UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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San Francisco, CA 94105-3901

September 30, 2009

Mr. Richard E. Eunice, PE
Base Civil Engineer
452 SPTG/CEV
610 Meyer Street, Bldg. 2403
March Air Reserve Base, California 92518-2166

**SUBJECT: SECOND 5-YEAR REVIEW REPORT FOR THE FORMER MARCH AIR FORCE BASE (AFB) AND MARCH AIR RESERVE BASE (ARB)**

Dear Mr. Eunice,

The U.S. Environmental Protection Agency (EPA) Region IX received the Draft Final Second 5-Year Review Report for the Former March AFB and March ARB (5YR Report), dated July 2009. EPA reviewed the 5YR Report along with other supporting documents and except for the issues identified below, EPA concurs with the findings, recommendations, and conclusions of the 5YR Report. EPA's comments on the 5YR Report are included in an attachment to this letter. EPA's protectiveness determinations for each Operable Unit (OU) in the 5YR Report are set forth below.

**OU1** - OU1 is protective of human health and the environment in the short term; however, EPA's determination with respect to long term protectiveness of OU1 is deferred. The soil remedial actions at Sites 31 and 34 are both expected to be protective upon completion of the ROD Amendment to change the remedy and address issues related to Institutional Controls (ICs). For other portions of OU1, including Site 4, Site 7, Site 31 Groundwater Plume, and OU1 Groundwater Plume, additional data has been collected, since the ROD was signed, that may impact the long-term protectiveness of the remedy. Therefore, although the remedies selected are protective in the short term, in order for the remedies to remain protective in the long-term, the following actions must be completed for Site 4, Site 7, Site 31 Groundwater Plume, and OU1 Groundwater Plume:

> **Site 4** - The remedial action at Site 4 is protective in the short term but is not protective in the long term because rising groundwater has changed site conditions and an evaluation is needed to determine if the selected remedial action remains appropriate. If the evaluation determines that the selected remedy

is no longer consistent with the current site conditions, then the remedy must be revised to address rising groundwater within the landfill waste.

**Site 7** - The remedial action at Site 7 is protective in the short term but is not protective in the long term because the current remedy must be revised to address a recently identified source of soil and groundwater contamination.

**Site 31 Groundwater Plume** - The remedial action for the Site 31 Groundwater Plume is protective in the short term and long term protectiveness is deferred. A new monitoring well was recently installed off-base and the 2007-2008 Annual Monitoring Report suggests a connection between the Site 31 plume and contamination in this well. The data must be evaluated to determine if the current remedy is appropriate. Recent groundwater monitoring data indicates that groundwater is rising at the Base. In addition, the AF should conduct the aquifer pump test at Site 31 as described in the 2007-2008 Annual Monitoring Report. If the results of the pump test and the evaluation of the new data show that the selected groundwater remedy is no longer appropriate, then the remedy needs to be optimized and/or the remedy must be amended/modified to address the current site conditions.

**OU1 Groundwater Plume** - The remedial action for the OU1 Groundwater Plume is protective in the short term and long term protectiveness is deferred. New monitoring wells were recently installed in the off-base plume and the new data must be evaluated to determine if the current remedy is appropriate. New groundwater monitoring data indicates that the off-base groundwater plume is migrating to the south and southeast and that groundwater is rising at the Base. In addition, contamination has been detected in two public drinking water wells where contamination levels are below the Maximum Contaminant Levels (MCLs). These low levels of contamination have remained constant for the last ten years and we do not expect them to change in the short term. If the new data shows that the selected groundwater remedy is no longer appropriate, then the remedy needs to be optimized and/or the remedy must be amended/modified to address the current site conditions.

**OU2 (AFRPA)** - The remedial actions at Sites 6, 12, 17, 19, 42 are protective of human health and the environment.

**OU2 (AFRC)** - The remedial actions at Sites 1 and 11 are protective of human health and the environment.

**OU4** - The remedial action at Site L is protective of human health and the environment.

The Air Force and the regulators need to develop a mutually acceptable timeline for completion of the actions described above for Site 4, Site 7, Site 31 Groundwater Plume, and OU1

Groundwater Plume. The ROD Amendment for Site 31 (soil remedy) and Site 34, and the remedy revision required for Site 7 should be completed within 6 months. The evaluation of new data required at Site 4, Site 31 Groundwater Plume, and OU1 Groundwater Plume should be completed within 1 year.

Pursuant to Section 27.2 of the FFA, EPA requests that the information identified in EPA's comments be provided as part of a comprehensive evaluation, including an examination of the changing site conditions at Site 4, Site 31 Groundwater Plume, OU1 Groundwater Plume, and the EGETS extraction system. If you have questions regarding these comments, please contact John Lucey at (415) 972-3145 or you can reach me at (415) 972-3438.

Mr. Michael M. Montgomery
Assistant Director of Federal Facilities and
Site Cleanup Branch, Region 9,
U.S. Environmental Protection Agency

Attachment:

| | | |
|---|---|---|
| Cc: | Eric Lehto, | AFRC |
| | Stephen Niou, | DTSC |
| | Ray Akhtarshad, | RWQCB |
| | Harold Ball, | EPA |
| | Robert Carr, | EPA ORC |

**EPA Comments on the**
**Draft Final 5-Year Review Report for**
**Former March Air Force Base and March Air Reserve Base,**
**California, dated July 2009**

1) The Draft Final Second 5-Year Review Report should be finalized with the addition of the word "Second" to the title. This will differentiate the first and second 5-Year Review Reports. All of the comments below should be incorporated into the subsequent Third 5YR Report as appropriate.

2) The next 5YR should discuss how the issues and recommendations from the previous version of the document were addressed during the interim 5 year period.

3) A summary of issues and recommendations, and all the protectiveness statements should be a part of the 5YR Summary Form. All of the protectiveness statements for any given site should be consistent throughout the 5YR.

4) Table ES-2 is the list of sites included in the 5YR. A column should be added to describe the protectiveness statement for each site.

5) Table ES-5 should be updated to indicate the sites and OUs to which the recommendations refer. In addition, specific completion dates should be provided for each issue.

6) Site 4 OU1: The discussion (p. 34-37) of the rising groundwater table indicates that the remedy does not meet CCR regulations regarding groundwater contact with landfill wastes but does not indicate whether this requirement is an ARAR. The document should clarify whether the CCR landfill regulation is an ARAR, if it is an ARAR, explain how the noncompliance will be addressed.

7) Site 7 OU1: The site is discussed in Sec. 4.5 (p. 51-56). Sec. 4.5.1.4, (p. 53) describes the progress since the last 5YR. The document should provide detailed information about the current site conditions and the results of the recent investigation.

8) Site 12 OU2: The Executive Summary does not provide a protectiveness determination for Site 12. The document should provide protectiveness determinations for all sites in the Executive Summary.

9) Site 19 OU2: The remedy in May 2004 was ICs (Sec. 4.10.1.1, p. 78) but later the 5YR says that the ROD was in September 2005 (Sec. 4.10.3.3, p. 79). The document should explain the discrepancy.

   The HHRA summary (Sec. 4.10.3.3, p. 79) indicates that the major risk to future exposure is from potential use of groundwater. However, it does not appear that a

groundwater remedy is part of the ROD. The document should clarify this discrepancy.

The Ecological Risk is described in Section 4.10.3.3 and states that no active remediation took place because the resultant habitat destruction would likely have caused more harm to ecological receptors than would result from leaving the contaminants in place. That conclusion is not supported by the ecological risk assessment presented in the Operable Unit 2 Final Remedial Investigation/Draft Final Feasibility Study for March AFB (July 1997). Neither the Remedial Investigation nor the Feasibility Study included an analysis of the amount or severity of habitat destruction which might result from remedial activities. The RI/FS did correctly emphasize the lack of habitat at this site. The actual conclusions of the ecological risk assessment for Site 19, together with an evaluation of the current conditions as described in the 5YR, can be better summarized in the Ecological Risk portion of Section 4.10.3.3 as follows:

"The habitat at the site was and is very low quality due to the ongoing and expanded industrial use of the land as a wastewater treatment and water recycling facility. The Remedial Investigation concluded that ecological risk from contaminants was generally acceptable. In those instances where an unacceptable risk was predicted, it was driven by rare locations with elevated contaminant concentrations and by highly conservative exposure assumptions. Given the highly disturbed, sparse non-native grassland which exists at Site 19, the risk to any ecological receptors is acceptable."

10) Site 29 OU1: The Human Health Risk is discussed in Section 4.11.33 (P. 84). It appears that the 2004 PRGs and not the 2008 RSLs were used. The RSL values are slightly higher and therefore total risk would be lower. The next 5YR should use the current RSLs.

Concerning Table 4.11.3.3-1 and Table F-1. The TEF or toxicity equivalent factors are multiplied by the concentration of the individual congeners to reach a TEQ or toxicity equivalent in 2,3,7,8 TCDD units. There is a consistency of terms issue. The TEFs are correct and the 5YR uses the 2005 WHO document. The concentration term should be TEQs. The footnote for the table should not assign TEF to classes of dioxin congeners but specific congeners. The document should clarify the footnote by stating "TEFs are assigned to individual congeners based on a weight of evidence approach".

11) Site 31 OU1: There is no information in the document on what the contamination levels were at Site 31, what they are now, or what they should be from an ARAR perspective.

12) Site 31 Groundwater Plume OU1: The 5YR indicates that progress is being made to meet the groundwater cleanup criteria, yet significant TCE concentrations remain (p.93) and there is only one groundwater extraction well operating (31BGEW03, p.91) although later on the document says that 7 EGETS wells are operating (Sec. 4.15.1.4, p. 109). The document should clearly explain the number of operating extraction wells that provide capture for the Site 31 Plume.

The document should describe the ICs that are in place at the site and describe if the groundwater is used for drinking water.

There is just one groundwater plume map (Figure 4-15) which is undated and has no concentration contours on the identified plume. The document should provide a current site specific groundwater map with concentration contours.

13) Site 34 OU1: The 5YR indicates that PAH soil levels are now within industrial use criteria and a ROD amendment is being prepared to change soil remedy to ICs. The document should describe what the contamination levels were, what they are now, or what they should be from an ARAR perspective.

14) OU1 Groundwater Plume: The 5YR has no protectiveness determination in the Executive Summary but the text indicates protective (Sec. 4.15.8, p. 114). OU1 ROD (1996) chose groundwater extraction (ongoing). The document should provide a protectiveness statement in the Executive Summary.

The discussion of the groundwater remedy status in the 5YR says the following, "The OU1 Plume is generally decreasing in size. The plume is also moving to the south and southeast." The document should provide time sequenced contour plume maps and a critical analysis of this plume behavior.

The 5YR indicates that the response is to notify Riverside County officials of the properties that are impacted by the off-site portion of the OU1 Plume and states that they "have been advised to deny the installation of wells" (Sec. 4.15.4, p. 112). The document should provide further documentation how this requirement has been fulfilled and reference the supporting documentation.

The document should provide a detailed description of the existing IC requirements and how IC compliance is reported to the regulatory agencies.

# DRAFT FINAL

# 5-Year Review Report
# for
# Former March Air Force Base
# and
# March Air Reserve Base
# California

**July 2009**

## EXECUTIVE SUMMARY

This is the second 5-year review of remediation sites at March Air Reserve Base (ARB) and the former March Air Force Base (AFB). When March AFB realigned, the property retained by the Air Force was renamed March ARB. The property transferred out of Air Force control is referred to as the former March AFB. This review is similar in format to the first 5-year review completed in 2003 and conducted in accordance with the EPA Comprehensive Five-Year Review Guidance, June 2001.

A summary of the status of all the remediation sites is in Table ES-1, ES-2 and ES-3. Table ES-1 is a summary of all remediation sites and has the sites in numerical order by site number. Table ES-2 has additional information on sites included in this review and has the sites grouped by Operable Unit. Table ES-3 has additional information on sites not included in this review and also has the sites grouped by Operable Unit.

Sites in a completed Record of Decision (ROD) with contamination left in place are included in this 5-year review. A site by site summary is in the next section of this Executive Summary.

Issues such as rising groundwater and Institutional Controls affect more than one site.

Groundwater is rising at the rate of one to two feet per year on March. As the groundwater comes into contact with more soil, there is the potential to transfer additional contamination from soil to groundwater. The remediation sites most affected by the rising groundwater are Site 4, Site 7 and the OU1 Groundwater Plume.

Different procedures for Institutional Controls are used for sites on property retained by the Air Force and for sites transferred from Air Force control. Institutional Controls on transferred property are contained in deed restrictions and State Land Use Covenants. The Institutional Control language for transferred property is described in RODs and Findings of Suitability for Early Transfer (FOSETs). Institutional Controls on retained property are contained in the March ARB General Plan. The Institutional Control language for retained property is contained in RODs. The Institutional Control language is included in Appendix D.

### Site Summary

**Site 1.** The selected remedy in the ROD for Site 1, 11, 37 and 39 is restriction from residential land use due to polyaromatic hydrocarbons (PAHs) in the surface soil. The restriction from residential use is included the Base General Plan. The remedy is protective of human health and the environment and no changes are recommended.

**Site 4.** The selected remedy in the Operable Unit (OU) 1 ROD is a landfill cap and groundwater extraction and treatment. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions include restricting Site 4 from residential use,

protecting the landfill cover and prohibiting groundwater extraction for any purpose other than monitoring.

Groundwater monitoring indicates that rising groundwater levels on the Main Base are not degrading the remedy at Site 4. Based on current groundwater monitoring data, the remedy is currently protective of human health and the environment.

**Site 5.** The selected remedy in the OU1 ROD is no further action, but landfill materials remain at the site. The no further action determination was based on residential land use. Continued monitoring of groundwater levels is recommended to determine if the groundwater level stays lower than the landfill materials remaining on site. The remedy is currently protective of human health and the environment.

**Site 6.** The selected remedy in the AFRPA OU2 ROD is institutional controls to protect the Site 6 waste cells. Institutional controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions include restricting Site 6 from residential use, protecting the landfill cover and prohibiting groundwater extraction for any purpose other than monitoring. The remedy is protective of human health and the environment and no changes are recommended.

**Site 7.** The selected remedy in the OU1 ROD is no further action based on industrial land use. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions include restricting Site 7 from residential use and prohibiting groundwater extraction for any purpose other than monitoring.

The OU1 Groundwater Plume extends through Site 7 (see OU1 Groundwater Plume entry below). Increases in trichloroethylene (TCE) levels in extraction wells have been observed. Additional soil borings and monitoring wells were installed in 2007 and found a previously undiscovered contaminant source in Site 7. An Explanation of Significant Differences is underway. The existing groundwater extraction and institutional controls are protective for the currently unused Site 7.

**Site 11.** The selected remedy in the ROD for Site 1, 11, 37 and 39 is restriction from residential land use due to PAHs in the surface soil. The restriction from residential use is included in the Base General Plan. The remedy is protective of human health and the environment and no changes are recommended.

**Site 12.** The selected remedy in the AFRPA OU2 ROD is groundwater use restrictions. The contamination in the groundwater is now less than Maximum Contaminant Levels (MCLs) for drinking water. A site closure report has been completed. No further action or monitoring required.

**Site 17.** The selected remedy in the AFRPA OU2 ROD is restriction from residential use and digging more than 7 feet due to polychlorinated biphenyl (PCB) contamination in the soil. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The remedy is protective of human health and the environment.

**Site 18.** The selected remedy in the OU1 ROD of dual phase extraction has been superseded by a Remedial Action Plan remedy of skimming, monitoring and institutional controls. Site 18 is a petroleum site and should not have been included in the OU1 ROD. A ROD Amendment to officially remove Site 18 from the OU1 ROD is being prepared. The Site 18 cleanup will be overseen by the Santa Ana Regional Water Quality Control Board under the Porter-Cologne Water Quality Control Act. The Base General Plan should be updated to specifically include the Site 18 groundwater plume. Human health and the environment are being protected.

**Site 19.** The selected remedy in the AFRPA OU2 ROD is restriction from residential use and soil disturbance restrictions due to PAH, PCBs, hexavalent chromium and thallium in the surface soil. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The remedy is protective of human health and the environment and no changes are recommended.

**Site 29.** The selected remedy is the OU1 ROD is no further action based on industrial land use. Site 29 is restricted from residential use in the Base General Plan due to beryllium, lead, manganese and dioxins in the surface soil. The current remedy is protective of human health and the environment.

**Site 31.** The selected remedy in the OU1 ROD is soil vapor extraction and carbon adsorption for subsurface soils and groundwater extraction and carbon adsorption for groundwater, primarily due to elevated TCE levels. The selected remedy for surface soils is excavation and low temperature thermal desorption due to PAHs. The soil vapor extraction was effective and has been turned off. Most of the groundwater extraction wells have also been turned off. Continued monitoring of downgradient groundwater is recommended. An additional downgradient extraction well may be required. Further evaluation of the surface soil contamination indicates no further action is the appropriate remedy. An amendment to the OU1 ROD is being prepared to change the surface soil remedy to no further action. The current remedies are currently protective of human health and the environment.

**Site 34.** The selected remedy in the OU1 ROD is bioventing for fuel contamination in the subsurface soils and excavation and low temperature thermal desorption for PAH contamination in the surface soils. The subsurface soil cleanup is complete. Further evaluation of the surface soil contamination indicates that restriction from residential use is the appropriate remedy. An amendment to the OU1 ROD is being prepared to change the surface soil remedy to restriction from residential use. The area is next to the aircraft parking ramp and is not being used. The

current remedies are protective of human health and the environment. Long term protectiveness will be provided by completion of the OU1 ROD Amendment. The OU1 ROD Amendment will restrict the site from residential use.

**Site 42.** The selected remedy in the AFRPA OU2 ROD is no further action, but minimal levels of PCB were left in the concrete floor inside Building 3404. A land use covenant between the County of Riverside and DTSC will ensure the use of the building remains restricted to industrial activities. The CERCLA remedy is currently protective of human health and the environment.

**OU1 Groundwater Plume.** The remedy selected in the OU1 ROD is groundwater extraction and treatment at the base boundary and monitoring to ensure the off base plume is decreasing and does not threaten water supplies. The OU1 Plume is generally decreasing in size. No increasing trends have been noted in off-base water supply wells. Generally decreasing contaminant concentrations indicate the groundwater extraction and treatment system is effective. Operation of the treatment system and monitoring continues.

**Site L.** The selected remedy in the OU4 ROD is a restriction from residential land use due to PCB contamination in the soil. The remedy is protective of human health and the environment and no changes are recommended.

**Issues**

**Table ES-4 Issues**

| Issue | Site | Currently Affects Protectiveness (Y/N) | Affects Future Protectiveness (Y/N) |
|---|---|---|---|
| Rising Groundwater | 4,5,7 | N | Impact of rising groundwater being evaluated |
| Increasing TCE Levels | 7 | N | An Explanation of Significant Differences is being prepared. |
| OU1 ROD Amendment | 18, 31, 34 | N | N |
| Base General Plan Update | 18 | N | N |

## Recommendations and Follow-Up Actions

**Table ES-5 Recommendations and Follow-Up Actions**

| Issue | Recommendations/ Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Rising Groundwater Basewide | Continue to monitor and evaluate | AFRC/ AFRPA | State/EPA | Annually in Annual Monitoring Report | N | Possible |
| Increasing TCE Levels at Site 7 | Explanation of Significant Differences | AFRPA | State/EPA | 2009 | N | Possible |
| OU1 ROD Amendment | Complete OU1 ROD Amendment | AFRC | State/EPA | 2010 | N | N |
| Base General Plan Update | Include groundwater restrictions at Site 18 | AFRC | State/EPA | June 2009 | N | N |

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**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 1 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 1** | Aircraft Isolation Area/Fuel Drainage Area | AFRC OU2 Sites 1, 11, 37 & 39 | AFRC | Fuel, solvents and PAHs | Majority of contaminated soil removed in 1995. Restricted from residential use in ROD. | Yes, land use controls |
| **Site 2** | Waste Oil Pits/Solvent Tanks | No ROD, but included in OU2 RI/FS | AFRC | Fuels, oils and solvents | Closure letter on fuel contamination from Santa Ana Regional Water Quality Control Board. Solvent contamination to be included in upcoming ROD. | No, no ROD |
| **Site 3** | Landfill No. 5 | AFRPA OU2 | AFRPA | Household waste, oil, and solvents | Waste was consolidated in the Site 6 landfill. No waste is present. No further action in ROD. | No |
| **Site 4** | Landfill No. 6 | OU1 | AFRPA | Household waste, oil, and solvents | Landfill was capped in 1995. Waste remains on site. Landfill cap, groundwater extraction and treatment, and use restrictions in ROD. | Yes |
| **Site 5** | Landfill No. 3 | OU1 | AFRC | Sanitary waste and construction rubble | No further action in OU1 ROD, but waste remains on site. | Yes, in 2003 5-year review. |
| **Site 6** | Landfill No. 4 | AFRPA OU2 | AFRPA | Household waste and construction rubble | Closed with a newly engineered waste cell design. Waste remains in place. Use restrictions in ROD to protect the waste cell. | Yes |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 2 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 7** | Fire Protection Training Area No. 2 | OU1 | AFRPA | Fuels, oils and solvents | Restricted from residential use in ROD. Another source of contamination was found in 2007. | Yes |
| **Site 8** | Flight Line Shop Area/ Operations | To be in a future OU2 ROD for Site 8 and 36 | AFRC | Fuels, oils and solvents | Some contaminated soils were removed. A Supplemental Remedial Investigation/Focused Feasibility Study was required prior to completing the ROD. | No, no ROD |
| **Site 9** | Oil/Water Separator | OU1 | AFRC | Fuels and solvents | No contaminants identified above unrestricted levels. No further action in ROD. | No |
| **Site 10** | Flightline Drainage Channel | OU1 | AFRC | Fuels, oils, and solvents with PAHs in surface soils | Contaminated soils removed in 1995 and treated by bioremediation vs. low temperature thermal desorption selected in ROD. ESD issued for treatment change. 2003 5-Year Review determined no further review is required because the site had been remediated to unrestricted land use. | No |
| **Site 11** | Bulk Fuel Storage Area | AFRC OU2 Sites 1, 11, 37 & 39 | AFRC | Fuels and PAHs | Restricted from residential use in ROD. | Yes, land use controls |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 3 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 12** | Civil Engineering Yard | AFRPA OU2 | AFRPA | Oils and solvents | Soil was excavated and placed at the Site 6 landfill. Groundwater use restrictions were placed in ROD. Recent groundwater monitoring shows groundwater contamination has dropped below MCLs. Closed in 2008 without restrictions. | Yes, but will not be included in next 5-year review. |
| **Site 13** | Tank Truck Spill | OU1 | AFRC | Fuels | No contamination identified above unrestricted levels. No further action in ROD. | No |
| **Site 14** | Liquid Fuel Pump Station Overflow | OU1 | AFRC | Jet Fuel | No contamination identified above unrestricted levels. No further action in ROD. | No |
| **Site 15** | Fire Protection Training Area No. 3 | OU1 | AFRC | Fuels, BTEX | Contaminated soils removed in 1995 and treated by bioremediation vs. low temperature thermal desorption selected in ROD. ESD issued for treatment change. 2003 5-Year Review determined no further review is required because the site had been remediated to unrestricted land use. | No |
| **Site 16** | East March Sludge Drying Beds | OU1 | AFRC | Sludge | No contamination identified above unrestricted levels. No further action in ROD. | No |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 4 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 17** | Swimming Pool Fill | AFRPA OU2 | AFRPA | Solvents, shop wastes, and demolition debris | Pool structure and contents were removed in 1994. Contamination remains above unrestricted levels. Use restrictions in ROD. | Yes, land use controls |
| **Site 18** | Engine Test Cell | OU1 | AFRC | Fuel and BTEX | Remedial Action Plan with Santa Ana Regional Water Quality Control Board. Contamination remains above unrestricted levels. Planned ROD Amendment to remove from OU1 ROD. | Yes, currently included in OU1 ROD |
| **Site 19** | West March Sludge Drying Beds | AFRPA OU2 | AFRPA | Sludge | Land use restrictions in ROD. | Yes, land use controls |
| **Site 20** | Landfill No. 7, West March | AFRPA OU2 | AFRPA | Household waste | Soil and waste was excavated and placed in Site 6. No contamination remains above unrestricted levels at the site. No further action in ROD. | No |
| **Site 21** | Effluent Pond | OU4 | AFRPA | Treated waste water | No contamination identified above unrestricted levels. No Action in ROD. | No |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 5 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 22** | Landfill No. 2 | AFRPA OU2 | AFRPA | None | Investigated in the OU2 RI/FS. No evidence of a landfill was found. No further action in ROD. | No |
| **Site 23** | East March Effluent Pond, Nandina and Heacock Street | AFRPA OU2 | AFRPA | Treated wastewater | No soil contamination found. No further action in ROD. | No |
| **Site 24** | Landfill No. 1 | AFRPA OU2 | AFRPA | Household waste and incinerator ash | Waste and soil was excavated in 1995 and placed at Site 6. No contamination remains above unrestricted levels. No further action in ROD. | No |
| **Site 25** | Munitions Residue Burial Area | AFRPA OU2 | AFRPA | Munitions residue | Non-hazardous waste was removed and placed in Site 6 landfill. No contamination remains above unrestricted levels. No further action in ROD. | No |
| **Site 26** | Water Treatment Sludge, West March | AFRPA OU2 | AFRPA | Sludge | Contamination removed and placed in Site 6. No contamination remains above unrestricted levels. No further action in ROD. | No |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 6 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 27** | Building 422 Underground POL Tanks | No ROD, but included in OU2 RI/FS | AFRC | Fuels | Tanks were removed. Soil Vapor Extraction system removed significant amounts of fuel. No Further Action per Santa Ana Regional Water Quality Control Board. | No, petroleum site |
| **Site 28** | Basewide Groundwater Monitoring Wells | None, originally included in OU2 | AFRC | Zone monitoring wells | Well network was part of the basewide groundwater monitoring well network. No specific site identified. | No, see Note 1 |
| **Site 29** | Fire Protection Training Area No. 1 | OU1 | AFRC | Fuels, oils, and solvents | Restricted from residential use in ROD. | Yes, land use controls |
| **Site 30** | Construction Rubble Site | AFRPA OU2 | AFRPA | Construction rubble | Debris removed. No contaminants identified above unrestricted levels. No further action in ROD. | No |
| **Site 31** | Solvent Spill | OU1 | AFRC | Solvents and PAHs | A soil and groundwater treatment system was installed in 1996. Most of the system has been turned off. PAH in surface soils. Soil vapor and groundwater extraction in ROD for groundwater and subsurface soil, excavation in ROD for surface soil. | Yes |

Note 1. Site 28, Zone Monitoring, was established in the IRP Phase II, Stage I in 1985 (Administrative Record number 8). The zone included suspected sources of solvents in groundwater. The zone monitoring concept was superseded by the ongoing groundwater monitoring program. Site 28 was not carried forward into a ROD. Also see OU1 Groundwater Plume following the numbered sites.

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 7 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 32** | Building Demolition Areas | None, originally included in OU2 | AFRPA | Assumed to contain construction rubble | Not located. Site was removed from the IRP list because the sites were not considered to present a risk for adverse affects on human health or the environment. | No, not a site |
| **Site 33** | Panero Aircraft Refueling Facility | None | AFRC | Fuels and BTEX | Tanks were removed. Clean up being done under a Remedial Action Plan with Santa Ana Regional Water Quality Control Board. A Soil Vapor Extraction system removed significant amounts of fuel and now has been shut down with the active portion of the cleanup complete. Monitoring and skimming continues. | No, petroleum site |
| **Site 34** | Pritchard Refueling System | OU1 | AFRC | Fuels, BTEX and PAHs | A bio-venting pilot study was used to clean the soil. Surface soil PAH contamination remains above unrestricted levels. Bioventing for subsurface soils and excavation for surface soils in ROD. | Yes |
| **Site 35** | 15$^{th}$ AF HQ leaking USTs | AFRPA OU2 | AFRPA | Fuels | The USTs were removed and bio-venting was used to clean the site. No remaining contamination above unrestricted levels. No further action in ROD. | No |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 8 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 36** | Building 458 Leach Pit | To be in a future OU2 ROD for Site 8 and 36 | AFRC | Solvents | Some contaminated soil removed in 1994. Groundwater and Soil Vapor Extraction system operated for several years. A Supplemental Remedial Investigation/Focused Feasibility Study was required prior to completing the ROD. | No, no ROD |
| **Site 37** | PCB Spill Site at Building 317 | OU2 AFRC Sites 1, 11, 37 & 39 | AFRC | PCBs | No further action in ROD. | No |
| **Site 38** | PCB Spill Site | OU1 | AFRPA | PCBs | The contamination was removed and the OU1 RI did not identify additional contamination. No further action in ROD. | No |
| **Site 39** | Base Gas Station, Building 2406 | OU2 AFRC Sites 1, 11, 37 & 39 | AFRC | Fuels | Cleanup complete. No further action in ROD. | No |
| **Site 40** | Landfill No. 8 | AFRPA OU2 | AFRPA | Household waste | Waste was removed in 1996 and placed at Site 6. No contamination remains above unrestricted levels. No further action in ROD. | No |
| **Site 41** | Hawes Radio Relay Facility, Barstow | OU4 | AFRPA | Fuels and oil | Four USTs were removed in 1995. No contamination remains above unrestricted levels. No further action in ROD. | No |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 9 of 10**

| Site | Site Description | ROD (see note on last page of table) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site 42** | Building 3404 Transformers | AFRPA OU2 | AFRPA | PCBs | Contaminated soil removed. No further action in ROD, land use covenant between current owner (County of Riverside) and California Department of Toxic Substances Control (DTSC) for PCB contamination inside Building 3404. | Yes, included per DTSC request |
| **Site 43** | Former Automotive Maintenance Area/Cal Trans Site | None | AFRPA | Fuels and BTEX | Contaminated soil removed. Closure letter from Santa Ana Regional Water Quality Control Board under the UST program. | No, no petroleum site |
| **Site 44** | Base Water Tower, Bldg 407 | OU4 | AFRC | Mercury | Contaminated soil removed in 1997. No further action in ROD. | No |
| **OU1 Ground-water Plume** | OU1 Groundwater Plume | OU1 | AFRPA/ AFRC | Solvents | Long-term monitoring and extraction and treatment required by ROD is ongoing. | Yes |
| **Site 2/27 Ground-water Plume** | Site 2/27 Groundwater Plume | None | AFRC | Fuel and solvents | Some groundwater cleanup accomplished with the Site 2 cleanup. Mostly petroleum contamination; solvent contamination to be included in upcoming ROD. | No, no ROD |

**Summary Table ES-1. Sites at March ARB/former March AFB**
**Page 10 of 10**

| Site | Site Description | ROD (see note) | AFRPA/ AFRC | Contaminants | Actions/ Current Status | Included in 5-Year Review? |
|---|---|---|---|---|---|---|
| **Site L** | Former NCO Club Swimming Pool/PCB Site | OU4 | AFRPA | PCBs | Some contaminated soil removed. Restricted from residential use in ROD. | Yes, land use controls |
| **Water Tank, Bldg 6601** | Water Tank | OU4 | AFRPA | Mercury | Contaminated soil removed. No further action in ROD. | No |
| **Water Tank, Bldg 3410** | Water Tank | OU4 | AFRPA | Mercury | No contamination found above residential levels. No action in ROD. | No |
| **March Base Hospital/ Dental Clinic** | Former Hospital and Dental Clinic | OU4 | AFRPA | Mercury | No action in ROD. | No |

AF - Air Force
AFRC - Air Force Reserve Command
AFRPA - Air Force Real Property Agency
BTEX - Benzene, Toluene, Ethylbenzene and Xylenes
DTSC - Department of Toxic Substances Control
ESD - Explanation of Significant Differences
FS - Feasibility Study
IRP - Installation Restoration Program
OU - Operable Unit
PAH - Polyaromatic Hydrocarbon
PCB - Polychlorinated Biphenyl
POL - Petroleum, Oil and Lubricants
PP - Proposed Plan
RI - Remedial Investigation
ROD - Record of Decision
UST - Underground Storage Tank

ROD Note: There are two existing RODs for OU2 sites with an additional ROD planned. OU2 was set up before March AFB realigned in 1996. Separate ROD documents were prepared to meet the different requirements for sites retained by the Air Force and for sites transferred out of Air Force control. A ROD was completed for OU2 sites on the former March AFB (AFRPA OU2 sites), property that is no longer controlled by the Air Force. A ROD was completed for four OU2 sites on March ARB (OU2 AFRC Sites 1, 11, 37 & 39), property retained by the Air Force. Additional investigation was required for the remaining two OU2 sites, Site 8 and 36. A separate ROD for these sites is planned.

