DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER

JUN 10 2013

MEMORANDUM FOR SEE DISTRIBUTION

FROM: AFCEC/CIBW
3411 Olson Street
McClellan, CA 95652-1003

SUBJECT: Revised Figures and CD, Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report, former Mather Air Force Base (Mather), California

1. Attached are revised figures and CD for the Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report issued 10 May 2013. Many of the figures were inadvertently labeled Draft on that report. We regret any inconvenience this may have caused.

2. Should you have questions or concerns please contact me at (916) 643-0830, ext. 202, or Bill Hughes, CNGS, at (916) 997-1564.

DOUGLAS L. SELF
BRAC Environmental Coordinator

Attachment:
Revised Figures and CD for Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report (URS 2013)

DISTRIBUTION:
AFCEC/CIBW, Attn: Administrative Record (complete hard copy with corrections + CD)
AFCEC/CIBW-Lackland, Attn: Stanley Pehl (without encl.)
AFCEC/CIBW-McClellan, Attn: Paul Bernheisel (without encl.)
CNGS, Attn: Bill Hughes
CalRecycle, Attn: Gino Yekta
CVRWQCB, Attn: Marcus Pierce
DTSC, Attn: Franklin Mark
Noblis, Attn: Ken Smarkel (without encl.)
Sacramento County Airport System, Attn: Philip Benedetto
Sacramento County EDD, Attn: Rick Balazs
SMAQMD, Attn: Angela Thompson (CD only)
TechLaw, Attn: Sharon Halper (CD only)
URS, Attn: Paul Graff (without encl.)
U.S. EPA Region IX, Attn: John Lucey

18600771.23003

10 June 2013

Mr. Stanley Pehl
AFCEC/CIBW
2261 Hughes Avenue, Suite 155
Lackland AFB TX 78236-9853

Subject: Revised Figures and CD, Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report,
Contract FA4890-06-D-0006, Task Order 0007
Former Mather Air Force Base (Mather), California

Dear Mr. Pehl:

URS Group, Inc. (URS) is submitting the attached revised figures and compact disc (CD) for the Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report for the former Mather Air Force Base (Mather), California. The report was initially issued on 10 May 2013, but it was discovered that many of the figures were inadvertently still labeled "DRAFT", both in the hard copy report and on the CD. The "DRAFT" label has been removed from the attached revisions.

We regret this inconvenience. Should you have questions or comments, please contact Paul Graff at (916) 634-1818 or Tim Gere at (916) 679-2022.

Sincerely,
URS Group, Inc.

Paul Graff, P.G.
Project Manager

Attachment:
Revised Figures and CD, Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report

cc: See distribution list, AFCEC/CIBW cover letter
https://afcee-eim.brooks.af.mil/Projects/PM/DZ
URS Project File (18600771.23003)

URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
Tel: 916.679.2000
Fax: 916.679.2900

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER

MEMORANDUM FOR SEE DISTRIBUTION

MAY 10 2013

FROM: AFCEC/CIBW
3411 Olson Street
McClellan, CA 95652-1003

SUBJECT: Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report, former Mather Air Force Base (Mather), California

1. Attached is the Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report.

2. Any comments on the report will be addressed in the next quarterly report or fact sheet, and any required changes to the annual report will be incorporated in the Annual and Fourth Quarter 2013 Mather Groundwater Monitoring Report, which is expected to be issued in April 2014.

3. Should you have questions or concerns please contact me at (916) 643-0830, ext. 202, or Bill Hughes, CNGS, at (916) 997-1564.

DOUGLAS L. SELF
BRAC Environmental Coordinator

Attachment:
Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report (URS 2013)

DISTRIBUTION:
AFCEC/CIBW, Attn: Administrative Record
AFCEC/CIBW-Lackland, Attn: Stanley Pehl (without encl.)
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TechLaw, Attn: Sharon Halper
URS, Attn: Paul Graff (without encl.)
U.S. EPA Region IX, Attn: John Lucey

18600771.23003

10 May 2013

Mr. Stanley Pehl
BRAC Program Manager
HQ AFCEC/CIBW
2261 Hughes Avenue, Suite 155
Lackland AFB TX 78236-9853

Subject: Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report,
Contract FA4890-06-D-0006, Task Order 0007
Former Mather Air Force Base (Mather), California

Dear Mr. Pehl:

In accordance with our contract, URS Group, Inc. (URS) is submitting the Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report for the former Mather Air Force Base (Mather), California. The Report presents the activities conducted and data collected for the Mather Groundwater Monitoring Program during 2012.

Should you have questions or comments, please contact Paul Graff at (916) 634-1818 or Tim Gere at (916) 679-2022.

Sincerely,
URS Group, Inc.

Paul Graff, P.G.
Project Manager

Attachment:
Annual and Fourth Quarter 2012 Mather Groundwater Monitoring Report

cc: See distribution list, AFCEC/CIBW cover letter
https://afcee-eim.brooks.af.mil/Projects/PM/DZ
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ANNUAL AND FOURTH QUARTER 2012
MATHER GROUNDWATER MONITORING REPORT
FORMER MATHER AIR FORCE BASE, CALIFORNIA

Prepared for:

AFCEC/CIBW
Stanley Pehl
2261 Hughes Avenue, Suite 155
Lackland AFB, Texas 78236-9853

In Support of:

AFCEC/CIBW
3411 Olson Street
McClellan, California 95652-1003

Prepared by:

URS Group, Inc.
2870 North Gateway Oaks Drive, Suite 150
Sacramento, California 95833

May 2013

STATEMENT OF LIMITATIONS

DEPARTMENT OF THE AIR FORCE - AIR FORCE CIVIL ENGINEER CENTER
FORMER MATHER AIR FORCE BASE
ANNUAL AND FOURTH QUARTER 2012 MATHER GROUNDWATER MONTIROING REPORT

May 2013

This report was prepared by the staff of URS Group, Inc. (URS) under the supervision of registered professionals. The data interpretation, conclusions, and recommendations presented in the report were governed by URS' experience and professional judgment. This report has been prepared based on data current at the time of preparation. Assumptions based on this data, although believed reasonable and appropriate based on the data provided herein, may not prove to be true in the future as new data are collected. The conclusions and recommendations of URS are conditioned upon these assumptions.

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ACRONYMS AND ABBREVIATIONS

ACL	aquifer cleanup level
AC&W	Aircraft Control and Warning
AFBCA	Air Force Base Conversion Agency
AFCEC	Air Force Civil Engineer Center
AFRPA	Air Force Real Property Agency
ARAR	applicable or relevant and appropriate requirement
avg	average
Bd	deep Unit B well
bgs	below ground surface
Boeing	The Boeing Company
Bs	shallow Unit B well
Bu	upper B unit
Cal Am	California American Water Company
CCl_4	carbon tetrachloride
CCR	California Code of Regulations
CFR	Code of Federal Regulations
COC	contaminant of concern
Contingency Plan	Mather AFB Off-Base Water Supply Contingency Plan
CVWB	Central Valley Regional Water Quality Control Board
CZA	capture zone analysis
DCA	dichloroethane
DCE	dichloroethene
DCP	dichloropropane
DL	detection limit
EPA	United States Environmental Protection Agency
FD	field duplicate
FFS	Focused Feasibility Study
ft/ft	feet/foot per foot
GAC	granular-activated carbon
gpm	gallons per minute
Granite	Granite Construction Company
HSG	hydrostratigraphic
IRCTS	Inactive Rancho Cordova Test Site
IRP	Installation Restoration Program
IT Corp.	International Technology Corporation
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
lbs/day	pounds per day
LF	landfill
LMT	Laguna-Mehrten Transition

ACRONYMS AND ABBREVIATIONS
Continued

Mather	the former Mather Air Force Base
MAFB	Mather Air Force Base (well designator)
MBS	Main Base/SAC Area (well designator)
MBSA	Main Base/SAC Area
MCL	maximum contaminant level
MS/MSD	matrix spike/matrix spike duplicate
msl	mean sea level
MWH	MWH Americas, Inc.
NEP	Northeast Plume
NS	normal sample (sample designator and Section 8)
OPS	Operating Properly and Successfully
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
POL	petroleum, oil, and lubricants
PVC	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RL	reporting limit
ROC	reactive organic compound
ROD	Record of Decision
SAC	Strategic Air Command
SAP	Sampling and Analysis Plan
SCWA	Sacramento County Water Agency
TB	trip blank
TCE	trichloroethene
TDS	total dissolved solids
Teichert	Teichert Aggregates Company or Teichert Land Company
TPH	total petroleum hydrocarbon
TPH-d	total petroleum hydrocarbons as diesel
TPH-g	total petroleum hydrocarbons as gasoline
TSS	total suspended solids
URS	URS Group, Inc.
UTL	upper tolerance limit
VOC	volatile organic compound

ACRONYMS AND ABBREVIATIONS
Continued

WP-07	Site 7
4Q12	fourth quarter of 2012
µg/L	micrograms per liter

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EXECUTIVE SUMMARY

In accordance with Task Order 0007, Contract FA4890-06-D-0006, URS Group, Inc. has prepared this *Annual and Fourth Quarter 2012 (4Q12) Mather Groundwater Monitoring Report* for the Air Force groundwater remediation program at the former Mather Air Force Base (Mather) and vicinity. The goal of the annual report is to present and interpret groundwater monitoring and groundwater treatment system monitoring data to assess the performance of the groundwater components of the remedies selected in the relevant Mather decision documents (Air Force Base Conversion Agency [AFBCA], 1993; AFBCA, 1995; AFBCA, 1996; AFBCA, 1997; Air Force Real Property Agency [AFRPA], 2008; and AFRPA, 2010a). The performance assessments document successful groundwater remediation, identify areas of uncertainty in the assessment regarding distribution and movement of groundwater contamination at Mather, and recommend steps to address any significant uncertainty. Additionally, the reports monitor compliance with the applicable cleanup goals, water quality standards, and approved decision documents. Appendices to this report contain extensive summaries of current and historical analytical data and groundwater elevation trends.

The groundwater monitoring program includes remedial performance monitoring of three groundwater extraction and treatment systems that operate on separate plumes: the Aircraft Control and Warning (AC&W) Site, Site 7, and Main Base/Strategic Air Command (SAC) Area plumes. The program also includes Northeast Plume (NEP) monitoring and post-closure monitoring at three closed landfills (LF-03, LF-04, and WP-07) that contain waste beneath engineered landfill caps. The off-base monitoring program has additional objectives that address the chlorinated solvent plume near off-base water supply wells.

The selected remedial alternatives for the Groundwater Operable Unit (OU) Main Base/SAC Area Plume, Site 7 Plume, and NEP at Mather are documented in the Superfund Record of Decision (ROD), Soil OU Sites and Groundwater OU Plumes (AFBCA, 1996) as modified by the Explanation of Significant Difference (AFRPA, 2010a) and include groundwater extraction, air stripping with groundwater injection, groundwater monitoring for the Main Base/SAC Area and Site 7 plumes, and long-term monitoring for the NEP, with institutional controls to prevent exposure to the contaminated groundwater. The selected remedial alternative for the AC&W groundwater plume is documented in the AC&W ROD (AFBCA, 1993), as modified by two Explanation of Significant Difference documents (AFBCA, 1997; AFRPA, 2008) and includes groundwater extraction, air stripping, injection of treated effluent, and institutional controls to prevent exposure to the contaminated groundwater; injection was supplemented by surface water discharge in 1997 under authority of the 1997 Explanation of Significant Difference. A pipeline that discharges treated water from the AC&W treatment system to Mather Lake was constructed in 1997; the injection wells have not been used since mid-1997 and were permanently decommissioned in 2009. Institutional controls were added by the 2008 ESD to prevent exposure to the contaminated groundwater.

Following is a summary of notable results and observations during 2012 for each groundwater monitoring program. The discussions below indicate where changes in contaminant concentration suggest changes in contaminant distribution or remedial progress (or areas where downgradient migration or seasonal fluctuation within the plume[s] may be occurring).

Northeast Plume Monitoring Program. The NEP, with apparent source areas at Northeast Perimeter Landfills LF-03 and LF-04, was selected for a remedial action of long-term monitoring under the Groundwater OU (AFBCA, 1996). The volatile organic compound (VOC) contamination present at the NEP is addressed under the Groundwater OU; the NEP VOC monitoring also satisfies some Landfill OU groundwater monitoring requirements.

Historical data trends, current groundwater levels, and the hydrogeologic conceptual model indicate the aquifer cleanup level volume is isolated to a few wells in close proximity to landfills LF-03 and LF-04

and is not expected to expand laterally. In 2012, tetrachloroethene (PCE) was detected below its cleanup level and cis-1,2-dichloroethene (DCE) was detected exceeding its cleanup level (but at a lower concentration than in 2011) in C zone well MAFB-398C, where data collected between 2009 and 2011 indicated that concentrations of chemicals exceeding cleanup levels had migrated to greater depths than previously observed.

The current monitoring network of the NEP wells is adequate to meet the corrective action monitoring requirements specified in the ROD.

Contaminant of Concern	Cleanup Level (µg/L)	Well	Maximum 2012 Detection (µg/L)
cis-1,2-Dichloroethene	6.0	MAFB-132	38
Tetrachloroethene	5.0	MAFB-132	33
Carbon tetrachloride	0.5	--	not detected
Chloromethane	3.0	--	not detected
1,2-Dichloropropane	5.0	MAFB-398C	0.5 J

J = estimated concentration
µg/L = micrograms per liter

Landfill Post-Closure Monitoring Programs. Post-closure monitoring programs are required for LF-03 and LF-04, as well as for the landfill at Site 7 (WP-07) located on the south side of Mather. Monitoring includes detection monitoring for selected VOCs and also for non-VOCs, which include metals and general minerals for LF-03 and LF-04, and metals for WP-07. The NEP and Site 7 Plume remedial actions for VOCs were selected under the Groundwater OU and are discussed in Sections 3.0 and 5.0, respectively.

With the exception of nickel and chromium, metal concentrations detected in samples collected from landfill wells were generally below calculated background concentrations for each landfill. The evaluation of nickel and chromium exceeding calculated background concentrations in LF-03 and LF-04 was further addressed in 2012 by installing monitoring well MAFB-465 with a PVC screen upgradient of MAFB-132, a LF-04 well with nickel and chromium concentrations greater than background concentrations. Initial sample results support the hypothesis that the metals exceeding background concentrations are associated with stainless steel screens; however, three more quarterly samples will be collected to confirm this hypothesis.

AC&W Performance Monitoring. During 2012, the AC&W treatment system consisted of six active extraction wells and the treatment plant. The AC&W treatment plant ceased operating on 29 December 2012 due to vandalism and the theft of crucial system components. Consequently, all of the extraction wells were shut down. The system was restarted on 15 March 2013. All treated water in 2012 was discharged to Mather Lake. During 2012, the treatment system operated at an average flow rate of 99 gallons per minute (gpm) with an average trichloroethene (TCE) influent concentration of 6.3 micrograms per liter (µg/L). The system removed approximately 2.7 pounds of TCE during 2012. Total influent concentrations have declined from a high of 170 µg/L observed in three samples in 1995 through 1997. The maximum TCE concentration observed in the AC&W wells sampled during 2012 was 28 µg/L in monitoring well MAFB-453. Remediation of the plume is progressing, as indicated by the continued decline in TCE concentrations from samples collected from monitoring wells and extraction wells in the central and downgradient portions of the plume.

