U.S. ARMY GARRISON ALASKA
FORT RICHARDSON, ALASKA

Interim Remedial Action Report
Operable Unit E

August 2007

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List of Acronyms

ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
AVMA	Armored Vehicle Maintenance Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CRREL	Cold Regions Research and Engineering Laboratory
DRMO	Defense Reutilization and Marketing Office
ECR	Excavation Clearance Request
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
GIS	Geographic Information System
IC	Institutional Controls
IRAR	Interim Remedial Action Report
LTM	Long Term Monitoring
LUC	Land Use Controls
MCL	Maximum Concentration Level
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan (Oil and Hazardous Substances)
NFA	No Further Action
NPL	National Priority List
OUD	Operable Unit D
OUE	Operable Unit E
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethylene
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAB	Restoration Advisory Board
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
TBC	To Be Considered
TCE	Trichloroethylene
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USAG Alaska	U.S. Army Garrison Alaska
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

This document presents the IRAR for OUE, Fort Richardson, Alaska. OUE consisted of two source areas, Building 35-752 and the AVMA Site. The objectives of the remedial actions at OUE are:

- Designed to ensure the protection of human health and the environment by preventing exposure to and use of groundwater as a potential drinking water source with chemical concentrations that pose an unacceptable risk or exceed MCLs,

- Return groundwater to beneficial use 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.

The remedy selected, as outlined in the CERCLA ROD, dated September 2005, was chosen to:

- Provide land use controls to prevent exposure to and use of groundwater at the site,

- Reduce the overall volume and toxicity of contaminants in groundwater at the site, and to return groundwater to a beneficial use within a 30 year time period,

- 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 conformational sampling.

The interim report for a given operable unit is used only for remedial actions that include ground or surface water restoration remedies, including monitored natural attenuation. Interim report are used because of the long delay between construction of the treatment facility (or ROD signature for monitored natural attenuation) and attaining cleanup goals as specified in the ROD. This delay could last many years. The interim report is identical in content to the final RA report.

1.1 Fort Richardson Background

Fort Richardson encompasses approximately 61,376 acres. The Post is located in south-central Alaska adjacent to the cities of Anchorage and Eagle River, and Elmendorf AFB. The Knik Arm of the Cook Inlet borders the north side of the

Post, and Chugach State Park lies to the south and southeast. The town of Eagle River lies along the northeast border. Anchorage and Elmendorf AFB form the western boundary.

The primary missions at Fort Richardson are to provide ready combat sources to deploy rapidly in support of worldwide joint military operations, crisis response, and peacetime engagements; to maintain a quality of life and force protection platform; to field Stryker Brigade Combat Team 3; and to serve as the Joint Force Land Component in Alaska.

In June 1994, Fort Richardson was added to EPA's NPL. An FFA was signed in December 1994 which outlined the approaches to investigations of various suspected hazardous substance areas. The Fort Richardson site currently encompasses five OUs. Four OUs were initially designated in the FFA. The original four OUs (A, B, C, and D) incorporated all known source areas at the time the FFA was signed.

1.2 Operable Unit E Background

OUE was formed from two existing contaminant source areas: 1) The Building 35-752 site that was transferred from OUD into OUE; and 2) Solvent contaminated groundwater thought to be associated with an area referred to as the AVMA. The location of these two sites is shown in Figure 1.

1.2.1 Building 35-752

The Building 35-752 Area is located in a relatively undeveloped part of Fort Richardson that includes high-frequency transmitter antennas. 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.

1.2.2 Armored Vehicle Maintenance Area

The AVMA is located in the western region of the cantonment area of Fort Richardson. The 140 acre area consists of open fields, grasslands, woods, and some buildings. The AVMA site was identified during completion of OUD remedial investigations. Information analyzed during preparation of the OUD ROD indicated that an OUD site (Building 45-590) was not the source of solvent-contaminated groundwater in the area. The AVMA was identified as a potential source area for groundwater contamination and was incorporated as 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 historical sources of PCE contamination in groundwater at the site. PCE contaminated groundwater appears to originate north of Building 726 and extend down gradient about 600 feet to the northwest.

