

7.0 TECHNICAL ASSESSMENT

This section discusses whether the remedy selected in the ROD and subsequently implemented for the sites under consideration in this Second Five-Year review remain effective in protecting human health and the environment. The RAOs for all OU-1 and OU-2 sites are the same: exposure prevention and protection of groundwater. In the discussion presented in the following subsections, the remedy for each site is evaluated to determine its continued effectiveness in achieving these RAOs, and determine whether new ARARs or other information has come to light since the last Five-Year Review that affects the protectiveness of the remedy. The evaluation was accomplished by reviewing relevant site documents and reports, revisiting the ARARs applied at the time of the remedy, evaluating risk assumptions, and considering the results of the site inspections.

The following discussion evaluates site-specific groundwater levels against MCLs, PRGs, and Arizona WQSs, whichever is the most conservative, in order to evaluate the protectiveness of the remedies. Soil levels are compared to PRGs and SRLs.

7.1 ASSESSMENT OF SITE-SPECIFIC REMEDIES

7.1.1 DP-13: Drainage Ditch Disposal Area

The selected remedy for DP-13 was institutional controls, based on the risk assessment determination that wastes were buried and there was no exposure threat based on current land use scenarios.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. Land use restrictions are in place and land use has not changed. The BGP and ICP require that any development at the site be approved through AF Form 332 (also known as the Base Civil Engineer Work Request form). All new AF Form 332's are reviewed at the weekly work order review board meeting. The Environmental Flight National Environmental Policy Act (NEPA) Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. Residential development is not allowed for these areas. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to acquire additional information on the area. The NEPA Manager initials off on the Form 332, logs it into his database, and then it goes to the Chief of Operations for final approval/disapproval. A VEMUR is also in place.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the

protectiveness of the remedy.

Changes in Standards and To Be Considered (TBC)- The medium of concern at this site is soil. Soil ARARs are the RCRA – Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs, and Arizona SRLs (Title 18 – Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 – Soil Remediation Standards, Appendix A- SRLs). ARARs are listed in Tables 6.34 through 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed. The industrial PRGs for the four SVOC contaminants and three of the five metals detected at this site have changed as follows:

- 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 (90 mg/kg to 2.10 mg/kg)
- Benzo(k)fluoranthene (29.0 mg/kg to 1.30 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)

In addition to the four SVOCs detected, TRPH was reported in the RI soil samples at levels that exceeded the current most stringent standards. Five inorganic contaminants also were detected at levels above the most conservative ARAR. Of the 10 constituents detected, only arsenic and benzo[b]fluoranthene were detected in surface soils. Arsenic was detected in four surface soils at a concentration that exceeded its industrial PRG of 1.60 mg/kg. Only one of the arsenic detections in surface soil exceeded the Arizona SRL of 10.0 mg/kg. The reported arsenic detections are believed to be naturally occurring. Naturally occurring arsenic levels in the state of Arizona range from 1.40 mg/kg to 97.0 mg/kg (USGS, 1981). Benzo[b]fluoranthene was detected in one surface soil sample at a concentration of 0.63 mg/kg, which slightly exceeds the residential soil PRG of 0.62 mg/kg, but is significantly below the industrial PRG of 2.10 mg/kg.

This site is used for industrial purposes and future land use is not expected to change. The BGP precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. Based on the concentrations of contaminants detected in subsurface soil samples collected during the RI, and the depth to water it is highly unlikely that the contaminants associated with this site will ever migrate to groundwater.

The remedy is still considered to be protective and ICs are adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

7.1.2 FTE-07E: Eastern Portion of North Fire Training Area

The selected remedy for FT-07E was institutional controls and LTM, based on the risk assessment determination that wastes were buried and posed no exposure threat based on current land use scenarios.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. Land use restrictions are in place and land use has not changed. The BGP and ICP require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. Residential development is not allowed for these areas. If non-residential construction is involved, then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the Chief of Operations for final approval/disapproval. A VEMUR is also in place.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The media of concern at this site are soil and groundwater. For groundwater, the ARARs are the Safe Drinking Water Act (SDWA) (40 CFR 141.11-141.16) from which many of the groundwater cleanup levels were derived - MCLs and MCLGs, USEPA Region 9 PRGs, and Arizona WQs (Title 18 - Environmental Quality, Chapter 11 - Department of Environmental Quality Water Quality Standards, Supplement 03-01 Article 1 - Numeric Water Quality Standards, Table 1 - Human Health and Agriculture Uses). The ARARs for soil are RCRA - Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 - Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 - Soil Remediation Standards, Appendix A- SRLs). ARARs are listed in Table 6.34 through 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed. One ARAR has changed for the contaminants detected at this site. The MCL for arsenic

decreased from 50.0 µg/L to 10.0 µg/L.

Arsenic was the only metal that was reported in the soil samples collected during the RI at level that exceeded the industrial PRG of 1.60 mg/kg. The reported arsenic detections ranged from 5.00 mg/kg to 10.0 mg/kg and are believed to be naturally occurring. Concentrations of naturally occurring arsenic for the state of Arizona range from 1.40 mg/kg to 97.0 mg/kg (USGS, 1981).

