

**UNITED STATES AIR FORCE
ELMENDORF AIR FORCE BASE, ALASKA**

ENVIRONMENTAL RESTORATION PROGRAM

**2004 WORK PLAN
ENVIRONMENTAL MONITORING AND SYSTEM
OPTIMIZATION OF SD15 HIGH VACUUM
EXTRACTION SYSTEM**

FINAL

AUGUST 2004



FINAL WORK PLAN

Environmental Monitoring and System Optimization of SD15 High Vacuum Extraction System

Elmendorf AFB, Alaska

Prepared for:

**3rd Civil Engineer Squadron/Environmental Restoration
and
Air Force Center for Environmental Excellence**

**Contract No. F41624-03-D-8622/TO 0043
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LIST OF ACRONYMS

ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liabilities Act
CES/CEVR	Civil Engineer Squadron/Environmental Restoration
CFR	Code of Federal Regulations
CESY	Contractor Environmental Staging Yard
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COR	Contracting Officers Representative
CPSMR	Contractor's Progress, Status, and Management Report
DRO	Diesel Range Organics
FFA	Federal Facilities Agreement
FSP	Field Sampling Plan
GRO	Gasoline Range Organics
HSP	Health and Safety Plan
HVE	High Vacuum Extraction
NPL	National Priority List
O&M	Operation and Maintenance
OU	Operable Unit
PPE	Personal Protective Equipment



LIST OF ACRONYMS (*continued*)

PHSC	Program Health and Safety Coordinator
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
SAP	Sample and Analysis Plan
SOW	Statement of Work
SSHO	Site Safety and Health Officer
SVE	Soil Vapor Extraction
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
WESTON	Weston Solutions, Inc.
WP	Work Plan
VOC	Volatile Organic Compound



1.0 INTRODUCTION

Under contract agreement (Contract No. F41624-03-D-8622-0043) with the United States Air Force Center for Environmental Excellence (AFCEE), Weston Solutions, Inc. (WESTON) has prepared this Work Plan (WP) for the AFCEE Statement of Work (SOW) entitled, *Environmental Monitoring and System Optimization of SD15 High Vacuum Extraction System at Elmendorf AFB, Alaska*, dated 15 January 2004.

This WP outlines the technical approach used to complete the proposed environmental monitoring and High Vacuum Extraction (HVE) system optimization project. Submission of this WP satisfies the requirements of the Quality Assurance Project Plan (QAPP) required by the AFCEE SOW. Included as appendices are the project Health and Safety Plan (HSP) and the project Sample and Analysis Plan (SAP). The SAP is comprised of the Field Sampling Plan (FSP) and Quality Assurance Program Plan (QAPP). This project is directed and coordinated by the United States Air Force (USAF), 3rd Civil Engineer Squadron/Environmental Restoration (3 CES/CEVR).

1.1 PROJECT PURPOSE AND SCOPE

The purpose of this project is to perform system maintenance and operation, environmental monitoring, and restoration activities in support of the 3 CES/CEVR mission. These activities include maintaining the HVE system at peak performance, optimizing the system's performance, minimizing system downtime due to repairs, and maintaining system operation at approximately 75 percent. Additional activities will include but are not limited to system operation, periodic environmental monitoring of the system performance, maintenance of system equipment and components, response to system alarm conditions, and system adjustments to optimize soil vapor extraction (SVE) treatment of shallow soils.

Work under this project will be accomplished by executing the following tasks:

1. Operate and maintain the SD15 HVE system in accordance with the HVE System Operation and Maintenance (O&M) Manual and the approved WP. O&M includes the completion of routine and non-routine maintenance tasks, monitoring of system operation parameters and response to system emergency calls. This includes semi-annual compressor oil changes to increase system operational time.
2. Provide sampling and analysis of water and vapor quality in monitoring wells, in the system and on the discharge stack. These data will be used to generate necessary information for comparison with established remediation parameters.
3. Utilize SVE wells located at two areas of shallow soil contamination, near sampling locations EHVE02-SB03C and EHVE02-SB19C.
4. Report monthly on the status of the project level of effort submitting a Contractor's Progress, Status and Management Report (CPSMR).
5. Optimize the performance of the system to include halting airflow from one or more wells to increase potential contaminant removal at other well(s).