1.3 Investigative History

1.3.1 Building 35-752 Site Investigation and History

- 1990 – Seven 5,000-gallon diesel fuel USTs were excavated from the south side of Building 35-752. About 200 cubic yards of contaminated soil were removed and thermally treated following removal of the tanks.
- 1995 – Building 35-752 is secured and a fence with locked gate is constructed around the facility.
- 1996 – A 1,000-gallon waste oil UST was removed from the north side of Building 35-752.
- 1997 - Approximately 1,650 cubic yards of soil were excavated during construction of a parking lot at the site. The soil was found to contain PCBs and was subsequently stockpiled in a lined and covered containment cell. Both the stockpiled soil and the soils excavated from the Bldg 35-752 site in 2004 were containerized and transported to US Ecology for disposal.
- 1998 – Another 1,000-gallon waste oil UST was removed from the north side of Building 35-752.
- 2002 – The 1650-cubic yard soil pile was excavated and transported by rail car to a permitted landfill in Idaho.
- 2003 and 2004 – Approximately 124 tons of PCB and Dioxin/Furan-contaminated surface soil were excavated from the west side of Building 35-750. The soil excavated in 2004 was loaded into super sacks, transported to DRMO, and then placed in lined containers for shipment to US Ecology.

1.3.2 AVMA Site Investigation and History

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).

- 2001 - Aerial Photograph Review and Geophysical Investigation. 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

- 2001 - Installation and Sampling of Soil Borings and Monitoring Wells. Installation and sampling of new soil borings, and monitoring wells (USACE, 2001).
- 2002 - OUE Remedial Investigation and Risk Assessments. 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.
- 2004 - OUE FS. An 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.
- 2004 - OUE Proposed Plan. 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.
- 2004 - Groundwater Monitoring. The Army initiated groundwater monitoring following completion of the OUE RI. The monitoring program in 2004 comprised of two sampling events. Sample results from the 2004 sampling program indicate that the plume is stable and that down gradient PCE contaminant concentrations decreased or remained static.
- 2006 - RD Work Plan. This plan outlined the activities that will be undertaken for monitoring at this site.
- 2006 - LTM Plan. Developed the strategy and procedures to conduct annual monitoring at the AVMA.
- 2006 - Groundwater Monitoring. The Army conducted the annual groundwater monitoring event.

Other documents associated with OUE:

- 2006 - Remedial Design Work Plan, OUE.
- 2006 - Preliminary Close Out Report, Fort Richardson, Alaska.

1.4 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 nine 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. 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. Only one comment was received from the public during the open comment period.

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 USAG Alaska Directorate of Public Works, 724 Quartermaster Road on 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.

2.0 OPERABLE UNIT E

2.1 Record of Decision Requirements

Remedial actions at OUE have been implemented in accordance with the ROD and the remedial design work plan. Implementation of the remedy at the AVMA site did not require construction of a treatment system. The remedy is complete and operational at this time.

2.1.1 Building 35-752 Site

The Building 35-752 Area was recommended for NFA under CERCLA as recorded in the OUE ROD. Risk assessment results indicated that contamination in soils did not pose an unacceptable risk to human health or the environment and PCB contamination in soils was less than the relevant TSCA cleanup standards. Surface soils containing PCBs in excess of 25 ppm had been excavated and removed from the site.

In addition, groundwater at the Building 35-752 Area was recommended for NFA under CERCLA. Risk assessment results indicated that contamination in groundwater did not pose an unacceptable risk to human health or the environment. Shallow groundwater was and is not used as a drinking water source and is non-potable due to high turbidity and high metals levels.

Contaminant concentrations in groundwater were decreasing and the concentration of TCE (8.6 ug/L) was only slightly greater than the MCL (5 ug/L) and data suggested that the contaminant was degrading. To ensure the protectiveness of the NFA decision, the Army, EPA, and ADEC agreed to monitor groundwater and site conditions during the CERCLA Five-Year Reviews. The next five year review which would require groundwater sampling and a site inspection is scheduled to be completed by February 22, 2008.