Arsenic was also the only inorganic constituent detected in groundwater samples collected during the RI at a concentration that exceeded an ARAR. These reported detections ranged from 19.0 µg/L to 23.0 µg/L, which exceed the current MCL of 10.0 µg/L and PRG of 0.045 µg/L. These levels are consistent with expected background concentrations. None of the organic compounds detected in the groundwater samples collected from the site were reported at a concentration that exceeded an MCL or WQS. However, the concentrations reported for six compounds exceeded a PRG. None of these compounds are believed to be attributable to the site. The detections are summarized in Section 6.0.

FT-07E is in the Luke AFB LTM program. Groundwater is sampled routinely for VOCs. LTM data indicate that no VOCs have been detected at levels above an ARAR since 1998. This site is used for industrial purposes and future land use is not expected to change. ICs are in place and FT-07E is in the ICP, which precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The arsenic reported in soil and groundwater were reported at naturally occurring levels and are not considered to be site related. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There are two monitoring wells at FT-07E included in the LTM program: MW-118 and MW-123. Well MW-123 has collapsed and, therefore, no groundwater samples can be collected. The well screen in MW-118 is submerged. Water levels across the base have been rising in recent years because the quantity of water withdrawn from the aquifer for irrigation purposes has decreased. Given that the static water level is above the well screen, the groundwater sample collected from this well may not be representative. However, the analytical data for the samples collected from well MW-118 is valid for the purpose of determining potential contaminant concentrations in the aquifer within the radius of influence of the pump inlet (sample zone), regardless of whether the well screen is submerged. In the case of the wells with submerged screens, the distance between the sample zone and point of contact where contaminants move from the vadose zone into groundwater is greater than for those wells with screens that bracket the water table. A shorter distance between the water table and sample zone provides a more conservative and representative monitoring program.

Another issue associated with the well screens being submerged beneath the water table is that potential light non-aqueous phase liquids (LNAPLs) that float on the water would not be

observed in these wells. However, because LNAPLs have never been observed in these wells, the objective of the LTM program of monitoring for potential groundwater contamination has not been compromised by the rise in static water levels.

The ROD does not stipulate that the wells must be included in the LTM network. Luke AFB collected a sample from MW-118 and attempted to collect a sample from the MW-123 at the request of ADEQ. Luke AFB is currently pursuing the funds to replace the wells at the site. The wells will be sampled once they are replaced.

7.1.3 LF-03: Outboard Runway Landfill

The selected remedy for LF-03 was ICs, based on the risk assessment determination that wastes were buried and there was no exposure threat based on current land use scenarios.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. Land use restrictions are in place and land use has not changed. The BGP and ICP require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. Residential development is not allowed for these areas. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the Chief of Operations for final approval/disapproval. A VEMUR is also in place. The remedy appears to be adequate for achieving RAOs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The medium of concern at this site is soil. The soil ARARs are the RCRA – Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 – Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 – Soil Remediation Standards, Appendix A- SRLs). ARARs are listed in Tables 6.34 through 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed.

The industrial PRGs for two of the four inorganic constituents detected in site soils have decreased as follows:

- Copper (76,000 mg/kg to 41,000 mg/kg)
- Lead (7,500 mg/kg to 800 mg/kg)

Four inorganic contaminants were detected in the RI soil samples at levels that exceeded the current most stringent ARAR. Only one of the contaminants (arsenic) was detected in a surface soil sample. Arsenic was detected in one surface soil sample at a concentration of 9.50 mg/kg, which exceeds the industrial PRG of 1.60 mg/kg. The reported detection did not exceed the Arizona SRL of 10.0 mg/kg. The reported arsenic detection is believed to be naturally occurring. Naturally occurring arsenic levels in the state of Arizona range from 1.40 mg/kg to 97.0 mg/kg (USGS, 1981).

This site is used for industrial purposes and future land use is not expected to change. ICs are in place and the BGP precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The arsenic concentrations reported in soil were reported at naturally occurring levels and are not considered to be site related. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

7.1.4 LF-14: Old Salvage Yard Burial Site

The selected remedy for LF-14 was ICs, based on the risk assessment determination that wastes were buried and posed no exposure threat based on current land use scenarios.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. Land use restrictions are in place and land use has not changed. The BGP and ICP require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. Residential development is not allowed for these areas. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the Chief of Operations for final approval/disapproval. A VEMUR is also in place. The remedy appears to be adequate for achieving RAOs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The medium of concern at this site is soil. The soil ARARs are the RCRA – Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 – Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 – Soil Remediation Standards, Appendix A- SRLs). ARARs are listed in Tables 6.34 through 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed.

Industrial PRGs for some constituents detected at this site have changed as follows:

- PCBs (1.00 mg/kg to 0.74 mg/kg)
- Benzo(a)pyrene (0.29 mg/kg to 0.21 mg/kg)
- Beryllium (2,200 mg/kg to 1,900 mg/kg)

Three inorganic contaminants and two organic contaminants were detected in the RI soil samples at levels that exceeded the current most stringent ARAR. Only one of the inorganic contaminants (arsenic) was detected in a surface soil sample. Arsenic was detected in two surface soil samples at a concentration that exceeded its industrial PRG of 1.60 mg/kg. One sample was reported to contain arsenic at 14.0 mg/kg, which exceeds the Arizona SRL of 10.0 mg/kg. The reported arsenic detection is believed to be naturally occurring. Naturally occurring arsenic levels in the state of Arizona range from 1.40 mg/kg to 97.0 mg/kg (USGS, 1981). PCBs were detected in three surface soil samples at concentrations that exceeded the industrial PRG of 0.74 mg/kg. One surface soil sample contained benzo(a)pyrene at 0.30 mg/kg, which is greater than its industrial PRG of 0.21 mg/kg.