6. Provide semiannual discharge monitoring reports.
7. Determine whether the HVE wells have reached an asymptotic or steady state and, if the groundwater is still above cleanup standards, changing the cleanup method to monitor natural attenuation as discussed in Section 6 of the O&M Manual.
8. Upgrade the O&M Manual to reflect current maintenance requirements and system modifications.
9. Provide an Annual Technical Report for the SD15 HVE system, summarizing the above information and providing: data analysis; how the HVE system is meeting performance goals; recommendations for future field activities including optimization efforts needed, estimated costs and cost savings, and year to be implemented.

1.2 DOCUMENT ORGANIZATION

This document is organized with the following sections:

- Section 1 provides a brief introduction and presents the project purpose and scope;
- Section 2 discusses background information for the project and lists guidance documents and regulations;
- Section 3 provides a description of the project organization and responsibility;
- Section 4 discusses site preparation including site clearance, site set-up, and communication;
- Section 5 provides a detailed description of the project tasks;
- Section 6 discusses record keeping and reporting requirements;
- Section 7 provides a project planning chart; and
- Section 8 provides references used to prepare this WP.

Three appendices to this document have also been included:

- Appendix A provides the project HSP;
- Appendix B provides the project SAP; and
- Appendix C provides forms that will be used during field activities.



2.0 BACKGROUND

The United States Environmental Protection Agency (USEPA) placed Elmendorf Air Force Base (AFB), AK on the National Priorities List (NPL) in August 1990. This listing designated the facility as a federal site subject to the remedial response requirements of the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA), often referred to as the “Superfund”. The USAF, USEPA, and Alaska Department of Environmental Conservation (ADEC) signed a Federal Facilities Agreement (FFA) for Elmendorf AFB on November 22, 1991. The FFA divided contaminated sites at Elmendorf AFB into seven operable units (OUs), each to be managed as a separate area and investigated according to a sequenced schedule.

OU 6 consists of six different contaminated source areas across Elmendorf AFB. Source Area SD15 is located in the northern area of the base on the Elmendorf End Moraine (Figure 2-1). The contaminated source at SD15 consists of three separate concrete pads used during the 1970s and 1980s for weathering fuel filters and pads, and disposal of tank sludge. Remaining fuel filters and the concrete pads were removed in 1996. The SD15 HVE system was installed in October 1996 and was operational in December 1996. Figure 2-2 provides a site diagram of SD15 and the well locations.

2.1 GUIDANCE DOCUMENTS AND REGULATIONS

This environmental restoration project will follow multiple guidance and regulatory documents. ADEC regulations and guidance documents include the following:

- *Recommended Practices for Monitoring Well Design, Installation, and Decommissioning, Final, April 1992.* This document provides guidance for monitoring well design, installation, and decommissioning. This document will be consulted for the abandonment of bioventing implants and wells.

The following Air Force documents will be used as guidance during the execution of this project:

- *Remedial Investigation/Feasibility Study Report, Volumes I through IV, Operable Unit 6, Elmendorf AFB, Alaska. January 1996.*
- *Final SD15 High-Vacuum Extraction System, Operation and Maintenance Manual, Environmental Restoration Program, Elmendorf AFB, Alaska, July 1997.*
- *Final SD15 High-Vacuum Extraction (HVE) System Annual Reports, Environmental Restoration Program, Elmendorf AFB, Alaska, June 1998b, May 1999, February 2000, March 2001, April 2002, March 2003, and July 2004.*
- *3rd Wing OPLAN 19-3, Hazardous Waste, Used Oil, and Hazardous Material Management Plan.*
- *Air Force Remedial Process Optimization Handbook, 2001.*
- *DUSD (I&E) Memorandum, Management Guidance for the Defense Environmental Restoration Program (DERP). September 2001.*
- *Contractor’s Guide, Environmental Restoration Program, May 2004.*



