}$$

$$379.457\ kg\ 40\ \%\ soln \times \frac{1}{1.36}\ (\text{Note 2}) \times \frac{1\ m^3}{1000\ kg\ 40\ \%\ soln} \times \frac{1000\ L}{1\ m^3} = \mathbf{279\ L\ of\ 40\%\ soln}$$

References:
RS Means. 2003. Environmental Remediation Cost Data – Assemblies.

Notes:
[1]Assumes a PCE plume extent of 120,000 square meters. Source area is assumed to be one-fifth the extent, which equals 24,000 square meters. The thickness of contamination is assumed to be 20 meters. The total volume to treat is 24,000 square meters times 20 meters, which equals 480,000 cubic meters
[2]Specific gravity of solution
[3]Conservative estimate of 2000 lbs

ft = feet
g = grams
kg = kilograms
L = liters
lbs = pounds
m = meter
m^3 = cubic meters

$NaM_NO_4^-$ = sodium permanganate
PCE = tetrachloroethylene
PPE = personal protective equipment
PVC = polyvinyl chloride
soln = solution
ug = micrograms