Site 7 Performance Monitoring. The Site 7 groundwater treatment system consists of two extraction wells (7-EW-01 and 7-EW-02), the groundwater treatment plant, and four injection wells. The extraction

wells operated at a combined average flow rate of 45 gpm during 2012 and removed approximately 3.7 pounds of VOCs from groundwater. The average influent total VOC concentration was approximately 19 µg/L. Decreasing concentration trends in the extraction wells and in nearby monitoring wells show the effectiveness of the groundwater extraction. The table below presents the maximum contaminant of concern (COC) detections in groundwater wells that monitor the Site 7 Plume; only trichloroethene and 1,2- dichloroethane (DCA) were detected at concentrations greater than their respective aquifer cleanup levels (ACLs). Detections from perched zone wells are not included in the table.

Contaminant of Concern	Cleanup Level (µg/L)	Well	Maximum 2012 Detection (µg/L)
1,1 -Dichloroethene	6.0	MAFB-149	0.5
1,2-Dichloroethane	0.5	MAFB-041	3.7
cis-1,2-Dichloroethene	6.0	MAFB-041	4.9
Benzene	1.0	--	not detected
1,4-Dichlorobenzene	5.0	--	not detected
Chloromethane	3.0	--	not detected
Vinyl chloride	0.5	--	not detected
Trichloroethene	5.0	MAFB-041	17
Tetrachloroethene	5.0	MAFB-041	1.2
Total petroleum hydrocarbons as diesel	100.0	MAFB-413	21

µg/L = micrograms per liter

In the perched zone, which occurs at roughly 50 feet below ground surface (approximately 25 feet above mean sea level), the only well sampled in 2012 was 7-PZ-37P. TCE was the only COC detected in the perched zone at a concentration (5.2 µg/L) greater than the ACL (5.0 µg/L) for the underlying aquifer.

Main Base/SAC Area Performance Monitoring. In 2012, the Main Base/SAC Area remedial system consisted of 26 active extraction wells, the treatment plant with 2 air stripping towers to remove VOCs, and four injection wells. During 2012, the Main Base/SAC Area extraction wells operated at a combined average flow rate of 1,471 gpm and removed 118 pounds of VOCs from groundwater. Beginning in September 2011, due to injection well operations and maintenance issues that have restricted well capacity, the Air Force began discharging approximately 300 to 500 gpm of treated groundwater into the nearby West Drainage Canal that ultimately flows to Morrison Creek, a tributary to the Sacramento River. COCs for the Main Base/SAC Area Plume, and their maximum observed concentrations for 2012, are presented in the table below.

Contaminant of Concern	Cleanup Level (µg/L)	Well	Maximum 2012 Detection (µg/L)
1,2-Dichloroethane	0.5	MBS EW-2AR	0.1 J
cis-1,2-Dichloroethene	6.0	MBS EW-2AR	0.4 J
Benzene	1.0	MAFB-338	0.05 J
Carbon tetrachloride	0.5	MBS EW-2AR	12
Xylenes	17.0	MAFB-349	0.3 J
1,1-Dichloroethene	6.0	MBS EW-2AR	1.2
Chloromethane	3.0	MAFB-462	0.2 J
Trichloroethene	5.0	MBS EW-2AR	15
Tetrachloroethene	5.0	MAFB-181	28
Total petroleum hydrocarbons as gasoline	15.0	MAFB-419	26
Total petroleum hydrocarbons as diesel	100	--	not detected

J = estimated concentration
µg/L = micrograms per liter

The Main Base/SAC Area Plume is observed in three main hydrostratigraphic units: the water table (includes Units A and Bu), Unit B, and Unit D. Many of the wells that monitor the Main Base/SAC Area plume are sampled on a biennial frequency and were not sampled in 2012. Accordingly, the following assessment is based on data collected in 2011 and 2012. The maximum COC detections from wells completed across or just below the water table continue to be observed at the Site 57 source area, where hot spot (10 times the ACL) concentrations are observed for TCE and carbon tetrachloride (CCl_4), and at groundwater monitoring well MAFB-439, where hot spot concentrations were observed for PCE and CCl_4 in 2011. The interpreted extent of the Site 57 hot spot appears to be stable, likely due to extraction at MBS EW-1ABu, EW-2ABu, EW-4ABu, EW-5ABu, and EW-2AR.

The Unit B VOC plume was generally stable during 2012. The estimated capture area associated with MBS EW-13BuB is slightly smaller relative to that of 2011, and a small portion of the Southwest Lobe TCE plume may be beyond the estimated 2012 capture zone.

The Unit D plume was defined by detections of TCE, PCE, and CCl_4 greater than cleanup levels. PCE is at hot spot concentrations beneath the northwest base boundary (along the axis of the plume). CCl_4 is at hot spot concentrations at off-base location MAFB-318. The CCl_4 concentration detected at MAFB-318 (6.6 µg/L) was the highest CCl_4 concentration detected beyond the boundaries of Mather. CCl_4 concentrations at MAFB-318 have shown a gradually increasing trend since approximately 2002 with a more drastic increase after approximately 2009.

Off-Base Water-Supply Well Monitoring. Ten high-volume, off-base groundwater production wells are sampled regularly to monitor for evidence of VOC contaminants originating at Mather. The two Juvenile Hall supply wells (OFB-51 and OFB-52) had a treatment system operating during 2012; influent water was treated by granular-activated carbon (GAC). A carbon change-out was performed at the Juvenile Hall Treatment Plant on 20 March 2012. The GAC system was reinstalled at the Moonbeam well (OFB-04) in 2012 because CCl_4 concentrations exceeded the threshold requiring the Air Force to operate the system per Revision 1 of the *Mather AFB Off-Base Water Supply Contingency Plan* (AFRPA, 2008).

Twenty-nine privately owned water supply wells were sampled during 2012. PCE and TCE were detected in all four quarterly samples collected from OFB-72 at concentrations ranging from 0.1 to 0.3 µg/L and 1.6 to 2.1 µg/L, respectively. Detections less than or equal to 0.2 µg/L of cis-1,2-DCE were also reported in the 2Q12, 3Q12, and 4Q12 samples from OFB-72. Water from this well is used solely for dust control on mining roads; it is not used as a potable water supply. VOC detections in other privately owned wells that have been sampled annually were consistent with historical results. All detections were less than respective Safe Drinking Water Act maximum contaminant levels (MCLs) for detected constituents.

PLUME CAPTURE SUMMARY

Based on the 2012 plume distribution and estimated capture zones developed using 4Q12 potentiometric surface data, the plumes being remediated by groundwater extraction and treatment are almost completely captured. The table below summarizes percent capture and exceptions to capture for each plume treated by groundwater extraction.

Plume	Hydrostratigraphic Unit	Percent Capture*	Comments
AC&W	C	100	Plume is captured.
Site 7	B/C	100	Plume is captured.
Main Base/ SAC Area	WT	98	Small parts of the TCE and CCl_4 plumes may be beyond capture in the upgradient part of the water-table plume at MAFB-405.
	B/C	98	Approximately 2 percent of the Southwest Lobe that may be beyond capture.
	D	100	Plume is captured.

*Percent capture was calculated based on areal extent of the composite plume in the target unit.

AC&W = Aircraft Control and Warning
CCl_4 = carbon tetrachloride
SAC = Strategic Air Command
TCE = trichloroethene

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1.0 INTRODUCTION

In accordance with Task Order 0007, Contract FA4890-06-D-0006, URS Group, Inc. (URS) has prepared this Annual and Fourth Quarter 2012 (4Q12) Mather Groundwater Monitoring Report for the Air Force groundwater remediation program at the former Mather Air Force Base (Mather) and vicinity. Groundwater monitoring includes measuring depths-to-groundwater (referred to as gauging) and collecting and analyzing water samples from groundwater extraction and treatment systems, monitoring wells, piezometers, and private water supply wells, on and off Mather property.

The objectives of this report are to report the results from 4Q12 monitoring, and assess monitoring data for 2012 with respect to patterns of groundwater flow, distribution of contaminants of concern (COCs), and performance of the groundwater extraction networks and treatment systems. This report is organized as follows:

- Section 1.0, Introduction, describes Mather and its background, the history of each site/plume and its remedial objectives, and the current understanding of the hydrogeology at Mather.
- Section 2.0, Mather Groundwater Monitoring Program, provides an overview of the 2012 Mather groundwater monitoring program activities. This section presents a summary of gauging and sample collection activities, a discussion and evaluation of the groundwater elevation and potentiometric surface maps, and a summary of monitoring well maintenance and status for 2012.
- Section 3.0, Landfill Post-Closure and Northeast Plume Monitoring Program, discusses the analytical results of samples collected from wells used for monitoring the Northeast Plume (NEP) and for post-closure monitoring at Landfill (LF) Sites LF-03, LF-04, and Site 7 (WP-07).
- Sections 4.0, 5.0, and 6.0, Remedial Performance Monitoring Programs for the Aircraft Control and Warning (AC&W) Site, Site 7, and Main Base/Strategic Air Command (SAC) Area, respectively, discuss performance monitoring results and evaluate the performance of each groundwater extraction and treatment system.
- Section 7.0, Off-Base Water Supply Well Monitoring Program, provides results of samples collected from off-base water supply wells and discusses analytical results from samples collected from nearby monitoring wells.
- Section 8.0, Analytical Data Quality Summary, discusses the analytical program, the quality control (QC) sample results, and how those results impact the groundwater analytical data collected during 2012.
- Section 9.0, Summary, Conclusions, and Recommendations, summarizes key observations in the monitoring results and recommends improvements to the remediation systems and monitoring programs.

The appendices in this report are organized as follows:

- Appendix A, Analytical Data Tables: Analytical results for the last 2 years are presented in Tables A-1 through A-4. The well list in each table is in alphanumeric order by well name.
- Appendix B, Water Table Hydrographs: This appendix presents yearly second-quarter groundwater elevation hydrographs for water table wells (grouped by hydrostratigraphic [HSG] unit and study area).

- Appendix C, PCE, TCE, and CCl_4 Concentration Trend Plots: This appendix presents time–concentration plots for the primary COCs at Mather: tetrachloroethene (PCE), trichloroethene (TCE), and carbon tetrachloride (CCl_4), for wells and treatment system samples.
- Appendix D, Main Base/SAC Area, AC&W, and Site 7 Plume Treatment Plant Air Strippers: Compliance with Air Emissions Standards: This appendix presents an update on the compliance with air emission standards by the Main Base/SAC Area (MBSA), AC&W, and Site 7 treatment systems.
- Appendix E, First Quarter 2012 Analytical Data: This appendix presents 1Q12 analytical data.
- Appendix F, Second Quarter 2012 Analytical Data: This appendix presents 2Q12 analytical data.
- Appendix G, Third Quarter 2012 Analytical Data: This appendix presents 3Q12 analytical data.
- Appendix H, Fourth Quarter 2012 Analytical Data: This appendix presents 4Q12 analytical data.
- Appendix I, List of Dry Wells 2012: This appendix compares water levels to screen elevations and presents a list of wells that were dry during at least part of 2012.
- Appendix J, Mather Groundwater Monitoring Well Installation Memorandum: This appendix contains the *Mather Well Installation Technical Memorandum for MAFB-465*, which reports on the construction details of the monitoring well installed in the LF-04 area (MAFB-465) during 2012.
- Appendix K: This appendix presents the 2012 Consultation Zone map developed to support implementation of Sacramento County Code, Title 6, Chapter 6.28.

The following sections describe Mather and the groundwater monitoring program.

1.1 SITE DESCRIPTION AND BACKGROUND

Mather is in the County of Sacramento, partially within the City of Rancho Cordova, California, approximately 10 miles east of downtown Sacramento, as shown on Figure 1-1. The former Air Force Base is south of U.S. Highway 50, a major east-west route of the U.S highway system. Mather was closed as an active air base under the Base Realignment and Closure Act on 30 September 1993. At that time, it encompassed approximately 5,845 acres (including 129 acres of easements) in an unsurveyed portion of Township 8 North, Ranges 6 East and 7 East. Figure 1-2 presents a site map.

Environmental cleanup at Mather is managed by the Air Force under the Installation Restoration Program (IRP). Remedial investigations and cleanup activities have been implemented under this program for environmentally impacted IRP sites. These activities include the installation of groundwater monitoring wells throughout Mather and beyond the Mather property line. Approximately 470 groundwater wells and piezometers and 32 operating extraction wells were included in the groundwater monitoring program at Mather during 2012.

Groundwater beneath and off base to the west-southwest of Mather is contaminated by chemicals used during routine operations at Mather Air Force Base, which began operations in 1918 and closed in 1993. IRP sites have been identified as sources of groundwater contamination. There are five areas of groundwater monitoring at Mather (Figure 2-1):

- **AC&W Site Plume:** The AC&W Site Plume reportedly resulted from disposal of solvents in a waste disposal pipe or dry well at IRP Site 12 from 1958 to 1966.

- **Site 7 Plume:** The source area for the Site 7 (WP-07) Plume was a gravel borrow pit used as a landfill into which waste was disposed from 1953 to approximately 1966. The borrow pit was reportedly used to dispose of petroleum, oil, and lubricant (POL) wastes, empty drums, sludge from plating shops, absorbent sand used for cleaning oil and solvent spills, and at least one load of transformer oil that may have contained polychlorinated biphenyls (PCBs). The Site 7 groundwater extraction and treatment system operated intermittently from 1998 through 2006 with interruptions to accommodate off-base mining and related reclamation activities (from July 1999 to May 2001, from July 2001 to March 2002, and from April 2003 to mid-December 2006). The extraction and groundwater treatment system resumed operation in December 2006 and has since operated continually.
- **Landfills and NEP:** The NEP is in the northeast part of Mather, south-southwest of LF-03 and LF-04. Sources of contamination include landfill disposal.
- **MBSA Plume:** The commingled contaminant plume resulting from sources at several IRP sites in the northwest part of Mather is referred to as the MBSA Plume. Multiple source areas of contamination resulted from industrial activities, equipment maintenance, dry cleaning, and fuel storage and delivery.
- **Off-base Area:** The off-base area is identified as the portion of the MBSA and Site 7 plumes that have migrated beyond Mather property boundaries. The monitoring program referred to as "Off Base," is the monitoring of large water supply wells, selected nearby monitoring wells, and generally smaller, privately owned supply wells in the vicinity of and downgradient from the plumes. The sampling of large water supply wells and nearby monitoring wells is governed by the *Mather AFB Off-base Water Supply Contingency Plan* (Contingency Plan) (Air Force Real Property Agency [AFRPA], 2008).

The table below lists each plume, its governing decision documents, selected remedial action, and current status of the remedial action.

Plume	Decision Document	Remedial Action	Status as of 2012
AC&W	*Superfund ROD: Aircraft Control and Warning Site, Mather Air Force Base, Sacramento County, California.* (AFBCA, 1993). *Explanation of Significant Difference for the AC&W OU* (AFBCA, 1997). *Explanation of Significant Difference for the AC&W Operable Unit* (AFRPA, 2007).	Groundwater extraction, air stripping with off-gas treatment, as necessary, groundwater discharge to Mather Lake and groundwater monitoring. Institutional controls.	Remedial action in place and operating. OPS determination in 1998. Continued operations and performance monitoring. Figure 4-1 presents the capture zone assessment.
Site 7	*Superfund ROD: Soil OU Sites and Groundwater OU Plumes, Mather Air Force Base, Sacramento County, California*. (AFBCA, 1996). *Revised Final Explanation of Significant Difference from the ROD for Soil OU Sites and Groundwater OU Plumes* (AFRPA, 2010a).	Groundwater extraction, air stripping with off-gas treatment, as necessary, injection, and groundwater monitoring. Institutional controls.	Remedial action in place and operating. OPS determination in 2011. Continued operations and performance monitoring. Figure 5-1 presents the capture zone assessment.