2.1.2 Armored Vehicle Maintenance Area

Solvent contamination, predominantly PCE and TCE, in groundwater at the AVMA site was determined to pose an unacceptable risk to human health and the environment. PCE contamination at the AVMA exceeded MCLs and the aquifer was determined to be unacceptable as a drinking water source. Based on the locations where concentrations of PCE exceeded the cleanup levels, it was estimated that groundwater in an area of covering 150,000 square feet (about 3.5 acres) had been impacted and required remedial action.

The major components of the remedy are:

- Land Use Controls/Institutional Controls,
- Natural Attenuation,
- Groundwater Monitoring.

2.2 Remedial Design Criteria – AVMA

The remedial design criteria for solvent-contaminated groundwater at the AVMA are discussed in this section. The overall objective is to return groundwater to a usable condition through the natural attenuation and monitoring. Until cleanup objectives are achieved, it is the Army's responsibility to enforce land use

controls to prevent accidental exposure to solvent contaminated groundwater at the AVMA site.

2.2.1 Remedial Action Objectives (RAOs)

The remedy described in this section has the following objectives at the AVMA site:

- 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 as a potential drinking water source within a 30 year time period,
- 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.

2.2.2 Regulatory Standards

The following regulatory standards have been identified and are applicable to groundwater contamination at the AVMA:

2.2.2.1 Chemical-Specific Applicable or Relevant and Appropriate Requirements

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.

2.2.2.2 Action-Specific Applicable or Relevant and Appropriate Requirements

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.

2.2.2.3 Location-Specific Applicable or Relevant and Appropriate Requirements

There are no location-specific ARARs or TBCs for groundwater at the AVMA.

2.2.2.4 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.

2.3 Remedial Design Summary

The selected remedy for the AVMA site is Land Use Controls, Natural Attenuation, and Monitoring. The remedy has been implemented using existing infrastructure (existing wells) and did not require construction of a treatment system. Progress of the remedy will be assessed as part of ongoing monitoring activities. The actual effectiveness of the remedy and progress towards the remedial action objectives are an integral part of the overall design. The monitoring schedule will utilize a step-down approach to reduce monitoring frequency in the out years, while ensuring the protectiveness of the remedy.

This step-down approach provides several benefits:

- Comprehensive analysis of the remedy during the initial phases of remedial action monitoring. This will enable an early determination of the effectiveness of the selected remedy.
- Realized cost savings in the out-years once initial monitoring indicates that the remedy is effective and that the remedial action objectives will be achieved within reasonable time limits.

Integral to approach is the monitoring strategy that will allow effective determination of the progress of the remedy.

The monitoring strategy includes:

- Analyzing the groundwater piezometric head data to determine flow and direction, ensuring that the monitoring network covers the contaminated area.

- Analysis of natural attenuation parameters and daughter product ratios to determine the effectiveness of the remedy and to allow early determination of effectiveness.

