

6.0 FIVE-YEAR REVIEW PROCESS

This section discusses the administrative components of this Five-Year Review.

6.1 ADMINISTRATIVE COMPONENTS

This review was led by Mr. Alan Thomas, P.E. Mr. Thomas is the Restoration Program Manager at Luke AFB. Others that assisted with the review are:

- Xuan-Mai Tran, USEPA Region 9
- Stacy L. Duffy, ADEQ
- Jeff Hodge, HGL
- Mary Knowles, HGL

Table 6.1 summarizes the administrative components of this Five-Year Review and the start and finish dates for the administrative components.

6.1.1 Community Involvement

Members of the community advisory board (CAB) were notified of the Second Five-Year Review via telephone on October 16, 2006. CAB members Joyce Clark and Dan Salzler were contacted. An attempt was made to contact a third member of the CAB (Martin Jefferies). However, Mr. Jefferies has moved from the area and could not be reached.

A public notice announcing the start of the five-year review process was published as a legal notification in three local newspapers on the dates listed below.

- *Arizona Republic* – October 21, 2006
- *Glendale Star* – October 26, 2006
- *Northwest Valley* – October 21, 2006

The public notice is provided below in italicized text. The affidavits for the notices are provided in Appendix C.

A Five-Year Review is in the process of being completed for environmental sites located within Luke AFB just west of Phoenix, Arizona. The review is scheduled to be completed in early 2007. Information about the site may be viewed at <http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0900884>. The Luke AFB Environmental Flight is leading the effort to complete the review. The contaminants of concern for the base are volatile organic compounds, semivolatile organic compounds (formerly known as BNAs), and metals. Environmental issues at the base are being or have been addressed by deed restrictions, plan modifications, soil capping, and various forms of contaminant removal. Interested parties may submit comments to Alan Thomas, Restoration Program Manager at 56 CES/CEVQR; 13970 W. Lightning St.; Luke AFB, AZ 85309-1149 or at alan1.thomas@luke.af.mil.

A second public notice will be placed in the same local newspapers listed above after the Second Five-Year Review has been approved by regulatory authorities. The results of the review will be made available to the public at the Glendale Public Library, Peoria Public Library, and the USEPA Region 9 office.

6.1.2 Document Review

The following regulatory guidance documents and publications were reviewed during preparation of this Second Five-Year Review:

- Arizona Numeric Water Quality Criteria (Arizona, 1996a)
- Arizona Soil Remediation Levels (Arizona, 1996b)
- Comprehensive Five-Year Review Guidance (EPA, 2001)
- Environmental Protection Agency Region 9 Preliminary Remediation Goals (EPA, 1996)
- Environmental Protection Agency Region 9 Preliminary Remediation Goals (EPA, 2000)
- Environmental Protection Agency Region 9 Preliminary Remediation Goals (EPA, 2004)
- National Primary and Secondary Drinking Water Standards (EPA, 2003)
- Supplement to the Comprehensive Five-Year Review Guidance: Evaluation of Institutional Controls (EPA, 2005)

The following historical site documents and reports were reviewed during preparation of this Second Five-Year Review. The documents were provided by Luke AFB:

- Draft Groundwater Long-Term Monitoring Report, August 2006 Sampling Event (HGL, 2006a)
- Final Close-Out Report (ARCADIS, 2001a)
- Final First Five-Year Review (ARCADIS, 2002a)
- Final Remedial Action Report, Luke AFB, Arizona (ARCADIS, 2001b)
- Final Remedial Investigation Report, Volumes I and II (Geraghty & Miller, 1997)
- Groundwater Sampling Event Results for PSC SS-42, PCS ST-18, and RW-02 at Luke Air Force Base, Arizona (ARCADIS, 2002b)
- Inspection of Concrete Cap and Cost Estimate for Recommended Repairs Site ST-18, Building 993, Luke AFB, AZ (ERMS, 2000)
- Inspection of Concrete Cap at Site ST-18, Building 993, Luke AFB, AZ (ERMS, 1999)
- Inspection of Concrete Cap Site ST-18, Building 993, Luke AFB, AZ (ERMS, 2001)
- Inspection of Concrete Cap Site ST-18, Building 993, Luke AFB, AZ (ERMS, 2002)
- Inspection of Concrete Cap Site ST-18, Building 993, Luke AFB, AZ (ERMS, 2003)
- Inspection of Concrete Cap Site ST-18, Building 993, Luke AFB, AZ (ERMS, 2004)
- Inspection of Concrete Cap Site ST-18, Building 993, Luke AFB, AZ (Luke AFB, 2006)
- Institutional Control Plan (ARCADIS, 2000)
- July 2004 Radiological Monitoring Summary at PSC RW-02, Luke Air Force Base, AZ (ARCADIS, 2004a)