**Table ES-2, Sites at March ARB/former March AFB Included in This 5-Year Review**
**Page 1 of 7**

| **OU1 Sites in Five Year Review - All in OU1 ROD** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **Institutional Controls (ICs)** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 4** | Landfill No. 6 | Transferred | Household waste, oil, and solvents | Landfill was capped in 1995. Waste remains on site. Landfill cap, groundwater extraction and treatment, and use restrictions in ROD. | Yes, deed restrictions and State Land Use Covenant | Capped landfill | Yes |
| **Site 5** | Landfill No. 3 | March ARB, Retained by AF | Sanitary waste and construction rubble | No further action in OU1 ROD, but waste remains on site. | No, but recorded on the March ARB General Plan as a former landfill | No | In area of OU1 plume, but not a significant source of groundwater contamination. |
| **Site 7** | Fire Protection Training Area No. 2 | Transferred | Fuels, oils and solvents | Restricted from residential use in ROD. Another source of contamination was found in 2007. | Yes, deed restrictions and State Land Use Covenant | Yes | Yes |

**Table ES-2, Sites at March ARB/former March AFB Included in This 5-Year Review**
**Page 2 of 7**

| OU1 Sites in Five Year Review- All in OU1 ROD - continued | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **Institutional Controls (ICs)** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 18** | Engine Test Cell | March ARB, Retained by AF | Fuel and BTEX | Remedial Action Plan with Santa Ana Regional Water Quality Control Board. Groundwater contamination remains above unrestricted levels. Planned ROD Amendment to remove from OU1 ROD. | Yes, groundwater plume will be recorded in Base General Plan | No | Yes |
| **Site 29** | Fire Protection Training Area No. 1 | March ARB, Retained by AF | Fuels, oils, and solvents | Restricted from residential use in ROD. | Yes, restriction to industrial use recorded in Base General Plan | Yes | In area of OU1 plume, but not a significant source of groundwater contamination. |
| **Site 31** | Solvent Spill | March ARB, Retained by AF | Solvents and PAHs | A soil and groundwater treatment system was installed in 1996. Most of the system has been turned off. PAH in surface soils. Soil vapor and groundwater extraction in ROD for groundwater and subsurface soil, excavation in ROD for surface soil. | No | No | Yes |

**Table ES-2, Sites at March ARB/former March AFB Included in This 5-Year Review**
**Page 3 of 7**

| OU1 Sites in Five Year Review- All in OU1 ROD - continued | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **Institutional Controls (ICs)** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 34** | Pritchard Refueling System | March ARB, Retained by AF | Fuels, BTEX and PAHs | A bio-venting pilot study was used to clean the soil. Surface soil PAH contamination remains above unrestricted levels. Bioventing for subsurface soils and excavation for surface soils in ROD. | No current ICs | Planned to be restricted to industrial use in OU1 ROD Amendment | In area of OU1 plume, but not a significant source of groundwater contamination. |
| **OU1 Ground-water Plume** | OU1 Groundwater Plume | Plume is beneath land retained by AF, transferred from AF and never belonging to AF | Solvents | Long-term monitoring and extraction and treatment required by ROD is ongoing. | No | No | Yes |

**Table ES-2, Sites at March ARB/former March AFB Included in This 5-Year Review**
**Page 4 of 7**

| **OU2 Sites in Five Year Review – See first column for ROD information and note on page 6** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **Institutional Controls (ICs)** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 1**<br><br>**AFRC OU2 ROD Sites 1, 11, 37 & 39** | Aircraft Isolation Area/Fuel Drainage Area | March ARB, Retained by AF | Fuel, solvents and PAHs | Majority of contaminated soil removed in 1995. Restricted from residential use in ROD. | Yes, restriction to industrial use recorded in Base General Plan | Yes | No |
| **Site 6**<br><br>**AFRPA OU2 ROD** | Landfill No. 4 | Transferred | Household waste and construction rubble | Closed with a newly engineered waste cell design. Waste remains in place. Use restrictions in ROD to protect the waste cell. | Yes, deed restrictions and State Land Use Covenant | Waste cell for landfill materials | No, but groundwater monitoring continues |
| **Site 11**<br><br>**AFRC OU2 ROD Sites 1, 11, 37 & 39** | Bulk Fuel Storage Area | March ARB, Retained by AF | Fuels and PAHs | Restricted from residential use in ROD. | Yes, restriction to industrial use recorded in Base General Plan | Yes | No |

**Table ES-2, Sites at March ARB/former March AFB Included in This 5-Year Review**
**Page 5 of 7**

| **OU2 Sites in Five Year Review, See first column for ROD information and note on page 6 - continued** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **Institutional Controls (ICs)** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 12**<br><br>**AFRPA OU2 ROD** | Civil Engineering Yard | Transferred | Oils and solvents | Soil was excavated and placed at the Site 6 landfill. Groundwater use restrictions in ROD. Recent groundwater monitoring shows groundwater contamination has dropped below MCLs. | No longer required because site has been closed with no restrictions. | Site closed in 2008 with no restrictions | Site closed in 2008 with no restrictions |
| **Site 17**<br><br>**AFRPA OU2 ROD** | Swimming Pool Fill | Transferred | Solvents, shop wastes, and demolition debris | Pool structure and contents were removed in 1994. Contamination remains above unrestricted levels. Use restrictions in ROD. | Yes, deed restrictions and State Land Use Covenant | Yes | No |

**Table ES-2, Sites at March ARB/former March AFB Included in This 5-Year Review**
**Page 6 of 7**

| OU2 Sites in Five Year Review, See first column for ROD information and note below - continued | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **Institutional Controls (ICs)** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 19**<br><br>**AFRPA OU2 ROD** | West March Sludge Drying Beds | Transferred | Sludge | Land use restrictions in ROD. | Yes, deed restrictions and State Land Use Covenant | Yes | No |
| **Site 42**<br><br>**AFRPA OU2 ROD** | Building 3404 Transformers | Transferred | PCBs | Contaminated soil removed. No further action in ROD, land use covenant between current owner (County of Riverside) and California Department of Toxic Substances Control (DTSC) for PCB contamination inside Building 3404. | Yes, State Land Use Covenant between County of Riverside and DTSC | No | No |

ROD Note: There are two existing RODs for OU2 sites with an additional ROD planned. OU2 was set up before March AFB realigned in 1996. Separate ROD documents were prepared to meet the different requirements for sites retained by the Air Force and for sites transferred out of Air Force control. A ROD was completed for OU2 sites on the former March AFB (AFRPA OU2 sites), property that is no longer controlled by the Air Force. A ROD was completed for four OU2 sites on March ARB (OU2 AFRC Sites 1, 11, 37 & 39), property retained by the Air Force. Additional investigation was required for the remaining two OU2 sites, Site 8 and 36. A separate ROD for these sites is planned.

**Table ES-2, Sites at March ARB/former March AFB Included in This 5-Year Review**


| **OU4 Site in Five Year Review - In OU4 ROD** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **Institutional Controls (ICs)** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site L** | Former NCO Club Swimming Pool/PCB Site | Transferred | PCBs | Some contaminated soil removed. Restricted from residential use in ROD. | Yes, deed restrictions and State Land Use Covenant | Yes | No |

AF - Air Force
AFRC - Air Force Reserve Command
AFRPA - Air Force Real Property Agency
BTEX - Benzene, Toluene, Ethylbenzene and Xylenes
DTSC - Department of Toxic Substances Control
ESD - Explanation of Significant Differences
FS - Feasibility Study
ICs - Institutional Controls
MCL - Maximum Contaminant Level
OU - Operable Unit
PAH - Polyaromatic Hydrocarbon
PCB - Polychlorinated Biphenyl
POL - Petroleum, Oil and Lubricants
PP - Proposed Plan
RI - Remedial Investigation
ROD - Record of Decision
UST - Underground Storage Tank

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**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 1 of 12**

| OU1 Sites Not in Five Year Review – All in OU1 ROD | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 9** | Oil/Water Separator | March ARB, Retained by AF | Fuels and solvents | No contaminants identified above unrestricted levels. No further action in ROD. | No | No | In area of OU1 plume, but not a significant source of groundwater contamination. |
| **Site 10** | Flightline Drainage Channel | March ARB, Retained by AF | Fuels, oils, and solvents with PAHs in surface soils | Contaminated soils removed in 1995 and treated by bioremediation vs. low temperature thermal desorption selected in ROD. ESD issued for treatment change. 2003 5-Year Review determined no further review is required because the site had been remediated to unrestricted land use. | No | No | In area of OU1 plume, but not a significant source of groundwater contamination. |
| **Site 13** | Tank Truck Spill | March ARB, Retained by AF | Fuels | No contamination identified above unrestricted levels. No further action in ROD. | No | No | In area of OU1 plume, but not a significant source of groundwater contamination |
| **Site 14** | Liquid Fuel Pump Station Overflow | March ARB, Retained by AF | Jet Fuel | No contamination identified above unrestricted levels. No further action in ROD. | No | No | In area of OU1 plume, but not a significant source of groundwater contamination |

| OU1 Sites Not in Five Year Review – All in OU1 ROD - continued | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 15** | Fire Protection Training Area No. 3 | March ARB, Retained by AF | Fuels, BTEX | Contaminated soils removed in 1995 and treated by bioremediation vs. low temperature thermal desorption selected in ROD. ESD issued for treatment change. 2003 5-Year Review determined no further review is required because the site had been remediated to unrestricted land use. | No | No | In area of OU1 plume, but not a significant source of groundwater contamination |
| **Site 16** | East March Sludge Drying Beds | March ARB, Retained by AF | Sludge | No contamination identified above unrestricted levels. No further action in ROD. | No | No | In area of OU1 plume, but not a significant source of groundwater contamination |
| **Site 38** | PCB Spill Site | Transferred | PCBs | The contamination was removed and the OU1 RI did not identify additional contamination. No further action in ROD. | No | No | No |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 3 of 12**

| **OU2 Sites Not in Five Year Review – See first column for ROD information and note on page 8** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 2**<br><br>**No ROD** | Waste Oil Pits/Solvent Tanks | March ARB, Retained by AF | Fuels, oils and solvents | Closure letter on fuel contamination from Santa Ana Regional Water Quality Control Board. Solvent contamination to be included in upcoming ROD. | No | No | Groundwater contamination to be addressed in upcoming ROD. |
| **Site 3**<br><br>**AFRPA OU2 ROD** | Landfill No. 5 | Transferred | Household waste, oil, and solvents | Waste was consolidated in the Site 6 landfill. No waste is present. No further action in ROD. | No | No | No |
| **Site 8**<br><br>**Upcoming ROD** | Flight Line Shop Area/ Operations | March ARB, Retained by AF | Fuels, oils and solvents | Some contaminated soils were removed. A Supplemental Remedial Investigation/Focused Feasibility Study was required prior to completing the ROD. | No | Subsurface soil contamination , no formal restriction from residential use | Groundwater contamination to be addressed in upcoming ROD. |
| **Site 20**<br><br>**AFRPA OU2 ROD** | Landfill No. 7, West March | Transferred | Household waste | Soil and waste was excavated and placed in Site 6. No contamination remains above unrestricted levels at the site. No further action in ROD. | No | No | No |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 4 of 12**

| **OU2 Sites Not in Five Year Review – See first column for ROD information - and note on page 8 continued** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 22**<br><br>**AFRPA OU2 ROD** | Landfill No. 2 | Transferred | None | Investigated in the OU2 RI/FS. No evidence of a landfill was found. No further action in ROD. | No | No | No |
| **Site 23**<br><br>**AFRPA OU2 ROD** | East March Effluent Pond, Nandina and Heacock Street | Transferred | Treated wastewater | No soil contamination found. No further action in ROD. | No | No | No |
| **Site 24**<br><br>**AFRPA OU2 ROD** | Landfill No. 1 | Transferred | Household waste and incinerator ash | Waste and soil was excavated in 1995 and placed at Site 6. No contamination remains above unrestricted levels. No further action in ROD. | No | No | No |
| **Site 25**<br><br>**AFRPA OU2 ROD** | Munitions Residue Burial Area | Transferred | Munitions residue | Non-hazardous waste was removed and placed in Site 6 landfill. No contamination remains above unrestricted levels. No further action in ROD. | No | No | No |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 5 of 12**

| **OU2 Sites Not in Five Year Review – See first column for ROD information and note on page 8 - continued** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 26**<br><br>**AFRPA OU2 ROD** | Water Treatment Sludge, West March | Transferred | Sludge | Contamination removed and placed in Site 6. No contamination remains above unrestricted levels. No further action in ROD. | No | No | No |
| **Site 27**<br><br>**No ROD**<br><br>**Petroleum Site** | Building 422 Underground POL Tanks | March ARB, Retained by AF | Fuels | Tanks were removed. Soil Vapor Extraction system removed significant amounts of fuel. No Further Action per Santa Ana Regional Water Quality Control Board. | No | No | No |
| **Site 28**<br><br>**No ROD** | Basewide Groundwater Monitoring Wells | March ARB, Retained by AF | Zone monitoring wells | Well network was part of the basewide groundwater monitoring well network. No specific site identified. See note 1. | No | No | No |

Note 1. Site 28, Zone Monitoring, was established in the IRP Phase II, Stage I in 1985 (Administrative Record number 8). The zone included suspected sources of solvents in groundwater. The zone monitoring concept was superseded by the ongoing groundwater monitoring program. Site 28 was not carried forward into a ROD. Also see OU1 Groundwater Plume entry on Table ES-1.

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**


| **OU2 Sites Not in Five Year Review – See first column for ROD information and note on page 8 - continued** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 30**<br><br>**AFRPA OU2 ROD** | Construction Rubble Site | Transferred | Construction rubble | Debris removed. No contaminants identified above unrestricted levels. No further action in ROD. | No | No | No |
| **Site 32**<br><br>**No ROD** | Building Demolition Areas | Not Applicable | Assumed to contain construction rubble | Not located. Site was removed from the IRP list because the sites were not considered to present a risk for adverse affects on human health or the environment. | No | No | No |
| **Site 35**<br><br>**AFRPA OU2 ROD** | 15th AF HQ leaking USTs | Transferred | Fuels | The USTs were removed and bio-venting was used to clean the site. No remaining contamination above unrestricted levels. No further action in ROD. | No | No | No |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 7 of 12**

| **OU2 Sites Not in Five Year Review – See first column for ROD information and note on page 8 - continued** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 36**<br><br>**Upcoming ROD** | Building 458 Leach Pit | March ARB, Retained by AF | Solvents | Some contaminated soil removed in 1994. Groundwater and Soil Vapor Extraction system operated for several years. A Supplemental Remedial Investigation/Focused Feasibility Study was required prior to completing the ROD. | No | Soil contamination to be addressed in upcoming ROD. | Groundwater contamination to be addressed in upcoming ROD. |
| **Site 37**<br><br>**AFRC OU2 ROD Sites 1, 11, 37 & 39** | PCB Spill Site at Building 317 | March ARB, Retained by AF | PCBs | No further action in ROD. | No | No | No |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 8 of 11**

| **OU2 Sites Not in Five Year Review – See first column for ROD information and note below - continued** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site /ROD** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 39**<br><br>**AFRC OU2 ROD Sites 1, 11, 37& 39** | Base Gas Station, Building 2406 | March ARB, Retained by AF | Fuels | Cleanup complete. No further action in ROD. | No | No | No |
| **Site 40**<br><br>**AFRPA OU2 ROD** | Landfill No. 8 | Transferred | Household waste | Waste was removed in 1996 and placed at Site 6. No contamination remains above unrestricted levels. No further action in ROD. | No | No | No |
| **Site 2/27 Ground-water Plume**<br><br>**No ROD** | Site 2/27 Groundwater Plume | March ARB, Retained by AF | Fuel and solvents | Some groundwater cleanup accomplished with the Site 2 cleanup. Mostly petroleum contamination; solvent contamination to be included in upcoming ROD. | No | No | Yes |

ROD Note: There are two existing RODs for OU2 sites with an additional ROD planned. OU2 was set up before March AFB realigned in 1996. Separate ROD documents were prepared to meet the different requirements for sites retained by the Air Force and for sites transferred out of Air Force control. A ROD was completed for OU2 sites on the former March AFB (AFRPA OU2 sites), property that is no longer controlled by the Air Force. A ROD was completed for four OU2 sites on March ARB (OU2 AFRC Sites 1, 11, 37 & 39), property retained by the Air Force. Additional investigation was required for the remaining two OU2 sites, Site 8 and 36. A separate ROD for these sites is planned.

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 9 of 12**

| **OU3 Site – Not in Five Year Review** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 33**<br><br>**Petroleum Site** | Panero Aircraft Refueling Facility | March ARB, Retained by AF | Fuels and BTEX | Tanks were removed. Clean up being done under a Remedial Action Plan with Santa Ana Regional Water Quality Control Board under the Porter-Cologne Water Quality Control Act A Soil Vapor Extraction system removed significant amounts of fuel and now has been shut down with the active portion of the cleanup complete. Monitoring and skimming continues. | Yes | Residual subsurface soil contamination, no formal restriction from residential use | Yes |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 10 of 12**

| OU 4 Sites Not in Five Year Review – All in OU4 ROD | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 21** | Effluent Pond | Received treated effluent water, but was not part of March AFB | Treated waste water | No contamination identified above unrestricted levels. No Action in ROD. | No | No | No |
| **Site 41** | Hawes Radio Relay Facility, Barstow | Transferred | Fuels and oil | Four USTs were removed in 1995. No contamination remains above unrestricted levels. No further action in ROD. | No | No | No |
| **Site 44** | Base Water Tower, Bldg 407 | March ARB, Retained by AF | Mercury | Contaminated soil removed in 1997. No further action in ROD. | No | No | No |
| **Water Tank, Bldg 6601** | Water Tank | Transferred | Mercury | Contaminated soil removed. No further action in ROD. | No | No | No |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 11 of 12**

| OU 4 Sites Not in Five Year Review – All in OU4 ROD - continued | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Water Tank, Bldg 3410** | Water Tank | Transferred | Mercury | No contamination found above residential levels. No action in ROD. | No | No | No |
| **March Base Hospital/ Dental Clinic** | Former Hospital and Dental Clinic | Transferred | Mercury | No action in ROD | No | No | No |

**Table ES-3. Sites at March ARB/former March AFB Not Included in This 5-Year Review**
**Page 12 of 12**

| **No OU** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site** | **Site Description** | **Lease/ Transfer Status** | **Contaminants** | **Actions/ Current Status** | **ICs** | **Residual Soil Contamination/ ICs for Industrial Land Use** | **Groundwater Contamination Above MCLs/ Groundwater ICs** |
| **Site 43**<br><br>**Petroleum Site** | Former Automotive Maintenance Area/Cal Trans Site | Transferred | Fuels and BTEX | Contaminated soil removed. Closure letter from Santa Ana Regional Water Quality Control Board under the UST program. | No | No | No |

AF - Air Force
AFRC - Air Force Reserve Command
AFRPA - Air Force Real Property Agency
BTEX - Benzene, Toluene, Ethylbenzene and Xylenes
ESD - Explanation of Significant Differences
FS - Feasibility Study
ICs - Institutional Controls
IRP - Installation Restoration Program
MCL - Maximum Contaminant Level
OU - Operable Unit
PAH - Polyaromatic Hydrocarbon
PCB - Polychlorinated Biphenyl
POL - Petroleum, Oil and Lubricants
PP - Proposed Plan
RI - Remedial Investigation
ROD - Record of Decision
UST - Underground Storage Tank

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site name: March Air Force Base** | | |
| **EPA ID: CA4570024527** | | |
| **Region: 09** | **State: CA** | **City/County: Riverside/Riverside** |
| **SITE STATUS** | | |
| **NPL status: X** Final __ Deleted __ Other (specify) | | |
| **Remediation status** (choose all that apply): __ Under Construction **X** Operating __Complete | | |
| **Multiple OUs?*** **X** YES G NO | **Construction completion date:** Not Applicable | |
| **Has site been put into reuse? X** YES __ NO | | |
| **REVIEW STATUS** | | |
| **Lead agency:** __ EPA __State __ Tribe **X** Other Federal Agency **U. S. Air Force** | | |
| **Author name: Eric Lehto** | | |
| **Author title: Remedial Project Manager** | **Author affiliation: U.S. Air Force** | |
| **Review period:** 1 /7 /08 to 6 /3 /09 | | |
| **Date(s) of site inspection:** 1 /7 /08 to 2/29/08; 6/3/09 | | |
| **Type of review:** **X** Post-SARA __ Pre-SARA __ NPL-Removal only __ Non-NPL Remedial Action Site __ NPL State/Tribe-lead __ Regional Discretion | | |
| **Review number:** __ 1 (first) **X** 2 (second) __ 3 (third) __ Other (specify) _____ | | |
| **Triggering action:** __ Actual RA Onsite Construction at OU #____ __ Actual RA Start at OU#____ __ Construction Completion **X** Previous Five-Year Review Report Other (specify) | | |
| **Triggering action date *(from WasteLAN)*:** 11 / 19 / 03 (EPA review letter on 9/30/03 5-Year Review) | | |
| **Due date *(five years after triggering action date)*:** 11 / 19/ 08 | | |

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

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# TABLE OF CONTENTS

## TABLES

## FIGURES



## APPENDICES

**LIST OF ACRONYMS**

| | |
|---|---|
| AAL | Applied Action Levels |
| AFB | Air Force Base |
| AFRPA | Air Force Real Property Agency |
| AFRC | Air Force Reserve Command |
| ANG | Air National Guard |
| ARB | Air Reserve Base |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| | |
| bgs | below ground surface |
| BPW | Base Production Well |
| BRAC | Base Realignment and Closure |
| BTEX | benzene, toluene, ethylbenzene, xylene |
| | |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CCR | California Code of Regulations |
| CFR | Code of Federal Regulations |
| COC | Contaminant of Concern |
| CPT | Cone Penetrometer Test |
| | |
| DCA | Dichloroethane |
| DCE | Dichloroethene |
| DPEW | dual phase extraction well |
| DTSC | Department of Toxic Substances Control |
| | |
| EGETS | expanded groundwater extraction and treatment system |
| EPA | Environmental Protection Agency |
| ESD | Explanation of Significant Difference |
| | |
| FFA | Federal Facilities Agreement |
| FOSL | Finding of Suitability to Lease |
| FOSET | Finding of Suitability for Early Transfer |
| | |
| GAC | granular activated carbon |
| GETS | groundwater extraction and treatment system |
| gpm | gallons per minute |
| | |
| HASP | Health and Safety Plan |
| HEAST | Health Effects Assessment Summary Tables |
| HI | Hazard Index |
| Hg | mercury |

| | |
|---|---|
| I-215 | Interstate 215 |
| IC | institutional control |
| IRIS | Integrated Risk Information System |
| IRP | Installation Restoration Program |
| JPA | Joint Powers Authority |
| JP-4 | jet propulsion fuel (#4) |
| LOX | liquid oxygen |
| LFG | landfill gas |
| MCL | Maximum Contaminant Level |
| µg/L | microgram per liter |
| mg/kg | milligrams/kilogram |
| MSL | mean sea level |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| O&M | operations and maintenance |
| OU | Operable Unit |
| PAH | polyaromatic hydrocarbon |
| PCB | polychlorinated biphenyl |
| PCE | perchloroethylene (tetrachloroethylene; terachloroethene) |
| POC | point of compliance |
| PRG | preliminary remediation goal |
| RAB | Restoration Advisory Board |
| RfC | reference concentration |
| RfD | reference dose |
| RI/FS | Remedial Investigation/Feasibility Study |
| RPM | Remedial Project Manager |
| ROD | Record of Decision |
| SVE | soil vapor extraction |
| SVOC | semi-volatile organic compound |
| TCE | Trichloroethylene (trichloroethene) |
| TEF | Toxicity Equivalency Factors |
| TPH | total petroleum hydrocarbon |

| | |
|---|---|
| USACE | U.S. Army Corps of Engineers |
| UST | underground storage tank |
| VOC | volatile organic compound |

## 1.0 INTRODUCTION

The purpose of 5-year reviews is to determine whether the remedy implemented at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in 5-year review reports. In addition, 5-year review reports identify issues found during the review, if any, and identify recommendations to address them.

This review is required by statute. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 as amended, states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The March ARB Federal Facilities Agreement (FFA) defines site as follows:

> "Site" shall include the Federal Facility of March Air Force Base as defined above, the facility as defined above, any area off the facility to or under which a release of hazardous substances has migrated, or threatens to migrate, from a source on or at March AFB.

The FFA also states in paragraph 5.2:

> March AFB is a facility under the jurisdiction, custody, or control of the Department of Defense within the meaning of Executive Order 12580, 52 Federal Register 2923, 29 January 1987. The Department of the Air Force is authorized to act in behalf of the Secretary of Defense for all functions delegated by the President through E.O. 12580 which are relevant to this Agreement.

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the second 5-year review for March AFB/ARB. The triggering action for this review is the September 2003 5-year review. The 5-year review is required because

hazardous substances, pollutants, or contaminants remain at a site above levels that allow for unlimited use and unrestricted exposure. Sites in a completed Record of Decision (ROD) are with listed in the table below along with the criteria for inclusion/exclusion in this 5-year review.

**Table 1.0. Sites in Completed RODs**

| ROD | Site Number | Included? | Rational for Inclusion/Exclusion |
|---|---|---|---|
| 1 | 4 | Yes | Landfill cap and groundwater extraction and treatment. |
| 1 | 5 | Yes | No further action in ROD, but solid waste remains on site. |
| 1 | 7 | Yes | Restricted from residential use, more contamination found in 2007. |
| 1 | 9 | No | No contamination above unrestricted levels. |
| 1 | 10 | No | No contamination above unrestricted levels. |
| 1 | 13 | No | No contamination above unrestricted levels. |
| 1 | 14 | No | No contamination above unrestricted levels. |
| 1 | 15 | No | No contamination above unrestricted levels. |
| 1 | 16 | No | No contamination above unrestricted levels. |
| 1 | 18 | Yes | Fuel contamination on site, planned to be removed from OU1 with oversight provided by Santa Ana Regional Water Quality Control Board. |
| 1 | 29 | Yes | Restricted from residential use. |
| 1 | 31 | Yes | Groundwater extraction and treatment in progress. PAH contamination in surface soils. |
| 1 | 34 | Yes | PAH contamination in surface soils. |
| 1 | 38 | No | No contamination above unrestricted levels. |
| 1 | OU1 Groundwater Plume | Yes | Contamination above unrestricted levels. |
| AFRPA OU2 | 3 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 6 | Yes | Waste containment cell in place. |
| AFRPA OU2 | 12 | Yes | Use groundwater restrictions during 5-year review period. Groundwater now meets standards. |
| AFRPA OU2 | 17 | Yes | Use restrictions. |
| AFRPA OU2 | 19 | Yes | Use restrictions. |
| AFRPA OU2 | 20 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 22 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 23 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 24 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 25 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 26 | No | No contamination above unrestricted levels. |

| Table 1.0. Sites in Completed RODs - continued | | | |
|---|---|---|---|
| **ROD** | **Site Number** | **Included?** | **Rational for Inclusion/Exclusion** |
| AFRPA OU2 | 30 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 35 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 40 | No | No contamination above unrestricted levels. |
| AFRPA OU2 | 42 | Yes | Included per request of DTSC. No further action in ROD, but contamination remains inside of facility. |
| AFRC OU2 Sites 1, 11, 37 & 39 | 1 | Yes | Restricted from residential use. |
| AFRC OU2 Sites 1, 11, 37 & 39 | 11 | Yes | Restricted from residential use. |
| AFRC OU2 Sites 1, 11, 37 & 39 | 37 | No | No contamination above unrestricted levels. |
| AFRC OU2 Sites 1, 11, 37 & 39 | 39 | No | No contamination above unrestricted levels. |
| OU4 | 21 | No | No contamination above unrestricted levels. |
| OU4 | 41 | No | No contamination above unrestricted levels. |
| OU4 | 44 | No | No contamination above unrestricted levels. |
| OU4 | L | Yes | Restricted from residential use. |
| OU4 | Water Tank, Bldg 6601 | No | No contamination above unrestricted levels. |
| OU4 | Water Tank, Bldg 3410 | No | No contamination above unrestricted levels. |
| OU4 | March Base Hospital/Dental Clinic | No | No contamination above unrestricted levels. |

A summary of the status of all the remediation sites by site number is in Table ES-1. Table ES-2 provides more information about the sites included in this 5-year review. Sites in Table ES-2 are grouped by Operable Unit. Table ES-3 provides more information about the sites not included in this 5-year review. Sites in Table ES-3 are also grouped by Operable Unit.

This review was led by Eric Lehto, the Remedial Project Manager for March ARB with assistance by Rick Solander, the Remedial Project Manager/BRAC Environmental Coordinator for the former March AFB starting in November 2007. Mr. Solander has been replaced by Jerry Bingham when this review was finalized. Members of the March ARB/former March AFB Base Cleanup Team also contributed to this report. This report documents the results of the review.