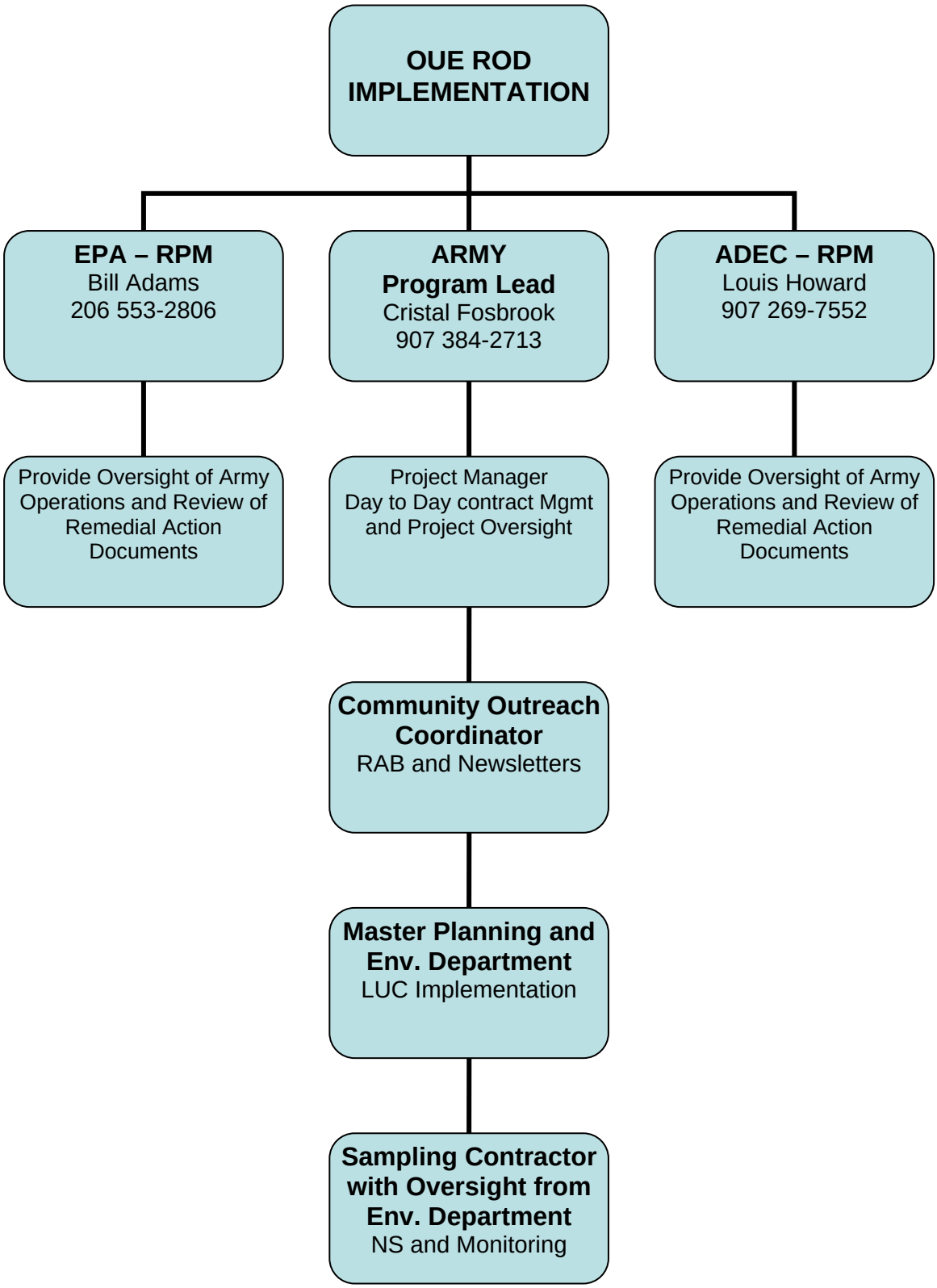
If at any time monitoring indicates that contaminant concentrations are increasing, the remedy will be reviewed by the Army, EPA, and State of Alaska to determine appropriate measures. In addition, if a specific source area for solvent contaminated groundwater is discovered the remedy will be reviewed to incorporate appropriate methods to remediate the source area. The remedy will be reviewed on a regular basis to determine progress toward meeting the RA objectives of the ROD. The remedy select for the Building 35-752 site was NFA. However, TCE concentrations exceeded federal MCLs and State of Alaska cleanup standards, and the Army, EPA, and ADEC agreed to conduct groundwater monitoring at this site during CERCLA Five-Year Reviews to ensure protectiveness of the NFA determination.

2.4 Personnel and Responsibilities

The key members and organization of the OUE RD Team are shown in Figure 2-1. The Army will be responsible for implementation of the remedy for the AVMA site. ICs will be implemented internally within USAG Alaska and enforced through existing mechanisms. Monitoring work will be performed under contract, but a specific contractor has not been identified at this time.

The Army's Program Lead is Cristal Fosbrook, Chief of Restoration for the Environmental Department for USAG Alaska. An Environmental Restoration Project Manager will assist with regulatory interface, assessment, technical evaluation, and preparation of regulatory documents. A community outreach coordinator will assist with technical evaluation, community outreach, and data/information management. LUCs will be enforced through the Army's master plan with cooperation from USAG Alaska Environmental Department. LUCs will be reviewed annually and results will be reported in the annual sampling report. Groundwater sampling will be conducted through a contract to a private environmental engineering firm (no specific firm has been identified at this time), and the contract will be overseen by the USAG Alaska Environmental Department.