Figure 2-1 Location Map, Elmendorf AFB and SD15, Alaska



Figure 2-2 SD15 Site Map



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3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

Project management, technical support, and engineering support will be provided from the Contractor's Anchorage, Alaska office. An organizational chart showing the reporting relationships of the persons involved in Quality Assurance/Quality Control (QA/QC) for this project is provided in Figure 3-1. The chart shows the lines of authority from the Project Manager through the program and project personnel. An independent Project QA Officer will ensure that the work performed on the project is effectively implemented through independent audits. As shown, the Project QA Officer has direct reporting lines to the Program Manager and Project Manager. The sections that follow describe the specific functions and authority of each of these persons.

3.1 PROGRAM MANAGER

The Program Manager, Mr. Frank Janicek, will have overall responsibility for all technical, contractual, and administrative matters for WESTON. He will be responsible for ensuring that a high degree of client responsiveness is maintained.

3.2 PROGRAM HEALTH AND SAFETY COORDINATOR/CERTIFIED INDUSTRIAL HYGIENIST

The Program Health and Safety Coordinator/Certified Industrial Hygienist (PHSC/CIH) for this project is Mr. George Crawford. Mr. Crawford is certified in comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene. He has over 25 years of industrial hygiene and safety experience. The PHSC will have final approval of the site-specific HSP (Appendix A) and will ensure that the HSP complies with all federal, state, and local health and safety requirements. He also will assist in modifying specific aspects of the HSP to adjust for on-site changes that affect safety, evaluate and authorize any changes to the HSP in conjunction with the Site Manager, and assist in acting as liaison with government officials regarding health and safety related matters.