The Air Force is the lead agency at March AFB/ARB. There is a Federal Facilities Agreement (FFA) between the Air Force, U.S. EPA and State of California (Admin Record 53). Section 27 of the FFA calls for a 5-Year review to be performed and reviewed by the FFA parties.

March AFB was realigned in 1996. The portion of March retained by the Air Force was re-designated as March ARB. Due to realignment, substantial areas of March (particularly at West March) have been transferred to civilian and other agencies, decreasing the 1993 area of the March AFB by about two thirds. The transferred area is referred to as the Former March AFB. The remediation of sites on March ARB is the responsibility of the Air Force Reserve Command (AFRC). The remediation of sites on the Former March AFB is the responsibility of Air Force Real Property Agency (AFRPA).

The technical assessments performed during this 5-year review examined the following questions:

- Question A – Is the remedy functioning as intended by the decision document?
- Question B – Are the assumptions used at the time of the remedy still valid?
- Question C – Has any other information come to light that could call into question the protectiveness of the remedy?

To answer these questions, the 5-year review included:

- Review of applicable site documents such as RODs, remedial action design documents, and site operations and maintenance (O&M) records and reports
- Review of newly promulgated standards and applicable or relevant and appropriate requirements (ARARs)
- Interviews with site managers
- Performing site inspections

Upon completion of the document reviews, interviews, and site inspections, conclusions of the 5-year review were developed. These conclusions include identification of remedy deficiencies, recommendations and follow-up actions, and a determination of whether the remedy is or is not expected to be protective of human health and the environment.

The Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) identification number is CA4570024527.

The remainder of this 5-year review is arranged as follows.

The preceding Executive Summary shows the result of this 5-year review.

Section 2 has tables with a timeline for major events in the March cleanup program.

Section 3 has background and general information about the cleanup program.

Section 4 discusses the individual sites included in this 5-year review.

Section 5 lists the documents reviewed.

## 2.0 SITE CHRONOLOGY

Table 2.0 list the major events in the March AFB/March ARB cleanup program, while Tables 2.1-1, 2.1-2, 2.1-3 and 2.1-4 list the chronology of events for Operable Unit (OU) 1, OU2, OU3, and OU4 respectively.

**Table 2.0. March AFB/March ARB Major Events**

| Date | Event |
|---|---|
| 1918 | Alessandro Aviation Field opened. Would eventually become March AFB. |
| March 1983 | March AFB IRP process began |
| November 1989 | March AFB listed on the National Priorities List (NPL) |
| September 1990 | Federal Facilities Agreement (FFA) signed |
| July 1994 | Final OU1 Remedial Investigation/Feasibility Study (RI/FS) published |
| September 1994 | OU3 FS report issued. It was later determined that the single site in OU3, Site 33, was a petroleum site and, as such, was outside of CERCLA. The Site 33 cleanup is being overseen by the Santa Ana Regional Water Quality Control Board under the Porter-Cologne Water Quality Control Act. |
| April 1996 | March AFB realigns. Approximately one third of March AFB was retained by the Air Force as March ARB. Process begins to transfer other two thirds of March AFB out of Air Force control. |
| June 1996 | OU1 Record of Decision (ROD) signed |
| July 1997 | OU2 RI/FS published |
| 2000 | Because of delays in completing the OU2 ROD and the need to have a completed ROD for the sites that are not be retained by the Air Force (these are the Air Force Real Property Agency (AFRPA) sites), the process to create separate OU2 ROD documents was started. |
| September 2000 | Explanation of Significant Differences (ESD) Site 10 and 15 |
| September 2003 | First 5-Year Review completed |
| December 2003 | Former OU3 Remedial Action Plan approved |
| May 2004 | ROD for AFRPA OU2 sites signed |
| July 2004 | OU4 Focused RI issued |
| September 2005 | ROD for AFRC OU2 Sites 1, 11, 37 and 39 signed |
| September 2005 | OU4 ROD signed |
| 2008 | Land transfer complete |
| 2009 | Final Supplemental Remedial Investigation/Focused Feasibility Study for the remaining OU2 sites, Site 8 and Site 36 (AFRC sites) |

| Table 2.1-1. Operable Unit 1 Chronology of Site Events | | |
|---|---|---|
| **Date** | **Event** | **Admin Record Number or other Record** |
| March 1983 | March AFB IRP process began (Phase I Record Search) | 2 |
| March 1985 | Phase II, Stage 1 began | 8, 9, 10 |
| June 1987 | Phase II, Stage 2 investigations began | 15, 16, 17, 18, 19 |
| July thru December 1988 | Phase II, Stage 3 performed | 29, 30 |
| December 1988 | Phase II, Stage 4 began | 87, 88 |
| November 1989 | March AFB listed on the National Priorities List (NPL) | 54 Federal Register, November 21, 1989, at page 48187 |
| September 1990 | Federal Facilities Agreement (FFA) signed by the Air Force, U. S. EPA, and State of California; Base divided into three separate OUs to facilitate environmental restoration planning and implementation, 39 sites listed | 53 |
| July 1994 | Final OU1 Remedial Investigation /Feasibility Study (RI/FS) published | 279 - 285 |
| 1994 | Landfill Cap placed on Site 4 | 364 |
| June 1996 | OU1 ROD signed | 544 |
| September 2000 | Explanation of Significant Differences (ESD) Site 10 and 15 | 1648 |
| September 2003 | First 5-Year Review completed | 2197 |
| November 2007 | Site 4 Rising Groundwater Evaluation | 2362 |
| 2007 - 2008 | Site 7 Investigation | Pending |

| Table 2.1-2. Operable Unit 2 Chronology of Site Events | | |
|---|---|---|
| **Date** | **Event** | **Admin Record Number or other Record** |
| March 1983 | March AFB IRP process began (Phase I Record Search) | 2 |
| March 1985 | Phase II, Stage 1 began | 8, 9, 10 |
| June 1987 | Phase II, Stage 2 investigations began | 15, 16, 17, 18, 19 |
| July thru December 1988 | Phase II, Stage 3 performed | 29, 30 |
| December 1988 | Phase II, Stage 4 began | 87, 88 |
| November 1989 | March AFB listed on the National Priorities List (NPL) | 54 Federal Register, November 21, 1989, at page 48187 |
| September 1990 | Federal Facilities Agreement (FFA) signed by the Air Force, U. S. EPA, and State of California; Base divided into three separate OUs to facilitate environmental restoration planning and implementation, 39 sites listed | 53 |
| April 1991 | Site 40, 41 and 43 added to IRP | 91 |
| 1994 | Site 4 Landfill Cap Construction | 364 |
| July 1994 | Site 17 Removal Action | 349 |
| 1994-1995 | Bio-venting System at Site 34 | 771 |
| December 1995 | Site 1 Removal Action | 552, 668, 581 |
| 1996 | Site 12 Removal Action | 739 |
| 1996 | Site 6 Waste Cell Construction | 789 |
| July 1997 | Final RI/FS report issued | 678 - 694 |
| May 2004 | ROD for AFRPA sites signed. This is the first ROD with OU2 sites. | 2226 |
| September 2005 | ROD for AFRC OU2 Sites 1, 11, 37 and 39 signed. This is the second ROD with OU2 sites. | 2289 |
| April 2008 | Site 12 Remedial Action Complete, Site Closed | Pending |
| 2009 | Final Supplemental Remedial Investigation/Focused Feasibility Study for the remaining OU2 sites, Site 8 and Site 36 (AFRC sites). When a ROD is completed for Site 8 and 36, all OU2 sites will be in a ROD. | Pending |

| Table 2.1-3. Operable Unit 3 Chronology of Site Events | | |
|---|---|---|
| **Date** | **Event** | **Admin Record Number or other Record** |
| March 1983 | March AFB IRP process began (Phase I Record Search) | 2 |
| March 1985 | Phase II, Stage 1 began | 8, 9, 10 |
| June 1987 | Phase II, Stage 2 investigations began | 15, 16, 17, 18, 19 |
| July thru December 1988 | Phase II, Stage 3 performed | 29, 30 |
| December 1988 | Phase II, Stage 4 began | 87, 88 |
| November 1989 | March AFB listed on the National Priorities List (NPL) | 54 Federal Register, November 21, 1989, at page 48187 |
| September 1990 | Federal Facilities Agreement (FFA) signed by the Air Force, U. S. EPA, and State of California; Base divided into three separate OUs to facilitate environmental restoration planning and implementation, 39 sites listed | 53 |
| August 1994 | RI report issued | 304 - 306 |
| September 1994 | FS report issued | 288 - 289 |
| May 1997 | Decision Document Removal Action Upgrade signed | 700 |
| October 2003 | Remedial Action Plan submitted | 2063 |
| December 2003 | Remedial Action Plan approved | 2062 |

| Table 2.1-4. Operable Unit 4 Chronology of Site Events | | |
|---|---|---|
| **Date** | **Event** | **Admin Record Number or other Record** |
| March 1983 | March AFB IRP process began (Phase I Record Search) | 2 |
| March 1985 | Phase II, Stage 1 began | 8, 9, 10 |
| June 1987 | Phase II, Stage 2 investigations began | 15, 16, 17, 18, 19 |
| July thru December 1988 | Phase II, Stage 3 performed | 29, 30 |
| December 1988 | Phase II, Stage 4 began | 87, 88 |
| November 1989 | March AFB listed on the National Priorities List (NPL) | 54 Federal Register, November 21, 1989, at page 48187 |
| September 1990 | Federal Facilities Agreement (FFA) signed by the Air Force, U. S. EPA, and State of California; Base divided into three separate OUs to facilitate environmental restoration planning and implementation, 39 sites listed | 53 |
| April 1991 | Site 40, 41 and 43 added to IRP | 91 |
| June 1996 | Site L Removal Action | 883 |
| June 2000 | Site L Mitigation | 1302 |
| July 2004 | OU4 Focused RI issued | 1995 |
| September 2005 | OU4 ROD signed | 2261 |

## 3.0 BASE AND OPERABLE UNIT BACKGROUND

This section provides an overview of the base and operable unit (OU) background and history.

## 3.1 LOCATION

March Air Force Base (AFB)/March Air Reserve Base (ARB) is located at the northern end of the Perris Valley, east of the city of Riverside, in Riverside County, California. March AFB (the Base) is approximately 60 miles east of Los Angeles and 90 miles north of San Diego (Figure 3-1). The Base lies in sections of Township 3 South, Range 4 West and covers portions of the Riverside East, Steele Peak, and Sunnymead, California quadrangle maps. The Base is bisected by Interstate 215 (I-215) in a northwest-southeast direction. The section to the east of the freeway is commonly referred to as the Main Base, and the section to the west is referred to as West March (Figure 3-2).

## 3.2 POPULATION

The total population in the vicinity of March AFB/ARB is over 500,000, including the cities of Moreno Valley, Riverside and Perris (Western Riverside Council of Governments, 2006).

## 3.3 LAND USE

The primary land use surrounding the Main Base is residential to the east, commercial and light industrial to the north and agricultural to the south. Agricultural land uses are being displaced by commercial/light industrial uses. The western boundary of the Main Base is parallel to I-215. The current land use of the Main Base is primarily classified as industrial and comprised of repair, maintenance, and operation of military aircraft activities.

Most of the area in West March is no longer being retained by the Air Force and is planned for industrial reuse. Significant new construction is currently ongoing. To the west of West March is civilian housing.

## 3.4 CLIMATE

The climate of the March AFB/ARB is characterized as Mediterranean to semi-arid, with warm to hot summers and mild winters. Precipitation in area averages about 14 inches of annual rainfall and primarily occurs from November through March.

## 3.5 GEOLOGY AND HYDROLOGY

March AFB/ARB is on the Perris Erosional Surface and the Paloma Surface. The depositional surface is underlain by sediments of various thicknesses that have filled the

Perris Groundwater Basin. There are bedrock outcroppings on West March and near Site 18.

The bedrock surface was defined by gravimetric survey and described as "complex bedrock scour surface morphology". The ground surface at the Main Base is relatively flat. Depth to bedrock ranges from 0 (at the bedrock outcroppings) to 900 feet below ground surface.

Subsurface investigations at the Main Base show that most of the underlying sediments consist of laterally discontinuous, interbedded fine to medium sands, silts, and lean clays with minor amounts of gravel. The uppermost units are not affected by elevation changes in the bedrock surface; deeper units are interrupted by bedrock highs.

On the Main Base, groundwater flow directions are generally to the southeast, except for a westerly flow in northern sections of the base. Groundwater has been rising at the rate of one to two feet per year since the early 1990s. The groundwater rise along with changes in well production in and around the base has caused changes in the groundwater flow directions over the years. Groundwater on the Main Base has been characterized as semi-confined.

Groundwater on West March is essentially unconfined. Groundwater on West March exists in a relatively thin layer of weathered bedrock and alluvial soils.

### 3.5.1 Groundwater Levels

Groundwater has been rising consistently on the Main Base. Figure 3-3 shows the groundwater contours from 1970. Note the groundwater in northeast corner of the base is between 1400 and 1450 feet above mean sea level in 1970. Figure 3-4 shows the groundwater contours in 1993. The groundwater in the northeast corner of the base is around 1480 feet above mean sea level in 1993. Figure 3-5 shows the groundwater contours in 2007. The groundwater in the northeast corner is now above 1500 feet above mean sea level.

Groundwater levels on West March are not rising.

## 3.6 SOIL

The Cieneba-Rockland-Fallbrook association and the Monserate-Arlington-Exeter association are the two major soil associations in the March AFB/ARB area. The Cieneba-Rockland-Fallbrook association is derived from granitic rock and occurs on the western portion of Base property. These soils are typically 1 to 3 feet thick, with a surface layer of sandy loam to fine sandy loam; they are well drained, coarse to medium grained, with slopes ranging from 2 to 50 percent. The Monserate-Arlington-Exeter association is derived from granitic alluvium and occurs on the eastern portion of the

Base. These well-drained soils have a surface layer of sandy loam, are fine to medium grained, and generally form gentle slopes.

## 3.7 SURFACE WATER AND WETLANDS

Permanent surface water impoundments do not exist on the Main Base. Small wetlands are associated with some of the West March sites, particularly Sites 6 and Site 40. Former quarries have filled with water and now support riparian habitats in these areas.

The U.S. Army Corps of Engineers (USACE) has performed a delineation of jurisdictional wetlands associated with the Cactus and Heacock flood control channels. These artificial channels act as ephemeral streams, support scattered wetland vegetation, and are considered waters of the United States. The USACE determined that approximately 2.17 acres of jurisdictional wetlands exist in the Heacock storm drain. The locations of these intermittent, localized patches of wetland vegetation change each year in accordance with the high volume, high velocity storm water flow through these channels during periods of rain.

## 3.8 WATER USE AND WELL INVENTORY

Water supply wells exist around March ARB. These wells have been used been primarily used for agricultural and domestic water supplies. See Section 4.15.3.4 for a discussion of water supply well sampling and Figure 4-15-1 for the location of water supply wells.

In previous years, March AFB owned wells that produced the base's water. All of these wells have been destroyed. Four of these wells (BPW-1 through BPW-4) were situated on the Main Base. The other two (BPW-5 and BPW-6) were southeast of the Main Base on the Gregory Radio Site. Production well use on the Main Base ceased in 1983 and the wells (BPW-1 through BPW-4) were destroyed in May 1997. Use of BPW-5 and BPW-6 was discontinued in 1988 and the wells were destroyed in 2000. Water for March ARB/former March AFB is now supplied by the Western Municipal Water District from Northern California through the State Water Project.

## 3.9 SITE ACTIVITIES

March AFB opened on March 1, 1918, as the Alessandro Aviation Field. The 640-acre facility was used during World War I as a training center for Curtiss JN1 "Jenny" aircraft pilots. After World War I, March AFB closed for about four years and reopened in 1927. By 1938, March AFB was considered the central location for bombing and gunnery training on the West Coast. During World War II, Camp Haan Army Base was constructed along the west side of I-215 (then Highway 395). Camp Haan extended from Alessandro Boulevard south along the Highway to Nandina Avenue and to Barton Street to the west approximately 3 to 4 miles. Camp Haan was used primarily as an anti-aircraft artillery camp and staging area for General Patton's tank force. At one time, as many as

80,000 personnel were reportedly stationed at Camp Haan. After World War II, a portion of Camp Haan became a part of March AFB. In 1949, the Strategic Air Command (SAC) assumed control of the Base. In June 1991, March AFB became an Air Mobility Command (AMC) installation, with primary missions of air refueling and cargo airlifts. From that time until realignment in 1996, the Base served as a main location for bombers as well as refueling and cargo aircraft. In addition, the AFRC and California Air National Guard (ANG) units are operating cargo and fighter missions at the Base at this time.

In 1993, the Base Closure and Realignment Commission designated March AFB for realignment, resulting in the transfer, by April 1996, of most active duty Air Force personnel and aircraft to Travis AFB, California. AFRC and California ANG units remained, and a portion of the Base was redesignated as March ARB. Due to realignment, substantial areas of the Base (particularly at West March) have been transferred to civilian and other agencies, decreasing the 1993 area of the March AFB by about two thirds. The transferred area is referred to as the former March AFB. Figure 3-2 shows the current base boundary, areas transferred, and areas retained by the Air Force. The figure also shows the locations of the OUs and sites on March AFB/ARB.

The Air Force at March AFB and elsewhere has long been engaged in a wide variety of operations involving the use, storage, and disposal of hazardous materials, including fuel and solvents. Past waste disposal practices, although in compliance with legal requirements in existence at that time, have resulted in contamination of soil and groundwater at several areas on the Main Base and on West March.

In 1980, the Department of Defense/Air Force developed the Installation (now Environmental) Restoration Program (ERP) to address soil and groundwater contamination at Air Force Bases nationwide. The ERP process at March AFB began in 1983 with a records search that included interviews with Base personnel and research of Base records and historic aerial photographs. The records search identified 30 potentially contaminated sites and recommended further investigation of most of those sites. Since then, numerous investigations have been conducted to delineate contaminants in the soil and groundwater.

In 1989, EPA placed March AFB on the National Priorities List (NPL), as a result of documented groundwater contamination by chlorinated solvents and other contaminants. In September 1990, the Air Force entered a Federal Facilities Agreement (FFA) with the EPA and the State of California to facilitate the assessment and cleanup process. The FFA establishes procedures for involving federal and state regulatory agencies as well as the public in the restoration process at March AFB. Four Operable Units (OUs) were designated to facilitate the restoration processes. The OU categorization was primarily based on geographical location and similarities in contaminant types and distribution.

Prior to the first five-year review in 2003, one ROD was signed. This was the OU1 ROD, signed in 1996.

The Agency for Toxic Substances and Disease Registry conducted a Public Health Assessment, starting in 1991. The Final Public Health Assessment (March 13, 2001) found no apparent public health hazard.

### 3.9.1 Significant Changes and Activities in the Last 5 Years

This section summarizes the significant changes since the last 5-year review.

Three more RODs were signed. The AFRPA OU2 ROD was signed in 2004. The OU4 ROD was signed in 2005. The ROD for Sites 1, 11, 37 and 39 was signed in 2005. A supplemental RI/Focused FS for Site 8 and 36 is expected to be finalized in early 2009. A ROD for Site 8 and 36 is planned.

Site closure was achieved for Site 12 (included in the AFRPA OU2 ROD), with no further action or monitoring required.

Groundwater sampling and groundwater level measurements were taken every quarter. Groundwater continues to rise on the Main Base at the rate of one to two feet per year. Groundwater at West March is not rising. West March is at a higher elevation than the Main Base. The rising groundwater affects Site 4, Site 5 and Site 7 on the Main Base. Most of the property on the Main Base has been retained by the Air Force. See the Site 4, 5 and Site 7 sections for more details. Site 4, 5 and 7 are all included in the OU1 ROD.

At Site 7, increases in trichloroethylene (TCE) levels in extraction wells have been observed. Additional soil borings and monitoring wells were installed in 2007, monitoring continues. An Explanation of Significant Differences is underway.

An OU1 ROD Amendment is in progress. Site 18 is a petroleum site and should be removed from OU1. Oversight of Site 18 is being provided by the Santa Ana Regional Water Quality Control Board. Additional investigation of the surface soil contamination at Site 31 supports a change in the remedy from excavation and low temperature thermal desorption to no further action. Similarly, additional investigation at Site 34 supports a change in the remedy from excavation and low temperature thermal desorption to restriction from residential use.

#### 3.9.1.1 Property Transfer and Institutional Controls

All property on the former March AFB that was designated for transfer has been transferred out of the Air Force control. No additional property transfer is planned. The property retained by the Air Force has been designated March ARB. Tables ES-2 and ES-3 show which sites have been transferred. The Air Force is still responsible for any contamination it caused on transferred property.

Institutional Controls on transferred property are contained in deed restrictions and State Land Use Covenants. The Institutional Control language for transferred property is described in RODs and Findings of Suitability for Early Transfer (FOSETs). Institutional Controls on retained property are contained in the March ARB General Plan. The Institutional Control language for retained property is contained in RODs.

The Institutional Controls are discussed for each site in Section 4. The Institutional Control language is included in Appendix D.

## 3.10 OPERABLE UNIT SITES

The Operable Unit (OU) concept to group similar sites in order to reduce overhead costs is used at March ARB/AFB.

### 3.10.1 OU1

OU1 is a groundwater and soil unit encompassing the sites along the eastern boundary and the OU1 groundwater plume. The OU1 sites are 4, 5, 7, 9, 10, 13, 14, 15, 16, 18, 29, 31, 34 and 38. The OU1 ROD was completed in 1996, and was the only completed ROD at the time of the 2003 5-year review. The 2003 5-year review assessed sites 4, 5, 7, 10, 15, 18, 29, 31, 34 and the OU1 groundwater plume. The other sites had no contamination left in place. The remediation at Sites 10 and 15 was completed after the OU1 ROD was signed and the 2003 5-year review recommended these sites not be included in further reviews.

The OU1 sites included in this review are sites 4, 5, 7, 18, 29, 31, 34 and the OU1 groundwater plume.

The OU1 site status is summarized in the following table.

**Table 3.10.1 OU1 Site Status**

| Site Group | Sites In this 5-Year Review | Sites Not In this 5-Year Review |
|---|---|---|
| All OU1 ROD Sites | 4, 5, 7, 18, 29, 31, 34, OU1 groundwater plume | 9, 10, 13, 14, 15, 16, 38 |
| • OU1 ROD Sites on March ARB (AFRC sites) | 5, 18, 29, 31, 34 OU1 groundwater plume | 9, 10, 13, 14, 15, 16 |
| • OU1 ROD Sites on the former March AFB (AFRPA Sites) | 4, 7 | 38 |

### 3.10.2 OU2

OU2 is a groundwater and soil unit for all sites not included in the other OUs. The OU2 sites are 1, 2, 3, 6, 8, 11, 12, 17, 19, 20, 22, 23, 24, 25, 26, 27, 28, 30, 32, 35, 36, 37, 39, 40, and 42. When March AFB realigned in 1996, the OU2 ROD had not been completed. Subsequently, a ROD for the OU2 sites property that was not retained by the Air Force was signed in 2004 (AFRPA OU2 ROD) and a ROD for most of the sites on property retained by the Air Force was signed in 2005 (ROD for Sites 1, 11, 37 and 39). A ROD has not been completed for two sites being retained by the Air Force (Site 8 and 36). Site 2 and 27 are petroleum sites and are being closed under a remedial action plan with the Santa Ana Regional Water Quality Control Board under the Porter-Cologne Water Quality Control Act. Site 28, Monitoring Wells, and Site 32, Construction Debris Area, were not continued forward to a ROD.

The OU2 sites included in this review are sites 1, 6, 11, 12, 17, 19, and 42. No contamination was left in place at sites 3, 20, 22, 23, 24, 25, 26, 28, 32, 35, 37, 39, and 40.

The OU2 site status is summarized in the following table.

**Table 3.10.2 OU2 Site Status**

| Site Group | Sites In this 5-Year Review | Sites Not In this 5-Year Review |
|---|---|---|
| AFRPA OU2 ROD (May 04) Sites | 6, 12, 17, 19, 42 | 3, 20, 22, 23, 24, 25, 26, 30, 35, 40 |
| AFRC OU2 ROD for Sites 1, 11, 37 and 39 (Sep 05) Sites | 1, 11 | 37, 39 |
| Future AFRC OU2 ROD Sites | | 8, 36 |
| Petroleum Sites originally included in OU2 | | 2, 27 |
| OU2 Sites not carried forward to a ROD | | 28, 32 |

### 3.10.3 OU3

OU3 has only one site, Site 33, the former Panero aircraft fueling system. Site 33 is a petroleum site and is being cleaned up under a remedial action plan with the Santa Ana Regional Water Quality Control Board under the Porter-Cologne Water Quality Control Act. There is no ROD for OU3 and none is planned.

### 3.10.4 OU4

OU4 consists of Site 21, 41, 44, L, Water Tower 3410, Water Tank 6601, Hospital and Dental Clinic. The OU4 ROD was signed in 2005.

The OU4 site included in this review is site L. The other sites have no contamination left in place.

## 3.11 RISK ASSESSMENT

### 3.11.1 OU1 Risk Assessment

The following description of the OU1 risk assessment was taken from the OU1 ROD.

In OU 1, a human health risk assessment was done. OU 1 is on a developed section of the Main Base, so an ecological risk assessment was not done.

**Human Health Risk Assessment**

Soil and groundwater data were used to select chemicals of potential concern in soil, groundwater, and air for sites or groundwater plumes. All organic analytes detected in one or more site samples were retained as chemicals of potential concern for that site. For naturally occurring inorganic chemicals in the soil, the selection process included statistical comparisons of site inorganic concentrations to OU1 background data. For inorganic chemicals in groundwater, total inorganic concentrations were statistically compared with background data for total inorganics. Chemicals of potential concern were evaluated in the human risk assessment, and the results of the risk assessment were used to determine the need for remediation.

Current and future human receptors were identified by selecting receptors who are or may be exposed to contaminated media (i.e., soil, groundwater, and air) at or migrating from OU1 sites. The human receptors identified were: current onsite base workers, current onbase/offsite adults, current offbase resident adults, current offbase school children, current offbase workers, future onsite resident children and adults, future onsite industrial workers, and future onsite construction workers.

The pathways identified for receptors exposed to chemicals were: dermal absorption of chemicals from the soil, incidental ingestion of chemicals in soil, ingestion of chemicals in drinking water, inhalation of volatilized organic compounds while showering, dermal absorption of chemicals in shower water, inhalation of contaminated fugitive dust, and inhalation of volatile organic compounds.

The toxicity value most often used to evaluate the non-carcinogenic effects of exposure to contaminants is the reference dose (RfD) for oral exposure and reference concentration (RfC) for inhalation. The first source for RfDs and RfCs was the U.S. EPA's Integrated

Risk Information System (IRIS) database. If the RFDs and RfCs had not been published in IRIS, the U.S. EPA's Health Effects Assessment Summary Tables (HEAST) values were used. If values were not available from IRIS or HEAST, State of California Applied Action Levels (AALs) were used. A similar process was used for toxicity slope factors.

The chemicals of concern for each site are discussed in Section 4 of this 5-year review.

**Ecological Risk Assessment**

OU 1 is on a developed section of the Main Base, so an ecological risk assessment was not done.

### 3.11.2 OU2 Risk Assessment

The following description of the OU2 risk assessment was taken from the OU2 RI/FS.

In OU 2, a human health risk assessment was done. Ecological risk was assessed for the West March sites. West March was mostly undeveloped with the Main Base being developed.

**Human Health Risk Assessment**

Soil and groundwater data were used to select chemicals of potential concern in soil, groundwater, and air for sites or groundwater plumes. Organic compounds that were detected at least once were selected as chemicals of potential concern. Metals were selected as chemicals of potential concern only if determined to be elevated above normal background concentrations.

An exposure assessment was conducted to estimate the type, timing, and magnitude of exposures that receptors may experience due to contact with chemicals of potential concerns. Exposures were evaluated for both current and future site conditions.

Toxicity values were obtained from several sources including a listing of carcinogenic Slope Factors developed by Cal/EPA, the U.S. EPA's IRIS database and the U.S.EPA's HEAST.

Chemicals of concern for each site are discussed in Section 4 of this 5-year review.

**Ecological Risk Assessment**

Given the number of species and the complexity of biological communities, each species present at a site was not individually assessed. Biological receptors of concern were identified to focus the ecological risk assessment on those receptors.

Chemicals of potential ecological concern are those known or suspected of causing harm to biological receptors of concern. Chemicals of potential ecological concern were selected based on accessibility to biota and concentration exceeding background.

Exposure pathways evaluated include:

Plant uptake from soil and groundwater,
Ingestion of surface water, soil and food,
Inhalation of air in burrows, and
Dermal contact with soil

Toxicity data was obtained from a review of available literature and toxicity databases.

### 3.11.3 OU3 Risk Assessment

OU3 is not included in this report. OU3 has only one site, Site 33, the former Panero aircraft fueling system. Site 33 is a petroleum site and is being cleaned up under a remedial action plan with the Santa Ana Regional Water Quality Control Board.

This section is included to account for OU3. With no completed ROD, OU3 is not subject to the 5-year review process.

### 3.11.4 OU4 Risk Assessment

The risk assessment is described in the OU4 Focused RI. A single OU4 site, Site L, is included in this 5-year review. Site L is in a developed area of the Main Base, so an ecological risk assessment was not done.

**Human Health Risk Assessment**

Available site information on waste quantities and sources, potential transport and exposure pathways, and potential receptors at March AFB/ARB were used to calculate risk. Estimating the health and environmental risks associated with exposure to chemicals involved the following steps:

- Selecting chemicals of potential concern
- Exposure assessment
- Toxicity assessment
- Risk characterization
- Uncertainty analysis
- Environmental risk assessment.

Preliminary risk evaluations were determined by comparing analytical results to U.S. EPA Region IX PRGs. If residual contamination was below the residential PRG for a particular contaminant, then a detailed risk assessment was not performed. For inorganic compounds, site values were compared to both residential PRGs and background values

that had been previously established in the OU1 and OU2 RI investigations. If inorganic contaminants exceeded background values and established PRGs, a detailed risk assessment was performed. If inorganic values exceeded residential PRGs but did not exceed background, the analyte was considered to be naturally occurring and was not evaluated further.

Chemicals of concern are discussed in Section 4 of this 5-year review.

**Ecological Risk Assessment**

A single OU4 site, Site L, is included in this 5-year review. Site L is in a developed area of the Main Base, so an ecological risk assessment was not done.

### 3.11.5 Vapor Intrusion

The vapor intrusion pathway was not evaluated for sites included in this 5-year review. However, the vapor intrusion study included in the Supplemental RI/Focused FS for Site 8 and 36 analyzed a higher potential risk than the sites included in this 5-year review.