This site is used for industrial purposes and future land use is not expected to change. ICs are in place and LF-14 is in the ICP, which precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The arsenic concentrations reported in soil were reported at naturally occurring levels and are not considered to be site related. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

7.1.5 LF-25: Northwest Landfill

The selected remedy for LF-25 was excavation of contaminated soils, ex situ mechanical treatment of contaminated soils, on-site disposal of treated soils, and ICs.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. Lead shot was mechanically separated from the soil. The soil was tested before being returned to the site to assure that the action level of 400 mg/kg had been achieved. A VEMUR is in place to restrict future development. Land use has not changed. The BGP and ICP require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. Residential development is not allowed for these areas. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the Chief of Operations for final approval/disapproval. The remedy appears to be adequate for achieving RAOs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The medium of concern at this site is soil. The soil ARARs for this PSC are the RCRA – Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 – Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 – Soil Remediation Standards, Appendix A- SRLs). Soil ARARs are summarized in Tables 6.36 and 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed.

The industrial PRGs for several constituents detected in site soils have changed as listed below.

- 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)
- Indeno(1,2,3-cd)pyrene (2.90 mg/kg to 2.10 mg/kg)

- Antimony (820 mg/kg to 410 mg/kg)
- Beryllium (2,200 mg/kg to 1,900 mg/kg)
- Lead (7,500 mg/kg to 800 mg/kg)

Four inorganic contaminants and five organic contaminants were detected in the RI soil samples at levels that exceeded the current most stringent ARARs. All four of the inorganic contaminants (antimony, arsenic, beryllium, and lead) were detected in a surface soil sample. The only inorganic constituent detected at a level that exceeded an ARAR was arsenic, which was detected in two surface soil samples at a concentration that exceeded its industrial soil PRG of 1.60 mg/kg. The reported arsenic detection is believed to be naturally occurring. Naturally occurring arsenic ranges from 1.40 mg/kg to 97.0 mg/kg in the state of Arizona (USGS, 1981). Lead was detected in one sample at 10,100 mg/kg, which exceeds the industrial PRG of 800 mg/kg and the SRL for industrial soils of 2,000 mg/kg. In December 1999, the antimony and lead contaminated area was delineated and remediated by mechanically removing lead shot from excavated soils. Treated soils were sampled before being returned to the site. Post-remediation concentrations of lead were less than all established standards. Four of the five organics were detected in one surface soil sample. The five organic compounds were PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene, and indeno(1,2,3-cd)pyrene.

This site is used for industrial purposes and future land use is not expected to change. ICs are in place and LF-25 is in the ICP, which precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The arsenic concentrations reported in soil were reported at naturally occurring levels and are not considered to be site related. The one lead detection in a surface soil sample is likely attributable to a lead particle being collected with the sample and not indicative of pervasive lead contamination. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

PAHs were detected in surface soil samples during the RI at levels that exceed their respective industrial PRGs (see Table 6.14). However, no soil samples have been collected at the site for over 10 years. The likelihood that PAH contamination is still present in near-surface soil samples is low. Moreover, the ICs described above ameliorate the threat of direct contact.