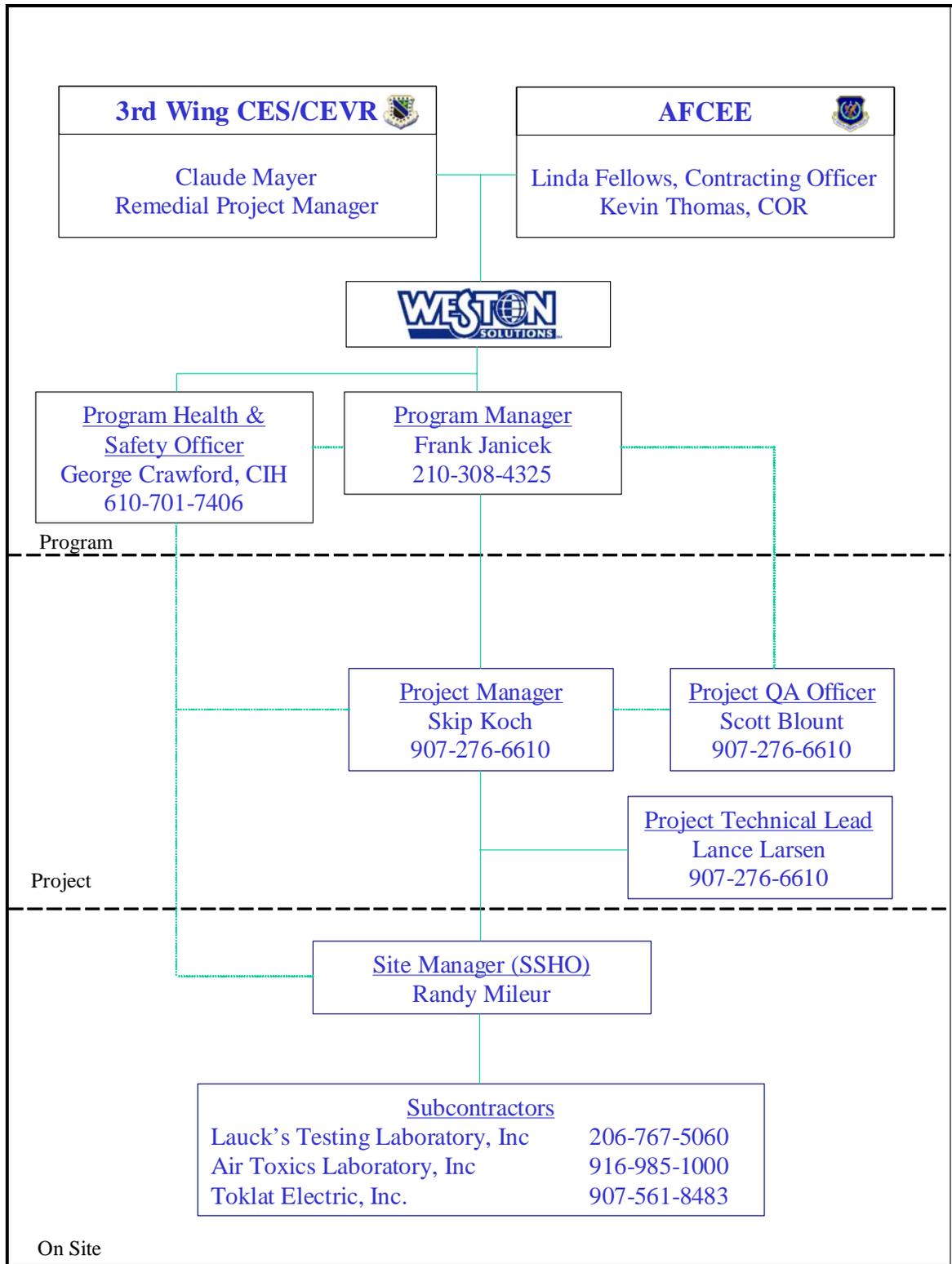
3.3 PROJECT QUALITY ASSURANCE OFFICER

The Project QA Officer, Mr. Scott Blount, will be responsible for reviewing and approving planning documents; overseeing staff selection; monitoring contract and task funds and schedules; reviewing submittals; performing of field and office audits; reviewing O&M specifications; and reviewing of analytical data submittals. Through implementation of the WP and the SAP (Appendix B), the Project QA Officer will execute QA programs for administrative, field, O&M, and analytical activities.

The QA procedures for field performance and analytical requirements vary in detail but not in importance. To provide proficiency in both areas, QA personnel with specialized knowledge in these fields will assist the Project QA Officer in the management of these activities.



Figure 3-1 Contractor/AFCEE Program and Project Organization



3.4 PROJECT MANAGER

The Project Manager, Mr. Skip Koch, will be responsible for daily supervision of project execution; establishment of work teams for specific tasks; allocation of assigned resources for optimum safe and quality work execution; resolution of issues regarding alternative approaches; direct and frequent liaison with the USAF staff; early identification and resolution of problems; identification of potential or desired modifications to the scope of work; cost, schedule, and field construction QC; and preparations of project progress reports. The Program Manager and Project QA Officer will be regularly informed about the status of project activities and any change in the scope of work, milestone dates, or resource requirements.

3.5 SITE MANAGER / SITE SAFETY AND HEALTH OFFICER

Randy Mileur will act as the Site Manager/Site Safety and Health Officer and report directly to the Project Manager. The Site Manager is responsible for supervising field implementation of the project during system modification and operational activities. The Site Manager provides direct supervision to the field staff. On this project, the Site Manager also functions as the Site Safety and Health Officer (SSHO) and is responsible for ensuring that all personnel adhere to the requirements of the WESTON Health and Safety Program and this HSP.

The Site Manager will have successfully completed 8-hour site supervisor training per 29 Code of Federal Regulations (CFR) 1910.120(e)(4) and will be certified in first aid, cardio-pulmonary resuscitation, and blood borne pathogens.