Plume	Decision Document	Remedial Action	Status as of 2012
Landfills (LF-03, LF-04, and WP-07)	For LF-03 and LF-04: *Superfund ROD, Landfill OU Sites* (AFBCA, 1995). For WP-07*: Superfund ROD: Soil OU Sites and Groundwater OU Plumes, Mather Air Force Base, Sacramento County, California* (AFBCA, 1996). *Revised Final Explanation of Significant Difference from the ROD for Soil OU Sites and Groundwater OU Plumes* (AFRPA, 2010a).	Capping of landfills; post-closure groundwater monitoring.	Remedial action in place. Background concentrations for metals and general mineral constituents defined in 2005. Evaluation monitoring continued at LF-04 for nickel and chromium.
NEP	*Superfund ROD, Soil OU Sites and Groundwater OU Plumes, Mather Air Force Base, Sacramento County, California* (AFBCA, 1996). *Revised Final Explanation of Significant Difference from the ROD for Soil OU Sites and Groundwater OU Plumes* (AFRPA, 2010a).	Long-term groundwater monitoring. Institutional controls.	Remedial action in place. OPS determination in 2011. Continued long-term groundwater monitoring.
MBSA	*Superfund ROD: Soil OU Sites and Groundwater OU Plumes, Mather Air Force Base, Sacramento County, California* (AFBCA, 1996). *Revised Final Explanation of Significant Difference from the ROD for Soil OU Sites and Groundwater OU Plumes* (AFRPA, 2010a).	Groundwater extraction, air stripping with off-gas treatment, as necessary, injection, surface water discharge, and groundwater monitoring.	Remedial action in place and operating. OPS determination in 2011. Continued operations and performance monitoring. Began discharging up to 500 gpm treated groundwater to surface water. Remainder of treated water was injected. Figures 6-2 through 6-11 present the capture zone assessments.
Off-base	*Superfund ROD: Soil OU Sites and Groundwater OU Plumes, Mather Air Force Base, Sacramento County, California* (AFBCA, 1996).	Identify potentially impacted supply wells, develop monitoring plan, identify alternative water supply options, determine effect of supply well pumping, and mitigate potential vertical migration near supply wells.	*Final Revision 1 Mather AFB Off-base Water Supply Contingency Plan* (AFRPA, 2008) implemented since 1998. GAC wellhead treatment system at Juvenile Hall in place and operating since 1997. GAC wellhead treatment system at Moonbeam (OFB-04) reinstalled in 2012 and operating.

AC&W = Aircraft Control and Warning
AFBCA = Air Force Base Conversion Agency
AFRPA = Air Force Real Property Agency
GAC = granular-activated carbon
gpm = gallons per minute
OPS = Operating Properly and Successfully
OU = operable unit
ROD = Record of Decision

1.2 MATHER GROUNDWATER MONITORING

Groundwater monitoring occurred sporadically from 1984 through 1989. Routine groundwater monitoring began in 1990, with groundwater samples collected quarterly and depths to groundwater gauged and recorded monthly. During 1993, wells were gauged every other month. From 1994 through 2006, wells were gauged quarterly. In 2007, the Air Force committed to semiannual gauging, with the option for more frequent measurements in selected areas as needed to guide decisions.

The groundwater monitoring program objectives include:

- Monitoring seasonal variations in groundwater elevations and gradients within each HSG unit
- Monitoring the extent of contamination and progress toward achieving cleanup levels
- Evaluating hydraulic capture by the groundwater extraction wells
- Evaluating the performance of groundwater extraction and treatment systems, including monitoring of mass-removal efficiency and compliance with discharge standards
- Assessing the potential impact of contaminant plumes on the off-base drinking water supply wells
- Monitoring groundwater quality in the landfill areas (detection monitoring and evaluation monitoring)
- Monitoring groundwater quality in the zones where treated water is injected
- Monitor surface-water quality where treated groundwater is discharged

The *2012 Groundwater Monitoring Program Sampling Plan for the Former Mather AFB, Sacramento County, California* (URS, 2012a) describes plans for the 2012 groundwater sampling program. The sampling plan identifies wells from which samples were to be collected in 2012, as well as specifying the analytical methods to evaluate the presence and extent of COCs. The sampling plan explains the rationale for the selected sample-collection frequencies (i.e., quarterly, semiannually, annually, biennially, or reserved [not sampled]) for each well.

Sections 3.0 through 7.0 provide specific descriptions of historical and current monitoring activities at the various sites at Mather.

1.3 HYDROGEOLOGIC SETTING

Mather is situated in the northern half of the California Great (Central) Valley physiographic province. The former base is situated on ancient stream terraces south of the American River. The topography of Mather consists of three relatively flat terraces that step progressively lower toward the American River to the north, with elevations on each decreasing gently toward the southwest.

Groundwater in the eastern Sacramento area occurs in Oligocene or younger geologic formations that include thick deposits of fluvial sands and gravels. In the area of Mather, these sediments are present to a depth of approximately 900 feet below ground surface (bgs). Groundwater within these geologic units receives recharge from surficial stream flow and rainfall. Possible significant local recharge sources include the American River, Mather Lake, Morrison Creek, drainage ditches, and numerous settling or recycling ponds and excavations associated with gravel and sand mining operations south (Teichert Aggregates Company [Teichert] and Granite Construction Company [Granite]) west of Mather. Other potential sources of recharge are the sanitary and storm sewer lines on and near Mather, and flood detention basins, one northeast of Mather (west of LF-03) and one northwest (at the intersection of

Systems Parkway and Routier Road). Former settling ponds northeast of Mather were in use by RMC Lonestar in the 1980s and 1990s, and appear to have been a significant source of recharge during that period.

Three geologic units are recognized at Mather (from youngest to oldest): the Terrace Gravels, the Laguna Formation, and the Mehrten Formation (Figure 1-3). These units are described below.

Terrace Gravels. Terrace Gravels of Quaternary age comprise the uppermost geologic unit at Mather. Three distinct terraces were formed by the ancestral American River (from oldest to youngest): the Arroyo Seco Terrace, the "Middle" Terrace (informal name), and the Riverbank Terrace. The Arroyo Seco Terrace, at the highest elevation, underlies the southeastern third of Mather. The Middle Terrace is found northwest of the Arroyo Seco Terrace. The Riverbank Terrace occurs at the lowest elevation and underlies the northwestern half of Mather. The Terrace Gravels consist primarily of sandy to silty gravel deposited by the northwestward migration of the ancestral American River. The gravels are unconsolidated to weakly cemented, are unsaturated across Mather, and are capped by silt to sandy silt. The Terrace Gravels range in thickness from 5 to 60 feet (Montgomery Watson, 1999a). A soil horizon (locally up to 10 feet thick) has developed above the Terrace Gravels.

Laguna Formation. The Laguna Formation of Tertiary to Quaternary age underlies the Terrace Gravels across and west of Mather. The ancestral American River eroded its channel into the Laguna Formation, producing an unconformable contact between the Terrace Gravels and the Laguna Formation. The Laguna Formation consists of unconsolidated fluvial silts, sands, and gravels of Pliocene to Pleistocene Age. These sediments were deposited in a westward-thickening wedge by streams draining the Sierra Nevada (California Department of Water Resources, 1964). The coarse sediments of the Laguna Formation represent multiple episodes of channel deposition and are stacked (or aggraded) vertically; the silts and clays represent overbank sediments deposited during floods. The Laguna Formation is exposed east of Mather, where it is estimated to be at least 200 feet thick. Stratigraphic data collected during characterization efforts by MWH Americas, Inc. (MWH) suggest the Laguna Formation is more than 350 feet thick beneath portions of Mather. The formation has been informally subdivided into three parts designated as Upper, Middle, and Lower Laguna. The Upper Laguna locally underlies the Terrace Gravels and consists predominantly of silt with some interbedded sand. The Middle Laguna beneath the MBSA is characterized by sandy gravel with some sand and silty sand. The Lower Laguna consists predominantly of silt and clay with intermittent sand and gravel channel-fill deposits (Montgomery Watson, 1999a).

Mehrten Formation. The lowermost geologic unit identified at Mather is the late Tertiary Mehrten Formation, a primary source of potable water to water supply wells on and west of Mather. The Mehrten Formation is composed of fluvial, volcaniclastic sediments consisting primarily of black andesitic sand and interbeds of blue to brown clay. Locally, channels are filled with andesitic gravels. The Mehrten Formation forms a sedimentary wedge that dips and thickens to the west. The Mehrten Formation is approximately 200 feet thick in outcrops east of Mather and thickens westward in the subsurface to approximately 400 to 500 feet. The Mehrten Formation is locally an excellent source of groundwater (Montgomery Watson, 1999a). The contact between the top of the Mehrten Formation and the bottom of the Laguna Formation is generally not clearly defined. A transitional zone composed of both granitic Laguna sands and andesitic sands with a thickness of between 60 and 120 feet has been observed and is called the Laguna-Mehrten Transition (LMT) Zone (Shlemon, 1967; International Technology Corporation [IT Corp.], 1994).

Functional Hydrostratigraphy at Mather. Four general HSG units, A to D, have been designated at Mather. Each unit is described briefly below.

Because the water table slopes generally westward at a slightly lower angle than the westward dip of the HSG units, the water table beneath Mather transects Units A, B, and C progressively to the east (Figure 1-3, for the area north of the runways). Accordingly, the saturated thickness of these units decreases to the east. The water table occurs in Unit C near LF-03 and LF-04. In general, Units A, C, and D are finer-grained, with A and D containing some coarser-grained channel deposits; Unit B north of the runways has generally coarser-grained sediments. South of the runways there is finer-grained lithology at roughly the same depths as Unit B; however, the fine-grained aquifer materials in this general depth range at Site 7 and Aircraft Control and Warning (AC&W) are referred to as Unit C based on the lithology, rather than the time-equivalent depositional history. Unit D and the Mehrten Formation are saturated beneath the entire Mather property.

- Unit A (the water table occurs in Unit A in the western portion of Mather and west of Mather) corresponds with the Upper Laguna Formation and consists primarily of overbank deposits of silt and fine sand, but some channel-fill sand and gravel is also present. The sediments are fairly continuous across Mather. In most areas, overbank deposits of Unit A overlie coarse sediment of Unit B; but locally, channel deposits from the two units are continuous from above the water table to the bottom of Unit B (Montgomery Watson, 1999a).
- Unit B corresponds with the Middle Laguna Formation and consists of coarse channel-fill deposits of sandy gravel beneath the MBSA, extending west of Mather. The deposits range in thickness from roughly 20 to 60 feet and are first encountered at depths of roughly 120 feet bgs in the east and 180 feet bgs in the west. In areas south of the runway (i.e., Site 7), the coarse sediments of Unit B transition laterally to finer-grained Unit C sediments. Generally, along eastern portions of Mather, Unit A is above the water table or absent, and groundwater is first encountered in Unit B or Unit C. Unit B is the most transmissive unit of the Laguna Formation in areas north of the runway and in areas where the Middle Laguna Formation is characterized by channel-fill deposits of sandy gravel. In the western portions of Mather and extending west off the Base, Unit B is divided into two subunits, an upper channel subunit (Unit Bu) and a lower channel subunit (Unit B) (IT Corp., 1996). Unit Bu is only identified as a distinct unit where fine overbank deposits, referred to as the Unit Bu/B aquitard, are present. The Unit Bu/B aquitard is locally discontinuous; in some areas along the Mather boundary, the aquitard is not present and Units Bu and B are indistinguishable, allowing effective vertical hydraulic communication throughout the Middle Unit of the Laguna Formation (Montgomery Watson, 1999a). For this reason, the following sections group these subunits together for purposes of describing the nature and extent of COCs. Hydrogeologic Units Bu and B are important to the flow of groundwater and movement of COCs. Because of their high transmissivity, channel-fill deposits of Units Bu and B provide a primary pathway for the flow of contaminated groundwater beneath and beyond Mather (IT Corp., 1996). Some wells screened in Unit B are further identified as representing the shallower Unit B wells (Bs) or the deeper Unit B wells (Bd).
- Unit C is a portion of the Lower Laguna Formation and consists predominantly of silt and clay. Unit C is defined as the vertical interval between Unit B sands and gravels and the uppermost Unit D sands. Unit C may functionally constitute an aquitard because of its persistent extent and thickness and the significant differences in hydraulic head between units lying above and below it. Unit C as defined above is generally 10 to 50 feet thick throughout the area (Montgomery Watson, 1999a). The water table occurs in Unit C beneath relatively small portions of Mather near LF-03, LF-04, Site 7, and the AC&W site. Fine-grained sediments at the AC&W and Site 7 areas are also defined as Unit C based on lithology, although they are at depths equivalent to Unit B gravels north of the runways.
- Unit D is the deeper portion of the Lower Laguna Formation and extends from the top of the uppermost sandy channel below Unit B to the beginning of the LMT. Unit D consists primarily of

fine overbank deposits of silt and clay and less frequent coarse channel deposits that are generally 20 to 40 feet thick. The unit behaves as a confined aquifer. Unit D channel deposits are encountered at approximately 220 to 300 feet bgs and are characterized by sands and silty sands, as opposed to the coarse sands and gravels of Unit B (Montgomery Watson, 1999a). Unit D is interpreted to be approximately 140 to 200 feet thick throughout the site. Volatile organic compound (VOC) contamination has been found in the upper to middle portions of Unit D.

- Underlying Unit D is a transition zone between the Laguna and Mehrten formations. The transition zone is characterized by materials derived from both andesitic and granitic source materials. The elevation of the top of the LMT Zone is interpreted to range from approximately 250 feet below mean sea level (msl) beneath the northwestern portion of Mather near the injection wells for the MBSA treatment system to approximately 380 feet below msl west of Mather near the Oaken Bucket water supply well (see Section 6.0 of the 2007 Capture Zone Analysis [CZA] Report, as well as Appendix B, Cross-Section E-E' [MWH, 2007a]). There are several deep-nested monitoring wells installed and/or monitored by Aerojet, Inc. in the upgradient portions of Mather, installed to monitor deep-level VOC and perchlorate contamination associated with the Inactive Rancho Cordova Test Site (IRCTS) plumes with sources hydraulically upgradient of Mather. These wells extend through the Laguna Formation, through the LMT, and several are completed in the underlying Mehrten Formation. Based on the HSG zonal classification of these wells provided by ENSR Consulting and Engineering (former consultant to The Boeing Company [Boeing]), the LMT in the upgradient portions of Mather (beneath the Northeast Perimeter Landfills) is between 70 and 130 feet thick. This thickness is corroborated by the lithologic descriptions in one of the deepest wells at Mather, MAFB-347, drilled to 530 feet and located on the northwest boundary of the MBSA Plume, southeast of the Oaken Bucket water supply well. Dark green to black andesitic grains are first noted on the log at approximately 370 feet bgs, which is interpreted to be the beginning of the LMT. Very dark gray andesitic sands are described beginning at about 490 feet depth. Assuming this is near the top of the Mehrten Formation, the LMT would be approximately 120 feet thick at this location.

Groundwater at Mather is generally encountered between 90 and 110 feet bgs in the Laguna Formation beneath the Riverbank Terrace deposits. The water table beneath Mather is encountered in Unit A, Unit B, or Unit C. The coarse sands and gravels of Units Bu and B of the Middle Laguna Formation are relatively transmissive and apparently continuous through the MBSA industrial areas, extending west beyond Mather. Consequently, these coarse sands and gravels are important to the flow of groundwater and the transport of COCs. Horizontal conductivity and transmissivity data for Units A, Bu, B, and D were compiled from wells installed at Mather and are listed below (Montgomery Watson, 2000a):

Hydrostratigraphic Unit	Hydraulic Conductivity (feet/day)	Transmissivity ($feet^2$/day)
A	1 to 290 (average [avg] 48)	3 to 3,378 (avg 570)
Bu	2 to 222 (avg 58)	8 to 5,550 (avg 1,550)
B	2 to 350 (avg 82)	24 to 14,000 (avg 2,550)
D	1 to 182 (avg 29)	70 to 8,000 (avg 1,596)

Overall, groundwater beneath Mather flows westerly to southwesterly, conforming with the regional groundwater flow direction but also influenced by local groundwater pumping. More regional municipal and agricultural pumping across the basin has created three groundwater "cones of depression" northwest, southwest, and south of Mather. The Elk Grove cone of depression to the southwest influences groundwater flow direction at Mather (Montgomery Watson, 1999a).