7.1.6 RW-02: Wastewater Treatment Annex Landfill

The selected remedy for RW-02 was ICs to prevent exposure to low-level radioactive wastes buried at the site, and monitoring for 30 years to assure that the integrity of the concrete burial vault has not been compromised and that groundwater has not been impacted.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. Results of the downhole radiological monitoring indicate that the concrete vault is functioning to contain the radioactive waste. Radiological results indicate readings commensurate with background levels. Section 4 of this report contains a brief discussion of the readings documented over the last five years, tables that summarize those readings, and graphical illustrations of the readings. Although groundwater samples were not collected during the last sampling event at this site, it is unlikely that the groundwater has been impacted. Various monitoring wells were sampled frequently from 1992 to 1996 at this site and only one organic (bis[2-ethylhexyl]phthalate) and two inorganic (arsenic and lead) contaminants were reported at a concentration that exceeded a clean-up goal. Bis(2-ethylhexyl)phthalate was reported for 3 of the 16 samples submitted for SVOC analysis for this site. These detections are not believed to be site related because bis(2-ethylhexyl)phthalate is known as a common laboratory contaminant. Two of the three reported bis(2-ethylhexyl)phthalate concentrations were estimated at 5 $\mu\text{g/L}$ and 8 $\mu\text{g/L}$. The third reported concentration was 63 $\mu\text{g/L}$. It should also be noted that these detections were randomly reported for wells and sample dates. Arsenic was detected in 26 of the 28 groundwater samples collected from the site. The reported concentrations ranged from 5 $\mu\text{g/L}$ to 17 $\mu\text{g/L}$ and averaged 9.9 $\mu\text{g/L}$. The laboratory reporting limit was 5 $\mu\text{g/L}$ and it is suspected that the two samples that did not report a detection of arsenic contained arsenic at a concentration just below the reporting limit. It is also believed the reported arsenic detections are naturally occurring. Lead was detected in one unfiltered sample at a concentration of 17 $\mu\text{g/L}$, which exceeds its MCL and AWQS of 15 $\mu\text{g/L}$. Lead was not detected (reporting limit 2 $\mu\text{g/L}$) in the filtered version of this same sample. In addition to the groundwater evidence presented above, the reported soil detections for this site do not indicate that the groundwater is threatened. Two organic contaminants were detected at a concentration that exceeded a clean-up goal. Benzo(a)pyrene was detected at an estimated concentration of 0.10 mg/kg and 0.63 mg/kg and benzo(b)fluoranthene was detected at an estimated concentration 0.11 mg/kg and 1.6 mg/kg. Considering these contaminants, the concentration of the contaminants, and the depth to water; it is highly unlikely the groundwater has been impacted by either. Arsenic and lead were also detected in soil samples at a concentration that exceeded a standard. The reported arsenic detections are believed to be naturally occurring and the lead detections are random and not considered a threat to groundwater. The ICs are in place and land use has not changed. The security fencing is in good condition and placarding is visible and adequate. ICs in place at RW-02 are detailed in the BGP. The BGP and ICP require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. Residential development is not allowed for these areas. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the Chief of Operations for final approval/disapproval.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The media of concern at this site are soil and groundwater. Groundwater ARARs are the Safe Drinking Water Act (SDWA) (40 CFR 141.11-141.16) from which many of the groundwater cleanup levels were derived - MCLs and MCLGs, USEPA Region 9 PRGs, and Arizona WQSs (Title 18 - Environmental Quality, Chapter 11 - Department of Environmental Quality Water Quality Standards, Supplement 03-01 Article 1 - Numeric Water Quality Standards, Table 1 - Human Health and Agriculture Uses). Soil ARARs are RCRA - Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 - Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 - Soil Remediation Standards, Appendix A- SRLs). ARARs are listed in Tables 6.34 through 6.37.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed.

The industrial PRGs for the contaminants detected at this site have changed as follows:

- Benzo(a)pyrene (0.29 mg/kg to 0.21 mg/kg)
- Benzo(b)fluoranthene (2.90 mg/kg to 2.10 mg/kg)

Arsenic and lead were detected in soil samples collected at the site. The highest lead concentration was reported to be 680 mg/kg, which is below the PRG for industrial soil of 800 mg/kg and the industrial SRL of 2,000 mg/kg. The reported arsenic detections ranged from 6.00 mg/kg to 30.0 mg/kg, which exceeds the PRG of 1.60 mg/kg and the SRL of 10.0 mg/kg. The presence of arsenic at these levels is believed to be naturally occurring. Concentrations of naturally occurring arsenic for the state of Arizona range from 1.40 mg/kg to 97.0 mg/kg (USGS, 1981). Three organic constituents were detected in three samples at a concentration that was greater than a current standard. One of the three detections was reported in a surface soil sample. The surface soil sampled contained benzo(a)pyrene at an estimated concentration of 0.10 mg/kg, which is less than the industrial PRG of 0.21 mg/kg. Radiological monitoring is conducted annually to insure the soil has not been impacted. Generally, the radiological monitoring results have decreased slightly each year.

Arsenic and lead were also the only inorganic contaminants detected in the RI groundwater samples at a concentration that exceeded an ARAR. Though some detections exceeded the MCL of 10.0 µg/L, the reported range of 5.00 µg/L to 17.0 µg/L is consistent with expected background concentrations. All of the reported detections exceed the PRG of 0.045 µg/L. The sample collected from MW-116 in July of 1992 reported a detection of 17.0 µg/L for total lead, which exceeds its MCL and Arizona WQS of 15.0 µg/L. The filtered fraction of this

sample did not contain lead. Lead was not detected in either the filtered or unfiltered samples collected during the subsequent six sampling events. Bis(2-ethylhexyl)phthalate was the only organic compound detected in a groundwater sample collected from this PSC that exceeded an ARAR. There is no MCL or WQS for bis(2-ethylhexyl)phthalate. The PRG is 4.80 µg/L. Three samples were reported to contain bis(2-ethylhexyl)phthalate at a level that exceeded the PRG. This compound is a common laboratory contaminant and the reported detections are believed to be attributable to laboratory contamination.

RW-02 is in the Luke AFB LTM program. Groundwater is sampled routinely for VOCs. LTM data indicate that no VOCs have been detected at levels above an ARAR. This site is used for industrial purposes and future land use is not expected to change. ICs are in place and RW-02 is in the ICP, which precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The arsenic concentrations reported in soil were reported at naturally occurring levels and are not considered to be site related. The one historic reported lead concentration is attributable to lead particles sorbed to particulates suspended in groundwater and not groundwater contamination; the dissolved fraction was reported as nondetect. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The monitoring well in place at RW-02 (MW-124) has collapsed. Therefore, no groundwater samples can be retrieved. The ROD does not stipulate that MW-124 be included in the LTM network. However, Luke AFB attempted to collect a sample from the well as requested by ADEQ and is currently pursuing funds to replace the well, which will be sampled upon replacement.