The SSHO has the following responsibilities:

- STOP WORK authority for health and safety reasons.
- Assist in the development of the HSP.
- Implement and enforce the WESTON Health and Safety Program and this HSP.
- Conduct daily safety briefings.
- Train employees in site-specific hazards and complete the Documentation of Training Form in Appendix C.
- Specify proper levels of personal protective equipment (PPE) according to the specifications of the HSP.
- Develop additional health and safety procedures, as required.
- Investigate accidents/incidents and “near misses.”
- Conduct visitor orientation.
- Conduct weekly safety audits and complete required documentation.
- Coordinate with the PHSC/CIH concerning monitoring and PPE.
- Conduct monitoring as specified in the HSP.



The Site Manager will report to the Project Manager and is responsible for field implementation of the project. The duties of the Site Manager include performing the system O&M, environmental monitoring, and system optimization as described in Section 5 of this WP.

3.6 SUBCONTRACTORS

The following is a list of subcontractors scheduled for use during the project:

Laucks Testing Laboratory – water analytical services laboratory.

Air Toxics, Inc. – air analytical services laboratory.

Toklat Electric, Inc. – qualified electrician.



4.0 PROJECT PREPARATION AND MANAGEMENT

4.1 SITE PREPARATION

The following subsections describe activities to be conducted in association with site clearance and preparation.

4.1.1 Site Clearance

Prior to intrusive field activities, the Contractor will obtain the required clearances/permits, to including the necessary excavation permits from the Air Force and local utility organizations as required. Prior to beginning work, the Contractor will coordinate with Elmendorf AFB personnel to locate any utilities that might run under all areas where intrusive activities are planned. All locate actions will occur in accordance with the requirements of Air Force Form 103. The Site Manager will witness all locates, and record and sketch their location in the site logbook. In addition, the Contractor will coordinate with the AFCEE Contracting Officer's Representative (COR) and the 3 CES/CEVR Remedial Project Manager to eliminate unnecessary delays in the project.

4.1.2 Site Set-Up

Site preparation will include establishing a staging area inside the Elmendorf AFB 3 CES/CEVR Contractor Environmental Staging Yard (CESY) where necessary materials and equipment may be stored during the field activities. A staging area for wastes also will be set up in the CESY. Waste management procedures are discussed in the attached SAP (Appendix B).

4.1.3 Communication

The Site Manager will report to the Contractor Project Manager daily regarding system checks and maintenance performed, test results, and problems encountered. The Contractor Project Manager will report to AFCEE and 3CES/CEVR according to the reporting schedule discussed in Section 6.



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5.0 PROJECT TASK DESCRIPTIONS

Under this project, the Contractor will perform SD15 HVE system O&M, environmental monitoring, and system optimization. The procedures and methods described in this WP were derived from information contained in the AFCEE SOW and referenced documents, and standard industrial practices and/or sound engineering principles. These may be modified to accommodate site conditions. No modifications to the field approach or this WP will be made without prior consultation with and approval by AFCEE and the Air Force.

5.1 SYSTEM OPERATION AND MAINTENANCE

O&M tasks include routine maintenance and non-routine maintenance tasks as described in Table 5-1, Year 2004 Maintenance Tasks. O&M tasks for 2004 were derived from the *2003 SD15 HVE System Annual Report* (USAF, 2004d) and the *SD15 HVE System Operation and Maintenance Manual* (USAF, 1997). Routine maintenance tasks will include weekly, monthly, six-month, and annual maintenance items as described in Table 5-1 and the above references. The monthly tasks will be completed during a weekly system check. In addition, the six-month and annual tasks will be coordinated with the shut down of the system for the groundwater sampling events to take place at SD15 and the system modification to take place this field season. Non-routine maintenance tasks will include items as listed in Table 5-1 below.

When performing O&M on the SD15 HVE system, the Site Manager will follow the steps outlined in the O&M Manual (referenced section in Table 5-1, Column 3).

The Contractor also will respond to system alarm conditions (approximately 3 per month anticipated). In addition, this task will include waste management and disposal of waste oil, oil soaked pads, carbon vessel carbon, oil/water separator media, air compressor coolant, and other waste produced during the operation and maintenance of the system. These will be included in the non-routine maintenance items. Waste management procedures are described in the attached SAP (Appendix B).