2.0 MATHER GROUNDWATER MONITORING PROGRAM

This section provides an overview of the field activities and sampling and gauging data collected during 2012 for the Mather groundwater monitoring program. More specific and detailed discussions are included in the sections on performance monitoring of the contaminant plumes and landfills (Sections 3.0 through 7.0). The *Second Quarter 2001 Basewide Groundwater Monitoring Report* (Montgomery Watson, 2001a) includes details of sampling protocols, except for the protocols for passive diffusion-bag sampling, which are included in Appendix B of the *2004 Groundwater Monitoring Program Evaluation Report* (MWH, 2005).

2.1 MONITORING ACTIVITIES

Groundwater monitoring at Mather includes groundwater gauging (measuring depths to groundwater) and sample collection and analysis. Table 2-1 presents the groundwater well reference list for Mather. A group of wells associated with the NEP were resurveyed following the installation of a new groundwater monitoring well near LF-04 (MAFB-465); these locations are noted on Table 2-1. Figure 2-1 shows the wells that are monitored in the program. Basewide gauging for potentiometric evaluation transitioned from quarterly to semiannually in 2007; therefore, depth-to-groundwater measurements were collected from each monitoring point in 2Q12 and 4Q12.Table 2-2 presents groundwater elevations calculated from depths to groundwater measured semiannually in 2012. Groundwater elevations that are at or below the bottom of the screened interval are presented in bold, and are believed to result from water observed in the well sump that does not represent the potentiometric surface of the nearby aquifer. These values are not used in the assessment of potentiometric surfaces.

Contaminant concentrations and groundwater elevations are used to evaluate extraction well performance and capture, plume migration, and groundwater flow direction. Decisions concerning sampling frequency are based on the analytical results, as well as location of each well relative to the plume, potential receptors, and groundwater flow directions. The Groundwater Monitoring Decision Tree presents the sampling frequency decision logic (Figure 2-2). The *2006 Groundwater Monitoring Program Evaluation Report* presents a detailed discussion regarding the Groundwater Monitoring Decision Tree (MWH, 2007b). The Extraction Well Shutdown Decision Tree (Figure 2-3) provides the logical criteria used to determine when to take an extraction well offline. Monitoring activities planned for 2012 are presented in the *2012 Groundwater Monitoring Program Sampling Plan* (URS, 2012a).Analytical results are discussed in more detail in the sections on performance monitoring (Sections 3.0 through 7.0), and Appendix A presents the analytical results from samples collected over the last eight quarters.

2.1.1 First Quarter

Sample Collection. Samples were collected from 59 monitoring points (including monthly and/or quarterly sampling of monitoring wells, piezometers, extraction wells, and treatment systems) during 1Q12. All samples were collected as scheduled, with the following exceptions: OFB-31, which was out of service, and OFB-49, which was shut down for rehabilitation activities. Additionally, samples were collected from MAFB-231, MAFB-234, MAFB 241, MAFB-407, MAFB-421, MBS 39ABuB, MBS 39MW02, and MBS 39MW04 to provide data to support the potential closure assessments for soil vapor sites located above the MBSA Plume. MAFB-300, which is frequently inaccessible because of its proximity to an emergent marsh, was also sampled because it was safely accessible. Appendix E presents analytical data from this sampling event.

2.1.2 Second Quarter

Gauging. The depth to groundwater was gauged at 551 monitoring points (including monitoring wells, piezometers, extraction wells, and biovent wells with submerged screens) from 23 to 26 April 2012. It is

important to note that these measurements were collected while the AC&W treatment plant was offline due to a failed pressure gauge that caused the plant to shut down during the afternoon of 22 April 2012. Table 2-2 lists groundwater elevations and wells that were dry or inaccessible during the 2Q12 gauging event.

Sample Collection. The 2Q12 sampling event served as the annual sampling round at Mather and included wells that have annual, semiannual, quarterly, and monthly monitoring frequencies. Groundwater samples were collected from 121monitoring points during 2Q12. All samples were collected as scheduled, with the following exceptions. Samples were not collected from the following dry wells in 2Q12: 7-PZ-37, ACW PZ-07, ACW PZ-08, ACW PZ-09, ACW PZ-10, MAFB-105, and MAFB-140. Samples also were not collected from OFB-03 because the well owner did not grant permission to sample the well; from OFB-08, OFB-09, OFB-31, and OFB-83 because the wells were not operational; from OFB-46 and OFB-70 because there was no power to the wells; and from OFB-68 because the well and the building that it served were destroyed by the owner. Additionally, samples were collected from ACW AT-2, ACW EW-1, ACW EW-2, and ACW EW-3. These samples were not required, but were collected to assess any changes after the AC&W treatment plant had shut down and was restarted (within 24 hours) in 2Q12. Appendix F presents analytical data from this sampling event.

2.1.3 Third Quarter

Sample Collection. Groundwater samples were collected from 43 monitoring points (including monthly and/or quarterly sampling of monitoring wells, piezometers, extraction wells, and treatment systems) during 3Q12. All samples were collected as scheduled, with the following exceptions: OFB-27, which was offline for rehabilitation, and OFB-31, which was out of service. Appendix G presents analytical data from this sampling event.

2.1.4 Fourth Quarter

Gauging. The depth to groundwater was gauged at 572 monitoring points from 3 to 7 December 2012. Table 2-2 lists groundwater elevations and wells that were dry or inaccessible during the 4Q12 gauging event.

Sample Collection. Groundwater samples were collected from 56 monitoring points during 4Q12. All samples were collected as scheduled, with the following exceptions: MAFB-112, MAFB-129, and MAFB-140, which were dry, and OFB-31, which was out of service. Additionally, samples were collected from MAFB-274, and MAFB-419 to provide data to support the potential closure assessments for soil vapor sites located above the MBSA Plume. MAFB-318 and MAFB-377 were also sampled to confirm elevated CCl_4 concentrations detected in 2Q12 at those wells. Appendix H presents analytical data from this sampling event.

2.2 EVALUATION OF POTENTIOMETRIC MONITORING AT MATHER

The following subsections identify and briefly discuss groundwater elevation trends across Mather. Groundwater elevation contour maps were prepared for the water table and the potentiometric surfaces of HSG units B and D in both 2Q12 and 4Q12 (Figures 2-4 through 2-6). These maps are used to interpret groundwater gradients and flow directions and to compare them to previous results. For reference, the HSG units are presented on Figure 1-3, which conceptualizes the stratigraphy north of the runways, from the shallowest saturated deposits (Unit A) through the deepest aquifer unit currently monitored at Mather (LMT Zone). Appendix B contains hydrographs of second quarter groundwater elevations at selected monitoring wells from 1990 through 2012. The plots in Appendix B depict the general regional decline in groundwater levels at the water table.

The objective of this section is to provide an overview of the potentiometric trends in groundwater across Mather. Separate sections of this report cover specific areas of interest (i.e., NEP, LF areas, MBSA Plume, AC&W Plume, Site 7 Plume, and off-base supply wells) as needed to support evaluation of the remedial performance. Water level observations were collected within a 4- or 5-day period and observations in each specific area were collected within a 1- or 2-day period.

2.2.1 Water Table Unit

The water table at Mather occurs in Units A, B, and C. Figure 2-4 presents the 2Q12 and 4Q12 groundwater elevation contours for the water table. The average horizontal component of the groundwater gradient at the water table across Mather (outside the apparent effects of pumping) for 2Q12 and 4Q12 was approximately 0.003 feet per foot (ft/ft), the same as the average gradient observed during 2011. The regional horizontal gradient in the water table unit is generally oriented toward the southwest. As in previous years, remedial pumping from the MBSA extraction wells at the water table and in shallow Unit B produces a large depression, or trough, in the potentiometric surface that extends roughly 7,000 to 8,000 feet along the northwestern Mather boundary, into which local groundwater flows are diverted. The potentiometric surface contours for 4Q12 are consistent with those from 2Q12.

The overall regional decline in water table elevation likely continues, despite a period of relative stability or slight increase in water levels observed from approximately 2005 through 2008 and the increase in groundwater elevations observed since 2010. The increasing trends are not attributed to changes in operation at Mather, but are likely caused by regional changes in the patterns of groundwater extraction and recharge. The continued overall water level declines (averaging approximately 0.70 foot per year over the past 20 years) have left many wells either dry or without enough water to evaluate groundwater quality. Appendix I contains a list of wells that were dry, or unable to be sampled due to low water levels, during at least one gauging event during 2012, as well as notes on whether or not the well is necessary for the groundwater monitoring program.

2.2.2 Units B and C

Figure 2-5 shows groundwater potentiometric surface contours for Units B and C (combined) interpreted from water level measurements during 2Q12 and 4Q12. It should be noted that the AC&W treatment system was not operating during, or for the approximately 12 hours prior to, the 2Q12 gauging event. It should also be noted that the water table occurs in Unit C in the AC&W and Site 7 areas and in landfill areas east of the MBSA Plume. The Unit B/C surface includes potentiometric data from AC&W and landfill area wells with screens placed approximately 10 to 40 feet below the water table and does not include data from wells screened across the water table. These landfill and AC&W wells monitor the upper and lower portions, respectively, of the Lower Unit of the Laguna Formation (Unit C). The average horizontal component of the gradient in Unit B across Mather (outside the apparent effects of pumping) in both 2Q12 and 4Q12 was approximately 0.002 ft/ft, the same as the average gradient observed during 2011. Groundwater in Units B and C flows southwest with local deviations near extraction wells associated with the Site 7, AC&W, and MBSA treatment systems.

2.2.3 Unit D

Figure 2-6 presents the groundwater potentiometric surface contours for Unit D for 2Q12 and 4Q12. The average groundwater gradient in Unit D across Mather (apart from local cones of depression) was approximately 0.002 ft/ft, the same as the average gradient observed during 2011. The groundwater gradients for 4Q12 are similar to those of 2Q12, with 4Q12 elevations generally being approximately 1 to 3 feet lower than 2Q12 elevations. Groundwater in Unit D generally flows west and southwest, with local deflections toward extraction wells screened in Unit D as part of the MBSA Plume remedy. The

westernmost cone of depression in Unit D water levels on Figure 2-6 is centered on MAFB-327 and represents the influence of the Moonbeam supply well on Unit D water levels.

2.3 MONITORING WELL AND TREATMENT SYSTEM MAINTENANCE

Maintenance tasks performed on groundwater monitoring wells and treatment systems during 2012 included routine maintenance and calibration of system components and replacement of malfunctioning parts. Table 2-7 presents a list of groundwater monitoring well and treatment system maintenance performed during 2012.

2.4 GROUNDWATER WELL DECOMMISSIONING

The Groundwater Monitoring Decision Tree (Figure 2-2) and the Extraction Well Shutdown Decision Tree (Figure 2-3) provide criteria used to determine when a well is no longer useful for sampling or extraction, respectively, and, therefore, if not otherwise useful, should be considered for decommissioning. When applicable, these wells are discussed in each specific groundwater plume section below.

No groundwater monitoring wells were decommissioned in 2012. However, 23 monitoring wells and 2 extractions wells are planned to be decommissioned during 2013 in accordance with the *Final 2012/2013 Groundwater Well Decommissioning Work Plan* (URS, 2013a).

2.5 PRODUCTION WELL STATUS

Tables 2-4 and 2-5 present the operating status and production volumes (in millions of gallons) for selected Sacramento County Water Agency (SCWA) and California American Water Company (Cal Am, formerly Citizens Utilities Company of California) production wells in the vicinity of Mather (i.e., the area within the domain for the MBSA groundwater model) in 2012.

Based on narrative estimates received from Teichert in 2010 (AFRPA, 2010b) regarding groundwater pumping information for OFB-72 and OFB-85: OFB-72 pumps at 300 gallon per minute (gpm), 10 hours per day, 5 days per week; and OFB-85 pumps at 1,000 gpm, 16 hours per day, 5 days per week. However, based on field observations, these wells are not pumping as long or as frequently as reported by the well owner; therefore, these values are not considered definitive enough to include in the tables.

3.0 LANDFILL POST-CLOSURE AND NORTHEAST PLUME MONITORING PROGRAMS

Evaluation of fourth quarter and annual 2012 data for the landfill post-closure and NEP monitoring programs is presented in the following sections. The landfill post-closure programs and the NEP monitoring program are described in the *2012 Groundwater Monitoring Program Sampling Plan* (URS, 2012a). Tables 3-1 through 3-3 summarize analytical detections in these programs.

3.1 REGULATORY AND STATUTORY FRAMEWORK FOR CURRENT MONITORING PROGRAMS

This section provides a description and framework for current monitoring programs. The status of the landfill post-closure and the NEP groundwater monitoring programs are described in Subsections 3.1.1 and 3.1.2, respectively. Subsection 3.1.3 provides a description of applicable or relevant and appropriate requirements (ARARs) for these programs, and how these ARARs affect the current and future status of the monitoring programs. The remedial action received EPA concurrence on the OPS finding in 2011 (EPA, 2011).

3.1.1 Landfill Post-Closure Monitoring Programs

The Air Force conducts monitoring programs at three closed and capped landfill sites: LF-03, LF-04, and WP-07. Remedial action construction activities have been completed at these sites, and the landfills contain waste under engineered caps constructed as part of the remedial action for each site. The groundwater component of the selected remedies for these closed landfills is post-closure monitoring under the Landfill Operable Unit (OU) for sites LF-03 and LF-04 (Air Force Base Conversion Agency [AFBCA], 1995), and under the Soils OU for Site WP-07 as part of the remedy for Site 7/11 (AFBCA, 1996). Specific post-closure monitoring requirements for LF-03 and LF-04 are outlined in the *Closure and Post-Closure Maintenance Plan for the Landfill Operable Unit* (Montgomery Watson, 1996; MWH, 2010a) and for WP-07 in the *Closure and Post-Closure Maintenance Plan for the Engineered Cap at Remedial Action Site 7* (Montgomery Watson, 1999b; MWH, 2010b). These plans identified specific post-closure monitoring wells, and provided the initial sampling frequencies and analytical parameters for post-closure monitoring. Further plan changes for post-closure landfill monitoring wells in response to changing site conditions (e.g., declining water levels) require remedial project manager approval of recommendations, which are presented in the annual groundwater monitoring reports or in the annual sampling plan documents. Changes to sampling frequencies for landfill wells are based on water quality results, including trends for VOCs and non-VOCs and comparison of non-VOC results to background concentrations. For non-VOCs, detections above any 95 percent upper tolerance limit (UTL) background concentration may trigger sample frequency changes through an evaluation monitoring program unless results are judged to be essentially compatible with background and compatible with historical results. Sampling frequencies for VOC analysis are dictated by the Groundwater OU remedial actions for the NEP or Site 7 Plume, and by the detection monitoring requirements required by the remedies. Sampling frequencies are assessed and presented once per year in the annual Groundwater Monitoring Sampling Plan. Sampling frequencies for 2012 were presented in the *2012 Groundwater Monitoring Program Sampling Plan* (URS, 2012a). However, any non-VOC result indicating a new increase above the background range may trigger an immediate confirmation sample and/or evaluation program prior to the completion of the next sampling plan.