Soil vapor samples were collected beneath the foundations of 11 buildings in the Site 8 area. The purpose of these samples was to assess the potential for VOCs in the subsurface to pose a risk to workers in these buildings through inhalation of indoor air. The results of the soil vapor samples were used with values for site-specific soil properties and the Johnson and Ettinger indoor air model to estimate potential indoor air risks. Based on the soil vapor samples, Building 453 had estimated an estimated risk from indoor air of $2 \times 10^{-5}$ for cancer risk. This is above the $1 \times 10^{-6}$ cancer risk typically used for risk based decision making. The other buildings had acceptable risk estimates.

Estimates from the soil vapor beneath the foundations may overestimate the risk, so indoor air samples were taken in Building 453. The risk analysis based on the indoor air showed acceptable risk from vapor intrusion.

The vapor intrusion analysis for Site 8 and 36 represents a worst case scenario. A separate vapor intrusion study is not needed for the sites included in this 5-year review.

### 3.11.6 Cleanup Standards

Surface soil cleanup standards are developed using U.S. EPA Preliminary Remediation Goals (PRGs). Groundwater cleanup standards are the Federal or State Maximum Contaminant Levels (MCLs). When the Federal and State MCLs for a contaminant are not the same, the more stringent of the two is used as a cleanup standard.

## 3.12 COMMUNITY INVOLVEMENT

A Restoration Advisory Board (RAB) has been established for the cleanup at March. The RAB is a citizens' advisory group for the environmental cleanup of the base.

The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings. A display ad is placed in the local newspaper (Riverside Press-Enterprise) for the RAB meetings and notice of the RAB meetings is sent out to the RAB mailing list. A review of the draft 5-year review was the featured presentation at the April 30th RAB meeting. No comments that would require changing the draft 5-year review were received. Minutes of the April 30th RAB meeting are included in Appendix B.

## 3.13 ARARS

An analysis of Applicable or Relevant and Appropriate Requirements (ARARs) was done in the OU1 ROD, AFRC OU2 ROD, and AFRC OU2 ROD for Sites 1, 11, 37 and 39 and the OU4 ROD. Additional analysis and back up information is contained in the OU1 RI/FS, OU2 and OU4 Focused RI.

The ARARS analysis included;

- Definition of ARARs. ARARs are further classified as chemical specific, location specific and action specific.
- Identification of ARARs. Federal and state requirements are reviewed to determine potential ARARs and actions to be considered that may apply to the site.
- Identification and screening of potential ARARs.

ARARs pertaining to landfills have been administratively changed from California Code of Regulations (CCR) Title 23 to Title 27. Actual requirements have not changed. Groundwater cleanup standards are the Federal and State Maximum Contaminant Levels (MCLs). These have not changed. No ARAR changes that affect soil cleanup were identified.

## 4.0 SITES

This section presents the procedures and results of the 5-year review.

## 4.1 SITE 1 – AIRCRAFT ISOLATION AREA/FUEL DRAINAGE AREA

Site 1 (SS001) is next to the northern taxiway connecting the primary runway to the aircraft parking apron (Figure 4-1). It is on March ARB and controlled by AFRC. Site 1 is an OU2 site and is included in the AFRC ROD for Sites 1, 11, 37 & 39, September 2005.

**Currently:** Restricted from residential use, in a secured area of March ARB. Use restriction recorded in the Base General Plan.

**Historic:** During the early 1960's fuel was reportedly removed from aircraft into portable tanks for transfer to other parts of the base. Reportedly, some of the fuel was drained directly to the ground. Chlorinated solvents such as trichloroethene (TCE) may have also been disposed of in this area.

Site sampling found no significant amounts of fuel or solvents, but levels of polyaromatic hydrocarbons (PAHs) were found in the surface soil at concentrations that exceed U.S. EPA Region IX Preliminary Remediation Goals (PRGs). PAHs are chemicals that are formed from the burning of organic compounds and are a major component of asphalt. In December 1995, a time-critical removal action was conducted where approximately 3,200 cubic yards of affected soil were removed from the site and placed in a Site 6 waste cell (Admin Record numbers 552, 668, 581, 678). Confirmation soil samples were collected from the surrounding undisturbed area. Post removal concentrations of PAHs were found to be within acceptable values for industrial land use (see EPA letter, Admin Record 614).

Following soil removal, a large portion of the site was graded for construction of the new California ANG alert facility. The facility has been completed and is in operation. No change to the current industrial land use is planned.

### 4.1.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 1.

#### 4.1.1.1 Remedy Selection

The remedial action identified in the ROD for Sites 1, 11, 37 and 39, September 2005, for Site 1 was Land Use Controls, restriction from residential use.

#### 4.1.1.2 Remedy Implementation

Land Use Controls that prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and limit the access to authorized personnel have been recorded in the Base Comprehensive Plan/Base General Plan (December 2005) with the reason for restrictions (elevated PAHs).

If Site 1 is transferred out of Air Force control, additional documentation and notifications are required.

The Land Use Control section of the Base General Plan is included in Appendix C. The Institutional Controls/Land Use Controls section from the ROD is reproduced in Appendix D.

#### 4.1.1.3 System Operations/Operations and Maintenance

There are no O&M activities required at the site since the approved action at Site 1 was Land Use Controls.

#### 4.1.1.4 Progress since the last 5-Year Review

This is the first 5-year review for this site.

### 4.1.2 Site 1 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force Remedial Project Manager (RPM) for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.1.3 Site 1 5-Year Review Findings

This section describes the findings of the 5-year review for Site 1.

#### 4.1.3.1 Interviews

No interviews were conducted for this site as part of the 5-year review. The 5-year review author was the person most knowledgeable about Site 1.

#### 4.1.3.2 Site Inspection

The site inspection was performed on February 11, 2008 by Eric Lehto. The site is contained within the March ARB alert complex, a secured area inside March ARB. Access to the alert complex is restricted by fencing with a guard at the gate. There is no residential land use on the site.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.1.3.3 Risk Information Review

**Human Health Risk**

The ROD for this site was signed in September 2005.

The current PRG tables, dated September 12, 2008, obtained from the EPA website, were reviewed and are consistent with the PRGs in the ROD. See table below.

**Table 4.1.3.3 Site 1 Risk Information Review for Soil**

| Chemical | ROD PRG Industrial, 2004 (mg/kg) | Current PRG, Industrial,12 Sep 08 (mg/kg) |
|---|---|---|
| Benz(a)anthracene | 2.1 | 2.1 |
| Benzo(a)pyrene | 0.21 | 0.21 |
| Benzo(b)fluoranthene | 2.1 | 2.1 |
| Benzo(k)fluoranthene | 21 | 21 |
| | 1.3 Cal modified PRG | Not Listed |

**Ecological Risk**

Site 1 is in a developed area of March ARB on the Main Base. The potential for ecological risk for Site 1 was evaluated in the OU2 RI/FS (Admin Record numbers 678-694). Because the Main Base area of March ARB (such as Site 1) was highly developed, consisting of landscaping, buildings or pavement, it was not evaluated for ecological risk. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

#### 4.1.3.4 Data Review

The Annual Inspection Reports for Sites 1 and 11, dated September 2007 and November 2008 were reviewed. No discrepancies were reported. The restriction against residential land use is recorded in the Base General Plan (updated in December 2005). The land use restriction section of the Base General Plan is included in Appendix C.

### 4.1.4 Site 1 Technical Assessment

The following conclusions support the determination that the actions performed at Site 1 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The site is restricted from residential land use, no residential uses are currently on the site and no future residential uses are planned. No HASP/Contingency Plans exist. The Base Digging Permit process requires that any excavating or digging on base have the approval of the Base environmental office before any work is conducted. Work coordination procedures are in AFI 32-1001, Operations Management. This ensures that the site is managed in a safe manner and that any work proposed in the area must be approved before work can be done.

***Implementation of Institutional Controls and Other Measures:*** The prohibition against residential land use has been identified in the Base General Plan and all earth work on base is subject to the digging permit system.

***Remedial Action Performance:*** The land use restriction remains in place. The site has no residential land use.

***System Operations/O&M:*** None required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the ROD for Sites 1, 11, 37 and 39 that would call into question the protectiveness of the remedy.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.1.5 Site 1 Issues

No major deficiencies were noted during the 5-year review.

### 4.1.6 Site 1 Assessment

The site is within a secured area inside March ARB. The site is restricted from residential land use due to PAH contamination in the surface soils. There are no residential type uses on the site.

### 4.1.7 Site 1 Recommendations and Follow-Up Actions

None.

### 4.1.8 Protectiveness Statement

The selected remedy is currently protective of human health and the environment.

### 4.1.9 Next Review

Five year reviews are required as long as contamination remains in place above unrestricted levels. The next review should be conducted within 5 years of the completion of this review.

## 4.2 SITE 4 – LANDFILL NO. 6

Site 4 (LF004) covers approximately 8.5 acres and is situated along the eastern boundary of the former base (Figure 4-2). It is on the former March AFB and the environmental cleanup is controlled by AFRPA. Site 4 is an OU1 site and is included in the OU1 ROD (1996).

**Currently:** Transferred to the City of Moreno Valley Community Services District. A landfill cap and groundwater extraction wells have been installed. The Air Force is responsible for maintenance of the landfill cap and operating the groundwater extraction wells and groundwater treatment system. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The groundwater extraction wells are in place and working properly. Groundwater monitoring indicates that rising groundwater levels on the Main Base are not degrading the remedy at Site 4.

**Historic:** A section of the Heacock storm drain runs southwardly adjacent to the site's eastern boundary. Heacock Street is approximately 250 feet from the eastern boundary of

the site. A residential housing area is situated across Heacock Street along the northern two thirds of the site. Grassy fields, formerly part of the base property, are to the west of the site.

The Site 4 landfill was in operation from 1955 to 1969. The RI/FS performed at Site 4 noted that the landfill is up to 25 feet deep and contains primarily sanitary waste, construction rubble and debris. Small amounts of medical wastes and empty petroleum product containers were also present. An estimated 150,000 cubic yards of waste were deposited at the landfill during its operation.

Soil samples from boreholes, test pits, and surface locations as well as soil gas and groundwater samples were collected from Site 4. Based on the results of the sampling, it was noted that beryllium and several PAHs were present in the surface soil (0-2 feet below ground surface (bgs)) at concentrations that exceed U.S. EPA Region IX PRGs. The analytical data also indicated that the presence of very low concentrations of chlorinated solvents in the subsurface soil and soil gas beneath the site.

Groundwater sampling also found several chemicals in greater than the Maximum Contaminant Level (MCL) for drinking water. Two of the chemicals, Bis(2-ethylhexyl)phthalate and methylene chloride, were determined to be a lab contaminant after the ROD was signed. The 1996 and 1997 Annual Groundwater Monitoring Reports (Admin Record 802 and 995) listed them as common laboratory contaminants. Bis(2-ethylhexyl)phthalate and methylene chloride are no longer a contaminants of concern. The remaining groundwater chemicals above the PRGs in the OU1 ROD are listed below.

**Table 4.2**

**Site 4 Groundwater Concentrations Exceeding MCLs in the OU1 ROD (1996)**

| Chemical | Maximum Concentration (µg/L) | MCL in OU1 ROD (µg/L) | Current MCL (µg/L) |
|---|---|---|---|
| PCE | 260 | 5 | 5 |
| TCE | 85 | 5 | 5 |
| Vinyl Chloride | 8 | 0.5* | 0.5* |
| cis-1,2-Dichloroethene | 21 | 6* | 6* |

* California MCL

### 4.2.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 4.

#### 4.2.1.1 Remedy Selection

The remedial actions selected in the OU1 ROD are summarized below. The OU1 ROD was signed in 1996. The remedial actions have been implemented as described in the following sections.

- Obtain closure of the landfill in accordance with California regulations (Title 23, Chapter 15, Article 8). This included installation of a cap over the landfill, protection of the cap from erosion, long-term maintenance of the cap, and groundwater monitoring.

- Secure the site by enclosing it in fencing that will limit access except for monitoring and maintenance activities.

- Implement groundwater extraction and treatment.

- Implement Institutional Controls through deed restrictions to prohibit the use of site groundwater, until groundwater standards have been achieved. Deed restrictions have been implemented with the transfer of land ownership.

The groundwater plume associated with Site 4 will be considered remediated when the groundwater meets the specified cleanup levels in Table 4.2.

In the OU1 ROD, the Site 4 groundwater remedy was grouped with the OU1 groundwater plume remedy (see section 4.15). The OU1 ROD identified the remedial action as an expansion of the groundwater extraction and treatment system at the base boundary in order to stop the migration of the on-base plume and to treat the contaminated water from the existing plume. The downgradient plume will be allowed to dissipate. Groundwater monitoring will done to ensure the onbase portion of plume does not migrate off base, to ensure the maximum concentration of off base contaminants continues to fall, and to ensure the offbase plume does not threaten off base water supplies.

#### 4.2.1.2 Remedy Implementation

**Groundwater**

At Site 4, there are three extraction wells, 4EX01, 4EX02 and 4MW01. Water from these wells is treated at Site 31. These wells are part of the Expanded Groundwater Extraction and Treatment System (EGETS), a series of groundwater wells that prevent contaminated groundwater from leaving the base (see Section 4.12 and Section 4.15). As part of the operation of this system, the wells are redeveloped to maintain groundwater pumping rates. The Site 4 wells are subject to bio-fouling and have to be redeveloped more often.

Monitoring of the groundwater around Site 4 is done under the basewide groundwater monitoring program. The Draft 2007-2008 Annual Monitoring Report (December 2008) recommends continued monitoring. The groundwater program takes quarterly groundwater level measurements on the Main Base. The groundwater surface is above the bottom in the waste in the northern and central sections of Site 4. See Section 4.2.3.4 for a further discussion of the impact of rising groundwater. Groundwater levels have been increasing on the Main Base, however, groundwater levels decreased by an average of 0.2 feet from the 2nd quarter of 2007 to the 2nd Quarter of 2008 at Site 4.

**Landfill/Soil**

The landfill cap was constructed in 1994. The cap was done in two parts. One part is the sloped area next to the Heacock storm drain. The other part is the relatively flat areas of the landfill. The cap next to the Heacock storm drain consists of (from bottom to top): a compacted subgrade layer, a one foot compacted foundation layer, an 18 inch clay barrier layer, a 6 inch sand filter layer, a 6 inch gravel bedding layer, a non-woven geotextile, and 2 to 4 feet of rip-rap. Concrete was placed over the rip-rap in some areas to prevent erosion. The cap over the rest of the landfill consists of (from bottom to top): a one foot undisturbed native cover layer, a 6 inch compacted native foundation layer, a 6 inch screened native foundation layer, a barrier layer, a 9 inch screened cover layer, and a 9 inch vegetative layer. The area was seeded in November 1994. Other features of the closure efforts included fencing, sub-drain installation, road construction and well installation.

Site 4 is contained in Finding of Suitability for Early Transfer (FOSET) for Parcels D-1, I-2, J-4, and K-5D South, February 2007 (Admin Record 2360). The property associated with Site 4 (Parcel I-2) was transferred via an early transfer approved by EPA with the Governor's concurrence, and deed restrictions are in place as well as a State Land Use Covenant in accordance with the FOSET. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside. The specific deed restrictions from the FOSET are in Appendix D. They include restricting Site 4 from residential use, protecting the landfill cover and prohibiting groundwater extraction for any purpose other than monitoring.

#### 4.2.1.3 System Operations/Operations and Maintenance

In 1994, a cap was installed on the Site 4 landfill.

System operations are conducted in accordance with the approved O&M plan (Admin Record 1029). System operations, as they are described in the O&M plan, are as follows:

- Security fencing is visually inspected on a quarterly basis or after major storm events. Repairs are performed as needed.

- Annual surveying of the landfill is performed by a licensed land surveyor in order to monitor settlement and determine if areas of the landfill top deck drain at the required slope.
- Five settlement monuments are inspected quarterly and after major storm events to ensure that they are intact and no areas have been disturbed. Repairs are performed as needed.
- The rip-rap protective layer is visually inspected quarterly and after major storm events to ensure that no erosion is taking place and that no areas have been disturbed. Repairs are performed as needed.
- The clean out risers, drainage ditches, and the overflow channel are visually inspected quarterly and after major storm events to ensure that they are in good working condition, free of any debris, and that no areas have been disturbed. Repairs are performed as needed.
- Visual inspections of the vegetative cover are performed quarterly to note areas of erosion, subsidence, or other damage. Areas of sparse or dead grass are to be remulched or reseeded.
- The membrane liner is to be inspected quarterly and after major storm events to ensure that no erosion is taking place and that no areas have been disturbed. Repairs are performed as needed.
- Surface runoff water is monitored in order to note any discharging of contaminants.
- Groundwater monitoring at point-of-compliance (POC) wells and a background monitoring well occurs on a semiannual basis. The POC wells are 4MW5, 4MW13, 4MW19, 4MW18 (if needed), 4MW20, and 4MW22. The background well is 6M4MW24.

Site specific O&M costs are not readily available. O&M actions at March ARB/former March AFB are not done separately for each site, but are grouped into different contracts with the goal of providing a comprehensive environmental solution for the entire March ARB/former March AFB complex. It is difficult to break out site specific costs. Costs are generally in line with estimates.

#### 4.2.1.4 Progress since the last 5-Year Review

Site 4 is contained in Finding of Suitability for Early Transfer (FOSET) for Parcels D-1, I-2, J-4, and K-5D South, February 2007 (Admin Record 2360). The property associated with Site 4 (Parcel I-2) was transferred to the City of Moreno Valley Community Services District via an early transfer approved by EPA with the Governor's concurrence, and deed restrictions are in place as well as a State Land Use Covenant in accordance with the FOSET. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside.

The basewide groundwater program has been monitoring contaminant concentrations and groundwater levels, see Section 4.2.3.4.

### 4.2.2 Site 4 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.2.3 Site 4 5-Year Review Findings

This section describes the findings of the 5-year review for Site 4.

#### 4.2.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator, was contacted as part of the 5-year review. He said Site 4 had been transferred to the National Park Service for eventual transfer to the Moreno Valley Parks Department. The Air Force performs O&M and will continue to do so for the life of the landfill. A State Land Use Covenant and deed restrictions are in place.

The interview was conducted via telephone and Mr. Solander reviewed the draft 5-year review to confirm its accuracy.

#### 4.2.3.2 Site Inspection

The site inspection started on January 31, 2008 by Eric Lehto. Extraction well 4EX02 was off; it was repaired and returned to service on February 4, 2008. The cover drainage outlet pipes were located during the follow up inspection on February 8, 2008. No other discrepancies were noted. No evidence of unauthorized digging was observed. Copper wire was damaged at the site in 2007 through vandalism. Additional security measures were implemented to reduce or eliminate future vandalism. There was no evidence of vandalism during the inspection.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.2.3.3 Risk Information Review

**Human Health Risk**

**Soil**

The ROD for this site was signed in June 1996. The current PRG tables, dated September 12, 2008, obtained from the EPA website, were reviewed. The PRGs have

changed (see table below), but do not affect the protectiveness of the remedy. Concerns about the protectiveness of the remedy are driven by the groundwater.

| Table 4.2.3.3 Site 4 Risk Information Review for Soil | | |
|---|---|---|
| Chemical | OU1 ROD (1996) PRG Residential (mg/kg) | Current PRG, Residential,12 Sep 08 (mg/kg) |
| Benz(a)anthracene | 0.61 | 0.15 |
| Benzo(a)pyrene | 0.061 | 0.015 |
| Benzo(b)fluoranthene | 0.61 | 0.15 |
| Benzo(g,h,i)perylene | 19 (note 1) | 3.9 (note 2) |
| Chrysene | 6.1 (note 3) | 15 |
| Dibenz(a,h)anthracene | 0.061 | 0.015 |
| Indeno(1,2,3-c,d)pyrene | 0.61 | 0.15 |
| Beryllium | 0.14 | 160 |

Note 1 – A PRG was not available for this non-carcinogenic PAH. The PRG for anathracene, which was the most conservative non-carcinogenic PRG at the time of the OU1 ROD, was used as a surrogate.
Note 2 - A PRG was not available for this non-carcinogenic PAH. The PRG for naphthalene, which is now the most conservative non-carcinogenic PRG, was used as a surrogate.
Note 3 – the California EPA PRG (December 1991) was used for this chemical because it was more restrictive than the EPA PRG.

Regulations dealing with landfill closure requirements have been administratively changed from CCR Title 23 to Title 27. Actual requirements have not changed.

**Groundwater**

The following standards were identified as ARARs in the OU1 ROD. They were reviewed for changes that could affect protectiveness:

- MCLs for Primary Drinking Water (Title 22, CCR, Division 4, Chapter 15, Article 5.5, Section 64444.5
- National Primary Drinking Water Regulations (40 CFR 141.61, MCLs for Organic Contaminants)
- NPDES Permit for Cleanup Project at March ARB

The most restrictive MCLs for the contaminants of concern have not changed since the OU1 ROD was signed. The NPDES Permit has been reissued since the OU1 ROD, discharge limits have not changed.

**Ecological Risk**

Site 4 is in a developed area of the former March AFB; ecological risk was not evaluated for the OU1 ROD. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

#### 4.2.3.4 Data Review

**Landfill**

Site 4 landfill monitoring is documented in annual monitoring reports. A review of the Annual Operations, Monitoring and Maintenance Report, January through December 2004, Operable Unit 1, IRP Site 4; Annual Operations, Monitoring, and Maintenance Report, January 2005 through December 2005, Operable Unit 1, IRP Site 4; and Annual Operations, Monitoring, and Maintenance Report, January 2006 through December 2006, Operable Unit 1, IRP Site 4 (Admin Record 2212, 2267 and 2268) showed that:

- Required inspections and maintenance has been performed.
- Landfill compliance monitoring under CFR, Title 40, Part 258 and CCR Title 27, Subchapter 3, Article was discontinued in 2003. Since there are groundwater extraction wells on the site, Site 4 is an active remediation site. The landfill compliance monitoring requirements are to determine if there is leakage from a landfill under passive conditions. TCE and PCE plumes are monitored and evaluated at Site 4 under the groundwater monitoring program. Analysis of the TCE and PCE plumes indicate that the landfill is not a continuing source of contamination, as discussed in the following section on groundwater. This indicates that monitoring for additional pollutants does not need to be re-instated. For reference, a listing of the priority pollutants found at Site 4 is included in Appendix G.
- Landfill gas perimeter monitoring was conducted. Methane levels were below the compliance limit of 5% in 2006 and 2004. A single reading from probe LFG-9 in March 2005 was 7.2%, above 5% compliance limit. In 2006, methane levels in LFG-9 were 3.4% in March, 0.7% in May, 0.2% in September and 0.0% in December.

**Groundwater**

Peak contaminant concentrations have decreased since the OU1 ROD with the exception of breakdown product cis-1,2-Dichloroethene.

See table on following page.

| Table 4.2.3.4 | | |
|---|---|---|
| **Site 4 Groundwater Concentrations in 2007-2008 Annual Monitoring Report vs. OU1 ROD (1996) Concentrations** | | |
| Chemical | 1996 or earlier Maximum Concentration from OU1 ROD (µg/L) | 2007-2008 Maximum Concentration from Draft 2007-2008 Annual Monitoring Report, AFRC and AFRPA Groundwater Monitoring Programs (µg/L) |
| PCE | 260 | 78 |
| TCE | 85 | 8.2 |
| Vinyl Chloride | 8 | 0.97 |
| cis-1,2-Dichloroethene | 21 | 45 (note 1) |

Note 1: Elevated concentrations of the breakdown product cis-1, 2 DCE are typically encountered in areas of historically high PCE and TCE concentrations due to biodegradation of these chlorinated hydrocarbons.

South of Site 4, monitoring well OU1MW4 has shown consistently high PCE levels ranging from 25 - 100 µg/L with no clear trend. Monitoring well OBMW02B, further downgradient from Site 4 and OU1MW4 has PCE levels ranging from 5 - 10 µg/L OBMW02B. Additional monitoring wells have been installed in 2008 to further evaluate contaminants downgradient of Site 4.

The effects of the rising groundwater were evaluated in the Final Operable Unit 1, IRP Site 4, Landfill No. 6, Rising Groundwater Evaluation Report, Former March Air Force Base, November 2007. The report evaluated the rising groundwater and corrective actions and costs of implementation to bring Site 4 into compliance with CCR Title 27, Chapter 3, Subchapter 2, Article 3(c), §20240, which states that landfill waste must be at least 5 feet above the surface of the groundwater.

The report stated that in the northern and central portion of the Site 4, groundwater is present in the bottom 8 to 10 feet of landfill materials. Over the past 15 years, groundwater levels have risen 20 to 25 feet at Site 4.

The report evaluated the following alternatives:

- Excavation and Off-Site Disposal of Landfill Waste
- Modification of the Heacock Storm Drain
- Horizontal Well/Gravity Drain
- Installation of Extraction Wells
- Excavation and On-Site Placement in New Engineered Waste Cells
- Excavation and Off-Site Placement at IRP Site 6 Landfill

The most cost effective and technically defensible alternative is to install additional extraction wells. The net present value cost range this option ranges from approximately $3 to 7 million, including 30 years of operation, monitoring and maintenance of the landfill and 30 years of operation of the Site 31 treatment plant.

Prior to implementing any of these alternatives, the Air Force is performing additional sampling to determine if the landfill is the source of contaminants in the groundwater.

Based on an analysis of the groundwater contaminants and the operation of the existing groundwater extraction wells, Site 4 does not seem to be continuing source of contamination. This indicates that groundwater is protected with the existing system and further efforts to achieve a 5 foot separation would not provide enough value to warrant the cost. Monitoring and analysis continues.

### 4.2.4 Site 4 Technical Assessment

The following conclusions support the determination that the actions performed at Site 4 are protective of human health and the environment based on current information. Additional sampling and analysis is being done.

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

***HASP/Contingency Plan:*** The Site Specific Health and Safety Plan is included in the Final Operations and Maintenance Work Plan for Site 4 (Admin Record 1029).

***Implementation of Institutional Controls and Other Measures:*** The institutional controls are identified in deed restrictions and a State Land Use Covenant, both on file with the County of Riverside. Inspections have indicated and verified no breaches in the institutional control restrictions.

***Remedial Action Performance:*** Analysis of the TCE and PCE plumes indicate that the landfill is not a continuing source of contamination. The ongoing evaluation into the rising groundwater will determine if the groundwater extraction system is provides the needed protection or needs to be optimized and expanded. The landfill cap and site fences prevent direct access to the wastes.

***System Operations/O&M:*** The current O&M procedures include routine cap maintenance, landfill gas monitoring, groundwater extraction and monitoring. As part of the closure/post closure requirements, the Air Force prepares quarterly and annual inspection reports for regulatory review and comments. Groundwater extraction and monitoring will continue until cleanup goals are achieved.

***Opportunities for Optimization:*** Opportunities for optimization will be considered in the ongoing evaluation.

***Early Indicators of Potential Remedy Failure:*** Groundwater levels are increasing and has risen into the Site 4 landfill materials through the unlined bottom of the landfill. Water is prevented from coming through the top by the landfill cap.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** The changes identified do not affect the protectiveness of the remedy.

***Changes in Exposure Pathway:*** The groundwater coming into contact with the wastes creates a potential exposure pathway.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU1 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** The remedy is potentially affected by the rising groundwater.

### 4.2.5 Site 4 Issues

Remedy is being re-evaluated due to rising groundwater levels.

### 4.2.6 Site 4 Assessment

The landfill cap and site fences prevent direct access to the wastes. Land use controls are contained in property transfer documents to help prevent future direct access to the wastes. The landfill gas monitoring demonstrates that Site 4 is meeting landfill gas standards. The effect of rising groundwater is being evaluated and potential changes to the remedy are being considered.

### 4.2.7 Site 4 Recommendations and Follow-Up Actions

The following recommendation was made:

- Continue to monitor the groundwater and contaminant levels to confirm that groundwater is protected.

| Table 4.2.7 Site 4 Recommendations and Follow-Up Actions | | | | | | |
|---|---|---|---|---|---|---|
| **Issue** | **Recommendations/ Follow-up Actions** | **Party Responsible** | **Oversight Agency** | **Milestone Date** | **Affects Protectiveness? (Y/N)** | |
| | | | | | **Current** | **Future** |
| Rising Groundwater Basewide | Continue to monitor and evaluate | AFRC/ AFRPA | State/EPA | Annually in Annual Monitoring Report | N | Possible |

### 4.2.8 Protectiveness Statement

The landfill cap is in place and well maintained. Groundwater around the site continues to be monitored and is not being used. The selected remedy is currently protective of human health and the environment. Continued evaluation of the impacts of rising groundwater is needed to verify the long term protectiveness.

### 4.2.9 Next Review

Site 4 should be included in the next 5-year review, five years from the completion of this review.

## 4.3 SITE 5 – LANDFILL NO. 3

Site 5 (LF005) is on March ARB and is controlled by AFRC. Site 5 covers approximately 5 acres and is situated along the southeast side of the flightline area (Figure 4-3). Site 5 is an OU1 site and is included in the OU1 ROD (1996).

**Currently:** Located on March ARB. Site 5 is identified as a former landfill in the March ARB General Plan. No Further Action in ROD.

**Historic:** The landfill was in operation from the late 1940s to approximately 1960. The OU1 RI/FS performed at Site 5 noted that the landfill consisted of construction rubble, newspaper, office waste, bottles and miscellaneous paper products. The construction rubble makes up a majority of the waste. The landfill pits range from 12 to 17 feet in depth. It is estimated that approximately 18,500 cubic yards of waste is present at Site 5 based on the OU1 RI/FS.

Soil samples from boreholes, test pits, and surface locations as well as soil gas and groundwater samples were collected from Site 5 during the OU1 RI/FS. Based on the analytical results, there were no significant levels of contaminants found in the soil or soil gas. Analysis of basewide groundwater contamination indicates that Site 5 is not a

source of groundwater contamination. Contaminants found in the groundwater at Site 5 are being dealt with under the OU1 Groundwater Plume (Section 4.15).

Risk assessments were conducted for Site 5 following U.S. EPA Region IX and California EPA guidance. The risk assessments produced estimates of the potential risk to public health that could result from ingesting the contaminants detected at Site 5. These risks were determined to be insignificant and the site was approved for no further action in the OU1 ROD.

Site 5 is part of March ARB and there are no plans to transfer the property from Air Force control. Site 5 is secured from the general public by the base fence. The Site 5 groundwater is not being used.

### 4.3.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 5.

#### 4.3.1.1 Remedy Selection

The remedial action identified in the OU1 ROD for Site 5 was no further action because Site 5 contained no significant levels of contamination in the soil or soil gas. The OU1 ROD was signed in 1996. Contaminants identified in the groundwater beneath Site 5 are addressed in the OU1 Groundwater Plume remedy.

#### 4.3.1.2 Remedy Implementation

The no further action remedy selected did not require any action to be taken on the site.

#### 4.3.1.3 System Operations/Operations and Maintenance

There are no O&M activities required at the site since the approved action at Site 5 was no further action.

#### 4.3.1.4 Progress since the last 5-Year Review

There have been no changes since the last 5-year review in 2003.