5.2 ENVIRONMENTAL MONITORING

Environmental monitoring of the system will be accomplished to ensure performance measurements are consistent with optimal operational parameters, reliability goals are being met, the progress of remediation is consistent with the system expectations, and compliance with applicable statues and regulations is demonstrated.

Environmental monitoring tasks will consist of the activities and frequencies listed in Table 5.2.



Table 5-1 Year 2004 Maintenance Tasks

Frequency ¹	Task	Reference ²
Weekly	Check cycle points on the HVE inlet separator Check seal oil level (L-01) Check needle valve flow Check condensate collection vessel level (L-02) Drain vapor discharge stack Visually inspect all pumps Exercise all valves in the HVE skid and water skid Record keeping	Section 2.3.1 Section 2.3.2 Section 2.3.3 Section 2.3.4 Section 2.3.5 Section 2.3.6
Monthly	Clean basket strainer on HVE inlet separator twice per month Drain spooge from the condensate collection vessel Visually inspect the seal oil after cooler Replace bag filters twice a month or more if necessary Grease vacuum pump and motor Clean out water flow totalizer Record keeping	Section 2.3.8 Section 2.3.10 Section 2.3.11 Section 2.3.12 Section 2.3.15
6 Months	Flush and drain the HVE inlet separator Clean Y-strainer on seal oil recirculation system Clean or change basket strainers Clean inlet separator level switches Clean or replace stained "sight glass" sections Bail well enclosures Perform scheduled oil change, including compressor Clean cooling fins on aftercooler Change belts (2) Record keeping/waste management	Section 2.3. Section 2.3.9 Section 2.3.13 Section 2.3.14
1 Year	Clean the O/W separator and both process tanks in the HVE skid Check rooftop condensate trap Clean condensate knock out and float trap assembly Drain and flush aftercooler Shutdown and startup system for two rounds of annual groundwater monitoring (Basewide Program) Replace D-cell batteries in autodialer cell phone	Section 2.4.4
Non-routine	Snow removal Replace screens on louvers and fixed vents Replace O/W separator media Replace two carbon vessels – carbon only Dispose of drum of oil-soaked pads Change seal oil Startup after automatic shutdown Change stained clear polyvinyl chloride (PVC) pipe	Section 2.1

1 The frequency of above tasks may be reduced due to planned system shutdown to accommodate groundwater and soil sampling events, system optimization, and the incorporation of any system modifications.

2 *SD15 High-Vacuum Extraction System Operation and Maintenance Manual, Final.* (USAF, 1997).

HVE – high-vacuum extraction

O/W – oil/water



5.3 SYSTEM OPTIMIZATION

The removal rate of contaminants by the HVE system has decreased significantly since it began operation. Contaminants in the soil around wells W-1302 and W-1304 are below cleanup levels. Only soils 8-11 feet below ground surface remain above cleanup levels around W-1303. The four SVE wells (SD15-SVE 1A, 1B, 2A and 2B) were added to the system in 2003. Two of these wells will address the 8-11 feet below ground surface contamination around W-1303. The water in the perched aquifer around wells W-1301, W-1302, and OU6MW-18 (not part of the HVE system) remains above cleanup levels. These results are summarized in the Table 5-4 below.

Table 5-4 Media Above Cleanup Levels

Well	Soil	Water
W-1301	X	X
W-1302		X
W-1303	X	
W-1304		
SVE-1A	X	
SVE-1B	X	
SVE-2A	X	
SVE-2B	X	

To optimize the HVE system contaminant reduction capabilities, W-1303 and 1304 have been disconnected from the vacuum system and will no longer be used. Wells W-1301 and W-1302 will continue to undergo vacuum extraction to remove the contaminated groundwater from both wells and to treat the contaminated soil around well W-1301. If either of these two wells goes dry, the well will be taken off-line to allow the water to flow to it and the extraction will be restarted.