7.1.7 SD-38: Oil/Water Separator at Auto Body Shop

The selected remedy for SD-38 was ICs, based on the risk assessment determination that wastes were buried and there was no exposure threat based on current land use scenarios. The site is in the Luke AFB LTM program.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. Land use restrictions are in place and land use has not changed. The BGP and ICP require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. Residential development is not allowed for these areas. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the

Chief of Operations for final approval/disapproval. A VEMUR is in place and SD-38 is included in the ICP. The remedy appears to be adequate for achieving RAOs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The media of concern at this site are groundwater and soil. The groundwater ARARs are the Safe Drinking Water Act (SDWA) (40 CFR 141.11-141.16) from which many of the groundwater cleanup levels were derived - MCLs and MCLGs, USEPA Region 9 PRGs, and Arizona WQSs (Title 18 – Environmental Quality, Chapter 11 – Department of Environmental Quality Water Quality Standards, Supplement 03-01 Article 1 – Numeric Water Quality Standards, Table 1 – Human Health and Agriculture Uses). Soil ARARs are RCRA – Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 – Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 – Soil Remediation Standards, Appendix A- SRLs). A list of ARARs is included in Section 6.0. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed. There have been no changes to the industrial PRGs for the contaminants detected at this site.

Arsenic and lead were the only metals that were reported in the soil samples collected during the RI at level that exceeded the current most stringent soil standards. The reported arsenic detections ranged from 5.00 mg/kg to 14.0 mg/kg and are believed to be naturally occurring. Concentrations of naturally occurring arsenic for the state of Arizona range from 1.40 mg/kg to 97.0 mg/kg (USGS, 1981). One sample contained at lead at 470 mg/kg, which is below the industrial PRG of 800 mg/kg. Three organic constituents were detected in four samples at concentrations that are greater than a current ARAR. None of the reported detections were for surface soils.

Arsenic was detected in the filtered and unfiltered samples collected from MW-117 at concentrations of 5.00 µg/L and 6.00 µg/L, respectively. The reported detections were greater than the PRG but less than the MCL and WQS. Further, the reported detections are consistent with background concentrations.

This site is used for industrial purposes and future land use is not expected to change. ICs are in place and SD-38 is in the ICP, which precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The arsenic concentrations detected in soil were reported at naturally occurring levels and are not considered to be site

related. The one arsenic concentration reported in groundwater exceeds only one ARAR (PRG) and is suspected to be naturally occurring. Though TRPH, TCE and PCE were detected on four soil samples, all were reported in samples collected from 6 feet to 8 feet bgs. ICs are in place to protect the hypothetical future construction that may contact subsurface soil during excavation. Groundwater modeling conducted during the RI concluded that subsurface soil contamination would not impact groundwater and the site is included in the Luke AFB LTM program. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

7.1.8 SS-42: Bulk Fuels Storage Area

The selected remedy for SS-42 was installation and operation of an SVE system to remediate the soil source, then monitoring the groundwater to confirm the effectiveness of the SVE system and groundwater quality.

Question A: Is the remedy functioning as intended by the decision documents?

The SVE system was installed and operated under an interim removal action before the OU-1 ROD was signed, thereby nullifying the need for further action. Routine groundwater monitoring is conducted under the LTM program and data indicate that groundwater in the site vicinity has not been impacted. The remedy appears to be adequate for achieving RAOs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The media of concern at this site are soil and groundwater. The groundwater ARARs for this site are the Safe Drinking Water Act (SDWA) (40 CFR 141.11-141.16) from which many of the groundwater cleanup levels were derived - MCLs and MCLGs, USEPA Region 9 PRGs, and Arizona WQSs (Title 18 - Environmental Quality, Chapter 11 - Department of Environmental Quality Water Quality Standards, Supplement 03-01 Article 1 - Numeric Water Quality Standards, Table 1 - Human Health and Agriculture Uses). Soil ARARs are RCRA - Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs, and Arizona SRLs (Title 18 - Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 - Soil Remediation Standards, Appendix A- SRLs). ARARs are summarized in Tables 6.34 through 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The exposure assumptions used to develop the Human Health Risk Assessment have not changed.

The industrial PRGs for the contaminants detected at this site have changed as follows:

- Benzene (1.50 mg/kg to 1.40 mg/kg)
- Toluene (880 mg/kg to 520 mg/kg)

Four organic constituents were detected in 15 soil samples at a level that exceeded an ARAR. Only 1 of the 15 samples was a surface soil sample. None of the constituents reported in this sample exceeded an ARAR. TRPH was detected at 9,000 mg/kg. There is no PRG established for TRPH. There is no current (2002) industrial SRL for TRPH; the 2000 SRL for TRPH in industrial soils was 18,000 mg/kg.