Figure 2-1 Project Organization and Roles



3.0 PERFORMANCE STANDARDS

Implementation of the remedy at the AVMA site involves groundwater sampling and monitoring utilizing existing groundwater wells. Wells may be replaced if damaged through natural events such as frost heave or earthquake, or if damaged due to maintenance activities such as snow plowing or mowing. The ROD indicated that groundwater samples would be collected from existing monitoring wells and analyzed for the presence of VOCs.

The Army has developed a LTM plan for this site, along with a QA/QC plan, safety plan, and waste management plan. These documents have been thoroughly reviewed by the agencies to ensure that they meet applicable regulatory requirements list in this section.

3.1 Monitoring Wells and Sampling Procedures

The wells that will be sampled as part of on-going annual monitoring at the AVMA are listed Table 1, and are shown on Figure 3. These wells were selected for the following reasons:

- Historic sampling data is present for trend analysis,
- Encompass and extend beyond the boundaries of the plume,
- Represent water quality in both the shallow unconfined and deeper confined aquifers located below Buildings 726 and 732,
- Represent water quality in the down gradient unconfined aquifer (in areas down gradient from where the shallow unconfined and confined aquifers merge – to the west northwest from Building 733 as shown in Figure 2).

Wells will be sampled annually during the monitoring program, unless damaged and rendered unusable for sampling. In the event a well becomes damaged or unusable, an alternate well will be designated, or the well, will be replaced. All wells will be sampled using approved low-flow methods. Sampling contractors will be required to develop a SAP that meets EPA and ADEC requirements for low-flow sampling. Groundwater samples will be collected in accordance with EPA guidance for low flow sampling (EPA, 1996). Static water levels will be determined prior to purging and sampling each well. Static water level data will be used to determine flow direction and to ensure that current sampling procedures are adequate to characterize site conditions. If the flow direction appears to change the sampling program will be reassessed and new wells may be designated or installed to ensure adequate characterization of groundwater contamination at the AVMA.

3.2 Sample Quality Assurance and Quality Control

The contractor conducting the sampling will be required to develop and submit a QA/QC plan that meets EPA and ADEC requirements. Specifically the contractor will adhere to following requirements: State of Alaska Administrative Code, 18

AAC 75 (specifically section 355; ADEC 2004b); ADEC Underground Storage Tank Procedures Manual, November 7, 2002 (ADEC, 2002); ADEC Laboratory Data Review Checklist November, 2006 (ADEC, 2006); ADEC Environmental Laboratory Data and Quality Assurance Requirements – Technical Memorandum 06-002, October 9, 2006 (ADEC, 2006); Guidance for Quality Assurance Project Plans, EPA, Dec 2002 (EPA, 2002); and EPA Requirements for QA Project Plans, May, 2001 (EPA, 2001a). QA/QC samples will be collected and analyzed as part or the sampling effort at AVMA. Duplicate samples will be collected during Final OUE Remedial Design Work Plan, September 2006

3.3 Sampling Schedule

In accordance with the OUE ROD, groundwater samples will be collected annually from 15 wells located at the AVMA site. The adapted schedule indicates that 15 wells will be sampled annually for four years, biennially for six years, and then every five years for 20 years following signature of the ROD, or until sampling indicates that contaminant levels have dropped below cleanup standards listed in Table 2. Thus, annual sampling is planned during 2006, 2007, 2008, 2009, 2011, 2013, 2015, 2020, 2025, 2030, and 2035 (or as determined necessary). Sampling will be conducted during the fall to coincide with other annual sampling events, generally late August or September. This sampling schedule would be consistent with on-going monitoring at the site. Monitoring will be discontinued when at least three subsequent sampling events indicate that contaminant concentrations have consistently dropped below cleanup standards. 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.

4.0 INSPECTION AND CERTIFICATIONS

4.1 AVMA

Remedial actions associated with AVMA are natural attenuation, monitoring, and land use controls. Remedial actions at OUE have been implemented in accordance with the ROD and the remedial design work plan. Implementation of the remedy at the AVMA site did not require construction of a treatment system. The remedy is complete and operational at this time.