### 4.3.2 Site 5 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.3.3 Site 5 5-Year Review Findings

This section describes the findings of the 5-year review for Site 5.

#### 4.3.3.1 Interviews

No interviews were conducted for this site as part of the 5-year review. The 5-year review author was the person most knowledgeable about Site 5.

#### 4.3.3.2 Site Inspection

The site inspection was performed on January 14, 2008 by Eric Lehto. The firehouse construction noted in the previous 5-year review has been completed. Additional landscaping in the form of wood chips was added to the west of the site. Ground squirrel holes are common on the site. The soil brought to the surface from the ground squirrel holes contains waste materials (primarily broken bottle fragments and burnt wood). This was also noted in the previous 5-year review report. No evidence of unauthorized digging was observed.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.3.3.3 Risk Information Review

**Human Health Risk**

The ROD for this site was signed in June 1996. No risk to current or future populations was identified from the soil. Groundwater risk in the Site 5 area is included in the OU1 groundwater plume (see Section 4.15).

The current PRG tables, dated September 12, 2008, obtained from the EPA website, were reviewed. The PRG for beryllium, the single soil contaminant exceeding PRGs in the ROD, has changed (see table below). The change does not affect the protectiveness of the remedy.

**Table 4.3.3.3 Site 5 Risk Information Review for Soil**

| Chemical | OU1 ROD (1996) PRG Residential (mg/kg) | Current PRG, Residential,12 Sep 08 (mg/kg) |
|---|---|---|
| Beryllium | 0.14 | 160 |

Since the signing of the OU1 ROD state regulations dealing with landfills and landfill closure requirements have changed from CCR Title 23 to CCR Title 27. CCR Title 27,

Chapter 3, Subchapter 2, Article 3(c), §20240, States that landfill waste must be at least 5 feet above the surface of the groundwater.

Site 5 has been identified as a landfill in the Base General Plan (see Appendix C.). The Base Digging Permit process requires that any excavating or digging on base have the approval of the Base environmental office before any work is conducted. The Digging Permit process is used to prevent inadvertent exposure to landfill materials.

**Ecological Risk**

Site 5 is in a developed area of March ARB; ecological risk was not evaluated for the OU1 ROD. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

### 4.3.3.4 Data Review

A review of the OU1 ROD prepared in 1994 indicated that the site did not pose a threat to human health and the environment and was approved for no further action.

Groundwater levels are measured quarterly throughout the base. Groundwater levels have been rising at the rate of 1 to 2 feet per year. Groundwater levels are measured in the Site 5 area are approximately 30 feet below ground surface with landfill materials at depths of 12 to 17 feet below ground surface.

**Table 4.3.3.4**
**Site 5 Groundwater Elevations**

| Well Number, north to south along Site 5 | 2nd Quarter 2008 Groundwater Elevation (ft msl) | Top of Casing Elevation, typically 2-3 feet above ground (ft msl) | Depth of Water Below Top of Casing (ft) | Screened interval (ft below Top of Casing) |
|---|---|---|---|---|
| 9MW02 | 1468.41 | 1497.21 | 28.80 | 148.56-158.56 |
| 5MW28 | 1466.83 | 1495.58 | 28.75 | 124.20-134.20 |
| 5MW29 | 1464.64 | 1494.45 | 29.81 | 91.65-101.65 |
| 5MW30 | 1464.08 | 1494.43 | 30.35 | 149.56-159.56 |
| 5MW01 | 1464.33 | 1494.87 | 30.54 | 47.05-87.05 |

### 4.3.4 Site 5 Technical Assessment

The following conclusions support the determination that the actions performed at Site 5 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The Base Digging Permit process requires that any excavating or digging on base have the approval of the Base environmental office before any work is conducted. Work coordination procedures are in AFI 32-1001, Operations Management. This ensures that the site is managed in a safe manner and that any work proposed in the area must be approved before work can be done. No HASP/Contingency Plans exist.

***Implementation of Institutional Controls and Other Measures:*** The OU1 ROD listed Site 5 as a No Further Action site. No institutional or land use controls were identified as part of the remedy for Site 5. However, since landfill materials remain in place, Site 5 has been identified as a landfill in the Base General Plan and all earth work on base is subject to the digging permit system.

***Remedial Action Performance:*** The OU1 ROD required no further action at Site 5. Therefore, there are no remedial action performance criteria to evaluate. Groundwater in the area of Site 5 will continue to be monitored under the Basewide Groundwater Monitoring Program.

***System Operations/O&M:*** There are no O&M procedures at Site 5 since the site was approved for no further action in the OU1 ROD. The base ensures that no unauthorized excavation occurs at the site with the digging permit system. The site visit identified minor amounts of landfill materials in the form of burnt wood fragments, glass fragments, and metal debris are being brought to the surface by burrowing animals.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified. Groundwater levels, although rising, are still below landfill materials.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** The changes identified do not affect the protectiveness of the remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review. There were no current or future planned changes in land use and no new contaminants, sources or routes of exposure identified. Small amount of waste material continues to be brought to the surface as identified in the previous 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU1 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** Rising groundwater levels could bring groundwater to within 5 feet of waste materials in the future.

### 4.3.5 Site 5 Issues

No major deficiencies were noted during the 5-year review.

### 4.3.6 Site 5 Assessment

Site 5 is a No Further Action site in the OU1 ROD and remains Air Force property. Solid waste remains in place. Solid waste has not been added to the site since approximately 1960. Due to the age of the solid waste, methane or other landfill gas generation should not be concern unless conditions change, such as groundwater coming into contact with waste. Currently, groundwater is greater than 5 feet below the waste. The five monitoring wells on Site 5 run from the northern edge of the site to the southern edge and are adequate to determine groundwater depth, although higher screened intervals would be preferred. The site is recorded in the Base General Plan and unauthorized digging is prevented by the base digging permit process.

### 4.3.7 Site 5 Recommendations and Follow-Up Actions

The following recommendations are made:

- Continue to monitor the groundwater level to determine if the Title 27 requirement for 5 feet of separation between the groundwater and waste is maintained.
- If groundwater continues to rise, consider installing monitoring wells with higher screened intervals and consider landfill gas monitoring.
- Minor recommendation. Continue to monitor the site with site visits to determine the quantity and type of material being brought to the surface by ground squirrels.

| Table 4.3.7 Site 5 Recommendations and Follow-Up Actions | | | | | | |
|---|---|---|---|---|---|---|
| **Issue** | **Recommendations/ Follow-up Actions** | **Party Responsible** | **Oversight Agency** | **Milestone Date** | **Affects Protectiveness? (Y/N)** | |
| | | | | | **Current** | **Future** |
| Rising Groundwater Basewide | Continue to monitor and evaluate | AFRC/ AFRPA | State/EPA | Annually in Annual Monitoring Report | N | Possible |

### 4.3.8 Protectiveness Statement

The selected remedy is currently protective of human health and the environment. Long term protectiveness will be verified by continued monitoring of groundwater levels and monitoring of waste materials brought to the surface by ground squirrels.

### 4.3.9 Next Review

Site 5 should be included in the next 5-year review, five years from the completion of this review.

## 4.4 SITE 6 – LANDFILL NO. 4

Site 6 (LF006) is located on West March, north of Air Force Village West residential development, south of Van Buren Boulevard, east of Plummer Road, and west of Air Force Village West Drive (Figure 4-4). It is on the former March AFB and the environmental cleanup is controlled by AFRPA. The landfill consists of three discrete areas: Site 6a (approximately 15 acres) the location of the main former landfill area; Site 6b Quarry (approximately 0.6 acres) the location of a former quarry; and Site 6b Pond (approximately 2.6 acres) the location of a pond. Site 6 is an OU2 site and is included in the AFRPA OU2 ROD, May 2004.

**Currently:** Transferred to the March Joint Powers Authority. Two waste cells have been constructed. The Air Force is responsible for maintenance of the waste cells. Institutional controls are in place in the form of deed restrictions and a State Land Use Covenant.

**Historic:** Site 6 was used by March AFB form the early 1950s to the early 1980s for disposal of household waste and construction debris. Polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, herbicides, and dioxins were found in samples of soil and water collected during the OU2 RI.

The risk assessment in OU2 RI/FS found the no unacceptable risk to current off site receptors (there are no current on site receptors). But there was unacceptable risk to future onsite residents, future industrial workers and future on site construction workers.

To mitigate these risks and to protect groundwater, a waste cell was constructed on Site 6. A Site Specific Action Memorandum was prepared (Admin Record 358) and approved (Admin Record 1250, 1252, and 1256). Material was removed from Site 6a and placed in a temporary stockpile. The removed material was visually screened for suspected hazardous material. Hazardous material was separated for disposal offsite at a licensed facility.

Two waste cells (A and B) were constructed to contain the waste. Construction details differ between the two cells, but both cells were similar. Clean fill was brought in to raise the wastes at least five feet above groundwater. A sub-drain system was installed, and then a bottom geomembrane and clay layer with a leachate collection system. An eighteen inch layer of screened waste was placed next to protect the geomembrane and the leachate collection system. The screening removed particles larger than ¾ of an inch. Unscreened waste was placed on top of the screened layer.

To complete the waste cell, layer of screened waste was placed on top of the waste. Over the screened waste is a geomembrane, with gas relief vents, and a drainage layer. Finally, a two to five foot thick protective soil layer was placed on top of the waste cells.

19,300 cubic yards of material from Site 6b Pond and Site 6b Quarry were removed and placed in the waste cells.

Additional materials were placed in the waste cells as described in the Modification to the Site-Specific Removal Action Memorandum, Site 1, 9, 25 and 12 UST Locations and Consolidation to OU2 Site 6 (Admin Record 581). A total of 579,232 cubic yards of waste material was placed in the waste cells.

### 4.4.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 6.

#### 4.4.1.1 Remedy Selection

The AFRPA OU2 ROD (May 2004), states that at Site 6, non-hazardous waste from old landfills was consolidated in engineered waste cells. Institutional Controls was selected as the remedy to protect the waste cells. The use, access, and activity restrictions will protect persons from exposure to the wastes in the engineered cells.

#### 4.4.1.2 Remedy Implementation

The waste cells have been protected and maintained by land use restrictions incorporated in the deed as grantee covenants and by a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside. The specific deed restrictions from the AFRPA OU2 ROD are in Appendix D. They include restricting Site 6 from residential use, protecting the landfill cover and prohibiting groundwater extraction for any purpose other than monitoring.

The waste cells were constructed under a removal action prior to the selection of the remedy in the ROD.

#### 4.4.1.3 System Operations/Operations and Maintenance

O&M activities at Site 6 are based on the Final Closure/Post Closure Maintenance Plan, Site 6 (Admin Record 389); the Final Closure/Post Closure Maintenance Plan, Cell B Expansion, Site 6 (Admin Record 579); the LFG Sampling Report and Work Plan Addendum, Site 4 (covers both Site 4 and Site 6, Admin Report 1955); and the LFG Sampling Report, Site 6 (Admin Record 1957).

System operations are conducted in accordance with the approved O&M plan (Admin Record 1030). System operations, as they are described in the O&M plan, are as follows:

- Security fencing is visually inspected on a quarterly basis or after major storm events. Repairs are performed as needed.
- Annual surveying of the landfill is performed by a licensed land surveyor in order to monitor settlement and determine if areas of the landfill top deck drain at the required slope.
- Ten settlement monuments are inspected quarterly and after major storm events to ensure that they are intact and no areas have been disturbed. Repairs are performed as needed.
- The surface drainage ditches and channels are visually inspected quarterly and after major storm events to ensure they are in good working condition, free of any debris or silt and that no areas have been disturbed. Repairs are performed as needed.
- The clean out risers, drainage ditches, and the overflow channel are visually inspected quarterly and after major storm events to ensure that they are in good working condition, free of any debris, and that no areas have been disturbed. Repairs are performed as needed.
- Visual inspections of the vegetative cover are performed quarterly to ensure erosion is under control and that no areas have been disturbed.
- The final cover will be visually inspected quarterly and after major storm events. Corrective measures will be taken if the inspection reveals excessive erosion, surface irregularities, cracking, or other damage to the final cover.

- Leachate levels will be measured and recorded quarterly. A sample will be collected if the leachate is more than 18 inches in depth. Leachate is normally processed through the Site 31 treatment plant.
- The subdrain system will be visually inspected quarterly and after major storm events to ensure it is intact, in good condition and that no areas have been disturbed. Subdrains will be cleaned or repaired as needed. One grab sample will be collected semi-annually if sufficient water is present. Analytical results will be compared to the leachate samples.

- Groundwater monitoring at point-of-compliance (POC) wells and background monitoring wells to determine the presence of contaminants from the landfill leachate and to continue monitoring groundwater quality upgradient of the site. The POC wells are 6M6MW5, 6M6MW6, 6M6MW7 and 5M6MW2. The background wells are 6M6MW3 and 5M6MW5. The wells are sampled semi annually for VOCs. At the end of 5 years, additional analysis is done and the sampling program re-evaluated.

Groundwater monitoring is performed as part of the basewide groundwater monitoring program.

Site specific O&M costs are not readily available. O&M actions at March ARB/former March AFB are not done separately for each site, but are grouped into different contracts with the goal of providing a comprehensive environmental solution for the entire March ARB/former March AFB complex. It is difficult to break out site specific costs. Costs are generally in line with estimates.

#### 4.4.1.4 Progress since the Last 5-Year Review

This is the first 5-year review for this site. The property associated with Site 6 (Parcel I-3) was transferred to the March Joint Powers Authority, and deed restrictions are in place as well as a State Land Use Covenant in accordance with the AFRPA OU2 ROD. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside.

### 4.4.2 Site 6 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents, interviews with government officials and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.4.3 Site 6 5-Year Review Findings

This section describes the findings of the 5-year review for Site 6.

#### 4.4.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator was contacted as part of the 5-year review. He said Site 6 has been transferred to March Joint Powers Authority. The Air Force continues to perform O&M for the landfill on the site. A State Land Use Covenant and deed restrictions are in place. Mr. Solander has no knowledge of plans to reuse the site.

The interview was conducted via telephone and Mr. Solander reviewed the draft 5-year review to confirm its accuracy.

#### 4.4.3.2 Site Inspection

The site inspection was performed on February 11 and 12, 2008 by Eric Lehto. The site is secured within a fence with locked gates and warning signs. No evidence of unauthorized digging, vandalism or land use was found. Settlement markers, monitoring wells and landfill gas probes were easily located. Subdrain cleanouts and leachate recovery points were more difficult to locate because they are built similarly and not all were labeled.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.4.3.3 Risk Information Review

**Human Health Risk**

**Soil**

The AFRPA OU2 indentified soil contaminants above the acceptable risk range. The contaminated soil was placed in the waste cells, eliminating the exposure pathway.

**Groundwater**

The following standards were identified as ARARs in the AFRPA OU2 ROD. They were reviewed for changes that could affect protectiveness:

- California MCLs for Primary Drinking Water, Organic Chemicals (Title 22, CCR, Section 64444)
- National Primary Drinking Water Regulations (40 CFR 141.61, MCLs for Organic Contaminants)

A review of the Site 6 annual monitoring reports (see next section) shows that organic chemicals are well below MCLs and are Non-Detect for most organic chemicals. MCL changes do not necessarily change effectiveness.

**Ecological Risk**

A qualitative ecological risk assessment was performed after the waste cells were constructed. The ecological risk assessment concluded that, in general, the removal action had removed the primary contaminants of ecological concern (ARPRA OU2 ROD, Admin Record 2226). The site inspection performed on February 11 and 12, 2008 showed the landfill cap was in place. No new ecological receptors have been introduced to the site.

### 4.4.3.4 Data Review

Site 6 landfill monitoring is documented in annual monitoring reports. A review of the Annual Operations, Monitoring, and Maintenance Report, January through December 2004, Operable Unit 2, IRP Site 6; Annual Operations, Monitoring, and Maintenance Report, January through December 2005, Operable Unit 2, IRP Site 6; and Annual Operations, Monitoring, and Maintenance Report, January through December 2006, Operable Unit 2, IRP Site 6 (Admin Record 2216, 2312 and 2352) showed that:

- Required inspections and maintenance has been performed.
- No significant levels of VOCs were found in the in the monitoring wells. There was an anomalous detection of TCE at 20 µg/L in 6M6MW6 in November 2005. The well was re-sampled in February 2006 and TCE was not detected. TCE was also not detected in the August 2006.
- Landfill leachate continues to be collected and processed at the Site 31 treatment plant.
- Some of the original landfill gas perimeter probes were placed too close to the landfill and landfill gas perimeter monitoring system had to be modified. Methane levels from modified system are well below the compliance limit of 5%.

The Institutional Control Annual Inspection Report for Sites 6, 17, 19 and L was reviewed (Admin Record 2334). No discrepancies were noted.

### 4.4.4 Site 6 Technical Assessment

The following conclusions support the determination that the actions performed at Site 6 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The Site Specific Health and Safety Plan is included in the Final Operations and Maintenance Work Plan for Site 6 (Admin record 1030).

***Implementation of Institutional Controls and Other Measures:*** The institutional controls are identified in deed restrictions and a State Land Use Covenant, both on file

with the County of Riverside. Inspections have indicated and verified no breaches in the institutional control restrictions.

***Remedial Action Performance:*** The landfill cap and the site fences prevent direct access to the wastes. Unlike Site 4, the wastes at Site 6 were excavated and a bottom structure for the waste cells was completed. To prevent groundwater from entering the waste cells, the bottom of the waste cells was raised five feet above groundwater levels, a sub drain system installed and a liner placed in the bottom of the waste cell.

***System Operations/O&M:*** The current O&M procedures include routine cap maintenance, landfill gas monitoring, leachate collection and treatment and groundwater monitoring. As part of the closure/post closure requirements, the Air Force prepares quarterly and annual inspection reports for regulatory review and comments.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified. Unlike the landfills on the Main Base on March ARB (such as Site 4 and Site 5) rising groundwater is not a concern at Site 6, which located in West March on the former March AFB. West March is at a higher elevation than the Main Base. Bedrock outcropping are scattered throughout the Site 6 area. Groundwater level measurements taken at Site 6 monitoring wells show no trend of increasing groundwater levels.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** The changes identified do not affect the protectiveness of the remedy.

***Changes in Exposure Pathway:*** None

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the AFRPA OU2 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** None, groundwater is not rising at this site.

### 4.4.5 Site 6 Issues

None identified.

### 4.4.6 Site 6 Assessment

The wastes at Site 6 are contained within a waste cell. The waste cell is regularly inspected and maintained. Groundwater is monitored to ensure no contaminants are leaching into the groundwater.

### 4.4.7 Site 6 Recommendations and Follow-Up Actions

Continue with current waste cell inspection and maintenance.

### 4.4.8 Protectiveness Statement

The selected remedy is currently protective of human health and the environment. Institutional Control annual reports and monitoring will continue.

### 4.4.9 Next Review

Site 6 should be included in the next 5-year review, five years from the completion of this review.

## 4.5 SITE 7 – FIRE PROTECTION TRAINING AREA NO. 2

Between 1954 and 1978, fire-training exercises were conducted in unlined training pits at Site 7 (FT007) situated along the southeast perimeter of the former March AFB boundary, north of the former Alert Facility and southeast of the March ARB flightline apron (Figure 4-5). It is on the former March AFB and the environmental cleanup is controlled by AFRPA. Site 7 is an OU1 site and is included in the OU1 ROD (1996).

**Currently:** Transferred to the March Joint Powers Authority. Industrial reuse is projected. Institutional Controls to prevent residential use are in place in the form of deed restrictions and a State Land Use Covenant. The remedy is being further evaluated due to increased TCE levels. Additional soil borings and monitoring wells were installed in 2007, monitoring continues. No soil was removed. An Explanation of Significant Differences is underway. The presumptive remedy is soil vapor extraction.

**Historic:** An estimated 50,000 to 100,000 gallons of waste per year was burned between 1961 and 1978. Wastes used in training exercise reportedly included contaminated fuel, waste oils, and spent solvents. Three distinct burn pits were identified in historic aerial photographs of the Base. A portion of the site may also have been used for crash rescue training.

Initial OU1 RI/FS field investigations took place during the months of April through July and again in December 1992. During the OU1 RI, soil samples from boreholes and surface locations as well as groundwater samples were collected from Site 7. Sampling

results indicated that beryllium, lead, manganese and dioxins were present in the surface soils (0-2 feet bgs) above the December 1991 U.S. EPA Region IX PRGs, but below industrial PRGs. Industrial PRGs were used to determine the need for cleanup at Site 7 because a residential reuse was unlikely. Based on an industrial risk assessment, no clean up was required.

Site 7 is within the OU1 groundwater plume, no specific Site 7 groundwater cleanup was called for in the OU1 ROD. Site 7 groundwater is not being used.

As part of the OU1 groundwater remedy, a series of extraction wells were placed at the base boundary. At most of the extraction wells, contaminant concentrations have decreased or remained stable. TCE levels in two of these wells, EX05A and OU1GEW04, after initially decreasing, started increasing. TCE in EX05A had dropped to 16 µg/L in July 1999 and then rose to a high of 130 µg/L in November 2007. TCE in OU1GEW04 had dropped to 24 µg/L in July 1998 and then rose to a high of 160 µg/L in November 2007. Groundwater levels have risen at an average of 1.4 feet per year in the vicinity of Site 7 since 1992.

This led to an additional investigation at Site 7 to try to identify the source of the TCE. Soil borings and groundwater sampling found a "hot spot" of contamination at the site in 2007. The investigation and evaluation continues. Up to date information is presented at Remedial Project Manager meetings.

### 4.5.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 7.

#### 4.5.1.1 Remedy Selection

Site 7 is prohibited from residential use based on industrial use PRGs for soil. U.S. EPA Region IX industrial PRGs were used, rather than residential PRGs, for the following reasons;

- It is unlikely to be used for residential purposes in the future.
- Cleanup of Site 7 is considered cost prohibitive in light of the minor risk reduction that would be achieved.

The remedial action identified in the OU1 ROD was no further action based on industrial use. The OU1 ROD was signed in 1996.

#### 4.5.1.2 Remedy Implementation

Institutional controls in the form of deed restrictions and a State Land Use Covenant have been placed on the property as required by the FOSET to protect human health and the environment pending the outcome of the investigation and follow-on remedial action. The deed restrictions and State Land Use Covenant are recorded with the County of

Riverside. The specific deed restrictions from the FOSET are in Appendix D. They include restricting Site 7 from residential use and prohibiting groundwater extraction for any purpose other than monitoring.

#### 4.5.1.3 System Operations/Operations and Maintenance

System operation was not required for the remedy selected in the OU1 ROD for Site 7.

#### 4.5.1.4 Progress since the last 5-Year Review

Site 7 is contained in Finding of Suitability for Early Transfer (FOSET) for Parcels D-1, I-2, J-4, and K-5D South, February 2007 (Admin Record 2360). The property associated with Site 7 (Parcel D-1) was transferred to the March Joint Powers Authority via an early transfer approved by EPA with the Governor's concurrence, and deed restrictions are in place as well as a State Land Use Covenant in accordance with the FOSET. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside.

Increased TCE levels in groundwater extraction wells led to further investigation. Additional soil borings and monitoring wells were installed in 2007, monitoring. An Explanation of Significant Differences is being prepared. The presumptive remedy is soil vapor extraction.

### 4.5.2 Site 7 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents, interviews with government officials, and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.5.3 Site 7 5-Year Review Findings

This section describes the findings of the 5-year review for Site 7.

#### 4.5.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator, was contacted as part of the 5-year review. He said Site 7 has been transferred to March Joint Powers Authority under early transfer provisions. A State Land Use Covenant and deed restrictions are in place. Mr. Solander said the site is planned for industrial reuse.

The interview was conducted via telephone and Mr. Solander reviewed the draft 5-year review to confirm its accuracy.

#### 4.5.3.2 Site Inspection

The site inspection was performed on January 30, 2008 by Eric Lehto. Access to the site is through a locked gate. The tar like material noted on in the RI/FS is still present on the surface in some areas of the site. No evidence of unauthorized digging was observed.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.5.3.3 Risk Information Review

**Human Health Risk**

The ongoing investigation into increased TCE levels at Site 7 is obtaining new contaminant information.

The OU1 ROD and the 2003 5-year review identified six chemicals exceeding the U.S. EPA Region IX PRGs, beryllium, lead, manganese, 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin, heptachlorinated dibenzo-p-dioxins, total and hexachlorinated dibenzo-p-dioxins, total.

The OU1 ROD prohibited residential use as the remedy. The 2003 5-year review concurred that land use restrictions was an appropriate remedy.

The increases in TCE levels have the potential to change the site risk. Risk will be considered in the planned Explanation of Significant Differences. See Section 4.5.7.

**Ecological Risk**

Site 7 is in the Main Base area of the former March AFB; ecological risk was not evaluated for the OU1 ROD. No new ecological receptors have been introduced to the site.

#### 4.5.3.4 Data Review

The information from the current investigation has been presented at the Remedial Project Managers meetings, but has not yet been included in a formal report.

The elevated levels of TCE in extraction wells EX05A and OU1GEW04 raised a concern that there was an area of previously undiscovered contamination within Site 7. This led to a series of direct push borings. The borings found an area of contamination with a peak groundwater concentration of TCE at 7,600 µg/L in CPT 16 at 60 feet bgs. A monitoring well, OU1MW20, was installed at this location. Significant soil discoloration and odors were observed in drilling the well. Significantly less contamination was observed in initial water samples from this well, however, a small amount of free product

was also found in the well. There was not enough free product to sample. Three additional monitoring wells, OU1MW21, OU1MW22 and OU1MW23, were installed in late 2007. The new monitoring wells at the base boundary have demonstrated that the TCE from Site 7 is not migrating offbase.

The maximum level of TCE found that was found in a Site 7 monitoring well was 250 µg/L in OU1MW21 in December 2007.

### 4.5.4 Site 7 Technical Assessment

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

***HASP/Contingency Plan:*** Will need to be revised based on the results on the on-going investigation.

***Implementation of Institutional Controls and Other Measures:*** The prohibition against residential use and other land use controls as listed in section 4.5.1.2 have been placed in property transfer documents. Inspections have indicated and verified no breaches in the institutional control restrictions.

***Remedial Action Performance:*** The land use restrictions remain in place. The site has no residential land use. The remedial action may be revised based on the on-going investigation.

***System Operations/O&M:*** None currently required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** Increases in TCE in extraction wells EX05A and OU1GEW4 led to additional site investigation. Subsequent investigation as described in Section 4.5.3.4 found an additional source of contamination.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** The existing Site 7 remedy focused on restricting contact with contaminated soil. With increased TCE levels in groundwater, additional pathways should be considered.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** None.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.5.5 Site 7 Issues

As described in the previous sections, a contamination "hot spot" has recently been discovered and is still being evaluated.

### 4.5.6 Site 7 Assessment

The remedy will be re-evaluated based on the results of the ongoing investigation.

### 4.5.7 Site 7 Recommendations and Follow-Up Actions

The following recommendations are made:

- Continue to monitor the groundwater level.
- Prepare an ESD for a new remedy.

**Table 4.5.7 Site 7 Recommendations and Follow-Up Actions**

| Issue | Recommendations/ Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Rising Groundwater Basewide | Continue to monitor and evaluate | AFRC/ AFRPA | State/EPA | Annually in Annual Monitoring Report | N | Possible |
| Increasing TCE Levels | Explanation of Significant Differences | AFRPA | State/EPA | 2009 | N | Possible |

### 4.5.8 Site 7 Protectiveness Statement

Continued investigation and evaluation as needed to determine if a new remedy is needed at Site 7. The existing groundwater extraction and institutional controls are protective for the currently unused Site 7. With groundwater not currently being used, the remedy will be protective until a decision is made on whether a new remedy is needed.

### 4.5.9 Next Review

Five year reviews are required as long as contamination remains in place above unrestricted levels. The next review should be conducted within 5 years of the completion of this review.

## 4.6 SITE 11 – BULK FUELS STORAGE AREA

Site 11 (SS011) is the tank farm area of approximately 20 acres in the northeast corner of the Base near the main gate. It is on March ARB and controlled by AFRC. The site includes the entire fuel storage facility and smaller portions to the northwest and southeast (Figure 4-6). Site 11 is an OU2 site and is included in the AFRC ROD for Sites 1, 11, 37 & 39, September 2005.

The fuel storage facility is enclosed by a fence with a locked gate. The site has been used as a storage and distribution facility for jet fuel since the early 1950s. A 1949 aerial photograph indicates that portions of the site were previously occupied by a motor-pool parking and storage area.

**Currently:** Restricted from residential use, in a secured area of March ARB. Use restriction recorded in the Base General Plan.

**Historic:** The site was investigated due to concerns about releases from historic site (such as motor pool use in the 1940s) as well as the current site use (fuel farm). A 10,000-gallon surface spill of fuel occurred in 1976 as the result of a transfer-valve malfunction.

Site sampling found elevated levels of a PAH in the surface soil, no significant amount of fuel contamination (evaporation removes a fraction of fuel spilled on the surface) and no significant groundwater contamination was found. The maximum concentration of the PAH, benzo(a)pyrene was 0.15 mg/kg with the 2004 U.S. EPA Region IX residential PRG at 0.062 mg/kg and the industrial PRG at 0.21 mg/kg.

Concentrations of benzo(a)pyrene were found to be within acceptable risk values for industrial land. No change to the current industrial land use is planned.

### 4.6.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 11.

#### 4.6.1.1 Remedy Selection

The remedial action identified in the ROD for Sites 1, 11, 37 and 39 for Site 11, September 2005, was Land Use Controls, restriction from residential use.

#### 4.6.1.2 Remedy Implementation

Land Use Controls that prohibit the development and use of property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and limit the access to authorized personnel have been recorded in the /Base General Plan (December 2005) along with the reason for restrictions (elevated PAHs).

If Site 11 is transferred out of Air Force control, additional documentation and notifications are required.

The Land Use Control section from the Base General Plan is reproduced in Appendix C. The Institutional Controls/Land Use Controls section from the ROD is reproduced in Appendix D.

#### 4.6.1.3 System Operations/Operations and Maintenance

There are no O&M activities required at the site since the approved action at Site 11 was Land Use Controls.

#### 4.6.1.4 Progress Since the Last 5-Year Review

This is the first 5-year review for this site.

### 4.6.2 Site 11 Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.6.3 Site 11 5-Year Review Findings

This section describes the findings of the 5-year review for Site 11.

#### 4.6.3.1 Interviews

No interviews were conducted for this site as part of the 5-year review. The 5-year review author was the person most knowledgeable about Site 11.

#### 4.6.3.2 Site Inspection

The site inspection was performed on February 8, 2008 by Eric Lehto. The site is at the bulk fuel storage area. The fence around the fuel storage area is good repair. No evidence of unauthorized digging was observed. No residential land use at the site.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.6.3.3 Risk Information Review

**Human Health Risk**

The ROD for this site was signed in September 2005. The risk assessment indicated the residential carcinogenic risk is $2 \times 10^{-4}$, above the acceptable risk range. For industrial and construction workers, the risk is $6 \times 10^{-5}$, which is within the acceptable risk range. No significant groundwater contaminants have been detected at Site 11.