During 2012, samples were collected from 15 of the 19 groundwater wells scheduled for sampling, and the data used to monitor post-closure performance of closed landfills LF-03, LF-04, and WP-07 (Figure 2-1). Samples were not collected from LF-04 monitoring well MAFB-140, or WP-07 monitoring wells 7-BV-13, 7-PZ-37, and 7-PZ-38P because the wells were dry.

3.1.2 NEP Monitoring Program

Groundwater sampling in the NEP is required by the Mather Groundwater OU Record of Decision (ROD) (AFBCA, 1996). Sampling frequencies for 2012 for NEP wells were presented in the *2012 Groundwater Monitoring Program Sampling Plan* (URS, 2012a).The NEP consists primarily of PCE and cis-1,2-dichloroethene (DCE) and is in the northeastern portion of Mather (Figure 3-1). The extent of the plume with concentrations above ROD cleanup levels (5.0 micrograms per liter [µg/L] for PCE and 6.0 µg/L for cis-1,2-DCE [AFBCA, 1996]) is restricted to the landfill areas (Figures 2-1 and 3-1). The highest VOC concentrations in the NEP and the apparent source areas for the plume are also in the vicinity of LF-03 and LF-04. Accordingly, near-source NEP monitoring wells selected as part of the NEP monitoring program include many of the post-closure monitoring wells at LF-03 and LF-04.

3.1.3 ARARs – Groundwater Monitoring

ARARs cited in the RODs governing groundwater monitoring for both the NEP (AFBCA, 1996) and the landfill post-closure monitoring programs (AFBCA, 1995; AFBCA, 1996) include portions of Title 23, Division 3, Chapter 15, Article 5, of the California Code of Regulations (CCR), which describes groundwater monitoring programs for discharges of hazardous wastes to land. The applicable monitoring programs include detection, evaluation, and corrective action monitoring programs. Detection monitoring programs are designed to provide evidence of any new releases to groundwater of contaminants from the landfills. Evaluation monitoring programs are designed to provide data to characterize the nature and extent of any groundwater contamination throughout the zone affected by the release, and to provide data to support a determination of the need for corrective action. Corrective action monitoring programs are designed to provide data to evaluate the effectiveness of a prescribed remedial action program.

The landfills are known or suspected sources for VOC groundwater contamination for the NEP and the Site 7 Plume. Remedial actions have been selected for both of these VOC plumes. As such, the requirements for corrective action monitoring for VOCs in groundwater plumes beneath LF-03, LF-04, and WP-07 are fulfilled under the monitoring requirements of the Groundwater OU remedial actions (AFBCA, 1996).

Title 40 of the Code of Federal Regulations (CFR) Part 258.51, which describes requirements for monitoring systems at municipal solid waste landfills, is also cited in the landfill ROD (AFBCA, 1995) as being an ARAR for LF-04. Part 258.51 of 40 CFR specifies that groundwater monitoring systems must be installed that consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that (1) represent the quality of background groundwater that has not been affected by leakage from a unit, and (2) represent the quality of groundwater passing the relevant point of compliance specified by the Director of an approved state under CFR Part 258.40(d), or at the waste management unit boundary in unapproved states. Neither the landfill ROD (AFBCA, 1995), nor the *Closure and Post-Closure Maintenance Plan for the Landfill Operable Unit* (Montgomery Watson, 1996; MWH, 2010a) specify a relevant point of compliance for water quality monitoring at the landfills, but in indicating the wells to be used initially for compliance monitoring compliance points were established. Compliance points for groundwater monitoring are typically and appropriately considered to be located on or near the line formed by the intersection of the vertical plane(s) passing through the downgradient landfill boundaries and the water table. Point-of-compliance wells are defined as water table wells installed along or nearest the downgradient landfill boundaries. In this case, these wells are downgradient landfill boundary wells that fulfill detection monitoring requirements at LF-03, LF-04, and WP-07. These include boundary wells MAFB-133 and MAFB-398 at LF-03, and MAFB-132, MAFB-136, and MAFB-465 at LF-04. At WP-07, the boundary wells are MAFB-149, MAFB-284, and MAFB-413. MAFB-424 is a Site 7 upgradient well sampled to provide necessary information regarding background concentrations. MAFB-284 was used as a replacement well for 7-PZ-37, which did not contain sufficient water for sampling purposes. Although screened in the

perched unit, 7-PZ-37P and 7-BV-13 are also monitored to detect any landfill release that may reach the underlying groundwater.

The ROD states: “Monitoring will be conducted pursuant to Title 23, CCR, Section 2550.10 (Corrective Action Monitoring) for at least one year from the date that [cleanup levels] are attained.” (AFBCA, 1996).

As of 2012, cleanup levels had not been attained for all COCs. Concentrations of COCs identified for the NEP above cleanup levels in 2012 were restricted to samples from wells MAFB-132 (cis-1,2 DCE and PCE), MAFB-133 (PCE), MAFB-398 (PCE), and MAFB-398C (cis-1,2-DCE), and MAFB-465 (cis-1,2 DCE and PCE), but historically have been observed in other downgradient wells. Section 3.3 covers this subject in more detail.

Monitoring for new VOC releases from landfills also is required under detection monitoring requirements per the ARARs. Detection monitoring under the landfill post-closure monitoring programs at LF-03 and LF-04 began in 4Q96; post-closure monitoring at WP-07 began in 2Q01. The Air Force recognizes that VOC corrective action monitoring under the NEP and WP-07 monitoring programs does not eliminate the need for continued detection monitoring at a minimum frequency of at least once every 5 years for each required analyte in the designated compliance-boundary wells at LF-03, LF-04, and WP-07 to monitor for potential new releases of VOCs. The requirements for VOC detection monitoring are fulfilled under the VOC monitoring program specified for downgradient landfill boundary wells at LF-03, LF-04, and WP-07. Specifically, VOC monitoring in 2012 was conducted annually at LF-03 boundary wells MAFB-133 and MAFB-398 during 2Q12. VOC monitoring in 2012 was conducted semiannually at LF-04 boundary well MAFB-132, and annually at MAFB-136. VOC monitoring in 2012 was conducted annually at WP-07 boundary wells MAFB-149, MAFB-284, and MAFB-413 (Table 3-1).

VOC monitoring near the landfills satisfies the dual requirements for detection and corrective action monitoring for VOCs. Detection and/or evaluation monitoring for non-VOCs is also part of the post-closure monitoring programs at LF-03, LF-04, and WP-07. Non-VOCs (including inorganics) are discussed separately from VOCs in relation to post-closure monitoring requirements under the Chapter 15 ARARs. The monitoring objectives of the non-VOC post-closure monitoring programs at LF-03, LF-04, and WP-07 include:

- Monitoring for potential new releases of non-VOCs to determine if the landfills are a source of non-VOC water quality impairment (detection monitoring).
- Evaluating the extent and migration of the contaminants for any contaminants detected above background values (evaluation monitoring).

Sections 3.3 and 3.4 discuss monitoring results for VOCs and non-VOCs. Appendix A presents analytical results from the last 2 years. Calculated upper background range concentrations for metals and general mineral constituents for Northeast Perimeter Landfills LF-03 and LF-04 are discussed in Section 3.4 and presented in Tables 3-4 and 3-5, respectively. Calculated upper background concentrations for metals in the groundwater near WP-07 are also discussed in Section 3.4 and presented in Table 3-6.

3.2 HYDROGEOLOGIC CONCEPTUAL MODEL

This section presents a summary of the hydrogeologic conceptual model for the NEP, which is discussed in detail in the 2008 annual groundwater report (MWH, 2009a). Since approximately 2005, the water table beneath the landfills has been at or just below the base of the Middle Unit of the Laguna Formation (Unit B), within the overbank deposits of the Lower Unit of the Laguna Formation (Unit C). Since 2005, the only areas where VOCs in the NEP have exceeded cleanup levels are beneath and immediately downgradient of the landfills, where declining water levels have resulted in the occurrence of dissolved-

phase contaminants being restricted to the very fine-grained overbank deposits of Unit C (Figures 3-2 and 3-3). These overbank deposits form an approximately 130-foot-thick aquitard between the Unit B sands and the uppermost transmissive channel deposits of the LMT zone. The aquitard limits the downward movement of contaminants through the Lower Unit of the Laguna Formation despite downward gradients in the upper portion of the saturated zone. Because of the relatively low hydraulic conductivity of the overbank deposits, significant or rapid lateral or vertical movement of the NEP aquifer cleanup level (ACL) volume is unlikely and it is likely that little dilution will occur in the aquifer, possibly resulting in a smaller but potentially more highly concentrated plume through time. Limited downward migration likely is occurring because contaminants are no longer being transported away from the area; however, there is still significant vertical separation between contamination and the next hydrologic unit. Due to the low transmissivity of the aquifer materials, it is unlikely that the ACL plumes will migrate to those depths. This model appears to be validated by contaminant trends (Appendix C) and the documented changes in ACL plume extent since 1997 (Figure 3-4).

The overall groundwater gradient of the water table is from northeast to southwest; however, local groundwater gradient directions south of LF-03 near MAFB-111 and MAFB-133, and south southwest of LF-04 near MAFB-112, MAFB-113, MAFB-141, and MAFB-399 appear to be consistently to the south. The overall orientation of the NEP has been northeast-southwest (Figure 3-4), despite the apparent southerly groundwater gradient near the landfills. Contaminant transport historically has been aligned with the southwesterly stratigraphic orientation of the lower gravel layer of Unit B in this area.

Previous investigations have concluded that, in this area of the base, specifically in the area immediately west of LF-04, there are channelized sands that do not appear to have a strong hydraulic connection to wells screened at identical depths and within 200 feet of each other (Aeroenvironment Inc., 1987). New well MAFB-465, installed approximately 125 feet east of MAFB-132, had a 4Q12 groundwater elevation of approximately 4 feet lower than that measured in MAFB-132. The lower of two screens (and the only portion that is submerged in MAFB-132) was interpreted as being installed in HSG Unit C. However, the groundwater elevations measured in this well are consistently higher than in those screened in HSG Unit C and the sands of HSG unit B. The lithologic log for MAFB-132 indicates that the lower screen is in a clayey silt below a silty sandy gravel. The log for MAFB-465 shows a similar lithologic pattern, but the clayey silt was not observed to be saturated during drilling. Water was not encountered at MAFB-465 until the borehole penetrated silt with no clay and sandy silt that are present below the clayey silt; these lithologies were not encountered during the drilling at MAFB-132. The relationship of the contact between HSG units B and C in this area is complex, but based on VOC distribution and concentrations there appears to be a limited hydraulic connectivity between the two, or at least a common source of contaminated water and a dominant south-to-southwest groundwater gradient at the water table.

3.3 VOC MONITORING RESULTS

Groundwater samples collected from wells that monitor the NEP and Site 7 are analyzed for VOCs by United States Environmental Protection Agency (EPA) Method SW8260B. The following subsections evaluate 2012 monitoring results for VOCs for those wells sampled under landfill post-closure monitoring requirements. These results, therefore, pertain to VOC contaminant distribution associated with the NEP (relevant to the LF-03 and LF-04 post-closure programs) or the Site 7 Plume (relevant to the WP-07 post-closure program). Subsection 3.3.1 presents NEP results; Subsection 3.3.2 presents results for the post-closure monitoring programs for LF-03, LF-04, and WP-07. NEP VOC results are presented graphically on Figure 3-1, a plan view of the concentrations of PCE and cis-1,2-DCE greater than cleanup levels at the water table. Site 7 VOC results are shown on figures presented in Section 5.0, which also discusses the groundwater remediation of the Site 7 Plume.

3.3.1 NEP Monitoring – VOCs

PCE and cis-1,2-DCE are the two COCs identified in the Groundwater OU ROD for the NEP that have been consistently detected at concentrations greater than cleanup levels. The NEP PCE and cis-1,2-DCE isoconcentration contours for samples collected from approximately the water table depth, together with the water table surface elevation contours as interpreted in 4Q12, are presented on Figure 3-1. Figures 3-2 and 3-3 also present the isoconcentration contours in cross-sectional view. Graphs depicting cis-1,2-DCE trends in NEP monitoring wells are included as Figures 3-5 through 3-7.

In 2012, PCE concentrations at or greater than the cleanup level of 5.0 µg/L were restricted to monitoring wells MAFB-132, MAFB-133, MAFB-398, MAFB-400, and MAFB-465 (Figure 3-1), resulting in a slightly larger overall ACL plume area as compared with the 2011 ACL plume (MAFB-133 contained PCE at 5.1 µg/L in 2Q12 compared to 3.9 µg/L in 2Q11). The maximum PCE concentration detected in 2012 from any NEP monitoring well was 35 µg/L in well MAFB-132 in 2Q12. This concentration exceeds the previous historical maximum of 28 µg/L reported in both 4Q10 and 2Q11. PCE concentrations have fluctuated near the cleanup level in wells MAFB-133 and MAFB-136 since approximately 4Q03 and were slightly greater than the cleanup level in MAFB-133 but less than the cleanup level in MAFB-136 in 2012. The PCE concentration in MAFB-398 (6.4 µg/L) exceeded the cleanup level of 5.0 µg/L for the first time since 2007, but PCE was detected below the ACL (3.7 µg/L) in the sample collected from MAFB-398C for the first time since 2009. At MAFB-400, PCE was detected at the ACL (5 µg/L), which is less than the concentration detected in 2011(5.5 µg/L). See Appendix C for a history of PCE concentrations in NEP wells.

Consistent with historical data, cis-1,2-DCE was detected at concentrations above the cleanup level of 6.0 µg/L at shallow well MAFB-132 in 2012 (Figure 3-1). The general distribution of cis-1,2-DCE has historically corresponded to the extent of PCE contamination in the NEP. The maximum concentration of cis-1,2-DCE detected in 2012 from any NEP monitoring well was 38 µg/L in well MAFB-132 during 4Q12. The cis-1,2-DCE concentrations in well MAFB-132 have returned to levels similar to the previous historic high concentrations observed in 2006 and 2007 samples, when 34 µg/L was reported during 4Q06 and 4Q07. . The 4Q12 sample collected from MAFB-465, a new well installed upgradient of MAFB-132 in 4Q12, contained cis-1,2-DCE and PCE at concentrations of 28 and 22 µg/L, respectively. The concentration of cis-1,2-DCE in deeper C zone well MAFB-400 remained below the ACL, at 3.8 µg/L. The cis-1,2-DCE concentration detected at C zone well MAFB-398C in 2Q12 was 6.6 µg/L, representing a decrease from 9.9 µg/L in 2Q11The Air Force will continue monitoring at this location to evaluate whether concentrations exceeding the ACL are sustained or constitute a temporary increase, as may be the case based on 2012 data.

Other COCs identified in the Groundwater OU ROD for the NEP are CCl_4, chloromethane, and 1,2-dichloropropane (DCP). Except for one CCl_4 detection at MAFB-152 in 4Q98, these other COCs have not been detected exceeding ACLs since the remedy was selected in 1996. During 2Q12, 1,2-DCP was detected at estimated concentrations of 0.1F µg/L in well MAFB-132 and 0.5F µg/L in well MAFB-398C. The cleanup level for 1,2-DCP is 5.0 µg/L. Chloromethane and CCl_4 were not detected in the NEP monitoring wells during 2012. Though TCE is not a COC for the landfills, it was detected at a concentration of 7.7 µg/L in the 4Q12 sample from well MAFB-132 (a new maximum) and at concentrations at or less than 1.3 µg/L in several other NEP wells; the maximum contaminant level (MCL) for TCE is 5 µg/L.