- July 2005 Radiological Monitoring Summary at PSC RW-02, Luke Air Force Base, AZ (ARCADIS, 2005a)
- Letter Report Summarizing the April 2005 Groundwater Sampling Event for PSC SS-42 and PSC ST-18 at Luke Air Force Base, Arizona (ARCADIS, 2006)
- Letter Report Summarizing the August 2003 Groundwater Sampling Event Results for PSC SS-42 and PCS ST-18 at Luke Air Force Base (AFB), Arizona (ARCADIS, 2003a)
- Letter Report Summarizing the June 2004 Groundwater Sampling Event for PSC SS-42 and PSC ST-18 at Luke Air Force Base, Arizona (ARCADIS, 2004b)
- Long-Term Monitoring Plan (ARCADIS, 2004c)
- Luke Air Force Base General Plan (Luke AFB, 2002)
- Radiological Long-Term Monitoring, August 2006 Annual Event at Luke Air Force Base, Arizona (HGL, 2006b)
- Radiological Monitoring Summary at PSC RW-02, Luke Air Force Base, AZ (ARCADIS, 2003b)
- Record of Decision Operable Unit 1 (EPA, 1994)
- Record of Decision Operable Unit 2 (EPA, 1999)
- Site DP-23, Soil Composting at Luke Air Force Base, Arizona (ECC, 1997)
- Soil Vapor Extraction and Confirmation Sampling Summary Report, SS-42 (ARCADIS, 2000b)

Additional information pertaining to the groundwater and soil cleanup standards listed above is summarized in Table 6.2.

6.1.3 Data Review

This section describes the groundwater and soil analytical data collected at the 11 PSCs from 1988 to 2006. The RI and LTM analytical data for both matrices was reviewed to develop a comprehensive list of contaminants that have been detected at the PSCs. Analytical results are summarized on data tables 6.2 through 6.33. Only results reported as detected are shown on the summary tables; therefore, if the data from an LTM event are not shown on the tables, this indicates that all analytical results were reported as nondetect.

The data was compared to the current ARARs (health-based standards) to determine whether the remedies implemented remain protective. Current and past ARARs used in this Second Five-Year Review are summarized below.

Groundwater and soil analytical data summary tables from the RI are included as Appendices D and E, respectively. It should be noted that for those samples collected prior to 1988, the analytical data is not available.

6.1.3.1 Groundwater

Organic Data Summary- No VOCs have been detected at any of the 11 PSCs at a level greater than an ARAR since 2003. From 1991 to 2003, 10 VOCs, 1 SVOC, Gasoline Range Organics

(GRO), and Diesel Range Organics (DRO) were detected in groundwater samples at levels that exceed an ARAR. Four of the ten VOCs (chloroform, dibromochloromethane, bromodichloromethane, and methylene chloride) and the SVOC (bis[2-ethylhexyl]phthalate) that were detected at concentration that exceeded a standard are likely not attributable to the PSCs. Tables 6.3 through 6.7 summarize by PSC the sample dates, monitoring wells sampled, and analytical data for the samples that exceeded an ARAR.

The list below summarizes the analytical data obtained from the samples collected during this Five-Year Review period.