The four SVE wells added to the system in 2003 have increased the rate of contaminant removal. The removal rates of these wells will be monitored to see if they should be pulsed (periodically turned off for several days and then returned to operation).



6.0 RECORD KEEPING AND REPORTING

This section discusses record keeping of all field activities and reporting to include an Annual Technical Report and monthly CPSMR.

6.1 RECORD KEEPING

The WESTON will maintain field records sufficient to recreate all sampling and measurement activities. The information shall be recorded with indelible ink in a permanently bound notebook, the O&M records found in the Appendix C, and the Weekly Monitoring Log found in the O&M Manual. These records shall be archived in an easily accessible form and made available to the USAF and AFCEE upon request.

O&M logs will be maintained by the maintenance staff and reviewed by the Project Manager. Out-of-specification conditions will be brought to the attention of the USAF and corrected as soon as possible. Repairs will be documented in the maintenance log found in Appendix C.

The following information shall be recorded in the field notebook for all field activities: (1) location, (2) date and time, (3) identity of people performing activity, and (4) weather conditions. For field measurements: (1) the numerical value and units of each measurement, and (2) the identity of and calibration results for each field instrument, shall also be recorded. Results from the laboratory analysis of soil samples will be compared to the remedial objectives for OU 6. Results will be documented in an Annual Report.

6.2 REPORTING

The Contractor will prepare and submit an Annual Technical Report for review and approval by AFCEE and 3 CES/CEVR. The annual report will provide a summary of monitoring, document operation and optimization activities, and will document overall system performance. Recommendations will be made to optimize system operation. The Contractor also will prepare and submit two semiannual discharge-monitoring reports for the SD15 HVE System. These discharge reports will provide results of effluent water sampling events and influent water sampling events. The Contractor will update the SD15 HVE System O&M Manual to reflect current maintenance requirements and system modifications.

The government will require 30 days for review of the draft reports and manual. The Contractor will incorporate government comments and submit a final version within twenty days of receipt of the comments.

The Contractor will prepare and submit a CPSMR monthly for this project. These reports are used to review and evaluate the overall progress and existing or potential problem areas on the project. The content of the report will include a summary of events occurring during the reporting period, discussion of performance, identification of problems and any corrective action taken, outstanding issues, funds expended during the reporting period, and cumulative expenditures and activities planned for the next reporting period.



In addition to the above reports, the Contractor will provide a bi-weekly project update, via e-mail, to 3 CES/CEVR and AFCEE. In addition, any condition affecting the SD15 HVE Systems will be reported to the COR and Contracting Officer. On critical issues, (e.g., contract performance and/or human health or environmental compliance), verbal notification will be made immediately, followed by written notification as soon as practical.

6.3 UPGRADE OF O&M MANUAL

The Contractor will upgrade the existing O&M Manual to reflect current maintenance requirements and system modifications. Tasks include the following:

1. Re-key and make electronic and printed version;
2. Add in O&M of SVE wells;
3. Further define pulsing of the HVE system with time duration and decision tree, similar to that of the SVE wells; and
4. Add current wiring diagrams.



7.0 PROJECT PLANNING CHART

Figure 7-1 presents the project schedule.



Figure 7-1 Project Schedule



8.0 REFERENCES

- ADEC, *Recommended Practices for Monitoring Well Design, Installation, and Decommissioning, Final*. April 1992.
- AFCEE, *Statement of Work, Environmental Monitoring and System Optimization of SD15 High Vacuum Extraction System at Elmendorf AFB, Alaska*. 15 January 2004.
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APPENDIX A—HEALTH AND SAFETY PLAN

APPENDIX B—SAMPLING AND ANALYSIS PLAN

APPENDIX B—PART I
FIELD SAMPLING PLAN

APPENDIX B—PART II
QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan attached as Part 2 of Appendix B to the October 2003 *Environmental Monitoring Plan, Basewide Groundwater Monitoring* will serve as guidance during the execution of this project.

APPENDIX C—FIELD FORMS