Three inorganic constituents were detected in RI groundwater samples at concentrations that exceeded an ARAR: arsenic, chromium, and nickel. Six samples contained metals contamination that exceeded an ARAR. Arsenic was detected at 7.00 $\mu\text{g/L}$ and as noted above it is believed that the low level detection of arsenic is consistent with naturally occurring concentrations. In 1993, total chromium was detected in MW-119 at an estimated concentration of 384 $\mu\text{g/L}$. (Its duplicate sample was reported to contain total chromium at an estimated concentration of 164 $\mu\text{g/L}$.) Chromium was reported as nondetect in the filtered fractions of these samples. The chromium concentration in the unfiltered sample collected in 1994 from this well was 73.0 $\mu\text{g/L}$, which is below the MCL and Arizona WQS of 100 $\mu\text{g/L}$. In 1993 and 1994, nickel was detected in MW-119. The total nickel concentration in 1993 was 103 $\mu\text{g/L}$ (estimated) and the dissolved nickel was 53.0 $\mu\text{g/L}$. In 1994, total nickel was detected at 254 $\mu\text{g/L}$ and dissolved nickel was detected at 250 $\mu\text{g/L}$. Total nickel in MW-121 in 1994 was 144 $\mu\text{g/L}$ and dissolved nickel was 143 $\mu\text{g/L}$. There is no MCL or MCLG for nickel. The Arizona WQS is 140 $\mu\text{g/L}$. Three organics were reported in SS-42 groundwater at a concentration that exceeded an ARAR: 1,2-dichloropropane, methylene chloride, and benzene. Benzene was detected in MW-121 in 1998 at 17.0 $\mu\text{g/L}$ and 19.0 $\mu\text{g/L}$; both levels exceed the MCL and WQS of 5.00 $\mu\text{g/L}$. Three additional samples from MW-121 reported a detection that exceeded the PRG for benzene of 0.35 $\mu\text{g/L}$. The concentrations reported for 1,2-dichloropropane and methylene chloride ranged from 1.00 $\mu\text{g/L}$ to 2.00 $\mu\text{g/L}$ and 0.04 $\mu\text{g/L}$ to 34.0 $\mu\text{g/L}$. The PRG for 1,2-dichloropropane is 0.16 $\mu\text{g/L}$ and the PRG for methylene chloride is 4.30 $\mu\text{g/L}$, respectively. The reported detections of 1,2-dichloropropane and methylene chloride are not believed to be site related.

SS-42 is in the Luke AFB LTM program. Groundwater samples are collected routinely and sampled for VOCs. None of the reported detections have exceeded a groundwater ARAR. Metals are not analyzed, so more recent data on nickel levels in groundwater are not available.

This site is used for industrial purposes and future land use is not expected to change. ICs are in place and SS-42 is in the ICP, which precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Wells MW-121 and MW-125 are sampled at SS-42 under the LTM program. The well screens are submerged in both wells. The issues associated with sample representativeness that occur when well screens are submerged are discussed in detail in Section 7.1.2 above.

7.1.9 SD-20: Oil/Water Separator and Earth Fissure

As detailed in Section 4.2.9, no remedial alternatives were developed for the SD-20 site during the FS. It was assigned no further action status in the ROD. However, after the First Five-Year Review was conducted, ADEQ requested that Luke AFB sample monitoring wells 112S, 112D, and 113 every five years. SD-20 was subsequently added to the LTM program. Seven organic compounds have been detected in groundwater samples collected at SD-20 at a level that exceeds an ARAR. Of these detections, only two (PCE and TCE), are thought to be site related. PCE was reported for two samples at estimated concentrations of 0.18 $\mu\text{g/L}$ and 0.35 $\mu\text{g/L}$. These reported detections exceed the PRG for PCE of 0.10 $\mu\text{g/L}$. TCE was reported in 15 samples at concentrations that ranged from 1.00 $\mu\text{g/L}$ to 2.00 $\mu\text{g/L}$, which exceeds only one of its ARARs: the PRG of 0.028 $\mu\text{g/L}$. Numerous samples reported an arsenic detection; however, all of the reported detections were less than 28.0 $\mu\text{g/L}$. Thus, they are considered to naturally occurring and not site related. Chromium and lead each were detected in an unfiltered sample at a level that exceeded an ARAR. The filtered versions of these samples contained the analytes at a concentration less than their respective ARARs.

SD-20 is in the Luke AFB LTM program. Groundwater samples are collected routinely for VOCs. Recent sample results indicate that groundwater is no longer contaminated with PCE and TCE. PCE and TCE have not been detected in a sample since 1998. This site is used for industrial purposes and future land use is not expected to change. ICs are in place and the BGP precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The well screens in all three SD-20 LTM wells are submerged. The issues associated with sample representativeness that occur when well screens are submerged are discussed in detail in Section 7.1.2 above. New wells may need to be installed to assure that samples are representative on site conditions. The remedy is considered to be protective and the ICs adequate.

7.1.10 ST-18: Former Liquid Waste Storage Facility (Facility 993)

The selected remedy for ST-18 in the OU-2 ROD was specified as capping, ICs, and groundwater monitoring.

Question A: Is the remedy functioning as intended by the decision documents?