- In 2002, there were no reported detections in the samples collected from the monitoring wells. The samples were analyzed by Del Mar Analytical of Phoenix, Arizona.
- In 2003, 1,2-dichloropropane was the only reported detection in the sample collected from the monitoring wells. It was reported at 1.6 $\mu\text{g/L}$ in the sample collected from MW-125R at SS-42. No Maximum Contaminant Level (MCL) has been established for 1,2-dichloropropane; the Arizona Water Quality Standard (AWQS) is 5.0 $\mu\text{g/L}$, and the EPA Region 9 tap water Preliminary Remediation Goal (PRG) is 0.16 $\mu\text{g/L}$. The laboratory analysis was performed by Precision Analytical Laboratories of Phoenix, Arizona (a division of Aerotech Environmental Laboratories [AEL]).
- In 2004, toluene was detected at 1.5 $\mu\text{g/L}$ in the sample collected from MW-114 at ST-18. The MCL and AWQS for toluene is 1,000 $\mu\text{g/L}$. The EPA Region 9 tap water standard is 720 $\mu\text{g/L}$. No other detections were reported. AEL performed the analysis of the samples.
- In 2005, there were no reported detections in the samples collected from the monitoring wells. The laboratory analysis was performed by AEL.
- In 2006, the only reported detection for the samples collected during this event is suspected to not be attributed to the site. Acetone was detected at 60 $\mu\text{g/L}$ in the sample collected from MW-112D at SD-20. Neither, an MCL or AWQS has been established for Acetone. The EPA Region 9 tap water PRG is 5,500 $\mu\text{g/L}$. AEL performed the analysis of the samples. Acetone is a common laboratory contaminant.

Inorganic Data Summary- A metals sample has not been collected from a monitoring well located within a PSC since 1994. Samples ceased to be collected because the reported concentrations were: less than their respective health-based standard, not attributable to the PSCs, or within expected background concentrations. Nearly all of the reported detections that exceeded a standard were arsenic. The reported arsenic detections ranged from 5.00 $\mu\text{g/L}$ to 28.0 $\mu\text{g/L}$. The arsenic concentrations are likely from Arizona's abundant sulfide mineral deposits. Naturally occurring concentrations of arsenic in the state of Arizona range from less than 0.10 mg/kg to 97.0 mg/kg (USGS, 1981). Sample dates, locations, analysis, and analytical data for the samples that exceeded an ARAR are summarized by PSC in Tables 6.8 through 6.13.

6.1.3.2 Soil

The remedial alternatives described in the ROD have been implemented with the exception of the issues noted in Section 8.0. The implementation of these remedies has reduced the levels of contamination and/or limited human exposure to the point that the USEPA approved the final closeout of the PSCs on April 26, 2001. The information below describes the tables that summarize the analytical data collected from the PSCs before the remedies were carried out.

Organics- Tables 6.14 through 6.23 summarize the sample dates, locations, depths, and analytical data for the samples that exceeded an ARAR by PSC.

Inorganic- Sample dates, locations, depths, and analytical data for the samples that exceeded an ARAR are summarized by PSC in Tables 6.24 through 6.33.

6.1.3.3 Applicable or Relevant and Appropriate Requirements

Groundwater

Current groundwater standards were compared to the 1999 chemical-specific ARARs summarized in the OU-1 ROD (which were used for the Base Wide Risk Assessment) and used to evaluate the historical data. The current standards are listed below:

- MCLs (revised 2006)
- PRGs (revised 2004)
- Arizona WQS (revised 1996)

Only one of the levels listed in the 1999 ROD decreased when compared to the current standards. The MCL and Arizona WQSs for lead decreased from 50.0 µg/L to 15.0 µg/L.

The PRGs for the following contaminants decreased:

- PCE decreased from 1.10 µg/L to 0.10 µg/L
- TCE decreased from 1.60 µg/L to 0.028 µg/L
- Total xylenes decreased from 1,400 µg/L to 210 µg/L

Tables 6.34 (organic) and 6.35 (inorganic) provide a summary of the ARARs compiled for groundwater.

Soil

There have been no decreases in Arizona SRLs documented from the First Five-Year Review for the contaminants detected at the PSCs. The Arizona SRLs are scheduled to be revised in May 2007. However, industrial PRGs for all but two of the metals detected, 10 SVOCs, and 4 VOCs have decreased. The subsequent lists summarize the reduced PRGs:

Metals

- Antimony (820 mg/kg to 410 mg/kg)
- Barium (100,000 mg/kg to 67,000 mg/kg)
- Beryllium (2,200 mg/kg to 1,900 mg/kg)

- Cadmium (810 mg/kg to 450 mg/kg)
- Copper (76,000 mg/kg to 41,000 mg/kg)
- Lead (7,500 mg/kg to 800 mg/kg)
- Mercury (610 mg/kg to 310 mg/kg)
- Nickel (41,000 mg/kg to 20,000 mg/kg)
- Selenium (10,000 mg/kg to 5,100 mg/kg)
- Silver (10,000 mg/kg to 5,100 mg/kg)
- Thallium (130 mg/kg to 67.0 mg/kg)