OUE is the final Operable Unit to be completed at the Fort Richardson site, however no Final Inspection was necessary, as no construction was required. Final Inspections were conducted on various dates at earlier OUs that did require construction, as reported in the RA reports. For OUE, the RPMs met several times to review monitoring results and confirm the selected remedy was performing as expected. The Preliminary Close Out Report for Fort Richardson, September 2006 confirmed that the remedy was operational and functional, ICs are in place, and no construction is necessary for OUE.

4.2 Institutional Controls

The OUE specific ICs are a means to prevent exposure to site-related contaminants. These controls are set forth and implemented under the Fort Richardson Institutional Control Policy and Master Plan. The IC Policy and Master Plan is reviewed no less than annually, and is 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 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 and allows planners to make accommodations when designating land use and/or planning future projects.

An additional aspect of the IC policy at Fort Richardson is the requirement that all organizations operating on Fort Richardson complete an ECR prior to excavating to a depth of more than six inches. Each ECR is reviewed for compliance with the IC policy prior to approval.

The following OU-specific ICs have also been implemented at the OUE:

- ICs have been implemented to restrict the access to and use of groundwater at the AVMA (OUE) until groundwater quality has been restored (contaminant concentrations are less than MCLs), thereby allowing for unrestricted use.

5.0 COST

ROD costs and Post-Rod Cost were 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. For OUE, there is no capital costs associated with the remedy because existing wells were utilized. 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 and includes the cost for monitoring and maintaining IC.

The estimated costs for each alternative evaluated are based on the information available at the time the alternatives were developed.

Cost Comparison of ROD Cost VS Estimated

OUE Remedy	ROD COST 2006	Estimated Annual Cost 2007	
2006 ROD Cost	$465,000	$15,500	
2007 Estimate	$503,733	$15,105	
% Change			8%

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

Actual cost versus 2007 estimate increased due to the increase in analytical services in Alaska.

6.0 Observations and Lessons Learned

The annual project cost, adjusted for inflation, has decreased overall from the ROD estimate. This savings is due, largely, to reduced labor and material costs, associated with combining semi-annual sampling of other Fort Richardson sites under one contract.

Increases in PCE concentrations have been observed near the center of the unconfined source area, potentially indicating the need for additional wells. This will be evaluated as part of the five year review.

MNA parameters indicated that MNA processes are occurring.

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Appendix I

ADEC Concurrence and Approval:

For ADEC:

JENNIFER ROBERTS
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Alaska Department of Environmental Conservation

Appendix I

EPA Concurrence and Approval:

For EPA:

9/21/2007

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LIST OF FIGURES

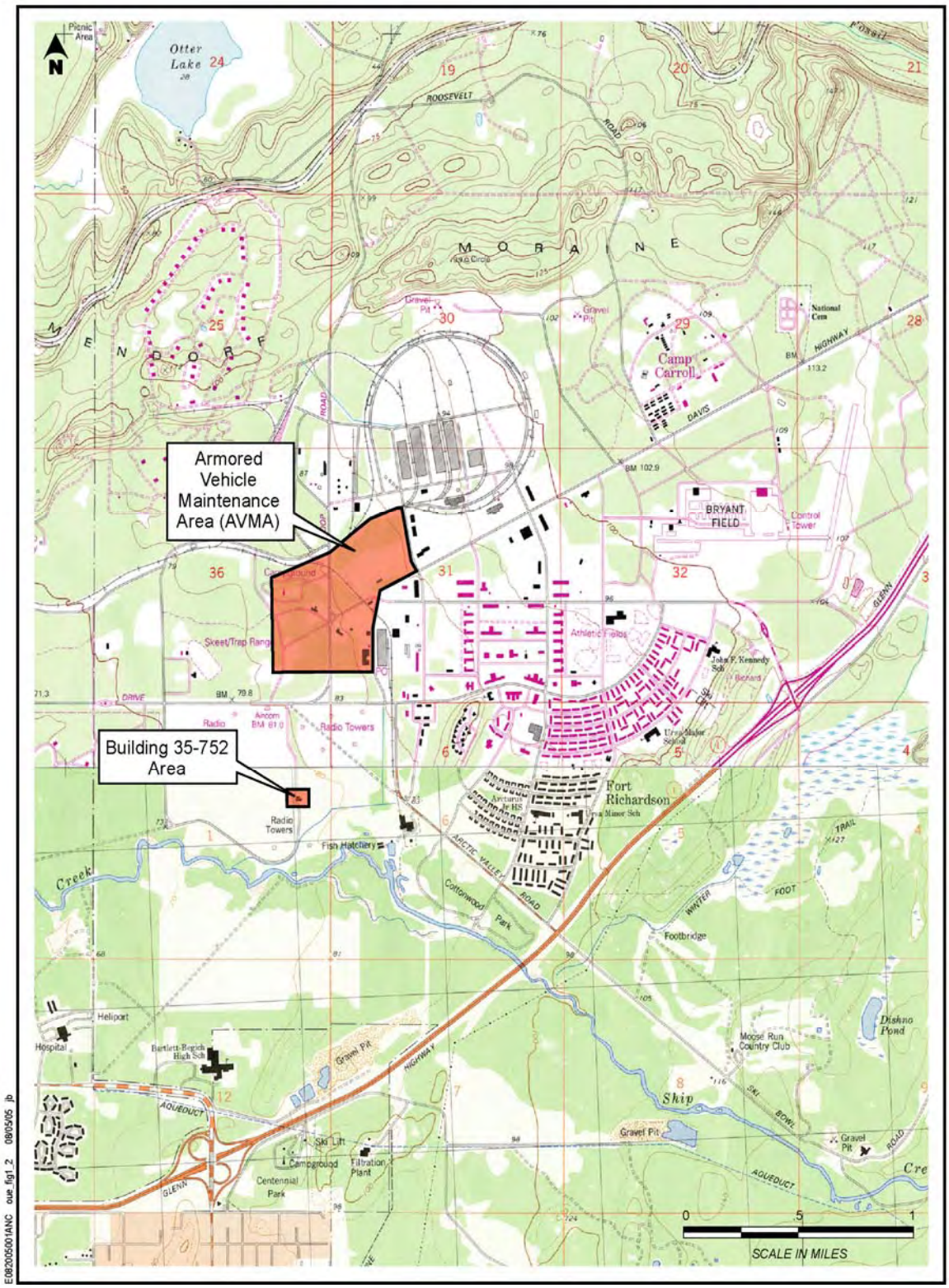

Figure 1: Location of OUE Sites – AVMA and Building 35-752

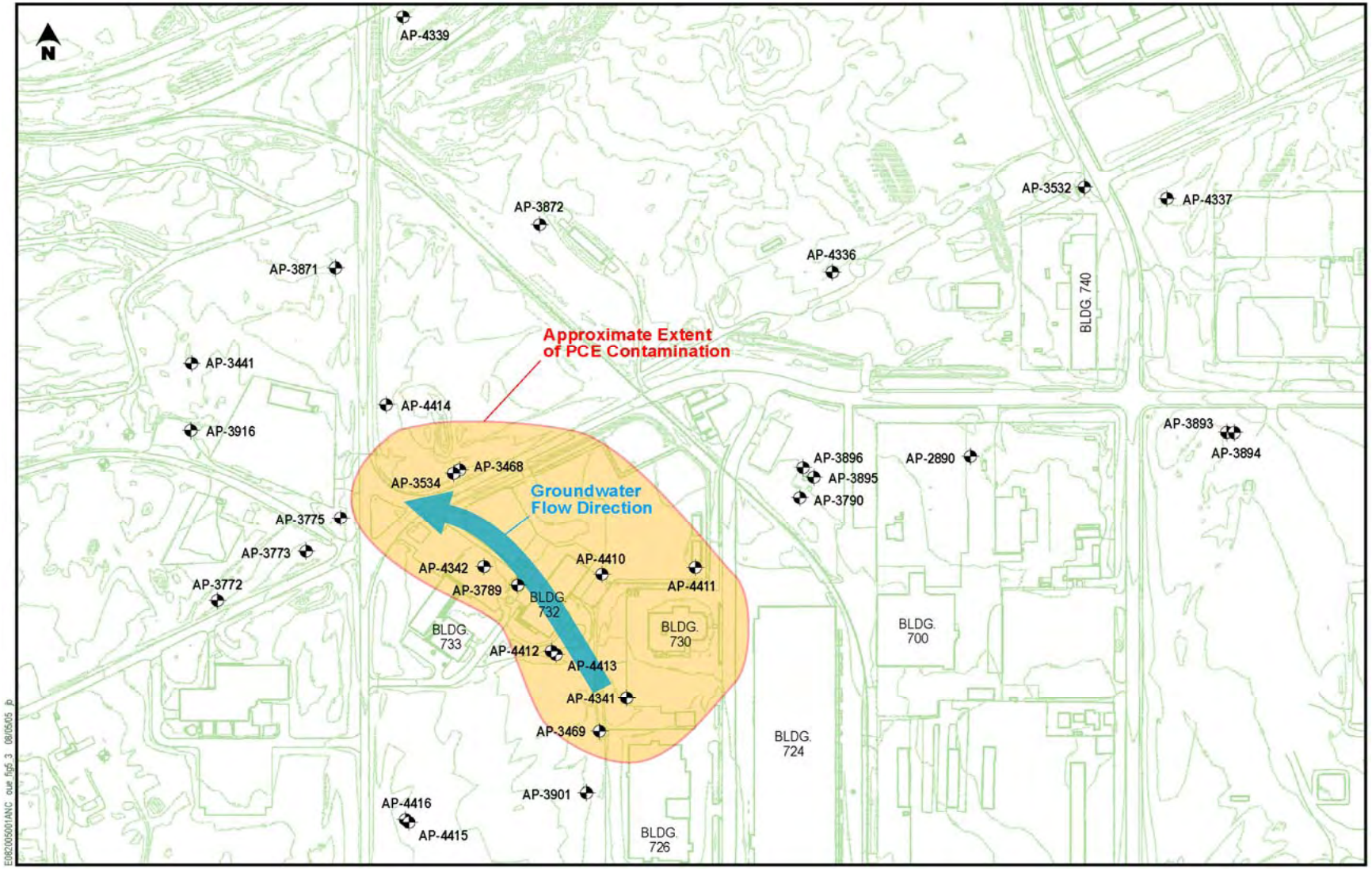

Figure 2: Approximate Extent of AVMA Contamination and Groundwater Wells

LIST OF TABLES

Table 1: AVMA Monitoring Wells.

Well	Condition	Total Depth (ft)	Depth to Water (ft)
AP-3467	Good	100.4	74
AP-3468	Good	115.5	105.98
AP-3534	Good	135	105.60
AP-3772	Good	117.2	103
AP-3773	Good	118	106
AP-3774	Good	113	102.52
AP-3789	Good	117.5	112
AP-3870	Good	120	95.29
AP-3871	Good	122	106.34
AP-3873	Good	112.5	107
AP-3901	Good	126.5	84.49
AP-4341	Good	68	63.97
AP-4342	Good	102	97.02
AP-4411	Good	73	67.49
AP-4413	Good	75	72.13

TABLE 2
Remedial Action Objectives and Preliminary Remediation Goals for AVMA Groundwater
Record of Decision
Operable Unit E, Fort Richardson, Alaska

Remedial Action Objective	Source Area	Chemicals of Concern	Remediation Goal	Basis
Environmental Protection				
Prevent exposure to and use of groundwater with chemical concentrations that pose an unacceptable risk or exceed applicable or relevant and appropriate requirement (ARARs)	Groundwater Plume	PCE	Institutional controls specify that no potable water wells can be installed at these areas.	
	Well AP-3893	Dibenzo(a,h)anthracene		
Return groundwater to beneficial use	Groundwater Plume	PCE	5 µg/L	1×10^{-4} ELCR 18 AAC 75
	Well AP-3893	Dibenzo(a,h)anthracene	0.1 µg/L	

Notes:
µg/L = micrograms per liter
AAC = Alaska Administrative Code
ELCR = Excess Lifetime Cancer Risk
PCE = tetrachloroethylene