The current PRG tables, dated September 12, 2008, obtained from the EPA website, were reviewed are consistent with the PRGs in the ROD.

| Table 4.6.3.3 Site 11 Risk Information Review for Soil | | |
|---|---|---|
| Chemical | ROD PRG Industrial, 2004 (mg/kg) | Current PRG, Industrial,12 Sep 08 (mg/kg) |
| Benzo(a)pyrene | 0.21 | 0.21 |

**Ecological Risk**

Site 11 is in a developed area of March ARB on the Main Base. The potential for ecological risk for Site 11 was evaluated in the OU2 RI/FS (Admin Record numbers 678-694). Because the Main Base area of March ARB (such as Site 11) was highly developed, consisting of landscaping, buildings or pavement, it was not evaluated for ecological risk. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

#### 4.6.3.4 Data Review

The Annual Inspection Reports for Sites 1 and 11, dated September 2007 and November 2008 were reviewed. No discrepancies were reported. The restriction against residential land use is recorded in the Base General Plan (updated in December 2005). The land use restriction section of the Base General Plan is included in Appendix C.

### 4.6.4 Site 11 Technical Assessment

The following conclusions support the determination that the actions performed at Site 11 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The site is restricted from residential land use, no residential uses are currently on the site and no future residential uses are planned. No HASP/Contingency Plans exist. The Base Digging Permit process requires that any excavating or digging on base have the approval of the Base environmental office before any work is conducted. Work coordination procedures are in AFI 32-1001, Operations Management. This ensures that the site is managed in a safe manner and that any work proposed in the area must be approved before work can be done.

***Implementation of Institutional Controls and Other Measures:*** The prohibition against residential land use has been identified in the Base General Plan and all earth work on base is subject to the digging permit system.

***Remedial Action Performance:*** The land use restriction remains in place. The site has no residential land use.

***System Operations/O&M:*** None required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the ROD for Sites 1, 11, 37 and 39 was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.6.5 Site 11 Issues

No major deficiencies were noted during the 5-year review.

### 4.6.6 Site 11 Assessment

The site is within a secured area inside March ARB. The site is restricted from residential land use due to PAH contamination in the surface soils. There are no residential type uses on the site.

### 4.6.7 Site 11 Recommendations and Follow-Up Actions

None.

### 4.6.8 Protectiveness Statement

The selected remedy is protective of human health and the environment.

### 4.6.9 Next Review

Five year reviews are required as long as contamination remains in place above unrestricted levels. The next review should be conducted within 5 years of the completion of this review.

## 4.7 SITE 12 – CIVIL ENGINEERING YARD

Site 12 (SS012), the 20-acre former Base Civil Engineering Yard, is located north of MacDill Street, between Lackland Avenue and Travis Avenue (Figure 4-7). It is on the former March AFB and the environmental cleanup is controlled by AFRPA. Site 12 is an OU2 site and is included in the AFRPA OU2 ROD, May 2004.

From the 1950's to 1996, Site 12 was the Civil Engineering yard for general building and utility system maintenance for March AFB. It included a carpentry shop, electrical shop, paint shop, pesticide shop, and storage areas for heavy equipment. The shops used and stored a variety of hazardous materials including paints and paint related products, pesticides, solvents, acids, and hazardous wastes.

**Currently:** Remedial Action completed. No further action or monitoring required.

**Historic:** During the OU2 RI, PAHs and hexavalent chromium were found in soil samples. An interim removal action was performed in 1996 to remove the contaminated soil. A risk assessment done after the removal action found no unacceptable soil risk for

both residential and industrial use scenarios. No additional soil actions for the Site 12 were indicated in the AFRPA OU2 ROD.

Groundwater beneath Site 12 had TCE and PCE above MCLs. Institutional Controls were selected as the remedy for groundwater at Site 12.

### 4.7.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 12.

#### 4.7.1.1 Remedy Selection

The remedial action identified in the AFRPA OU2 ROD (May 2004) for Site 12 is a prohibition against groundwater extraction for any purpose other than monitoring.

#### 4.7.1.2 Remedy Implementation

The AFRPA OU2 ROD indicated land use restrictions will be incorporated in the deed as grantee covenants. The property was transferred to the U.S. Army. The land use restrictions were included in government agency to government agency property transfer documents. Subsequent to the transfer, the groundwater contamination has dropped to unrestricted levels, which eliminates the requirement for use restrictions. The specific deed restrictions from the AFRPA OU2 ROD are in Appendix D.

#### 4.7.1.3 System Operations/Operations and Maintenance

There are no active clean up systems at Site 12. Groundwater is sampled under the basewide groundwater monitoring program

#### 4.7.1.4 Progress since the last 5-Year Review

This is the first 5-year review for this site.

### 4.7.2 Site 12 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents, interviews with government officials, and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.7.3 Site 12 5-Year Review Findings

This section describes the findings of the 5-year review for Site 12.

#### 4.7.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator, was contacted as part of the 5-year review. He said Site 12 has been transferred to US Army. Environmental restrictions as listed in Appendix D were placed in the government agency to government agency property transfer document. No State Land Use Covenant is required because the site remains federal property.

The interview was conducted via telephone and Mr. Solander reviewed the draft 5-year review to confirm its accuracy.

#### 4.7.3.2 Site Inspection

The site inspection was performed on February 7, 2008 by Eric Lehto with Ivan Vargas, MWH. MWH performs the groundwater monitoring at the site. A US Army facility is being constructed on the site. Monitoring well 5M12MW05 was properly destroyed as part of the facility construction. Monitoring well 5M12MW02 was damaged, and then properly repaired.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.7.3.3 Risk Information Review

**Human Heath Risk**

The following standards were identified as ARARs in the AFRPA OU2 ROD. They were reviewed for changes that could affect protectiveness:

- California MCLs for Primary Drinking Water, Organic Chemicals (Title 22, CCR, Section 64444)
- National Primary Drinking Water Regulations (40 CFR 141.61, MCLs for Organic Contaminants)

The MCLs for the contaminants of concern (PCE and TCE) have not changed since the AFRPA OU2 ROD was signed.

**Ecological Risk**

Site 12 is in a developed area of March ARB on the Main Base. The potential for ecological risk for Site 12 was evaluated in the OU2 RI/FS (Admin Record numbers 678-694). Because the Main Base area of March ARB (such as Site 12) was highly developed, consisting of landscaping, buildings or pavement, it was not evaluated for

ecological risk. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

### 4.7.3.4 Data Review

PCE and TCE levels have decreased to below the MCLs since the AFRPA OU2 ROD was signed.

**Table 4.7.3.4**
**Site 12 Groundwater Contaminant Trends**

| | PCE/TCE May 2005 (µg/L) | PCE/TCE May 2006 (µg/L) | PCE/TCE June 2007 (µg/L) |
|---|---|---|---|
| 5M12MW01 | <1/0.77F | <1/0.53F | <1/0.28F |
| 5M12MW03 | <1/6.9 | <1/1.8 | <1/1.4 |
| 5M12MW05 | <1/<1 | <1/<1 | <1/<1 |

F : Reported between the Reporting Limit (RL) but greater than the Method Detection Limit (MDL)

Groundwater contamination is now below MCLs. A closure report, Site 12 Remedial Action Complete, April 2008 has been issued and approved.

### 4.7.4 Site 12 Technical Assessment

The following conclusions support the determination that the actions performed at Site 12 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** Groundwater monitoring is performed at the site. The HASP for Long-Term Monitoring, Long-Term Operation and Long-Term Operations and Maintenance is in place and properly implemented.

***Implementation of Institutional Controls and Other Measures:*** The groundwater restrictions are currently in place and included in property transfer documents. After the transfer, the groundwater contamination has dropped to unrestricted levels, which eliminates the need for use restrictions.

***Remedial Action Performance:*** The groundwater contamination has decreased to where no further groundwater restrictions are needed.

***System Operations/O&M:*** None required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the AFRPA OU2 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.7.5 Site 12 Issues

No major deficiencies were noted during the 5-year review.

### 4.7.6 Site 12 Assessment

Groundwater contamination has dropped below MCLs and the site has been closed.

### 4.7.7 Site 12 Recommendations and Follow-Up Actions

Minor recommendation. Remove restrictions from the government agency to government agency property transfer document.

### 4.7.8 Protectiveness Statement

The selected remedy is protective of human health and the environment.

### 4.7.9 Next Review

Site closed with no further action or monitoring required. No further 5-year reviews are needed.

## 4.8 SITE 17 – SWIMMING POOL FILL

Site 17 (WP017) is a former Base swimming pool located on the Main Base on U Street between DeKay and K Streets (Figure 4-8). It is on the former March AFB and the environmental cleanup is controlled by AFRPA. Site 17 is an OU2 site and is included in the AFRPA OU2 ROD, May 2004.

**Currently:** Transferred to the March Joint Powers Authority. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant.

**Historic:** The former swimming pool at Site 17 was closed in the 1970s. After it was closed, the pool was used as a disposal site and the wastes were covered with soil. The waste consisted of drums, paint containers and demolition debris. After discussions with the regulatory agencies and the public, a decision was made to clean the site by removing the waste. The pool and its contents were removed during a 1994 interim removal action. The wastes were taken off Base for disposal. The excavation was filled with clean soil.

The concrete pool bottom was removed as part of the removal action. Soil samples were taken from beneath the pool bottom. A PCB, Aroclor 1254 was found at levels ranging from 4.4 mg/kg to 0.8 mg/kg (the method detection limit was 1.1 mg/kg). This was above the residential PRG of 0.22 mg/kg.

Four additional soil samples from below the pool bottom were taken during the RI. One detection of Aroclor 1254 found at 0.021 mg/kg, and one detection of Aroclor 1260 was found at 0.012 mg/kg. The remaining samples were below the method detection limit of 0.012.

The selected remedy for Site 17 in the AFRPA OU2 ROD is a prohibition against residential land use and drilling or excavation of more than 7 feet below ground surface. The prohibitions are based on PCBs in the soil at least 8 feet below ground surface.

### 4.8.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 17.

#### 4.8.1.1 Remedy Selection

The remedial action identified in the AFRPA OU2 ROD (May 2004) for Site 17 is a prohibition against residential land use and drilling or excavation of more than 7 feet below ground surface. The prohibitions are based on PCBs in the soil at least 8 feet below ground surface.

#### 4.8.1.2 Remedy Implementation

Land use restrictions have been incorporated in the deed as grantee covenants and a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside. The specific deed restrictions from the AFRPA OU2 ROD are in Appendix D.

#### 4.8.1.3 System Operations/Operations and Maintenance

There is no active clean up system on Site 17. Annual site inspections are made in accordance with the State Land Use Covenants at the former March AFB.

#### 4.8.1.4 Progress since the last 5-Year Review

This is the first 5-year review for this site. Property transferred to the March Joint Powers Authority. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside.

### 4.8.2 Site 17 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents, interviews with government officials, and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.8.3 Site 17 5-Year Review Findings

This section describes the findings of the 5-year review for Site 17.

#### 4.8.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator, was contacted as part of the 5-year review. He said Site 17 has been transferred to March Joint Powers Authority under early transfer provisions. Deed restrictions and a State Land Use Covenant are in place. March Joint Powers Authority is now doing the annual inspections.

The interview was conducted via telephone and Mr. Solander reviewed the draft 5-year review to confirm its accuracy.

#### 4.8.3.2 Site Inspection

The site inspection was performed on January 30, 2008 by Eric Lehto. The site is within a housing area, bounded on two sides by the March ARB perimeter fence. Access to the

housing area is restricted to residents and other authorized entrants by an automatic gate. No evidence of unauthorized digging was observed.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

### 4.8.3.3 Risk Information Review

**Human Health Risk**

The ROD for this site was signed in May 2004. The current PRG tables, dated September 12, 2008, obtained from the EPA website, were reviewed. The residential soil PRG for high risk PCBs, e.g. Aroclor 1254, is unchanged at 0.22 mg/kg.

**Table 4.8.3.3 Site 17 Risk Information Review for Soil**

| Chemical | AFRPA OU2 ROD (2004) PRG Residential (mg/kg) | Current PRG, Residential,12 Sep 08 (mg/kg) |
|---|---|---|
| Aroclor 1254 | 0.22 | 0.22 |
| Aroclor 1260 | 0.22 | 0.22 |

**Ecological Risk**

Site 17 is in a developed area of March ARB on the Main Base. The potential for ecological risk for Site 17 was evaluated in the OU2 RI/FS (Admin Record numbers 678-694). Because the Main Base area of March ARB (such as Site 17) was highly developed, consisting of landscaping, buildings or pavement, it was not evaluated for ecological risk. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

### 4.8.3.4 Data Review

The Annual Inspection Report for Sites 6, 17, 19 and L was reviewed (Admin Record 2234). No discrepancies were noted.

### 4.8.4 Site 17 Technical Assessment

The following conclusions support the determination that the actions performed at Site 17 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The site is restricted from residential land use, no residential uses are on the site and no future residential uses are planned. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside. No HASP/Contingency Plans is required.

***Implementation of Institutional Controls and Other Measures:*** The prohibition against residential land use and digging has been identified in deed restrictions and a State Land Use Covenant, both on file with the County of Riverside. Inspections have indicated and verified no breaches in the institutional control restrictions.

***Remedial Action Performance:*** The land use restrictions remain in place. The site has no residential land use and no evidence of digging activities.

***System Operations/O&M:*** None required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the AFRPA OU2 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.8.5 Site 17 Issues

No major deficiencies were noted during the 5-year review.

### 4.8.6 Site 17 Assessment

There is no evidence of unauthorized land use or digging. Land use restrictions are recorded in property transfer documents. A State Land Use covenant is in place.

### 4.8.7 Site 17 Recommendations and Follow-Up Actions

Institutional Control annual reports and monitoring will continue.

### 4.8.8 Protectiveness Statement

The selected remedy is currently protective of human health and the environment.

### 4.8.9 Next Review

Five year reviews are required as long as contamination remains in place above unrestricted levels. The next review should be conducted within 5 years of the completion of this review.

## 4.9 SITE 18 – ENGINE TEST CELL

Site 18 (OT018) is situated between the primary runway to the west, the aircraft parking apron to the east, and taxiways to the north and south (Figure 4-9). It is on March ARB and controlled by AFRC. Site 18 is an OU1 site and is included in the OU1 ROD (1996).

**Currently:** Monitoring and skimming of groundwater is being done under a Remedial Action Plan between the Air Force and the Santa Ana Regional Water Quality Control Board. A ROD Amendment is in progress to remove Site 18 from OU1. Site 18 is in a secured area of March ARB.

**Historic:** A jet engine test cell historically operated within the area of Site 18. The test cell was constructed in 1957 and was inactive for an undetermined amount of time prior to its demolition in 2000. An oil water separator was installed in 1976, prior to that time, the test cell floor drain emptied into a dry well. The oil water separator has also been removed. Other suspected sources for fuel found on site were older fuel tanks predating the jet engine test cell and aircraft fuel tanks.

During the OU1 RI/FS, soil samples from boreholes and surface locations. The surface soil sampling detected beryllium at concentrations greater than the residential PRG. A risk assessment was performed and showed that beryllium did not require remediation. The primary subsurface soil contaminants were jet fuel and its components.

Groundwater was also sampled during the OU1 RI/FS. Free product (jet fuel) was found in several of the monitoring wells. In addition, groundwater sampling found several chemicals in greater than the Maximum Contaminant Level (MCL) for drinking water.

One of the chemicals, methylene chloride, was determined to be a lab contaminant after the ROD was signed. The 1996 and 1997 Annual Groundwater Monitoring Reports (Admin Record 802 and 995) listed it as a common laboratory. Methylene chloride is no longer a contaminant of concern.

Total phenols were also listed as a Site 18 groundwater contaminant in the OU1 ROD. 1998/1999 Annual Monitoring Report (Admin Record 2088) stated that the phenols were most likely associated with the biodegradation of naphthalene, a common semi-volatile compound found in fuel. It was agreed that other fuel components (benzene, ethylbenzene, toluene, and xylenes) would be used to evaluate fuel groundwater contamination.

The remaining groundwater chemicals above the MCLs in the OU1 ROD are listed on the following table.

**Table 4.9**

**Site 18 Groundwater Concentrations Exceeding MCLs**

| Chemical | Maximum Concentration (µg/L) | OU1 ROD MCLs (µg/L) | OU1 ROD NPDES Limit (µg/L) |
|---|---|---|---|
| Benzene | 12,000 | 1 | 1 |
| Toluene | 11,000 | 150 | 10 |
| Ethylbenzene | 1,500 | 680 | 10 |
| Xylenes, Total | 7,700 | 1750 | 10 |

The remedial action selected in the OU1 ROD was soil vapor and groundwater extraction.

Initial remedial actions (conducted in 1996 and 1997) consisted of additional site investigations and a pilot test. Several alternative cleanup remedies (air sparging, high vacuum extraction, and free product removal) were also investigated, but were not shown to be an improvement over the selected OU1 ROD remedy. Based on the additional investigations, the conceptual site model was refined. The primary source of contamination was determined to be a floor drain in the jet engine test cell. Prior to the oil/water separator installation in 1976, the floor drain led to a dry well. The fuel drained to the dry well and migrated away from the well horizontally through sandy soil layers. Over the years, rising groundwater has submerged the sandy soil layers. The rising groundwater either smeared the fuel across previously uncontaminated soil or trapped the fuel in between relatively uncontaminated soil and groundwater layers.

Subsequent investigations at Site 18 consisted of long term aquifer pump tests, SVE tests, and construction of a three dual phase extraction well system. System construction and functional testing, and checkout were completed in 1999. The treatment approach involved groundwater extraction and treatment, free product removal, and dewatering of the site to allow removal of contaminants in the smear zone.

The system was unsuccessful in lowering the groundwater level and removing adequate amounts of contamination.

Subsequent review showed the contamination at Site 18 consists of petroleum products which are exempt from regulation under CERCLA, as amended by the Superfund Amendment and Reauthorization Act.

A Remedial Action Plan was submitted to and approved by the Santa Ana Regional Water Quality Control Board replacing the ROD remedy with free product skimming, monitoring and restrictions on groundwater use. An OU1 ROD Amendment to officially remove Site 18 from the OU1 ROD is being prepared. The Site 18 cleanup will be overseen by the Santa Ana Regional Water Quality Control Board under the Porter-Cologne Water Quality Control Act.

### 4.9.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 18.

#### 4.9.1.1 Remedy Selection

The remedial action identified in the OU1 ROD (1996) for Site 18 has been replaced by a Remedial Action Plan. The remedy in the remedial action plan is free product skimming, monitoring and groundwater use restrictions. An OU1 ROD Amendment to officially remove Site 18 from the OU1 ROD is being prepared.

#### 4.9.1.2 Remedy Implementation

Groundwater and free product levels are taken quarterly. Free product skimming is also done quarterly, if required. Groundwater sampling is done annually. Sampling results are documented in the Annual Monitoring Report for petroleum sites.

#### 4.9.1.3 System Operations/Operations and Maintenance

Monitoring wells maintenance is done as required.

#### 4.9.1.4 Progress since the last 5-Year Review

The groundwater plume has decreased slightly since 2000, as measured by benzene concentrations in the upper alluvial layer. Natural attenuation parameters show that natural attenuation is occurring. Decreased nitrate, sulfate and dissolved oxygen levels along with increased methane levels in contaminated wells when compared with background wells give strong evidence that natural attenuation is occurring. Small amounts of fuel are being removed by skimming. Fuel is slow to return to the wells after skimming.

The natural attenuation at the Site 18 is documented in the 2003-2004 Annual Monitoring Report for Sites 18 and 33, 2004-2005 Annual Monitoring Report for Petroleum Sites, 2005-2006 Annual Monitoring Report and the 2006-2007 Annual Monitoring Report for Petroleum Sites (Admin Record 2219, 2314, and 2371). These reports show that natural attenuation is occurring consistently, so further sampling for natural attenuation parameters is not needed. Natural attenuation sampling has been discontinued. However, groundwater plume monitoring continues in order to track the size and shape of the plume. Free product skimming also continues when free product is found.

### 4.9.2 Site 18 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.9.3 Site 18 5-Year Review Findings

This section describes the findings of the 5-year review for Site 18.

#### 4.9.3.1 Interviews

No interviews were conducted for this site as part of the 5-year review. The 5-year review author was the person most knowledgeable about Site 18.

#### 4.9.3.2 Site Inspection

The site inspection was performed on February 7, 2008 by Eric Lehto and Ivan Vargas, MWH. MWH performs the groundwater monitoring and skimming at the site. Site 18 is in a grassy area surrounded by aircraft runways and taxiways. Taxiways are used to get to Site 18; March ARB ground control limits access to the taxiways. No evidence of unauthorized digging or distressed vegetation was found. The wells are in good repair.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

### 4.9.3.3 Risk Information Review

**Human Health Risk**

**Soil**

The ROD for this site was signed in June 1996. The current PRG tables, dated September 12, 2008, obtained from the EPA website, were reviewed. The PRG for beryllium, the single soil contaminant exceeding PRGs in the ROD, has changed (see table below). The change does not affect the protectiveness of the remedy.

**Table 4.9.3.3 Site 18 Risk Information Review for Soil**

| Chemical | OU1 ROD (1996) PRG Residential (mg/kg) | Current PRG, Residential,12 Sep 08 (mg/kg) |
|---|---|---|
| Beryllium | 0.14 | 160 |

**Groundwater**

The following standards were identified as ARARs in the OU1 ROD. They were reviewed for changes that could affect protectiveness:

- MCLs for Primary Drinking Water (Title 22, CCR, Division 4, Chapter 15, Article 5.5, Section 64444.5
- National Primary Drinking Water Regulations (40 CFR 141.61, MCLs for Organic Contaminants)
- NPDES Permit for Cleanup Project at March ARB

The most restrictive MCL for ethylbenzene has changed from 680 µg/L to 300 µg/L (Title 22 CCR, now in Table 64444-A). The benzene MCL remains at 1 µg/L and will continue to drive the cleanup. The ethylbenzene change does not affect the protectiveness. The NPDES Permit has been reissued since the OU1 ROD, discharge limits have not changed.

**Ecological Risk**

Site 18 is in a developed area of March ARB; ecological risk was not evaluated for the OU1 ROD. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

#### 4.9.3.4 Data Review

A review of the 2004-2005 Annual Monitoring Report for Petroleum Sites, 2005-2006 Annual Monitoring Report for Petroleum Sites, and 2006-2007 Annual Monitoring Report for Petroleum Sites, (Admin Record 2219, 2314, and 2371) showed that:

- free product continues to found and skimmed from monitoring wells
- natural attenuation is occurring on the site
- the plume is not expanding
- contaminant concentrations are not measured in wells with free product. Maximum concentrations have probably not decreased since the OU1 ROD.

### 4.9.4 Site 18 Technical Assessment

The following conclusions support the determination that the actions performed at Site 18 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The HASP for Long-Term Monitoring, Long-Term Operation and Long-Term Operations and Maintenance (including monitoring at Site 18) is in place and properly implemented. The Base Digging Permit process requires that any excavating or digging on base have the approval of the Base environmental office before any work is conducted. Work coordination procedures are in AFI 32-1001, Operations Management. This ensures that the site is managed in a safe manner and that any work proposed in the area must be approved before work can be done.

***Implementation of Institutional Controls and Other Measures:*** No groundwater is being pumped from the site. Groundwater on March ARB is only being pumped for groundwater cleanup. No water from underneath March ARB is being used for drinking water or irrigation. The Site 18 groundwater plume is not specifically noted in the Base General Plan. It was inadvertently omitted during the previous General Plan updates.

***Remedial Action Performance:*** The Site 18 groundwater plume is stable and is documented in the Petroleum Sites Annual Monitoring Reports. The stable plume indicates the remedial action is performing acceptability.

***System Operations/O&M:*** Skimming and groundwater monitoring is being done.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review. There were no current or future planned changes in land use and no new contaminants, sources or routes of exposure identified. Small amount of waste material continues to be brought to the surface as identified in the previous 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU1 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.9.5 Site 18 Issues

No major deficiencies were noted during the 5-year review.

### 4.9.6 Site 18 Assessment

Site 18 is in an access controlled area of March ARB. Development of the site is severely limited by its proximity to March ARB runways and aircraft taxiways. The monitoring wells are in good condition. Groundwater monitoring and skimming is performed as scheduled. The groundwater plume is stable.

### 4.9.7 Site 18 Recommendations and Follow-Up Actions

The following recommendations are made:

- Complete the OU1 ROD amendment, removing Site 18 from the OU1 ROD. Clean up of Site 18 as a petroleum site is under the jurisdiction of the Santa Ana Regional Water Quality Control Board.
- Update the Base General Plan to specifically show the Site 18 groundwater plume.

| Table 4.9.7 Site 18 Recommendations and Follow-Up Actions | | | | | | |
|---|---|---|---|---|---|---|
| **Issue** | **Recommendations/ Follow-up Actions** | **Party Responsible** | **Oversight Agency** | **Milestone Date** | **Affects Protectiveness? (Y/N)** | |
| | | | | | **Current** | **Future** |
| OU1 ROD Amendment | Complete OU1 ROD Amendment | AFRC | State/EPA | 2010 | N | N |
| Base General Plan Update | Include groundwater restrictions at Site 18 | AFRC | State/EPA | June 2009 | N | N |

### 4.9.8 Protectiveness Statement

The selected remedy is currently protective of human health and the environment. Long term protectiveness will be verified by continued groundwater monitoring.

### 4.9.9 Next Review

After completion of the OU1 ROD Amendment, Site 18 will be removed from OU1 and will be out of the CERCLA program and as such will no longer be subject to 5-year reviews. The next review should be conducted within 5 years of the completion of this review. If Site 18 is still part of OU1 ROD at the time of the next review, it should be included.

## 4.10 SITE 19 – WEST MARCH SLUDGE DRYING BEDS

Site 19 (WP019) is about 7 acres in size, located at the southern end of West March (Figure 4-10), east of the active wastewater treatment plant. It is on the former March AFB and the environmental cleanup is controlled by AFRPA. The site is generally vacant land with four concrete lined drying beds in the western portion of the site. Site 19 is an OU2 site and is included in the AFRPA OU2 ROD, May 2004.

**Currently:** Transferred to the March Joint Powers Authority, then to the Western Municipal Water District. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant.

**Historic:** Site 19 contains the four active lined sludge drying beds and three inactive, unlined sludge-drying beds associated with the sewage treatment plant. The plant was constructed in 1941 and used to process the wastewater from Camp Haan and March AFB. A total of 10 sludge-drying beds have historically been used at the site. Three of these beds have been backfilled. In 1990, when the plant was upgraded, four lined drying beds were constructed at the location of previously unlined beds.

In the past, wastewater treatment sludge was spread out in the unlined beds to dry. When dry, the sludge was removed from the drying beds. PAHs, PCBs, hexavalent chromium, and thallium were found in soil samples in the area of the unlined beds at levels above residential PRGs. Risk to industrial workers is within the acceptable risk range.

### 4.10.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 19.

#### 4.10.1.1 Remedy Selection

The remedial action identified in the AFRPA OU2 ROD (May 2004) for Site 19 is a prohibition against residential land use and restrictions and soil disturbance activities.

#### 4.10.1.2 Remedy Implementation

Land use restrictions have been incorporated in the deed as grantee covenants and by a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside. The specific deed restrictions from the AFRPA OU2 ROD are in Appendix D.

#### 4.10.1.3 System Operations/Operations and Maintenance

There is no active clean up system on Site 19. Annual site inspections are made in accordance with the State Land Use Covenants at the former March AFB.

#### 4.10.1.4 Progress since the last 5-Year Review

This is the first 5-year review for this site. Site 19 was transferred to the March Joint Powers Authority, then to the Western Municipal Water District. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside.

### 4.10.2 Site 19 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and interviews with government officials. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.10.3 Site 19 5-Year Review Findings

This section describes the findings of the 5-year review for Site 19.

#### 4.10.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator, was contacted as part of the 5-year review. He said Site 19 has been transferred to March Joint Powers Authority, then to the Western Municipal Water District. Deed restrictions and a State Land Use Covenant are in place. Western Municipal Water District is now performing the annual inspections.

Linda Garcia, Western Municipal Water District, was also contacted as part of the 5-year review. She was familiar with the land use restrictions. There are no plans for residential use of the site.

The interview with Mr. Solander was conducted via telephone and he reviewed the draft 5-year review to confirm its accuracy. The interview with Ms. Garcia was also conducted via telephone and the accuracy was confirmed in the site inspection described below.

#### 4.10.3.2 Site Inspection

A site inspection was performed on June 3, 2009 with Linda Garcia and Brenda Meyer, both with the Western Municipal Water District. Site 19 remains as a wastewater treatment plant, but is now referred to as a water recycling facility.

The facility is being expanded. Construction work is being done in accordance with a soil management plan approved by the California Department of Toxic Substances Control.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.10.3.3 Risk Information Review

**Human Health Risk**

The ROD for this site was signed in September 2005. The RI/FS was completed in 1997. Both the ROD and RI/FS note that the major contributor to the unacceptable risk to future on-site residents, industrial workers, and construction workers is from potential future use of groundwater. Site 19 is not in a good water bearing area due to high bedrock.

Groundwater in the area of Site 19 is not currently consumed, and no current receptors were identified to be at risk from exposure to groundwater. For future on-site residents, risks above the acceptable range were identified from the ingestion and dermal contact with groundwater contaminated by arsenic, dieldrin, hepatachlor epoxide, and 4-chloroaniline. Arsenic is the major contributor the risk from measured concentrations in groundwater. Further analysis of arsenic under the basewide groundwater monitoring

program has shown the levels of arsenic at Site 19 to be consistent with background levels of arsenic in the area of March AFB. Therefore, the levels of arsenic detected in the groundwater are believed to be indicative of background and not the result of Air Force activities at the site. Additionally, groundwater and bedrock are shallow in this area and the potential for future use of groundwater as a potable source is extremely unlikely.

Soil carcinogenic risk greater than $10^{-4}$ from PAHs for future residents and between $10^{-4}$ and $10^{-6}$ from PAHs, PCBs, and hexavalent chromium for future residents, industrial workers and construction workers was indentified in the AFRPA ROD. Also non-carcinogenic health risk Hazard Index greater than 1 was identified for soil.

There have been no significant changes since the ROD was signed in 2005.

**Ecological Risk**

A risk assessment summary was presented in the AFRPA OU2 ROD (Admin Record 2226). The risk assessment concluded that damage to ecological receptors of concern from remediation of the site would probably cause more damage, due to destruction and loss of habitat, than if the contaminants were left in place. No new ecological receptors have been introduced to the site.