SVOCs

- Benzo(a)pyrene (0.29 mg/kg to 0.21 mg/kg)
- Benzo(a)anthracene (2.90 mg/kg to 2.10 mg/kg)
- Benzo(b)fluoranthene (2.90 mg/kg to 2.10 mg/kg)
- Benzo(k)fluoranthene (29.0 mg/kg to 1.30 mg/kg)
- Bis(2-ethylhexyl)phthalate (180 mg/kg to 120 mg/kg)
- Chrysene (290 mg/kg to 210 mg/kg)
- Fluoranthene (27,000 mg/kg to 22,000 mg/kg)
- Indeno(1,2,3-cd)pyrene (2.90 mg/kg to 2.10 mg/kg)
- Naphthalene (2,400 mg/kg to 190 mg/kg)
- PCBs (1.00 mg/kg to 0.74 mg/kg)
- Pyrene (54,000 mg/kg to 29,000 mg/kg)

VOCs

- Benzene (1.50 mg/kg to 1.40 mg/kg)
- PCE (19.0 mg/kg to 1.30 mg/kg)
- Toluene (880 mg/kg to 520 mg/kg)
- TCE (7.00 mg/kg to 0.11 mg/kg)

Tables 6.36 and 6.37 provide a summary of the ARARs compiled for organic and inorganic constituents in soil, respectively.

6.1.4 Site Inspections

Inspections at the PSCs were conducted in August 2005, October 2005, and August 2006, by Alan Thomas (Restoration Program Manager, Luke AFB Environmental Flight) and HGL. The site inspection checklists from the Second Five-Year Review are provided as Appendix A. The purpose of the inspections is to assess the protectiveness of the remedy, including the presence of fencing to restrict access, the integrity of the cap at ST-18, the status of the land use restrictions, and the condition of the restricted areas.

No significant issues have been identified at any time regarding the fence, the cap at ST-18, or the restricted areas. The fencing at RW-02 was intact and well maintained. The annual ST-18 cap inspection reports are provided as Appendix E. ICs were evaluated during the site visit and by accessing the county website to review VEMURS. A copy of the VEMURS is included as Appendix D. Luke AFB did not file a VEMUR for PSCs DP-23 and ST-18 as was

recommended in the First Five-Year Review. They opted instead to file internal land use restrictions, which have the same practical effect as VEMURs.

The ICs that are in place include prohibitions on the use or disturbance of soil, excavation activities, disturbance of the cap, and any other activities or actions that might interfere with the implemented remedy. No activities were observed that would have violated the ICs. The cap at ST-18 and restricted areas were undisturbed, and no new land use was observed at any of the PSCs inspected.

6.1.5 Interviews

Interviews were conducted with various parties connected to the site. Joyce Clark, owner of nearby property and CAB member, was interviewed on October 16, 2006. Ms. Clark stated that the CAB's interaction with Luke AFB was successful. Two other nearby residents, Dan Salzler and Martin Jefferies, were attempted to be interviewed on October 17, 2006. Mr. Salzler did not return telephone or electronic mail messages. Mr. Jefferies has moved from the area and could not be reached. Stacy Duffy, a representative of the ADEQ, was interviewed, and stated that she was satisfied with the progress of the environmental restoration program at Luke AFB, and that communication between ADEQ and Luke AFB as it related to the project was successful. Ms. Duffy indicated that ADEQ needed at least 60 days to review deliverables. Alan Thomas, the Luke AFB Restoration Program Manager, was interviewed on October 17, 2006. Mr. Thomas deemed the five-year review process at Luke AFB to be highly successful. He also noted that some of the monitoring wells may have to be replaced to address the fact that some well screens are submerged and two have collapsed. Jeff Rothrock, the Base point of contact, completed his interview questionnaire on November 6, 2006 and also noted that the project was a success citing the history of events. Mr. Rothrock specifically noted that Luke AFB was the first active duty Air Force installation to be de-listed from the EPA's National Priorities List.

Table 6.1
Administrative Components Summary
Luke AFB, Arizona

Administrative Component	Start Date	Finish Date
Community Involvement	October 16, 2006	November 15, 2006
Document Review	July 11, 2006	October 27, 2006
Data Review	July 11, 2006	October 27, 2006
Site Inspection	August 2005	August 2006
Interviews	October 16, 2006	November 15, 2006
Report Development and Review	August 28, 2006	January 15, 2007