Yes. The site was capped with a concrete runway in 1997 as part of RCRA closure requirements before the OU-2 ROD was signed. Because the cap recommended in the ROD was already in place, this component of the remedy was not implemented. The cap is inspected annually to assure its integrity and repairs are made as needed. The cap inspection reports for ST-18 since the last Five-Year Review are included in Appendix D. Groundwater monitoring is conducted under the LTM program and analytical results indicate that groundwater beneath the site is not impacted. Land use restrictions are in place and land use has not changed. The land use restrictions require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. The BGP does not discuss this site; however, the plan is scheduled to be updated to include this area. Considering, this area is apart of the tarmac construction is very unlikely before the plan is updated. Additionally, the Environmental Flight NEPA Program Manager has immanent knowledge of this area. Residential development is not allowed for this area. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the Chief of Operations for final approval/disapproval.

The remedy appears to be adequate for achieving RAOs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC- The media of concern at this site are soil and groundwater. The groundwater ARARs are the Safe Drinking Water Act (SDWA) (40 CFR 141.11-141.16) from which many of the groundwater cleanup levels were derived - MCLs and MCLGs, USEPA Region 9 PRGs, and Arizona WQSs (Title 18 – Environmental Quality, Chapter 11 – Department of Environmental Quality Water Quality Standards, Supplement 03-01 Article 1 – Numeric Water Quality Standards, Table 1 – Human Health and Agriculture Uses). Soil ARARs are RCRA – Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 – Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 – Soil Remediation Standards, Appendix A- SRLs). ARARs are listed in Tables 6.34 through 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics- The

exposure assumptions used to develop the Human Health Risk Assessment have not changed.

Industrial PRGs for the constituents detected at this site have changed as follows:

- Benzo(a)pyrene (0.29 mg/kg to 0.21 mg/kg)
- Benzo(b)fluoranthene (2.90 mg/kg to 2.10 mg/kg)
- Benzene (1.50 mg/kg to 1.40 mg/kg)
- TCE (7.00 mg/kg to 0.11 mg/kg)
- PCE (19.0 mg/kg to 1.30 mg/kg)

The only inorganic constituent detected was arsenic, which was reported in four soil samples. Only two of these samples were surface soils. Arsenic was detected in two surface soil samples at 5.00 mg/kg, which exceeds the industrial PRG of 1.60 mg/kg but is well below the Arizona SRL of 10.0 mg/kg. The reported arsenic detections are believed to be naturally occurring. Naturally occurring arsenic ranges from 1.40 mg/kg to 97.0 mg/kg in the state of Arizona (USGS, 1981).

Nine organic constituents were detected in 10 RI soil samples at levels that exceeded an ARAR: 1,1-dichloroethene; 1,1,2,2-tetrachloroethane; benzene; TCE; PCE; total xylenes; benzo[a]pyrene; benzo[b]fluoranthene; and TRPH. Two of these samples were surface soil samples. Benzo(a)pyrene was the only constituent that was reported in the surface soil samples at levels that exceeded an ARAR. Benzo(a)pyrene was detected in one sample at 0.43 mg/kg, which exceeds the industrial PRG of 0.21 mg/kg but below the SRL of 2.60 mg/kg.

Four inorganic constituents were detected in RI groundwater samples at a concentration that exceeded an ARAR: arsenic, chromium, lead, and zinc. Arsenic was detected at concentrations that ranged from 5.00 µg/L to 19.0 µg/L and as noted above it is believed that the low level detections of arsenic are consistent with background concentrations. The unfiltered sample collected from MW-114 reported arsenic, chromium, lead, and zinc at concentrations that exceeded the MCL and/or WQS. Only lead was reported at a level that exceeded a standard in the filtered fraction of this sample. No metals contaminants were reported at a level that exceeded a standard in the subsequent sampling events.

ST-18 is in the Luke AFB LTM program. Groundwater is sampled routinely for VOCs. Recent LTM data indicate that no VOCs have been detected at levels above an ARAR. PCE and TCE have not been detected since 2001 and 1,2-dibromo-3-chloropropane has not been detected since 1992. This site is used for industrial purposes and future land use is not expected to change. ICs are in place and ST-18 is in the ICP, which precludes residential development on the site. Therefore, there is no direct contact exposure threat at this site. The remedy is considered to be protective and the ICs adequate.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

During the First Five-year Review, it was recommended that a VEMUR be filed for the site. Luke AFB opted instead to emplace internal land use restrictions because land use restrictions and restrictions on future development are managed under existing Luke AFB programs. Any development at the site must be approved through AF Form 332 by the Base Chief of Operations. These forms will not be approved at sites such as ST-18 where land use restrictions are in place.

Wells MW-114 and MW-122 are sampled at ST-18 under the LTM program. The well screens are submerged in both wells. The issues associated with sample representativeness that occur when well screens are submerged are discussed in detail in Section 7.1.2 above.

7.1.11 DP-23: Old Surface Impoundment West of Facility 993

DP-23 was divided into the southern portion and the northern portion. The remedy for the southern portion was excavation, ex situ soil treatment via composting, on-site disposal of treated soils, then subsequent monitoring. Based on the findings of the risk assessment, the remedy for the northern portion of DP-23 was ICs.

Question A: Is the remedy functioning as intended by the decision documents?