#### 4.10.3.4 Data Review

The Annual Inspection Report for Sites 6, 17, 19 and L was reviewed (Admin Record 2234). No discrepancies were noted.

### 4.10.4 Site 19 Technical Assessment

The following conclusions support the determination that the actions performed at Site 19 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The site is restricted from residential land use, no residential uses are on the site and no future residential uses are planned. No HASP/Contingency Plans is required.

***Implementation of Institutional Controls and Other Measures:*** The prohibition against residential land use and digging has been identified in deed restrictions and a State Land Use Covenant, both on file with the County of Riverside. Inspections have indicated and verified no breaches in the institutional control restrictions.

***Remedial Action Performance:*** The land use restrictions remain in place. The site has no residential land use and there has been no evidence of digging without prior approval

from the California Department of Toxic Substances Control per State Land Use Covenant.

***System Operations/O&M:*** None required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the AFRPA OU 2 ROD was signed that call into question the protectiveness of the remedy.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.10.5 Site 19 Issues

No major deficiencies were noted during the 5-year review.

### 4.10.6 Site 19 Assessment

Site 19 remains in use as a sewage treatment plant. Land use restrictions are recorded in property transfer documents. A State Land Use covenant is in place.

### 4.10.7 Site 19 Recommendations and Follow-Up Actions

Institutional Control annual reports and monitoring will continue.

### 4.10.8 Protectiveness Statement

The selected remedy is currently protective of human health and the environment.

### 4.10.9 Next Review

Five year reviews are required as long as contamination remains in place above unrestricted levels. The next review should be conducted within 5 years of the completion of this review.

## 4.11 SITE 29 – FIRE PROTECTION TRAINING AREA NO. 1

Site 29 (FT029) is on March ARB and is controlled by AFRC. Site 29 is situated along the eastern part of the base, north of Site 9 (Figure 4-11). Site 29 is an OU1 site and is included in the OU1 ROD (1996).

**Currently:** Restricted from residential use, on March ARB. Use restriction recorded in the Base General Plan.

**Historic:** The area was reportedly used as a fire protection training pit prior to 1951. A review of aerial photographs taken in 1959 showed the site covered an area of approximately 1 acre. The sources of soil contamination at Site 29 were burn pits situated throughout the southern portion of the site. While information about Site 29 is limited, large quantities of aviation gas, oils, jet fuels, and solvents were reported to have been used during training exercises for the base fire department.

Initial field investigations at Site 29 took place during the months of April 1992 throughout September 1992, and again from December 1992 to January 1993. An additional site characterization study was conducted in November 1993. Soil samples from boreholes and surface locations as well as groundwater samples were collected from Site 29.

The COCs in the soil were beryllium, lead, manganese, and dioxins. These contaminants were detected at concentrations greater than the December 1991 U.S. EPA Region IX residential PRGs, but lower than the industrial PRGs. Based on the 1991 industrial PRGs, no contaminants at this site require remediation.

Site 29 is within the OU1 groundwater plume; information relating to the groundwater contaminants at Site 29 can be found in the OU1 Groundwater Plume Review (see section 4.14 of this document). Site 29 groundwater is not being used.

### 4.11.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 29.

#### 4.11.1.1 Remedy Selection

Site 29 is prohibited from residential use based on industrial use PRGs for soil. U.S. EPA Region IX industrial PRGs were used, rather than residential PRGs, for the following reasons;

- Site 29 is retained by the Air Force as part of March ARB.
- It is unlikely to be used for residential purposes in the future.
- Cleanup of Site 29 is considered cost prohibitive in light of the minor risk reduction that would be achieved.

The remedial action identified in the OU1 ROD for Site 29 was no further action. The OU1 ROD was signed in 1996. The prohibition against residential land use has been identified in the Base General Plan and all earth work on base is subject to the digging permit system. Site 29 is on March ARB and is not planned to be transferred out of Air Force control.

Contaminants identified in the groundwater beneath Site 29 are addressed in the OU1 Groundwater Plume remedy.

#### 4.11.1.2 Remedy Implementation

The restriction from residential use is recorded in the Base General Plan (December 2005).

The Land Use Control section of the Base General Plan is included in Appendix C. The Institutional Controls/Land Use Controls section from the ROD is reproduced in Appendix D.

#### 4.11.1.3 System Operations/Operations and Maintenance

There are no O&M activities required at the site since the approved action at Site 29 was no further action.

#### 4.11.1.4 Progress since the last 5-Year Review

There have been no changes since the last 5-year review in 2003.

### 4.11.2 Site 29 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.11.3 Site 29 5-Year Review Findings

This section describes the findings of the 5-year review for Site 29.

#### 4.11.3.1 Interviews

No interviews were conducted for this site as part of the 5-year review. The 5-year review author was the person most knowledgeable about Site 29.

#### 4.11.3.2 Site Inspection

The site inspection was performed on January 30, 2008 by Eric Lehto. The site is a grass/weed area that is not irrigated. Weed control around utility poles and fence lines was the only sign of distressed vegetation. No evidence of unauthorized digging was found.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.11.3.3 Risk Information Review

**Human Health Risk**

**Soil**

The OU1 ROD and 2003 5-year review identified five chemicals exceeding the U.S. EPA Region IX PRGs, beryllium, lead, manganese, 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin and heptachlorinated dibenzo-p-dioxins, total.

The PRGs for beryllium and manganese have changed as noted in the following table.

| Table 4.11.3.3-1 | | | | | |
|---|---|---|---|---|---|
| **Site 29 Changes in PRGs** | | | | | |
| Contaminant | Concentration Range from OU1 ROD (mg/kg) | U.S. EPA Region IX Residential PRG (mg/kg) | | U.S. EPA Region IX Industrial PRG (mg/kg) | |
| Beryllium | 0.27-0.66 | Previous (Dec 91) | 0.14 | Previous (Dec 91) | 1.1 |
| | | Current (Oct 04) | 150 | Current (Oct 04) | 1900 |
| Manganese | 250.0-554.0 | Previous (Dec 91) | 380 | Previous (Dec 91) | 7800 |
| | | Current (Oct 04) | 1800 | Current (Oct 04) | 19000 |
| Lead | 5.3-246.0 | Previous (Dec 91) | 130 (more restrictive CAL EPA value used) | Previous (Dec 91) | 1000 |
| | | Current | 150 (more restrictive CAL EPA value used) | Current | 800 |
| 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | ND – 0.00079 | Previous Note 1 | 0.00038 | Previous Note 1 | 0.0024 |
| | | Current | Note 2 | | |
| Heptachlorinated dibenzo-p-dioxins Total | ND – 0.0014 | Previous Note 1 | 0.00038 | Previous Note 1 | 0.0024 |
| | | Current | Note 2 | Note 2 | |

Note 1 (from the OU1 ROD): 2, 3, 7, 8-TCDD is the only dioxin for which Region IX has calculated PRGs ($3.8 \times 10^{-6}$ for residential soil and $2.4 \times 10^{-5}$ for industrial soil). Therefore, this PRG has been adjusted using a Toxic Equivalency Factor (TEF) listed in the table on the next page.

| Table 4.11.3.3-2 | |
|---|---|
| **Toxicity Equivalency Factors (TEF) for Dioxins** | |
| Congener | TEF |
| 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | 0.01 |
| Heptachlorinated dibenzo-p-dioxins, Total | 0.01 |
| TEFs were obtained from "Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities", State of California Environmental Protection Agency, Department of Toxic Substances Control, Office of the Science Advisor, July 1992 | |

Note 2: Updated toxicity equivalents concentration (TEQ) for dioxins detected in soil at Site 29 were calculated, using currently accepted toxicity equivalency factors (TEFs) for dioxins and furans, and compared the corresponding carcinogenic risk estimates to the previous risk estimates for dioxins. The currently accepted TEFs for dioxins are the World Health Organization (WHO) 2005 TEFs published by Van den Berg et al. (2006). The current WHO 2005 TEF for 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin equal to 0.01 remains unchanged from the previous USEPA (1987) TEF of 0.01 for this congener. However, the current WHO 2005 TEF for octachlorodibenzo-p-dioxin (OCDD), which was detected in shallow soil at Site 29, equal to 0.0003 is lower than the previous USEPA (1987) TEF of 0.001 for OCDD that was used in the OU1 RI Report. We would not currently include 'heptachlorinated dibenzo-p-dioxins, total' in the TEQ, because we have already accounted for this congener with the analytical result for 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin. As indicated in the table F-1 in Appendix F, the updated TEF for dioxins is equal to 8.8E-06 mg/kg. This updated TEF is greater than the USEPA (2004) Region 9 PRG for Residential Soil equal to 3.9E-06 mg/kg, but it is less than the Region 9 PRG for Industrial Soil (1.6E-05).

A risk evaluation for soil at Site 29 was done as part of this 5-year review to evaluate the potential for cumulative risks and hazards across all chemicals of potential concern (COPCs) that were identified for Site 29 soil. Briefly, concentrations of all COPCs in soil, calculated as the 95 percent upper confidence limit (95% UCL) on the mean concentration (as presented in Table 3.4-7 the OU1 RI Report) were compared to Region 9 PRGs for Residential and Industrial Soil, and chemical-specific and cumulative cancer risk and non-cancer hazard indices (HI) were calculated. As shown in table F-2 in Appendix F, cumulative cancer risk and HI estimates for a residential receptor slightly exceeded the acceptable screening cancer risk criterion of 1E-06, and the non-cancer HI of 1. However, cumulative cancer risk and HI estimates for an industrial receptor were below these criteria. These cumulative risk evaluation results confirm the above conclusions based on updated TEQ calculations for dioxins, alone.

**Ecological Risk**

Site 29 is in a developed area of March ARB; ecological risk was not evaluated for the OU1 ROD. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

### 4.11.3.4 Data Review

The restriction against residential land use is recorded in the Base General Plan (updated in December 2005). The land use restriction section of the Base General Plan is included in Appendix C.

### 4.11.4 Site 29 Technical Assessment

The following conclusions support the determination that the actions performed at Site 29 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The site is restricted from residential land use, no residential uses are on the site and no future residential uses are planned. No HASP/Contingency Plans exist. The Base Digging Permit process requires that any excavating or digging on base have the approval of the Base environmental office before any work is conducted. Work coordination procedures are in AFI 32-1001, Operations Management. This ensures that the site is managed in a safe manner and that any work proposed in the area must be approved before work can be done.

***Implementation of Institutional Controls and Other Measures:*** The OU1 ROD listed Site 29 as a No Further Action site. However, it used industrial PRGs to evaluate the site and stated that residential land use would be prohibited. The prohibition against residential land use has been identified in the Base General Plan and all earth work on base is subject to the digging permit system.

***Remedial Action Performance:*** The OU1 ROD required no further action at Site 29. Therefore, there are no remedial action performance criteria to evaluate. Groundwater in the area of Site 29 will continue to be monitored under the Basewide Groundwater Monitoring Program.

***System Operations/O&M:*** There are no O&M procedures at Site 29 since the site was approved for no further action in the OU1 ROD.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** Changes in PRGs and dioxin TEFs may indicate the site presents less of a hazard than originally calculated.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU1 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.11.5 Site 29 Issues

No major deficiencies were noted during the 5-year review.

### 4.11.6 Site 29 Assessment

Site 29 is a No Further Action site in the OU1 ROD based on industrial land use and remains Air Force property. The site is recorded in the Base General Plan and unauthorized digging is prevented by the base digging permit process.

### 4.11.7 Site 29 Recommendations and Follow-Up Actions

None.

### 4.11.8 Protectiveness Statement

The selected remedy is protective of human health and the environment.

### 4.11.9 Next Review

Five year reviews are required as long as contamination remains in place above unrestricted levels. The next review should be conducted within 5 years of the completion of this review.

## 4.12 SITE 31 – SOLVENT SPILL

Site 31 (SS031) is on the east-central portion of the Base, south of the main cantonment area and to the east of the aircraft parking apron (Figure 4-12). It is on March ARB and controlled by AFRC. Site 31 is an OU1 site and is included in the OU1 ROD (1996).

The site, initially described as an unconfirmed solvent disposal, is within the OU1 groundwater plume and is considered to be the source area for much of the TCE

contamination in the plume. Site 31 is comprised of two source areas of contamination: Site 31A and 31B.

**Currently:** Cleanup continues in the form of groundwater extraction. Site 31 is on March ARB. A ROD Amendment is in progress to change the surface soil remedy from excavation and low temperature thermal desorption to no further action.

**Historic:** Site 31A is south of Bldg 1211. The Bldg 1211 was used for gun cleaning. Drains the cleaning area fed into an oil water separator south of the building. Leaks from the oil water separator plumbing system and unconfirmed reports of solvents being discharged to the ground are suspected to be the origin of the TCE.

Site 31B includes the area around the Liquid Oxygen (LOX) Facility, Bldg 1254.

Site sampling found PAHs, beryllium, lead and manganese in excess of residential PRGs in the surface soil. At the time, the goal was to clean up to residential levels, so industrial PRGs were not considered. A risk assessment was performed. The results of the risk assessment indicated that beryllium and manganese did not cause an unacceptable risk. For lead, the method developed by the California Department of Toxic Substances Control was used to estimate blood-lead concentrations. Results indicated that lead did not require remediation. However, the OU1 ROD indicates there was an unacceptable risk from several PAHs.

Groundwater sampling also found several chemicals in greater than the Maximum Contaminant Level (MCL) for drinking water. One chemical, Bis(2-ethylhexyl)phthalate, was determined to be a lab contaminant after the ROD was signed. The 1996 and 1997 Annual Groundwater Monitoring Reports (Admin Record Numbers 802 and 995) listed it as a common laboratory contaminant. Bis(2-ethylhexyl)phthalate is no longer a contaminant of concern. The remaining groundwater chemicals above the PRGs in the OU1 ROD are listed below.

**Table 4.12**

**Site 31 Groundwater Concentrations Exceeding MCLs in the OU1 ROD (1996)**

| Chemical | Maximum Concentration from the OU1 ROD (µg/L) | MCL from the OU1 ROD (µg/L) | Current MCL (µg/L) |
|---|---|---|---|
| TCE | 1,400 | 5 | 5 |
| 1,1-Dichloroethene | 260 | 6 | 6* |

* California MCL

### 4.12.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 31.

#### 4.12.1.1 Remedy Selection

The remedial actions selected in the OU1 ROD (1996) are as follows:

- Soil Vapor Extraction (SVE) with carbon adsorption treatment for subsurface contamination

- Groundwater extraction, treatment and re-injection

- Excavation and treatment of contaminated surface soils

#### 4.12.1.2 Remedy Implementation

**Surface Soil:** PAH contamination is found on other sites at March ARB. After soil removal at Site 1 did not result in Site 1 being cleaned up to unrestricted levels, the risk from Site 31 was re-evaluated (Admin Record 2040). The site was re-sampled and the risk figures re-calculated. The risk was within the acceptable risk range for unrestricted use.

An OU1 ROD amendment is being prepared to change the surface soil remedy to no further action.

**Subsurface Soil:** After a SVE pilot test in 1994, three dual phase (soil vapor and groundwater) wells were installed and put into operation as part of a treatability study in 1995. Full scale remediation started in 1996.

The soil vapor system was turned off in 1997 due to significantly reduced TCE vapor concentrations. No significant rebound in TCE or PCE was observed in subsequent vapor testing. Benzene, toluene, ethylbenzene, xylene (BTEX) was found in the soil vapor from well 31A-DEW6. No BTEX was found in groundwater or soil vapor from any other Site 31 well. The SVE system continued to pull vapors from 31A-DEW6 (to remove BTEX) and 31B-DEW3, 31B-DEW4, and 31B-DEW5 (to improve groundwater extraction). Total amount of TCE removed by SVE was 167 pounds. Total amount of PCE removed by SVE was 44 pounds. In January 1999, BTEX was not-detected in 31A-DEW6.

The SVE system has been turned off.

**Groundwater:** Full scale remediation of the groundwater started with 11 dual phase extraction wells and 2 groundwater extraction wells in 1996.

A program to optimize cleanup actions was developed and presented at the March AFB Groundwater Working Group meeting on September 10, 1997. The proposed site cleanup targets (more appropriately mass removal targets) and criteria for operation of the dual phase (soil vapor and groundwater) extraction wells at Site 31A were reviewed at the March AFB Cleanup Team meeting on September 11, 1997, including results of the supporting modeling simulations using the March AFB Groundwater Flow and Transport Model. Approval to start the rebound test program was given at this same meeting.

Based on modeling simulations, groundwater at Site 31 in excess of 100 ppb but less than 250 ppb were predicted to result in a groundwater concentration of <5ppb at 200 inside the eastern base boundary. Off base groundwater is further protected by the Expanded Groundwater Extraction and Treatment System (EGETS), a series of groundwater extraction and injection wells, which prevents contaminated water from leaving the base. The cleanup (mass removal**)** targets and criteria are as follows:

a) Site 31A source area maximum contaminant concentration (based on modeling) for attainment of <5 ppb TCE 200 feet inside EGETS wells.
b) Requirement of groundwater extraction wells to be considered for rebound test:

Asymptotic Cleanup Profile Contaminant Concentration <50 ppb TCE

c) Average target after groundwater rebound tests, <50 ppb
d) Maximum allowable concentration for shut-down of any one well after rebound test, <85 ppb for Site 31A wells and <43 ppb for Site 31B wells.

The effect of the EGETS system is to accelerate the rate of plume migration to the base boundary, increase the plume dispersion, and prevent offbase migration of significant VOC concentrations. However, even without the EGETS in operation, the worst offbase VOC plume concentration was predicted to be reduced 50 times relative to the site 31A source. Thus, if remediation objectives for Site 31A are in the range of 100 ppb to 250 ppb, the predicted peak offbase concentrations without the EGETS in operation would only be 2 to 5 ppb (Admin Record 2085).

Five wells had met the rebound criteria in 1998; additional wells met the rebound evaluation later.

One additional groundwater extraction well was installed after the original installation in 1996, 31BGEW03. In March 2008, one well was extracting groundwater, 31BGEW03. All other wells were in rebound or post-rebound status.

Two new monitoring wells were installed downgradient of 31B, OU1MW15A&B and OU1MW16A&B.

#### 4.12.1.3 System Operations/Operations and Maintenance

The Site 31/EGETS treatment plant System Operations/Operations and Maintenance are conducted in accordance with the Revised Final Operations and Maintenance Plan, (Admin Record 1946). The following samples are taken:

- Monthly "mid bed" samples to monitor carbon consumption.
- Quarterly influent and effluent samples to monitor discharge requirements.
- Semi-annual well samples to monitor contaminant trends.

In addition, influent and effluent flow rates are monitored. Quarterly process monitoring reports and quarterly discharge reports are generated.

Site specific O&M costs are not readily available. O&M actions at March ARB/former March AFB are not done separately for each site, but are grouped into different contracts with the goal of providing a comprehensive environmental solution for the entire March ARB/former March AFB complex. It is difficult to break out site specific costs. Costs are generally in line with estimates.

#### 4.12.1.4 Progress since the last 5-Year Review

Peak contaminant concentrations have decreased since the OU1 ROD.

**Table 4.12.1.4-1**

**Site 31 Maximum Groundwater Concentrations in 2008 vs. OU1 ROD (1996) Maximum Concentrations**

| Chemical | 2007-2008 Maximum Concentration from Draft 2007-2008 Annual Monitoring Report, AFRC and AFRPA Groundwater Monitoring Programs (µg/L) | OU1 ROD (1996) Maximum Concentration (µg/L) |
|---|---|---|
| TCE | 98 | 1,400 |
| 1,1-Dichloroethene | 12 | 260 |

Only one of the groundwater extraction wells, 31BGEW03 is running in March 2008. The remainder of the wells has met the rebound test criteria and has been turned off. The most recent well to meet the rebound criteria is 31BGEW02. 31BGEW02 had previously been placed in rebound status, but was returned to operation after the November 2006 sample showed elevated TCE readings. It was again turned off for rebound testing in 2008.

| Table 4.12.1.4-2 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Concentration Trends in Site 31 Groundwater Extraction Wells** | | | | | | | | | | |
| Well | Oct 2003 TCE/PCE (µg/L) | | Nov 2005 TCE/PCE (µg/L) | | Nov 2006 TCE/PCE (µg/L) | | May 2007 TCE/PCE (µg/L) | | May/June 2008 TCE/PCE (µg/L) | |
| 31BGEW02 | 66.8 | 3.6 | 28.5 | 2.4 | 78 | 2.2 | 21 | 2.9 | 11 | 2 |
| 31BGEW03 | 177 | 2 | 83.3 | 1.9 | 77 | 2.2 | 68 | 2.1 | 61 | 2.7 |

Additional contamination was suspected downgradient of 31BGEW03 (31BGEW03 itself is downgradient of what was thought to be area of contamination at Site 31B). OU1MW15A and B were placed just off base, downgradient of Site 31B. It was placed in a suspected area of high TCE. The initial elevated PCE level led to the installation of OUMW16A and B. OUMW16A and B were placed on base. OUMW16A has the highest level of TCE in the Site 31 area.

| Table 4.12.1.4-3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Concentration Trends in Monitoring Wells Downgradient from Site 31** | | | | | | | | | | |
| Well | Feb 2004 TCE/PCE (µg/L) | | Feb 2005 TCE/PCE (µg/L) | | Nov 2006 TCE/PCE (µg/L) | | May/June 2007 TCE/PCE (µg/L) | | May/June 2008 TCE/PCE (µg/L) | |
| OU1MW15A | 16 | 40 | 15 | 0.34F | 47 | 1.3 | 53 | 1.3 | 76 | 2 |
| OU1MW15B | 19 | 51 | 2.7 | 0.42F | 4.5 | 0.24F | 4.3 | 0.3F | 6.4 | 0.29F |
| OU1MW16A | NS | NS | 210 | 8.5 | 250 | 11 | 320 | 11 | 160 | 8.9 |
| OU1MW16B | NS | NS | 120 | 2.1 | 110 | 2 | 120 | 3.6 | 83 | 2 |

NS = Not Sampled F= Detected between the method detection limit and reporting limit

### 4.12.2 Site 31 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.12.3 Site 31 5-Year Review Findings

This section describes the findings of the 5-year review for Site 31.

#### 4.12.3.1 Interviews

Ivan Vargas, MWH, O&M contractor for Site 31, was contacted as part of the 5-year review. O&M documents are maintained at the Site 31 trailer. Only one Site 31 well, 31BGEW3 is operating. Rebound test criteria have been met in the rest of the wells.

The interview with Mr. Vargas was conducted at Site 31 and he reviewed the draft 5-year review to confirm its accuracy.

#### 4.12.3.2 Site Inspection

The site inspection was performed on February 12, 2008 by Eric Lehto. The treatment system was up and running. Almost all of the water being treated comes from the EGETS system. The roof on the equipment shed is damaged; the equipment shed is scheduled for replacement.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.12.3.3 Risk Information Review

**Human Health Risk**

The following standards were identified as ARARs in the OU1 ROD. They were reviewed for changes that could affect protectiveness:

- MCLs for Primary Drinking Water (Title 22, CCR, Division 4, Chapter 15, Article 5.5, Section 64444.5
- National Primary Drinking Water Regulations (40 CFR 141.61, MCLs for Organic Contaminants)
- NPDES Permit for Cleanup Project at March ARB

The most restrictive MCLs for the contaminants of concern have not changed since the OU1 ROD was signed. The NPDES Permit has been reissued since the OU1 ROD, discharge limits have not changed.

**Ecological Risk**

Site 31 is in a developed area of March ARB; ecological risk was not evaluated for the OU1 ROD. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

#### 4.12.3.4 Data Review

Process monitoring reports are completed every quarter and submitted to the regulatory agencies (U.S EPA, California Department of Toxic Substances Control and Santa Ana Regional Water Control Board).

The November 2007 report indicated that approximately 8.3 million gallons of water from Site 31 and EGETS was treated at the Site 31/EGETS treatment system.

Approximately 5.99 pounds of VOCs were removed from the water. 0.95 pounds of VOCs came from Site 31.

### 4.12.4 Site 31 Technical Assessment

The following conclusions support the determination that the actions performed at Site 31 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The HASP for Long-Term Monitoring, Long-Term Operation and Long-Term Operations and Maintenance (including Site 31) is in place and properly implemented.

***Implementation of Institutional Controls and Other Measures:*** The digging permit process insures that no unauthorized digging/construction occurs. This protects the treatment system piping and monitoring wells. Further review of the surface soil contamination indicates that No Further Action is needed. A ROD Amendment is being prepared to change the remedy for the surface soils to No Further Action. No base groundwater is being currently used for drinking water; there are no plans to use base groundwater for drinking water.

***Remedial Action Performance:*** Rebound testing indicates that the remedial actions are effecting cleaning up the site.

***System Operations/O&M:*** System operation is acceptable and documented by the quarterly process monitoring reports.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU 1 ROD was signed that call into question the protectiveness of the remedy.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.12.5 Site 31 Issues

No major deficiencies were noted during the 5-year review.

### 4.12.6 Site 31 Assessment

The groundwater and subsurface soil remedy was implemented per the OU1 ROD. The remedy has been effective in reducing the level of subsurface soil and groundwater contamination and the remedy has been protective of human health and the environment.

The PAH contamination in the surface soil has been re-evaluated and is within the acceptable risk range for unrestricted use. A ROD amendment is being prepared to change the surface soil remedy from exaction and low temperature thermal desorption to no further action.

### 4.12.7 Site 31 Recommendations and Follow-Up Actions

The following recommendations are made:

- Complete the OU1 ROD amendment, changing the remedy from excavation and low temperature thermal desorption to no further action.
- Minor recommendation. Continue to monitor TCE concentrations downgradient of the site. A new extraction well downgradient of 31BGEW03 may be indicated.

**Table 4.12.7 Site 31 Recommendations and Follow-Up Actions**

| Issue | Recommendations/ Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| OU1 ROD Amendment | Complete OU1 ROD Amendment | AFRC | State/EPA | 2010 | N | N |

### 4.12.8 Protectiveness Statement

The selected remedies for the groundwater and subsurface soil at Site 31 are currently protective of human health and the environment. Long term protectiveness will be ensured by continued system operation and groundwater monitoring.

Further evaluation of the surface soil indicates that no further action is appropriate.

### 4.12.9 Next Review

Site 31 should be included in the next 5-year review, five years from the completion of this review.

## 4.13 SITE 34 – PRITCHARD REFUELING SYSTEM

Site 34 (ST034) encompasses the former Pritchard Refueling System. The site is next to Building 1245 at the southeast end of the aircraft parking apron (Figure 4-13). It is on March ARB and controlled by AFRC. Site 34 is an OU1 site and is included in the OU1 ROD (1996).

**Currently:** Site 34 is in an access controlled area inside of March ARB. Bioventing has cleaned up the subsurface soils. A ROD Amendment is in progress to change the surface soil remedy from excavation and low temperature thermal desorption to restriction from residential use.

**Historic:** Six 50,000 gallon tanks were moved from the Panero Fueling System to Site 34 in 1962 to provide JP-4 jet fuel for jet aircraft. The tanks were discovered to be leaking during a geologic investigation for a construction project just south of the site in 1988. Use of this system was discontinued in 1960 and most of the piping system and tanks were removed in 1991. An additional 550-gallon tank was removed in 1999.

During the OU1 RI/FS, soil samples from boreholes and surface locations as well as groundwater samples were collected from Site 34 in order to determine the extent of contamination caused by the leaking underground storage tanks. Sampling results indicated that several PAHs and beryllium were present in the surface soil (0-2 feet bgs) at concentrations exceeding the December 1991 U.S. EPA Region IX PRGs. At the time, the goal was to clean up to residential levels, so industrial PRGs were not considered. Subsurface soil (from the ground surface to the groundwater level) contamination was also detected. The subsurface soil contaminants detected were benzene, ethylbenzene, and xylenes. In addition to the soil contaminants, groundwater contamination was discovered. Benzene was detected in the groundwater at Site 34 at concentrations exceeding the established ARARs.

A human health risk assessment was conducted for Site 34 following U.S. EPA Region IX and California EPA guidance. The risk assessment produced estimates of the potential risks to public health from the previously mentioned contaminants detected at Site 34. As a result of the risk assessment, PAHs in the surface soil were found to present a potential human health risk. Beryllium did not create an unacceptable risk.

OU1 ROD selected bioventing as the subsurface soil contamination remedy. Bioventing is a remedial technique that consists of injecting oxygen into the soil to stimulate the growth of hydrocarbon degrading microbes. These microbes use the hydrocarbons as an energy source and break them down into nonhazardous compounds.

A bioventing system was started 1994 and completed in 1995. The bioventing system was used to prevent degradation of the groundwater through migration of the contaminants from subsurface soil to groundwater. The system was shut down in December 1995 after investigations indicated that the subsurface soil had been remediated to the extent required to prevent groundwater degradation.

In addition, a 550 gallon UST was removed in June 1999. The UST was used to collect condensed fuel vapors from the pipeline feeding the Pritchard Refueling System.

Site 34 is within the OU1 groundwater plume. More information about the relating to the OU1 groundwater plume can be found section 4.14.

The following paragraphs deal address the surface soil contamination.

### 4.13.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 34.

#### 4.13.1.1 Remedy Selection

The OU1 ROD (1996) identified excavation and low-temperature thermal desorption as the preferred method of cleanup for the contaminated surface soils at Site 34. Excavation removes the contaminated surface soil from the site and low-temperature thermal desorption destroys the contaminants of concern, thereby protecting human health and the environment.

#### 4.13.1.2 Remedy Implementation

PAH contamination is found on other sites at March ARB. After soil removal at Site 1 did not result in Site 1 being cleaned up to unrestricted levels, the risk from Site 34 was re-evaluated (Admin Record 2040). The site was re-sampled and the risk figures re-calculated. The risk was within the acceptable risk range for industrial workers. However, there was an unacceptable risk for potential future site residents.

An OU1 ROD amendment is being prepared to change the remedy to land use controls.

#### 4.13.1.3 System Operations/Operations and Maintenance

None.

#### 4.13.1.4 Progress Since the Last 5-Year Review

The initial draft OU1 ROD amendment also had additional changes to institutional control language. The OU1 ROD amendment has been revised to include only the required changes at Site 18, 31 and 34.

### 4.13.2 Site 34 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.13.3 Site 34 5-Year Review Findings

This section describes the findings of the 5-year review conducted for Site 34.

#### 4.13.3.1 Interviews

No interviews were conducted as part of the 5-year review. The 5-year review author was the person most knowledgeable about Site 34.

#### 4.13.3.2 Site Inspection

The site inspection was performed on January 30, 2008 by Eric Lehto. The site is contained within the March ARB flightline fence (a secured area inside of the March ARB perimeter fence). The site is hard packed dirt with little vegetation. No evidence of unauthorized digging was observed.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.13.3.3 Risk Information Review

**Human Health Risk**

Additional soil samples were taken and a new risk assessment performed in the Final Project Report, Sites 31 and 34 Investigations, January 2003 (Admin Record 2040).