3.3.2 Landfill Post-Closure Monitoring – VOCs

VOC concentrations from sample locations near the landfill sites at Mather are monitored both to satisfy requirements for performance monitoring for the Groundwater OU remedies (discussed in Section 3.3.1) and detection monitoring under the Landfill OU (LF-03 and LF-04) and Soil OU (WP-07) remedies. The

following subsections summarize notable VOC results for each of the three post-closure monitoring programs.

Landfill LF-03. Appendix A, Table A-1, presents 2 years of analytical results for significant VOCs for samples collected from wells that monitor LF-03. The distribution of VOCs in the vicinity of LF-03 is shown on Figure 3-1 and discussed in Subsection 3.3.1. PCE and cis-1,2-DCE were the only COCs with detections greater than the cleanup levels in LF-03 post-closure monitoring wells during 2012. PCE was detected at 5.1 µg/L in well MAFB-133 and 6.4 µg/L in MAFB-398, and cis-1,2-DCE was detected at 6.6 µg/L in well MAFB-398C during 2Q12. These concentrations are within the range of historical concentrations detected in these wells. The concentration of cis-1,2-DCE in the 2Q12 sample from well MAFB-398C represents the fourth consecutive exceedance of the cleanup level for cis-1,2-DCE in this deeper Unit C monitoring well; however, the concentration decreased in 2012 relative to 2011, indicating that this increase may have been temporary. TCE was detected in MAFB-112, MAFB-133, MAFB-398, and MAFB-398C, consistent with historical detections and less than the MCL of 5 µg/L. TCE is not a COC for the landfills, but low concentrations have historically been, and continue to be, detected in some NEP wells. The TCE detections may be the result of the breakdown of PCE, do not indicate a new release from the landfill, and do not require evaluation monitoring. PCE and cis-1,2-DCE concentrations should continue to be monitored as evidence of potentially continuing VOC contributions to the NEP from LF-03.

Landfill LF-04. Appendix A, Table A-1, presents 2 years of analytical results for significant VOCs for samples collected from wells that monitor LF-04. The distribution of VOCs in the vicinity of LF-04 is illustrated on Figure 3-1 and discussed in Subsection 3.3.1. PCE and cis-1,2-DCE were the only COCs with detections greater than the cleanup levels in LF-03 post-closure monitoring wells during 2012. PCE and cis-1,2-DCE concentrations in well MAFB-132 in 4Q12 (33 and 38 µg/L, respectively) are new concentration maximums for this well. The 2Q12 TCE concentration in well MAFB-132 (7.7 µg/L) exceeded the MCL (5 µg/L). PCE was also detected exceeding the ACL at MAFB-465 (28 µg/L). PCE was detected at the ACL at MAFB-400 (5.0 µg/L). Cis-1,2-DCE was detected exceeding the ACL at MAFB-465 (28 µg/L). TCE is not a COC for landfills, but low concentrations have historically been, and continue to be, detected in some NEP wells. The TCE detections may be the result of the breakdown of PCE, do not indicate a new release from the landfill, and do not require evaluation monitoring. The 2Q12 analytical data confirm an end to a previous overall upward trend in PCE in well MAFB-136 (the 2Q11 and 2Q12 results were 2.5 and 2.2 µg/L, respectively) observed from 2003 through 2010 (Appendix C). PCE and cis-1,2-DCE concentrations should continue to be monitored as evidence of potentially continuing VOC contributions to the NEP from LF-04.

Dry Wells and Data Quality Objectives. Continued overall decline in water levels has resulted in several NEP or landfill post-closure water table monitoring wells either becoming dry or anticipated to soon become dry. However, some wells that had been dry for several quarters recovered in 2011 and 2012. Appendix I contains a list of wells that were dry during at least one gauging event in 2012. Assuming a resumption of the overall long-term decline in water levels, these wells are not expected to permanently recover. Upgradient NEP monitoring well MAFB-110 is dry. Upgradient NEP monitoring well MAFB-075 and upgradient LF-03 post-closure monitoring well MAFB-130 have recently been dry, but recovered in 4Q11 and maintained sufficient water levels to allow sampling in 2Q12. Wells MAFB-075 and MAFB-110 are currently on reserve sampling status. MAFB-130 is on a biennial sampling frequency and was not scheduled for sampling in 2012. None of these upgradient wells are used to define the NEP VOC plume boundaries, and sufficient historic data has been collected to determine background concentrations for the detection monitoring program. These wells have been evaluated and were determined not to require replacement.

Cross-gradient LF-04 well MAFB-140 had approximately 0.4 foot of water in the screened interval during 2Q12 and 4Q12 and was not able to be viably sampled during 2012. MAFB-140 is currently on reserve sampling status for VOCs and has historically had only low-level detections of PCE at less than 1.0 µg/L. Downgradient LF-03 well MAFB -112 was dry during 2012. With respect to VOCs, MAFB-112 is currently on biennial sampling status and had PCE detections in 2009 (the last year that samples could be collected) ranging from 0.74 µg/L to 1.1 µg/L. MAFB-112 is co-located with MAFB-399, a deeper Unit C monitoring well screened 25 feet lower than MAFB-112 in the finer-grained overbank deposits. MAFB-111, MAFB-112, and MAFB-140 have been used to define the southern boundary of the NEP PCE plume and of these, only MAFB-111 is currently a viable well. However, based on the body of historical data, which includes more than 10 years of PCE detections below the ACL in MAFB-112, it is not critical to replace any of these wells on the basis of VOC monitoring. Section 3.4 further discusses these wells in relation to monitoring of non-VOCs.

Landfill WP-07. Site 7 is on the southern side of Mather (Figure 1-2). Like the LF-03 and LF-04 post-closure programs, sampling for VOCs in these WP-07 wells fulfills the dual requirement for detection monitoring for the landfill to identify any new releases, as well as corrective action monitoring for VOCs to monitor the effectiveness of the remedial action for the Site 7 Plume. VOC results for WP-07 are discussed in Section 5.1, which describes the distribution of the Site 7 Plume; non-VOC results are described below.

3.4 NON-VOC MONITORING RESULTS

The following subsections present results for non-VOCs for sampling conducted under the post-closure monitoring programs. These subsections compare the observed concentrations of metals and general mineral constituents at LF-03 and LF-04, and metals at WP-07, to the background ranges for these constituents to identify any potential releases from the landfills. The upper concentrations of the background range are estimated to be approximately the calculated 95 percent upper tolerance limit of background values for constituents in groundwater, and are calculated separately for the water table aquifer near the WP-07 landfill and for the water table aquifer near the Northeast Perimeter landfills (LF-03 and LF-04).

3.4.1 Northeast Perimeter Landfills – Calculated Background Concentrations for Metals and General Mineral Constituents

Tables 3-4 and 3-5 present upper background concentrations from water table aquifer near the Northeast Perimeter Landfills for metals and general mineral constituents, respectively. Background concentration estimates were calculated from wells upgradient of the Northeast Perimeter Landfills to evaluate whether the landfills are contributing significant amounts of these constituents to the groundwater. The background concentration statistics for metals were calculated using the analytical results collected from 4Q96 through 2Q05, and for general mineral constituents from 4Q96 through 4Q05. Background calculations were based on data from wells MAFB-005, MAFB-075, MAFB-110, and MAFB-131. These wells were selected because (1) they are located hydraulically upgradient of LF-03 and LF-04, (2) they had been sampled for Title 22 metals, and (3) historical data indicate they were not affected by contamination.

Based on persistent detections of chromium and/or nickel exceeding upper background levels in wells MAFB-112, MAFB-132, and MAFB-136, an evaluation monitoring program has been ongoing since 1Q06 at LF-03 and LF-04 for these two metals. Wells used in the evaluation monitoring program include MAFB-111, MAFB-112, MAFB-129, MAFB-132, MAFB-136, MAFB-140, MAFB-288, and MAFB-400. Results of the evaluation monitoring program are discussed below and presented on Figures 3-8 and 3-9.

Chromium was detected exceeding the upper background concentration range estimate of 10 µg/L for LF-03 and LF-04 in MAFB-112 and MAFB-132 in 2012, continuing a pattern of intermittent detections (see Figure 3-9). The source of chromium in groundwater at LF-03 and LF-04 is likely to be corrosion of the stainless steel well screens and not a result of a release from the landfills (MWH, 2008, Appendix L). Therefore, quarterly sampling for chromium was reduced to annual sampling in 2010, with the exception of MAFB-132, which was reduced to semiannual sampling (MWH, 2009a). Sampling at these frequencies will continue in 2013.

Nickel was detected greater than the upper background concentration range estimate of 3.9 µg/L in one well at LF-03 and two wells at LF-04 in 2012. However, concentrations were low relative to nickel concentrations detected in MAFB-132 (350 µg/L) and MAFB-136 (170 µg/L) in 2011 (the 2011 concentrations were among the highest concentrations for these wells in several years). No sample was collected from MAFB-112 in 2011 because it was dry. The 2Q09 sample from MAFB-140 (18F µg/L) was the first sample to contain nickel above the background concentration range. However, MAFB-140 became an effectively dry well (there is not enough submerged screen for sampling) and has not been able to be viably sampled since 2Q09. In 2013, the above mentioned wells will continue to be sampled on a semiannual frequency for nickel.

Corrective action has not been proposed to date because the extent of the elevated metals has been limited, and the working hypothesis is that the elevated chromium and/or nickel concentrations at MAFB-112, MAFB-132, and MAFB-136 are the result of corrosion of the stainless steel well screens in these wells, as was shown to be the case at LF-06. To evaluate this hypothesis, a monitoring well (MAFB-465) constructed with a polyvinyl chloride (PVC) casing and screen was installed approximately 100 feet upgradient of MAFB-132 (Figure 3-1) and 100 feet downgradient of LF-04 during 4Q12. This location was selected because it is expected to be outside the volume of water potentially affected by corrosion of the stainless steel screen at MAFB-132, but is in a similar location to monitor for any elevated nickel or chromium concentrations in the water table aquifer that may indicate contribution of contaminants in leachate from LF-04. Appendix J presents details regarding the installation of MAFB-465.

Initial sample results (4Q12) support the hypothesis that the metals are associated with stainless steel screens, with nickel and chromium concentrations well below their upper background levels in MAFB-465, while VOCs were detected at similar concentrations to samples collected from MAFB-132 during 4Q12. As with all new Mather wells, four consecutive quarterly groundwater samples will be collected before determining the long-term well sampling frequency. If all of these quarterly samples indicate nickel and chromium concentrations less than their respective UTLs, it will be concluded that the landfill is not the source of nickel and chromium in the wells noted above, and these wells will revert to detection monitoring. However, more variable results will require further data analysis, which precludes establishing detailed criteria in advance to either establish or exclude LF-04 as the metals source. These additional analyses may include averaging or applying other statistical techniques to the data or further evaluating the background metals concentrations using either new or existing data. During 2Q11, manganese was detected in MAFB-132 at a concentration of 930 µg/L (which exceeded the upper background value of 653 µg/L) This concentration was considered sufficiently close to the background concentration range (0.7 to 714 µg/L) to use the next scheduled sample (4Q11) as a confirmation sample. Manganese was detected at a concentration of 110 µg/L in 4Q11. In 2012, manganese concentrations at MAFB-132 in 2Q and 4Q were 4.8 µg/L and 250 µg/L, respectively. When compared to historical and current data, which includes approximately 12 years of data that range from not detected to 391.8 µg/L, the 2Q11 concentration appears to have been anomalously high.

MAFB-140 could not be sampled in 2012 due to declining groundwater levels. If no sample can be collected from MAFB-140 in 2013, then MAFB-139 will be used as a replacement location due to its downgradient position and similar (but slightly deeper) screen elevation.

No general mineral constituents detected in 2012 groundwater samples exceeded background concentrations.

3.4.2 Site 7 Landfill – Background Concentrations for Metals

MWH calculated statistics-based background concentrations for metals for WP-07 (Table 3-6) to evaluate whether WP-07 is contributing significant amounts of metals to groundwater. The background concentrations were calculated using the analytical results from the following water table wells: MAFB-148, MAFB-183, and MAFB-254. These wells were selected as background wells because they are located hydraulically upgradient of WP-07 and had been sampled for Title 22 metals.

As shown in Table 3-6, metals concentrations in samples collected from Site 7 wells in 2012 were less than the calculated upper background range.

Because the chemical profiles of the regional groundwater and perched-zone water are so dissimilar at Site 7, separate background values were calculated for each water type. Total dissolved solids (TDS) in the perched zone are higher than in the underlying regional groundwater, likely resulting from former infiltration of meteoric water through, or in contact with, the fill material in WP-07. In 2012 results from the Site 7 detection monitoring samples, water table results did not exceed water table background concentrations and perched-zone concentrations did not exceed perched-zone background concentrations.

3.5 CONCLUSIONS AND RECOMMENDATIONS FOR NEP AND LANDFILL MONITORING

Historical and recent data trends, current groundwater levels, and the hydrogeologic conceptual model indicate the ACL volume is isolated to a few wells in close proximity to LF-03 and LF-04 and is not expected to expand laterally. Concentrations of COCs are stable or decreasing at the plume edges (including deeper wells), and increasing in the center of each ACL plume. The detections of cis-1,2-DCE exceeding the cleanup level in the 4Q09, 2Q10, 2Q11, and 2Q12 samples and PCE exceeding the cleanup level in 2Q10 and 2Q11 at Unit C well MAFB-398C indicate that chemicals have migrated to greater depths, as predicted by the conceptual model for the site. 2012 analytical results indicate that this trend may have reversed. However, it is recommended that monitoring continue to assess cis-1,2-DCE concentrations in the deeper part of Unit C.

Metal concentrations detected in samples collected from landfill wells were generally below calculated upper background concentrations for each landfill. The evaluation of nickel and chromium exceeding calculated background concentrations in LF-03 and LF-04 continued with the installation of a well with a PVC screen (MAFB-465) near LF-04 to help determine the source of elevated nickel and chromium detected in some wells. Initial sample results from MAFB-465 support the hypothesis that the source of nickel and chromium concentrations exceeding background in some water table wells is corrosion of stainless steel well screens in those wells.

The objectives for the NEP remedial action are being achieved. The current monitoring network of NEP wells is adequate to meet the corrective action monitoring requirements specified in the Groundwater OU ROD. Specific recommendations for the monitoring programs include:

- Continue sampling the evaluation monitoring wells for chromium at an annual frequency (except for MAFB-132, which will be sampled semiannually) and for nickel at a semiannual frequency as stated in the 2013 groundwater sampling plan (URS, 2013b) with the following exception:
  - To confirm initial results and further evaluate whether elevated chromium and nickel concentrations, relative to the calculated background ranges, detected in groundwater are a result of the deterioration of stainless steel screen material, continue to sample MAFB-465 quarterly for metals though 3Q13.
  - If no sample can be collected from MAFB-140 in 2013, then MAFB-139 should be sampled as a replacement location.
- PCE and cis-1,2-DCE concentrations should continue to be monitored to maintain an understanding of plume extent and continue to assess near-source evidence of potentially continuing VOC contributions to the NEP from LF-03 and LF-04.
- Decommission MAFB-128 (currently not sampled) in accordance with the *2012/2013 Groundwater Well Decommissioning Work Plan* (URS, 2013a).

4.0 AC&W REMEDIAL PERFORMANCE MONITORING PROGRAM

This section discusses the AC&W Plume using data collected through 4Q12. Table 4-1 lists detections reported in 2012 for TCE, the COC for the AC&W Plume. Figure 4-1 shows locations of extraction and monitoring wells that are part of the AC&W groundwater extraction and treatment system, the surface-water discharge location, TCE isoconcentration contours, and the water table surface as interpreted in 4Q12. Figure 4-2 presents a hydrogeologic cross-section beneath the site.