Internal land use restrictions are in place and land use has not changed. The land use restrictions require that any development at the site be approved through AF Form 332. All new AF Form 332s are reviewed at the weekly work order review board meeting. The Environmental Flight NEPA Program Manager attends the weekly meeting. The project location identified on the Form 332 is compared to the BGP map of IRP sites with institutional controls. The BGP and ICP do not discuss this site; however, the plans are scheduled to be updated to include this area. Considering, this area's remote location construction is very unlikely before the plan is updated. Additionally, the Environmental Flight NEPA Program Manager has immanent knowledge of this area. Residential development is not allowed for this area. If non-residential construction is involved then the NEPA Manager annotates on the Form 332 that PPE should be worn when disturbing soil in the area and that the contractor should meet with the IRP Program Manager prior to the work to obtain additional information regarding potential hazards in the area. The NEPA Manager initials the Form 332, logs it into the NEPA program database, then routes the form to the Chief of Operations for final approval/disapproval. See additional discussion in Question B below.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

Changes in Standards and TBC - The medium of concern at this site is soil. Soil ARARs are RCRA - Criteria for Classification of Solid Waste Disposal and Practices (40 CFR 257), USEPA Region 9 PRGs for industrial soils, and Arizona SRLs for industrial soils (Title 18 - Environmental Quality, Chapter 7- Department of Environmental Quality Remedial Action, Article 2 - Soil Remediation Standards, Appendix A- SRLs). ARARs are listed in Tables 6.34

through 6.37. No new standards or TBCs affecting the protectiveness of the remedy have been discovered.

The primary COC at DP-23 is benzo(a)pyrene. When the OU-2 ROD was signed, the RAO for DP-23 was to reduce the concentrations of contaminants in soil to below PRGs through composting – this level was considered to be protective of groundwater resources as well. Based on site investigative data listed in the ROD, that the most significant reported detection of benzo(a)pyrene was 3.30 mg/kg. The ROD stated the PRG for the contaminant was 0.78 mg/kg. Based on this data, the composting process was estimated to take 120 days (4 months). However at 4 months verification sampling results indicated that the cleanup goals had not been achieved; thus, additional soil amendments were added to the compost mixture and the composting was continued for another 60 days to achieve the cleanup goal. The benzo(a)pyrene concentration documented at the end of the additional 60 days was 0.51 mg/kg. Since the completion of the composting, the PRG for benzo(a)pyrene has been reduced to 0.21 mg/kg. However, it should be noted that the impacted soils were moved to a remote location to be composted where they remain. The composting location is relatively remote, is situated on secure Base property, and is rarely visited by Base personnel. Therefore, the exposure risk is minimal and the current PRG is not applicable. The land use restriction implemented by the Base for DP-23 mitigates the remaining impacted soil.

The stated RAOs for soil were intended to be protective of groundwater resources. Despite the fact that near-surface soil levels of the primary COC benzo(a)pyrene may exceed the current PRG, it is not expected that groundwater resources would be impacted. The Soil Screening Level (SSL) PRGs for migration to groundwater are appropriate for evaluating soil concentrations of contaminants and their propensity to leach to groundwater. The SSL for benzo(a)pyrene in 1996, 2000, and 2004 was established at 800 mg/kg. Concentrations of benzo(a)pyrene in near-surface soils – even at their highest reported preredial level—are well below the SSL.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

During the First Five-year Review, it was recommended that a VEMUR be filed for the site. Luke AFB opted instead to emplace internal land use restrictions because land use restrictions and restrictions on future development are managed under existing Luke AFB programs. Any development at the site must be approved through AF Form 332 by the Base Chief of Operations. These forms will not be approved at sites such as DP-23 where land use restrictions are in place.

It is unclear what ‘monitoring’ is required by the ROD. No groundwater samples are required and the contaminated soils were treated and disposed on site.

7.2 SUMMARY OF FINDINGS

The findings of the technical review of each of the sites under consideration in this Five-Year Review are detailed in Section 7.1 and summarized under the OU-1 and OU-2 RODs.

7.2.1 Operable Unit 1 Sites

It can be determined from available information and data that the specified remedies for all sites within OU-1 remain protective of human health and the environment under current and future land use scenarios. The submerged screens mentioned above may be affecting the quality of the groundwater samples collected during the LTM events, but this issue is not expected to compromise the objective of the groundwater monitoring component of the ROD.

Though some of the ARARs for the COCs at the OU-1 sites have changed since the remedial action and since the last Five-Year Review, the cleanup accomplished under the 1996 PRGs are still protective under current land use scenarios. (Note: ARARs were not evaluated in the First Five-Year Review.) See the site-specific evaluations in Section 7.1.

7.2.2 Operable Unit 2 Sites

The remedy at ST-18 appears to remain protective under current and future land use scenarios. However, the screens at the two ST-18 monitoring wells (MW-114 and MW-122) are submerged. Therefore, the groundwater water samples collected from these wells under the LTM program as required by the ROD may not be truly representative of aquifer conditions in the immediate site vicinity. This problem with the submerged well screens is not expected to compromise the objective of the groundwater monitoring component of the ROD. As with the OU-1 sites, some of the ARARs have changed since the remedial action and since the First Five-Year Review. However, the cleanup accomplished under the 1996 PRGs are still protective under current land use scenarios.

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