The new risk assessment indicated that restriction from residential use is an appropriate remedy.

**Ecological Risk**

Site 34 is in a developed area of March ARB; ecological risk was not evaluated for the OU1 ROD. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

#### 4.13.3.4 Data Review

Additional soil samples were taken and a new risk assessment performed in the Final Project Report, Sites 31 and 34 Investigations, January 2003 (Admin Record 2040).

The new risk assessment indicated that restriction from residential use is an appropriate remedy.

### 4.13.4 Site 34 Technical Assessment

The following conclusions support the determination that the actions performed at Site 34 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** Groundwater monitoring of the OU1 plume is the only current on-site operation. The HASP for Long-Term Monitoring, Long-Term Operation and Long-Term Operations and Maintenance is in place and properly implemented.

***Implementation of Institutional Controls and Other Measures:*** The digging permit process insures that no unauthorized digging/construction occurs. Institutional controls will be implemented when the OU1 ROD amendment is completed.

***Remedial Action Performance:*** The bioventing system effectively remediated the subsurface soil.

***System Operations/O&M:*** Groundwater monitoring of the OU1 plume continues.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU 1 ROD was signed that call into question the protectiveness of the remedy.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.13.5 Site 34 Issues

No major deficiencies were noted during the 5-year review.

### 4.13.6 Site 34 Assessment

Site 34 is in an access controlled area inside of March ARB. Development of the site is restricted because it is next to the aircraft parking ramp. The site is not being used. Bioventing has cleaned up the subsurface soils. Further evaluation of the PAH contamination in the surface soil indicates that restriction from residential use is appropriate.

### 4.13.7 Site 34 Recommendations and Follow-Up Actions

Complete the OU1 ROD amendment, changing the remedy from excavation and low temperature thermal desorption to restriction from residential use.

| Table 4.13.7 Site 34 Recommendations and Follow-Up Actions | | | | | | |
|---|---|---|---|---|---|---|
| **Issue** | **Recommendations/ Follow-up Actions** | **Party Responsible** | **Oversight Agency** | **Milestone Date** | **Affects Protectiveness? (Y/N)** | |
| | | | | | **Current** | **Future** |
| OU1 ROD Amendment | Complete OU1 ROD Amendment | AFRC | State/EPA | 2010 | N | N |

### 4.13.8 Protectiveness Statement

The site is not being used and inside an access controlled area within March ARB. Human health and the environment are being protected. Long term protectiveness will be provided by completion of the OU1 ROD Amendment, which will restrict the site from residential uses. Site 34 is near the aircraft parking ramp, making it incompatible with residential land uses.

### 4.13.9 Next Review

Site 34 should be included in the next 5-year review, five years from the completion of this review.

## 4.14 SITE 42 – BUILDING 3404 TRANSFORMERS

Site 42 (OT042) is located on less than one acre near the intersection of 11$^{th}$ Street and Davis Avenue on West March (Figure 4-14). Site 42 is an OU2 site and is included in the AFRPA OU2 ROD, May 2004.

**Currently:** Transferred to the County of Riverside. A land use covenant for the interior of Building 3404 between the County of Riverside and DTSC is in place.

**Historic:** Transformers located in Building 3404 reportedly leaked oils containing PCBs onto the floor of the transformer room. These oils were also spilled onto the soil surrounding the building. After discussions with the regulatory agencies and the public, a decision was made to clean up the area outside of Building 3404 by removing the contaminated soil.

In the interim removal action, the contaminated soils were removed from the site. A total of 330 tons of contaminated soils were removed from the site. The PCB concentrations were low enough to allow disposal of 292 tons of contaminated soils as non-hazardous waste. An additional 38 tons was disposed of off base as hazardous waste. Clean fill was placed in the excavation to grade and a gravel cover was placed on top of the previously excavated area.

Confirmation samples taken after the removal action showed minor residual PCB contamination in soils at Site 42. Residential risk from residual PCBs in soil is within the acceptable risk range for carcinogenic risks and less than 1 for non-carcinogenic risks. The carcinogenic risk is less than $10^{-6}$ for industrial receptors.

The site is currently owned by the County of Riverside.

There is no detected groundwater contamination on site.

The selected remedy for Site 42 in the AFRPA OU2 ROD is no further action.

Transformer oils may be present in the concrete floor of Building 3404. The Air Force attempted to remove the PCBs from the concrete. Minimal levels of PCBs were left and have been encapsulated to prevent exposure. The concrete was not addressed in the ROD. The County of Riverside has entered into a land use covenant with DTSC to ensure that the use of the building remains restricted to industrial activities due to PCB contamination inside Building 3404.

### 4.14.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site 42.

#### 4.14.1.1 Remedy Selection

The AFRPA OU2 ROD (May 2004) identified no further action as the CERCLA remedy. The land use covenant for the interior of Building 3404 between the County of Riverside and DTSC is referenced.

#### 4.14.1.2 Remedy Implementation

The no further action remedy selected does not require any action to be taken on the site. The referenced land use covenant restricts Building 3404 from residential use and calls for annual inspections of the encapsulated surface and maintenance as required. Residential use includes hospitals for human care, public or private schools for persons under 21 years of age, day care centers for children, and any permanently occupied human habitation other than those used for industrial purposes.

#### 4.14.1.3 System Operations/Operations and Maintenance

None for the CERCLA remedy.

#### 4.14.1.4 Progress Since the Last 5-Year Review

This is the first 5-year review for the site. Property was transferred to the County of Riverside.

### 4.14.2 Site 42 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of a review of related documents and interviews with government officials. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings. This site was not specifically addressed because it was added to the 5-year process after the meeting.

### 4.14.3 Site 42 5-Year Review Findings

This section describes the findings of the 5-year review conducted for Site 42.

#### 4.14.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator, was contacted as part of the 5-year review. He said Site 42 has been transferred to the County of Riverside.

The interview with Mr. Solander was conducted via telephone and he reviewed this section to confirm its accuracy.

#### 4.14.3.2 Site Inspection

No site inspection was performed.

#### 4.14.3.3 Risk Information Review

**Human Health Risk**

The ROD for this site was signed in 2004. The current PRG table, September 2008, obtained from the EPA website was reviewed. The residential soil PRG for Aroclor 1260 is unchanged from the PRG in the ROD at 0.22 mg/kg. The industrial PRG for Aroclor 1260 is also unchanged at 0.74 mg/kg.

**Ecological Risk**

Site 42 is in a developed area of the former March AFB. The potential for ecological risk for OU2 sites was evaluated in the OU2 RI/FS (Admin Record numbers 678-694). Because Site 42 was in a developed area, it was not evaluated for ecological risk. No

new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

#### 4.14.3.4 Data Review

No site data has been generated since the ROD was signed.

### 4.14.4 Site 42 Technical Assessment

The following conclusions support the determination that the actions performed at Site 42 are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** Based on the CERCLA no further action determination, no HASP/Contingency Plan is required.

***Implementation of Institutional Controls and Other Measures:*** Based on the CERCLA no further action determination, no institutional Controls are required. The referenced land use covenant between the County of Riverside and DTSC has been accomplished.

***Remedial Action Performance:*** None required for no further action.

***System Operations/O&M:*** None required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the AFRPA OU 2 ROD was signed.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.14.5 Site 42 Issues

No major deficiencies were noted during the 5-year review.

### 4.14.6 Site 42 Assessment

Site 42 is now part of the Ben Clark Public Safety Training Center. Building 3404 is a support building for the training center headquarters and classrooms. The no further action determination remains appropriate.

### 4.14.7 Site 42 Recommendations and Follow-Up Actions

None.

### 4.14.8 Protectiveness Statement

Human health and the environment are being protected.

### 4.14.9 Next Review

Site 42 was included in this 5-year review per the request of DTSC and should be included in the next 5-year review, five years from the completion of this review.

## 4.15 OPERABLE UNIT 1 GROUNDWATER PLUME

The OU1 ROD identified an OU1 groundwater plume. The plume extends from Site 31 south and east through Site 34, 29, 9, 14, 16, 10, 9, 5, 15 and 7. The OU1 plume is on March ARB, the former March AFB and extends off Base (Figure 4-15). The main source of the OU1 groundwater plume was suspected to be Site 31. The OU1 groundwater plume is an OU1 site and is included in the OU1 ROD (1996).

**Currently:** The OU1 plume is generally decreasing in size.

**Historic:** Groundwater sampling results from the OU1 plume detected several chemicals in greater than the Maximum Contaminant Level (MCL) for drinking water.

Two of the chemicals, Bis(2-ethylhexyl)phthalate and methylene chloride, were determined to be a lab contaminant after the ROD was signed. The 1996 and 1997 Annual Groundwater Monitoring Reports (Admin Record 802 and 995) listed them as a common laboratory contaminant. Bis(2-ethylhexyl)phthalate and methylene chloride are no longer a contaminants of concern.

Total phenols were listed as a component of the plume in the OU1 ROD. 1998/1999 Annual Monitoring Report (Admin Record 2088) stated that the phenols were most likely associated with the biodegradation of naphthalene, a common semi-volatile compound found in fuel. It was agreed that other fuel components (benzene, ethylbenzene, toluene, and xylenes) would be used to evaluate fuel groundwater contamination.

The remaining groundwater chemicals above the PRGs in the OU1 ROD are listed below.

**Table 4.15**
**OU1 Plume Groundwater Concentrations Exceeding MCLs in the OU1 ROD (1996)**

| Chemical | Maximum Concentration (µg/L) | MCL (µg/L) | Current MCL (µg/L) |
|---|---|---|---|
| PCE | 19 | 5 | 5 |
| TCE | 1400** | 5 | 5 |
| cis-1,2-Dichloroethene | 30 | 6 | 6* |
| Benzene | 420 | 1 | 1* |
| Carbon Tetrachloride | 3 | 0.5 | 0.5* |
| 1,1-Dichloroethene | 260** | 6 | 6* |
| 1,2-Dichloroethane | 25 | 0.5 | 0.5* |

* California MCL
** Same as the Site 31 Maximum Concentrations

### 4.15.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for OU1 plume.

#### 4.15.1.1 Remedy Selection

The OU1 ROD (1996) identified the remedial action as an expansion of the groundwater extraction and treatment at the base boundary in order to stop the migration of the onbase plume and to treat the contaminated water from the existing plume. The downgradient plume will be allowed to dissipate. Groundwater monitoring will be done to ensure the onbase portion of plume does not migrate off base, to ensure the maximum concentration of off base contaminants continues to fall, and to ensure the offbase plume does not threaten off base water supplies.

#### 4.15.1.2 Remedy Implementation

The original 9 extraction well system at the base boundary has been expanded to a 17 extraction well and 5 injection well system. The two original carbon vessels used to treat

the groundwater have been augmented by two additional carbon vessels. The expanded system includes wells at Site 4 and Site 7.

Since the OU1 ROD was signed in June 1996, the following offbase OU1 monitoring wells have been added:

| | |
|---|---|
| OBMW01A and B | RBEMW01A thru E |
| OBMW02B | RBEMW02A and B |
| OBMW03 | RBEMW03A and B |
| OBMW04A and B | RBEMW07A thru E |
| OBMW05A and B | RBEMW11A thru E |
| OBMW06A thru F | RBEMW12A thru E |
| OBMW07A and B | RBEMW13A thru E |
| OBMW08A thru D | OU1MW25 (installed in 2008) |
| OBMW09A and B | OU1MW27 (installed in 2008) |
| OBMW10A thru D | OU1MW24 (installed in 2009) |
| OBMW18 | |

#### 4.15.1.3 System Operations/Operations and Maintenance

The Site 31/EGETS treatment plant System Operations/Operations and Maintenance are conducted in accordance with the Revised Final Operations and Maintenance Plan, (Admin Record 1946). The following samples are taken:

- Monthly "mid bed" samples to monitor carbon consumption.
- Quarterly influent and effluent samples to monitor discharge requirements.
- Semi-annual extraction well samples to monitor contaminant trends.

In addition, influent and effluent flow rates are monitored. Quarterly process monitoring reports and quarterly discharge reports are generated. As part of the operation of this system, the wells are redeveloped to maintain groundwater pumping rates. The last redevelopment of an EGETS well was done in March 2009 in well EX05A.

The plume maps are redrawn each year in the Annual Monitoring Report based on that year's samples.

Site specific O&M costs are not readily available. O&M actions at March ARB/former March AFB are not done separately for each site, but are grouped into different contracts with the goal of providing a comprehensive environmental solution for the entire March ARB/former March AFB complex. It is difficult to break out site specific costs. Costs are generally in line with estimates.

#### 4.15.1.4 Progress since the Last 5-Year Review

Contaminant concentrations have dropped in most of the extraction wells. At the October 2006 RPM meeting, it was agreed to suspend operations at 10 EGETS extraction wells which had contaminant concentrations less than twice the MCLs. Additional groundwater monitoring was also agreed to at the RPM meeting. The additional monitoring will help determine if suspending operations at these wells has any effect on the plume. The 7 EGETS extraction wells that remain in operation are near Sites 4, 7 and 31.

The monitoring wells installed since the OU1 ROD was signed have better defined the plume. Most of the off-base monitoring wells installed after the completion of OU1 ROD were installed between 1997 and 2000. The 2006-2007 Annual Monitoring Report compares the plume maps from 2000 sampling year to the 2007 sampling. The OU1 plume is generally decreasing in size and slowly moving down gradient.

Locations for additional monitoring wells were presented at December 2007 RPM meeting. These wells should complete the OU1 monitoring well network.

### 4.15.2 OU1 Plume 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.15.3 OU1 Plume 5-Year Review Findings

This section describes the findings of the 5-year review for the OU1 plume.

#### 4.15.3.1 Interviews

No interviews were conducted for this site as part of the 5-year review. The 5-year review author was the person most knowledgeable about the OU1 plume.

#### 4.15.3.2 Site Inspection

The OU1 plume site inspection was done in conjunction with the Site 4, 7 and 31 site inspections. The only significant item noted was that extraction well 4EX02 was off; it was repaired and returned to service on February 4, 2008.

### 4.15.3.3 Risk Information Review

**Human Health Risk**

The following standards were identified as ARARs in the OU1 ROD. They were reviewed for changes that could affect protectiveness:

- MCLs for Primary Drinking Water (Title 22, CCR, Division 4, Chapter 15, Article 5.5, Section 64444.5
- National Primary Drinking Water Regulations (40 CFR 141.61, MCLs for Organic Contaminants)
- NPDES Permit for Cleanup Project at March ARB

The most restrictive MCLs for the contaminants of concern have not changed since the OU1 ROD was signed. The NPDES Permit has been reissued since the OU1 ROD, discharge limits have not changed.

**Ecological Risk**

The groundwater plume stays underground and doesn't impact surface water. No ecological risk is required.

### 4.15.3.4 Data Review

The 2006-2007 Annual Monitoring Report evaluates the groundwater in and around March ARB/former March AFB. Contained in this report are:

1) A comparison of the 2007 groundwater plumes to the 2000 groundwater plumes.
2) Sampling results from off-base water supply wells. Updated 2007-2008 sampling results recently became available. The updated sampling results are used.
3) An EGETS evaluation.

**2000 and 2007 Plume Comparison**

The OU1 Plume is generally decreasing in size. The plume is also moving to the south and southeast. Appendix E has the current concentrations of the chemicals listed in Table 4.15 for the OU1 Plume.

**Sampling Results from Off-Base Water Supply Wells**

The maximum detected concentrations in the water supply wells are summarized in the following table.

| Table 4.15.3.4 | | |
|---|---|---|
| **Water Supply Wells Contaminant Detections in Draft 2007-2008 Annual Monitoring Report** | | |
| **Well** | **Contaminant and Concentration (µg/L)** | **MCL (µg/L)** |
| Bowers | No contaminants detected | Not Applicable |
| Clarke1 | Chloroform, 0.97 | 100 |
| Indian | TCE, 0.73 | 5 |
| Mendez | No contaminants detected | Not Applicable |
| Nordarse | No contaminants detected | Not Applicable |
| Perry1 | TCE, 1.2 | 5 |
| Terao | Chloroform, 0.21F | Not Applicable |

F – Detected between the method detection limit and the reporting limit

Perry1 TCE levels are consistent with historic levels.

Data Quality Objectives have been prepared for the water supply wells. As stated in the Annual Monitoring Report, if the 95% upper confidence limit concentration for a Contaminant of Concern or indicator compound is within 50% of the MCL in samples collected from off-base water supply wells, then remedial options will be evaluated. The Annual Monitoring Report concluded that no action, other than continued monitoring, in required in accordance with the Data Quality Objectives.

The water supply wells are shown in Figure 4-15-1.

A similar analysis was also done on the water supply guard wells. No action, other than continued monitoring, was indicated.

**EGETS Evaluation**

The maximum concentrations of TCE, PCE and carbon tetrachloride in off-base wells were evaluated to help determine the effectiveness of EGETS capture. A summary of the overall trends in off-base wells is provided below:

- The maximum concentration of PCE of 11.6 µg/L (monitoring well OBMW05B) in June 2004 is greater than the maximum concentration of 5.5 µg/L (OBMW02B) in June 2007.
- The maximum concentration of TCE of 41 µg/L (5MW14) in September 1993 is greater than the maximum concentration of 19 µg/L (5MW07) in June 2007.
- The maximum concentration of carbon tetrachloride of 2.7 µg/L (5MW36) in July 1999 is greater than the maximum concentration of 0.87 µg/L (OBMW05A) in May 2007.

The decreasing trends indicate that the EGETS is effective.

### 4.15.4 OU1 Plume Technical Assessment

The following conclusions support the determination that the OU1 groundwater plume remedial actions are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The HASP for Long-Term Monitoring, Long-Term Operation and Long-Term Operations and Maintenance is in place and properly implemented.

***Implementation of Institutional Controls and Other Measures:*** Riverside County officials have been notified of the properties offbase that are impacted by the OU1 Plume and have been advised to deny the installation of wells. For property that has been transferred and is situated over the OU1 plume, such as property associated with Site 4 and Site 7, deed restrictions and a State Land Use Covenant are in place to restrict use of groundwater.

***Remedial Action Performance:*** Results of groundwater sampling have indicated that the OU1 remedial actions are effectively remediating the groundwater contamination.

***System Operations/O&M:*** System operation is acceptable and documented by the quarterly process monitoring reports and annual monitoring report.

***Opportunities for Optimization:*** An optimization study (Final Remedial Process Optimization and OU1 Remedy Recommendations Report, August 2007) was performed. The primary objectives of this study included:

- Developing an updated Conceptual Site Model along the eastern base boundary
- Determining if the EGETS can be effectively monitored and optimized using existing data and the updated Conceptual Site Model
- Utilizing the updated Conceptual Site Model and groundwater fate and transport model to identify data gaps regarding offbase plume migration, identification of potential unknown sources, and delineation of the plume at the base boundary
- Evaluating and developing recommendations to optimize the monitoring program to maintain the data required for evaluation of the current remedy in relation to the remedial action objectives established in the OU1 ROD
- Providing data for the next 5-year review

The study recommended:

- Partial EGETS operations (current operation) continue while Site 4 and Site 7 continue to be assessed. This recommendation was implemented.
- Evaluation of additional pumping scenarios to evaluate additional groundwater extraction at Site 4, downgradient of Site 31B, and at Site 7. These recommendations have not been implemented yet. The current evaluation of Site 4 suggests no additional pumping is needed and the current Site 7 evaluation is focusing on source removal.

- Additional monitoring wells be installed, both on-base and off-base. The recommended additional monitoring wells were prioritized at the December 2007 groundwater meeting and later approved by the regulators. The well status was updated at the January 2009 groundwater meeting. Some wells were installed, some are not required and some continue to be deferred until more monitoring from existing wells is done.
- The groundwater sampling schedule be revised. The proposed revisions were presented at the December 2007 groundwater meeting. After additional information was provided after the meeting, a modified version of the revised sampling plan was approved by the regulators

***Early Indicators of Potential Remedy Failure:*** Extraction well monitoring and groundwater monitoring led to the discovery of an additional contamination hot spot at Site 7. Additional groundwater evaluation is being done at Site 4. Continued evaluation of Site 31 may lead to the installation of an additional extraction well. However, the overall plume is stable or shrinking, which does not indicate remedy failure.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU 1 ROD was signed that call into question the protectiveness of the remedy.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.15.5 OU1 Plume Issues

No major deficiencies were noted during the 5-year review.

### 4.15.6 OU1 Plume Assessment

Based on the current monitoring well network, the OU1 plume is generally decreasing in size. Although some contaminants are detected in off-base water supply wells, the

contaminant concentrations are small and not increasing. The EGETS system is in place and functioning properly.

### 4.15.7 OU1 Plume Recommendations and Follow-Up Actions

Continue to monitor the plume and evaluate the monitoring well network.

### 4.15.8 Protectiveness Statement

The selected remedy is currently protective of human health and the environment. Long term protectiveness will be ensured by continued groundwater monitoring.

### 4.15.9 Next Review

The OU1 plume should be included in the next 5-year review, five years from the completion of this review.

## 4.16 SITE L – FORMER NCO CLUB SWIMMING POOL/PCB SITE

Site L, formerly a swimming pool at the NCO Club, is east of Riverside Drive and north of Meyer Drive (Figure 4-16). It is on the former March AFB and the environmental cleanup is controlled by AFRPA. Site L is an OU4 site and is included in the OU4 ROD, September 2005.

**Currently:** Transferred to the March Joint Powers Authority. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant.

**Historic:** The swimming pool at Site L was reportedly constructed in 1953 along with the NCO Club. The swimming pool was later used to store waste materials. The pool and waste were covered with soil. A removal action was conducted at in 1996. The contents of the pool (mostly construction debris and soil) were removed and properly disposed of. There were no drums or transformers in the pool. The pool structure was removed and confirmation soil samples were taken from the sidewalls and bottom of the excavation. PCB was found in several samples above residential and industrial PRGs. Additional samples were taken around the swimming pool and they also contained PCBs. Seven samples contained PCBs at concentrations ranging from 0.054 mg/kg to 1.79 mg/kg. All but one contained PCBs above the 1998 EPA Region IX residential PRG (0.2 mg/kg. Aroclor 1254 was the PCB most often detected.

This led to several rounds of additional soil sampling. The sampling found PCBs north and south of the pool. It was concluded that a single contaminant source was unlikely and that the contamination was probably the result of generalized application of PCB containing oils for weed or dust control.

The site was covered with asphalt to reduce the risk in 2001.

The risks were calculated using the 2004 PRGs. Based on the 95 percent upper confidence limit and average residual concentration that remains on the site, the industrial cancer risk is approximately $1 \times 10^{-6}$ and the residential cancer risk is approximately $1 \times 10^{-5}$. The industrial non-cancer risk is 0.2 and the residential non-cancer risk is 2.

### 4.16.1 Remedial Actions

This section describes the remedy selection, implementation, system operations, and cleanup process for Site L.

#### 4.16.1.1 Remedy Selection

The AFRPA OU4 ROD, September 2005, references the removal action and asphalt cover of the site and provides further protection with Institutional Controls.

#### 4.16.1.2 Remedy Implementation

Land use restrictions have been incorporated in the deed as grantee covenants and a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside. The specific deed restrictions from the OU4 ROD are in Appendix D.

The AFRPA OU4 ROD also states that the 5-year review report will address whether the Institutional Controls in the ROD was included in the deed, if property was transferred, whether owners and State and local agencies were notified of the Institutional Controls affecting the property, and whether use of the property has conformed to the Institutional Controls. The 5-year review will make recommendations on the continuation, modification or elimination of annual reports and Institutional Control monitoring frequencies.

#### 4.16.1.3 System Operations/Operations and Maintenance

No system operation is required, annual inspections of the Institutional Controls are made in accordance with the State Land Use Covenants at the former March AFB.

#### 4.16.1.4 Progress Since the Last 5-Year Review

This is the first 5-year review for this site. Transferred to the March Joint Powers Authority. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside.

### 4.16.2 Site L 5-Year Review Process

The 5-year review was performed by Eric Lehto, Air Force RPM for March ARB.

The 5-year review consisted of the following activities: a review of related documents, interviews with government officials, and a site inspection. The public was informed of the 5-year review at the November 7, 2007 and April 30, 2008 RAB meetings.

### 4.16.3 Site L 5-Year Review Findings

This section describes the findings of the 5-year review for Site L.

#### 4.16.3.1 Interviews

Rick Solander, BRAC Environmental Coordinator, was contacted as part of the 5-year review. He said Site L has been transferred to March Joint Powers Authority. A State Land Use Covenant and deed restrictions are in place. March Joint Powers Authority is now performing the annual inspections.

The interview with Mr. Solander was conducted via telephone and he reviewed the draft 5-year review to confirm its accuracy.

#### 4.16.3.2 Site Inspection

The site inspection was performed on January 30, 2008 by Eric Lehto. No evidence of residential use or unauthorized digging was observed. Warning signs are in place. The asphalt cover is in good repair.

The site inspection form from the EPA 5-year review guidance was completed and included in Appendix A.

#### 4.16.3.3 Risk Information Review

**Human Health Risk**

The ROD for this site was signed in September 2005. The current PRG tables, dated October 2004, obtained from the EPA website, were reviewed. The residential soil PRG for high risk PCBs, e.g. Aroclor 1254, is only slightly changed from the earliest site risk calculations in 1998 (0.20 mg/kg) to the current value of 0.22 mg/kg.

**Ecological Risk**

Site L is in a developed area of the former March AFB; ecological risk was not evaluated. No new ecological receptors have been introduced to the site. An ecological risk assessment is not required.

### 4.16.3.4 Data Review

The Annual Inspection Report for Sites 6, 17, 19 and L was reviewed (Admin Record 2234). No discrepancies were noted.

### 4.16.4 Site L Technical Assessment

The following conclusions support the determination that the actions performed at Site L are expected to be protective of human health and the environment.

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

***HASP/Contingency Plan:*** The site is restricted from residential land use, no residential uses are currently on the site and no future residential uses are planned. Institutional Controls are in place in the form of deed restrictions and a State Land Use Covenant. The deed restrictions and State Land Use Covenant are recorded with the County of Riverside. No HASP/Contingency Plan is required.

***Implementation of Institutional Controls and Other Measures:*** The prohibition against residential land use has been identified in deed restrictions and a State Land Use Covenant, both on file with the County of Riverside. Inspections have indicated and verified no breaches in the institutional control restrictions.

***Remedial Action Performance:*** The land use restriction remains in place. The site has no residential land use.

***System Operations/O&M:*** None required.

***Opportunities for Optimization:*** None identified.

***Early Indicators of Potential Remedy Failure:*** None identified.

***Question B: Are the assumptions used at the time of the remedy selection still valid?***

***Changes in "Standards" and "To Be Considered":*** This 5-year review did not identify any "standards" or "to be considered" that would require a different remedy.

***Changes in Exposure Pathway:*** No changes in site conditions that affect exposure pathways were identified in the course of the 5-year review.

***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.

***Changes in Risk Assessment Methodologies:*** There have been no changes in risk assessment methodologies since the OU 4 ROD was signed that call into question the protectiveness of the remedy.

***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*** No.

### 4.16.5 Site L Issues

No major deficiencies were noted during the 5-year review.

### 4.16.6 Site L Assessment

The asphalt cap remains in place and is in good repair. Warning signs are posted on several locations at the site. Land use restrictions are recorded in property transfer documents. A State Land Use covenant and deed restrictions are in place.

### 4.16.7 Site L Recommendations and Follow-Up Actions

Institutional Control annual reports and monitoring will continue.

### 4.16.8 Protectiveness Statement

The selected remedy is protective of human health and the environment.

### 4.16.9 Next Review

Five year reviews are required as long as contamination remains in place above unrestricted levels. The next review should be conducted within 5 years of the completion of this review.

## 5.0 LIST OF DOCUMENTS REVIEWED

5-Year Review Report for Former March Air Force Base and March Air Reserve Base, September 2003

2003-2004 Annual Monitoring Report for Sites 18 and 33, May 2005

2004-2005 Annual Monitoring Report for Petroleum Sites, May 2006

2006-2007 Annual Monitoring Report for Petroleum Sites (draft became final), October 2006

Active Remediation Complete Report for Site 31A, June 2002

Annual Inspection Reports for Sites 1 and 11, various dates

Annual Inspection Reports for Sites 6, 17, 19 and L, January 2007

Annual Monitoring Report (Groundwater Monitoring), various dates

Annual Operations, Monitoring and Maintenance Report, January through December 2004, Operable Unit 1, IRP Site 4, August 2005

Annual Operations, Monitoring, and Maintenance Report, January 2005 through December 2005, Operable Unit 1, IRP Site 4, February 2006

Annual Operations, Monitoring, and Maintenance Report, January 2006 through December 2006, Operable Unit 1, IRP Site 4, April 2007

Annual Operations, Monitoring, and Maintenance Report, January through December 2004, Operable Unit 2, IRP Site 6, August 2005

Annual Operations, Monitoring, and Maintenance Report, January through December 2005, Operable Unit 2, IRP Site 6, April 2006

Annual Operations, Monitoring, and Maintenance Report, January through December 2006, Operable Unit 2, IRP Site 6, May 2007

Base General Plan (March ARB), December 2005

Federal Facilities Agreement, September 1990

Final Closure/Post Closure Maintenance Plan, Site 6, May 1995

Final Closure/Post Closure Maintenance Plan, Cell B Expansion, Site 6, September 1995

Final O&M Work Plan, Site 6, July 1999

Final Remedial Process Optimization and OU1 Remedy Recommendations Report, August 2007

Final Project Report Sites 31 and 34 Investigations, January 2003

Finding of Suitability for Early Transfer (FOSET) for Parcels D-1, I-2, J-4, and K-5D South, February 2007

LFG Sampling Report and Work Plan Addendum, Site 4, February 2003

LFG Sampling Report, Site 6, April 2003

Modification to the Site-Specific Removal Action Memorandum, Site 1, 9 25, and 12

UST Locations and Consolidation to OU2 Site 6, February 1996

O&M Work Plan, OU-1, Site 4, July 1999

OU1 Record of Decision (ROD), June 1996

OU1 Remedial Investigation/Feasibility Study (RI/FS), July 1994

OU2 RI/FS, July 1997

OU2 ROD (AFRPA sites), May 2004

OU2 ROD for AFRC Sites 1, 11, 37 and 39, September 2005

OU4 Focused RI, July 2004

OU4 ROD, September 2005

Process Monitoring Report, OU1 Sites, various dates

Region 9 Preliminary Remediation Goals, various dates

Revised Final O&M Plan, Site 31/EGETS (Operable Unit 1 Plume) and Site 18, November 2002

Site 4 Rising Groundwater Evaluation, November 2007

Site 12 Remedial Action Complete, April 2008

Site Specific Action Memorandum, Site 6, February 1995

Supplemental Remedial Investigation/Focused Feasibility Study for Site 8 and Site 36, January 2009