4.1 AC&W PLUME REMEDIAL HISTORY

A detailed description of the AC&W Plume groundwater extraction and treatment system, as well as a full description of historical operations, was provided in the annual monitoring reports through 2007 (e.g., see Section 4.11 of the *Annual and Fourth Quarter 2007 Groundwater Monitoring Report* [MWH, 2008]). The system received EPA concurrence on the OPS finding in 1998 (EPA, 1998).

4.2 AC&W TREATMENT SYSTEM AND PLUME MONITORING

The performance of the AC&W Plume groundwater extraction and treatment system has been monitored since December 1994 to ensure compliance with discharge requirements and to ensure the objectives of the remedial action are met. The primary objectives of the remedial action as stated in the AC&W ROD (AFBCA, 1996) and explanation of significant difference documents (AFBCA, 1997; AFRPA, 2007) are as follows:

- **Remediation:** Remove contaminant mass from the groundwater plume and remediate the plume to the ACL for TCE (5.0 µg/L).
- Comply with discharge requirements for the treated water.
- Comply with air-emission requirements.

Secondary objectives also have been adopted for the remedial action; these objectives are management strategies being used to meet the primary ROD objectives and include:

- **Capture:** Capture the contaminant plume and extract the contaminated groundwater for remediation.
- **System Performance:** Operate extraction wells to efficiently extract TCE.

Water quality in groundwater monitoring wells, extraction wells and Mather Lake is monitored to evaluate the effects of extraction on the plume and of discharge to the receiving water at Mather Lake. The objectives of the water quality monitoring include:

- In conjunction with water level measurements, demonstrating that the zones of influence of the extraction wells are adequate to capture (at a minimum) the plume that exceeds 5.0 µg/L of TCE.
- Monitoring remediation of the plume by monitoring changes in contaminant concentrations.
- Removing contaminants from groundwater effectively and efficiently.
- Demonstrating that treated groundwater does not exceed discharge standards and that its discharge does not degrade the receiving water quality.
- Demonstrating compliance with air emissions standards.

The following subsections describe monitoring activities and results for 2012.

4.2.1 Operations, Maintenance, and Monitoring of Extraction Wells and Groundwater Treatment Plant

The AC&W Plume treatment system in 2012 consisted of six active extraction wells and the treatment plant with one air stripper. All treated water was discharged to Mather Lake. From approximately 1998 to 2003, up to 50 gpm of the treated water was used by Sacramento County for irrigation near Mather Lake; such use was discontinued when the treated water system was isolated from the irrigation system.

Extraction Wells. Table 4-2 presents the quarterly average flow rates, TCE concentrations, and yearly mass removed for each of the active AC&W extraction wells. Between 2008 and 2012, TCE concentrations at groundwater extraction wells ACW EW-2 and ACW EW-3 were less than the ACL of 5.0 µg/L.

Between 2002 and 2007, the concentration of TCE in extraction well ACW EW-6R decreased from 29 µg/L to 19 µg/L (Appendix C). After the flow rate at the well was increased from approximately 10 gpm to 40 gpm in late August 2006, concentrations increased to an estimated 32 µg/L during 2Q07 but have since declined to less than the ACL, reaching 4.3 µg/L in 2011 and decreasing each quarter in 2012 to 3.4 µg/L in 4Q12. Extraction well ACW EW-3, which is upgradient of ACW EW-6R captures the current toe of the ACL plume (Figure 4-1). ACW EW-6R is recommended to be shut down in 2013.

TCE concentrations at ACW EW-4 were less than the cleanup level from 2006 through 2008, and this well was recommended to be shut down in the *Annual and Fourth Quarter 2008 Groundwater Monitoring Report* (MWH, 2009a). ACW EW-4 was turned off in February 2010 and sampled during 1Q10, 2Q10, 4Q10, and 2Q11 to monitor for potential concentration rebound. No significant COC concentrations or concentration rebounds was observed. TCE was not detected in the 2Q11 sample, and the 2Q12 sample contained an estimated TCE concentration of 0.1 µg/L. ACW EW-5 was shut down in 2000 and TCE has not been detected in samples collected form this well since 2002. Based on historical and 2011 analytical data, and confirmed by 2012 data for ACW EW-4 (Appendix C), ACW EW-4 and ACW EW-5 are scheduled for decommissioning in 2013 (URS, 2013a).

Groundwater Treatment Plant. During 2012, air stripper influent water samples were collected each quarter for VOC and general minerals analysis. Water samples were collected from the air stripper effluent monthly in 2012 for VOC analysis. Weekly system operation and maintenance activities were conducted to check system operations, download data collected by the treatment system computer, and maintain the system components. Appendix A provides analytical results for all sampling events. Table 4-2 presents the average flow rate at the treatment plant, quarterly influent sample results, and the total TCE mass removed in 2012. Treatment system TCE concentrations and influent flow rates in 2012 were similar to those in 2011, and the total mass removed during the year (approximately 2.5 pounds) was equal to that removed during 2011.

The TCE mass removed by the pump-and-treat system is calculated to evaluate system performance. Figure 4-3 presents the total mass of TCE removed by the system since startup of continuous full-scale operation. The system has removed approximately 477 pounds of TCE through 2012, from approximately 1.6 billion gallons of treated groundwater. The average air emission discharge rate from the strippers for 2012 was 0.007 pound per day (lb/day) of TCE, and the maximum observed emission rate was 0.008 lb/day (Appendix D), well under the air emissions standard of 2 lbs/day for reactive organic compounds (ROCs) above which active emissions abatement would be required.

During 2012, the treatment system effluent complied with discharge standards. TCE was not detected in any of the AC&W system effluent samples (Table 4-3).

Mather Lake Discharge. Table 4-3 presents field parameters and total VOC concentrations for the receiving water at Mather Lake (ACW R-2) and the AC&W Plume treatment system effluent collected during quarterly sampling. TCE was not detected in any receiving water or effluent samples during 2012. Throughout 2012, monthly samples were collected from the effluent discharge to Mather Lake; these samples met the total VOC discharge treatment standards (total monthly median of 0.5 µg/L or less with any one sample not to exceed 1.0 µg/L). Appendix A includes the 2011 and 2012 sampling event results. Mather Lake was inspected monthly for any unusual conditions (algae blooms, turbidity, foams, etc.) resulting from the discharge of the treated groundwater. Periodic pH measurements (bi-weekly from January 2012 through April 2012 and monthly for the rest of the year) were also collected at several locations around Mather Lake to assess impact from the groundwater discharge. No unusual conditions resulting from groundwater discharge were observed in 2012.

4.2.2 Plume Monitoring and Distribution

In map view, Figure 4-1 shows the TCE distribution of the AC&W Plume based on 2012 analytical results. Figure 4-2 presents a hydrogeologic cross-section beneath the site. Appendix C presents time-concentration graphs illustrating TCE concentrations for all AC&W well samples collected from approximately 1996 to the present.

A detailed description of the hydrologic conceptual model, HSG zones, historical source area investigations, and hypotheses on contaminant fate and transport, is provided in Subsection 4.4.1.1 of the *Annual and Fourth Quarter 2007 Groundwater Monitoring Report* (MWH, 2008). For additional historical information, refer to the 2007 annual report.

Regional groundwater flow at the AC&W Site is predominantly to the southwest, at a gradient of approximately 0.002 ft/ft during 4Q12. Flow lines deflect both south and west toward the operating extraction wells along the length of the plume (ACW AT-1, ACW AT-2, ACW EW-1, ACW EW-2, ACW EW-3, and ACW EW-6R) (Figure 4-1). The entire area encompassed by the 5.0 µg/L TCE contour has been interpreted to lie within the capture radius of the extraction system (as indicated by groundwater flow directions interpreted from the potentiometric surface).

In 2012, the highest TCE concentrations were reported in the upgradient portions of the plume, near extraction wells ACW AT-1 (22 µg/L) and ACW AT-2 (14 µg/L). As summarized in previous annual reports, concentration trends indicate that TCE concentrations in the downgradient portion of the plume have been stable or declining (Table A-1; Appendix C). Additionally, the samples collected from ACW EW-6R in 2Q11 and quarterly in 2012 did not contain TCE at concentrations greater than the ACL, continuing a steady decrease since 2007.

Since 2006, the operation of Boeing extraction well EX-2 (located northeast of the AC&W Plume and screened in Unit D; Figure 4-2) has induced a downward gradient from Unit C to Unit D near the head of the plume, but sample results from the Unit D wells (MAFB-067 and MAFB-068) have not indicated that measurable TCE is migrating downward.

Groundwater elevation trends are depicted in hydrographs generated from second quarter groundwater levels for water table wells across Mather (Appendix B). In 2011, a majority of the wells showed an increase in groundwater elevation, while the hydrographs for the AC&W Site continued an overall long-term trend of declining groundwater levels. In the AC&W area, many water table/Unit C monitoring wells have gone dry as the water table has declined below the base of the screened interval, particularly at older wells installed in areas peripheral to the plume. Upgradient water table wells MAFB-401,

MAFB-402, MAFB-403, and MAFB-408 have been periodically dry over the past 2 years. The water table elevation in the upgradient portion of the AC&W plume has decreased approximately 9 feet since the startup of EX-2 in 2006. None of these upgradient water table wells had detections of TCE concentrations exceeding the cleanup level in 2011 or 2012. However, only MAFB-403 was sampled in 2012 (none of the other wells were scheduled) and the TCE concentration detected was 4.7 µg/L. This concentration is within the historical range of concentrations for this well. These data (and the historical data from these wells) establish the upgradient extent of the ACL plume. As such, the Air Force does not consider replacement wells necessary if and when these wells go dry. Additionally, MAFB-401 is scheduled for decommissioning in 2013 (URS, 2013a).

4.3 CONCLUSIONS AND RECOMMENDATIONS

The AC&W groundwater extraction and treatment system successfully operated in 2012 to remove mass from the groundwater contaminant plume. TCE concentrations in the upgradient part of the plume are increasing or stable, while they are decreasing or stable in the downgradient part of the plume. Water level and concentration data from the AC&W wells have been used to characterize the TCE plume and to show that the plume is likely completely captured by AC&W extraction wells (Figure 4-1). The objectives for the remedial action at AC&W are being achieved.

The AC&W treatment plant ceased operating on 29 December 2012 due to vandalism and the theft of crucial system components. Consequently, all of the extraction wells were shut down. The system was restarted on 15 March 2013. Because 2013 is a biennial sampling year, all wells that are currently part of the sampling program for AC&W will be sampled in 2Q13. These data will be used to assess the effect of the system shutdown at the AC&W Site.

Based on the decision logic presented in Figure 2-3, it is recommended that extraction well ACW EW-6R be shut down due to the decrease in TCE concentrations to less than ACL. ACW EW-6R will be sampled semi-annually for two years (four sampling events) to assess potential concentration rebound. Additionally, flow rates and capture at all AC&W extraction wells should be evaluated and possibly modified to optimize capture of the downgradient part of the plume and remediation in the upgradient part of the plume.

Groundwater monitoring for 2013 will take place in accordance with the *2013 Groundwater Monitoring Program Sampling Plan* (URS, 2013b).

ACW EW-4 and ACW EW-5 have been shut down since 2010 and 2005, respectively, are no longer required for remediating or monitoring the plume, and are scheduled for decommissioning in 2013 (URS, 2013a). Additionally, MAFB-082, MAFB-197, MAFB-198, MAFB-303, and MAFB-401 have been recommended for decommissioning (URS, 2013a). After the AC&W treatment plant is restarted and the AC&W wells are sampled (in 2Q13), it will be determined if the decommissioning of these wells is still appropriate.

5.0 SITE 7 REMEDIAL PERFORMANCE MONITORING PROGRAM

This section describes the Site 7 Plume based on monitoring data through 4Q12 and discusses the performance of the groundwater extraction and treatment system during 2012. Table 5-1 lists the Site 7 Plume COCs, their respective cleanup levels, and a summary of COC detections for 2012. A detailed discussion of the site conceptual model was most recently presented in the *Annual and Fourth Quarter 2007 Mather Groundwater Monitoring Report* (MWH, 2008). Figure 5-1 shows locations of extraction and monitoring wells that are part of the Site 7 groundwater extraction and treatment system, TCE and 1,2-DCA isoconcentration contours, and the water table surface as interpreted in 4Q12. Hydrogeologic cross-sections originally presented in the Site 7 CZA (Appendix N of the *Annual and Fourth Quarter 2008 Mather Groundwater Monitoring Report* [MWH, 2009a]) have been updated with information provided by the recently (2011) installed monitoring well MAFB-464, and are presented on Figures 5-2 and 5-3.

The VOC plume has migrated off Mather to the southwest, approximately 3,800 feet beyond the southern property boundary near the Site 7 disposal area (Figure 5-1). The interpreted downgradient extent of the plume is approximately 4,500 feet upgradient from the nearest water supply well (see Figure 2-1).

5.1 SITE 7 PLUME REMEDIAL HISTORY

The gravel borrow pit at Site 7 reportedly was used to dispose of wastes, including POL wastes, from 1953 to 1966. The gravel borrow pit was originally excavated to a depth of approximately 40 feet. Other wastes reportedly disposed include empty drums, sludge from plating shop dip tanks, absorbent sand used for cleaning oil and solvent spills, paint chips, waste paint and thinners, and at least one load of transformer oil that may have contained PCBs. The former disposal area was brought up to grade in 1998 and 1999 by receiving soils excavated from the West Ditch (Site 15), the South Ditch (Site 85), and from other IRP cleanup activities. An engineered cap was constructed over the former disposal area in 1999. VOCs in the vadose zone at Site 7 were initially remediated by vapor extraction until volatile contaminant concentrations had decreased significantly. In April 2007, the vadose-zone treatment system was converted to active bioventing to address less volatile hydrocarbons. Passive bioventing replaced active bioventing in 2009 because sufficient oxygen was being maintained without active air injection. Because remaining vadose-zone contamination is not expected to significantly impact groundwater, a site closure report was submitted to permanently terminate vadose-zone remediation and the system and wells not in the groundwater or landfill gas monitoring program were dismantled and destroyed in 2012 (URS, 2012b).

The material disposed into the gravel pit that is now the Site 7 landfill (WP-07) is the suspected source for the Site 7 VOC groundwater plume. In 1995, the cancer risk to humans from exposure to maximum concentrations of COCs measured in Site 7 groundwater samples collected before remediation was estimated at 9.7×10^{-5} (AFBCA, 1996). Although the cancer risk was within the risk management range (10^{-6} to 10^{-4}), the Air Force opted to remediate the Site 7 Plume because the estimated risk was near the 1×10^{-4} threshold, and the plume extended beyond Mather in the direction of private drinking water wells.

The remedial action selected for the Site 7 Plume in the Groundwater OU ROD (AFBCA, 1996) is remediation by groundwater extraction, treatment by air stripping, and injection back into the aquifer through wells. Long-term monitoring and institutional controls on portions of the former Mather Air Force Base supplement active remediation. Post-closure groundwater monitoring is also required under the Soils OU for the closed Site 7 landfill WP-07 (AFBCA, 1996). Section 3.0 discusses post-closure groundwater monitoring results for non-VOCs. Because a remedial action has been selected for the Site 7 Plume (groundwater extraction and treatment), corrective action monitoring is required under the

Groundwater OU Remedial Action (AFBCA, 1996). Performance monitoring of the Site 7 Plume remedy is conducted as the corrective action monitoring program for VOCs for the selected remedy.

The treatment system was constructed according to the *Remedial Action Work Plan for Phase I Groundwater Remediation for Main Base/Strategic Air Command Industrial Area Plume and Groundwater Remediation of Site 7 Plume* (Montgomery Watson, 1997a) and the *Preliminary Engineering Report for Phase I Groundwater Remediation of Main Base/SAC Industrial Area Plume and Groundwater Remediation of Site 7 Plume* (Montgomery Watson, 1997b). The extraction system concept was modified during the remedial design process to reduce the number of extraction wells from three to two. Construction of the Site 7 treatment facility was completed in October 1998. Groundwater flow modeling in 1993 and 1994 to support the Focused Feasibility Study (FFS) (IT Corp., 1995) suggested that three wells cumulatively pumping 150 gpm would capture the Site 7 Plume. Subsequent plume characterization and modeling by MWH suggested that two extraction wells would suffice (MWH, 2008). Between 1998 and 2004, as gravel mining precluded full build-out, the system operated for three separate periods, each using a different extraction well. The following is a brief description of each period and other steps taken toward the current configuration.

Groundwater was extracted initially from only one well during the initial phase of the operation. However, this well (FFS-EW7-1) was destroyed in July 1999 because of gravel mining in the area.

One extraction well (7-EW-1) and seven performance monitoring wells (MAFB-370, MAFB-371C, MAFB-371D, MAFB-372B, MAFB-372D, MAFB-373C, and MAFB-373D) were installed across the leading edge of the Site 7 Plume during 4Q00. Startup of the extraction well and restart and prove-out of the treatment system began in early April 2001. However, Granite began mining in the vicinity of 7-EW-1 in July 2001 and, consequently, the conveyance piping was removed and the system taken offline on 27 July 2001 to accommodate mining in the area.

An additional six monitoring wells (MAFB-391, MAFB-392, MAFB-393, MAFB-394, MAFB-395, and MAFB-396), four piezometers (7-PZ-38P, 7-PZ-39B, 7-PZ-40B, and 7-PZ-41B), and one extraction well (7-EW-2) were installed during 1Q02. The treatment system was restarted in March 2002 with extraction from 7-EW-2. However, the treatment system was taken offline on 18 April 2003 to accommodate the aqueduct construction for rerouting Morrison Creek and other mining and reclamation activities.

The Site 7 groundwater extraction and treatment system resumed operation with the two remaining wells (7-EW-1 and 7-EW-2) in December 2006. Several monitoring wells at the toe of the Site 7 Plume (single-completion monitoring well MAFB-370, and dual-completion monitoring wells MAFB-371C and D, MAFB-372B and D, and MAFB-373C and D) were rehabilitated and sampled during 3Q06 and 4Q06 as part of system startup activities. Monitoring well rehabilitation and startup activities were described in Appendix M of the *Annual and Fourth Quarter 2006 Mather Groundwater Monitoring Report* (MWH, 2007c). MAFB-370 was decommissioned in September 2010.

Groundwater monitoring well MAFB-464 was installed on 19 October 2011 to help delineate the southern (regionally downgradient) extent of the plume.

Figure 5-1 shows the groundwater extraction and treatment system for the Site 7 Plume, including extraction wells, injection wells, and conveyance piping. The system received EPA concurrence on the OPS finding in 2011 (EPA, 2011).

5.2 SITE 7 TREATMENT SYSTEM AND PLUME MONITORING

The performance of the Site 7 groundwater extraction and treatment system is monitored to ensure compliance with discharge requirements and to ensure the objectives of the remedial action are met. The primary objectives of the remedial action as stated in the Groundwater OU ROD (AFBCA, 1996) and explanation of significant difference documents (AFRPA, 2010a) are as follows:

- **Remediation:** Remove contaminant mass from the groundwater plume and remediate the plume to the ACLs for all COCs (Table 5-1).
- Comply with discharge requirements for the treated water.
- Comply with air-emission requirements.

Secondary objectives have also been adopted for the remedial action; these objectives are management strategies being used to meet the primary ROD objectives and include:

- **Capture:** Capture the contaminant plume and extract the contaminated groundwater for remediation.
- **System Performance:** Operate extraction wells to efficiently extract COCs.

Water quality in groundwater monitoring wells and extraction wells is monitored to evaluate the effects of extraction on the plume. The objectives of the water quality monitoring include:

- In conjunction with water level measurements, demonstrating that the zones of influence of the extraction wells are adequate to capture (at a minimum) the COC plume(s) that exceeds ACL.
- Monitoring remediation of the plume by monitoring changes in contaminant concentrations.
- Removing contaminants from groundwater effectively and efficiently.
- Demonstrating that treated groundwater does not exceed discharge standards and that its discharge does not degrade the receiving water quality.
- Demonstrating compliance with air emissions standards.

The following subsections describe monitoring activities and results for 2012.

5.2.1 Operations, Maintenance, and Monitoring of Extraction Wells, Groundwater Treatment Plant, and Injection Wells

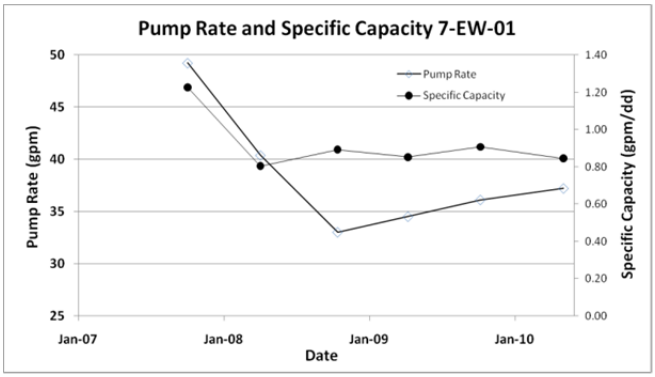
The Site 7 Plume groundwater treatment system, including the extraction wells, injection wells, and the treatment plant, operated in general accordance with the *Operations and Maintenance Manual for the Groundwater Extraction and Treatment System for the Site 7 Plume* (MWH, 2010c).

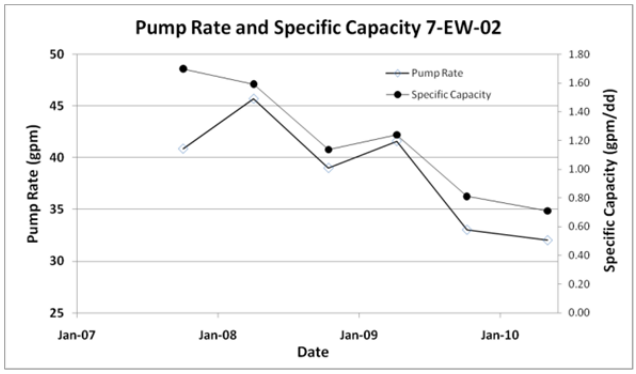
Extraction Wells. Samples collected from the wellheads of groundwater extraction wells 7-EW-1 and 7-EW-2 were analyzed for VOCs, TPH-g, and general minerals. Table 5-2 presents quarterly average flow rates and the estimated 2012 mass removal for the plant. Mass removal was not estimated for individual extraction wells because these wells have a biennial sampling frequency and 2012 was not a biennial sampling year.

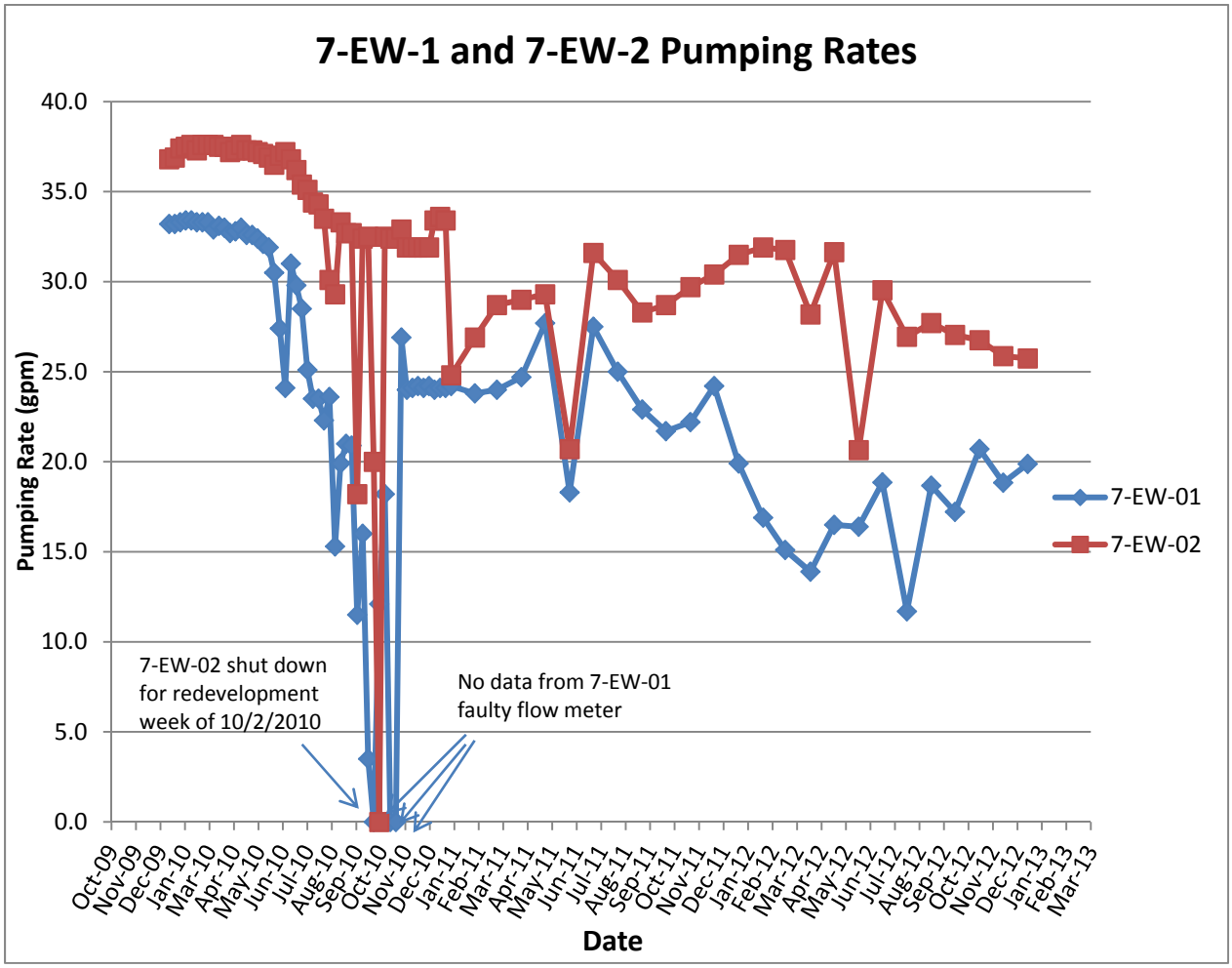
Extraction rates for the Site 7 system extraction wells were approximately 50 gpm (the original design rate for each well) during initial periods of operation from 2001 to 2003. However, pumping rates have decreased due to excessive drawdown, likely caused by a combination of declining regional water levels

and declining specific capacity (gpm per foot of drawdown) of the wells as discussed below. Quarterly average extraction rates in 2012 were between 15.3 and 19.8 for 7-EW-1 and between 26.1 and 30.6 gpm for 7-EW-2 (see graph below).

Extraction rates for the period between late 2007 and December 2012 are shown on the graphs below to illustrate current performance of the wells and to assess the need for additional well maintenance.







Extraction well 7-EW-1 was redeveloped in July of 2008 following a sharp decline in the sustainable pumping rate. Following redevelopment, the flow rate for 7-EW-1 remained relatively stable through 2011 but began declining again in 2012. 7-EW-1 was redeveloped in July 2012, and the flow rate increased to approximately 21 gpm. 7-EW-1 appears to be capturing the entire downgradient portion of the Site 7 Plume at concentrations above ACLs, as demonstrated by the estimated capture zones plotted on Figure 5-1.

The specific capacity of extraction well 7-EW-2 declined approximately 60 percent, from 1.7 to 0.71 gpm per foot of drawdown, from 4Q07 to 2Q10. 7-EW-2 was redeveloped in October 2010 and, as shown on the graph above, the well's flow rate did not significantly increase. In 2011, URS worked to increase the flow rate in this well to maximize capture of the plume in this location. The results of the optimization appear to have been successful in increasing the extraction rate to greater than 30 gpm. However, the rate decreased to approximately 26 gpm by the end of 2012. URS will continue assessing performance throughout 2013.

Groundwater Treatment Plant. Table 5-2 presents the quarterly average flow rates, quarterly cumulative VOC influent concentrations, and total mass removed in 2012 by the Site 7 treatment plant. Water samples were collected quarterly from the air stripper influent for VOC, total petroleum hydrocarbons (TPH), and general minerals analysis. Water samples were collected monthly from the air stripper effluent for VOCs and quarterly for total petroleum hydrocarbon as gasoline (TPH-g), total petroleum hydrocarbons as diesel (TPH-d) and general minerals analysis. Appendix A includes results from all sampling events in 2011 and 2012. During 2012, the treatment system effluent complied with discharge standards.

Figure 5-5 illustrates the cumulative volume of water treated and VOC mass removed by the Site 7 treatment system, as well as the historical system influent concentration. In 2012, the system removed approximately 3.7 pounds of VOCs from 23,822,424 gallons of groundwater. Since 2007, the rate of COC removal has gradually decreased as the plume continues to be remediated. Through 2012, the system has removed approximately 56 pounds of VOCs from 255 million gallons of water. The average and maximum air emission discharge rate from the stripper for 2012 was 0.010 lbs/day (Appendix D), well under the ROC air emission standard of 10 lbs/day.

Injection Wells. In 2012, all four injection wells received treated water from the groundwater treatment system. Table 5-2 presents quarterly average flow rates for each injection well. The capacity of the injection wells is sufficient to accommodate all of the treated groundwater. Groundwater sample collection is not required for the injection wells because the injected water is treated to discharge treatment standards, as verified by the analytical data from the air stripper effluent samples.

5.2.2 Plume Monitoring and Distribution

The Site 7 Plume consists of a groundwater plume with TCE and 1,2-dichloroethane (1,2-DCA) above ACLs and PCE near its ACL. Figure 5-1 shows isoconcentration contours for TCE and 1,2-DCA contamination exceeding ACLs in the groundwater plume. The cis-1,2-DCE concentration at MAFB-041 (4.9 µg/L) decreased to less than the ACL (6.0 µg/L) for the first time in 2Q12. A potential residual source for the groundwater plume is migration of contaminants from a perched-water zone beneath the engineered landfill cap with TCE and occasionally, 1,2-DCA, vinyl chloride, TPH-d, and benzene detected at concentrations greater than established cleanup levels for the underlying groundwater plume. Extraction of the perched water to provide source control has been deemed impractical (MWH, 2009b). Figure 5-2 shows isoconcentration contours for contamination in the perched zone. Figures 5-3 and 5-4 illustrate the conceptual model of the site in two hydrogeologic cross-sections.

Perched Zone. Groundwater samples were collected from two wells during 2012 from the perched zone at Site 7; all wells screened in the perched zone at Site 7 will be sampled in 2013. TCE exceeded the ACL in the 2Q12 samples collected from 7-BV-08 (7.3 µg/L) and 7-PZ-37P (5.2 µg/L). The TCE detection at 7-PZ-37P was the first detection since 2007 to exceed the ACL, but is within the historical range of concentrations for this well. Although the lateral extent of the perched zone has not been defined, the extent of contamination in the perched zone is defined except to the south, where the TCE concentration at 7-PZ-37P slightly exceeded ACL in 2012. Monitoring of the perched zone will continue to help evaluate whether the perched water may be a significant source of contaminants to the underlying water table in the future.

Groundwater Plume. VOC concentrations exceeding cleanup levels continued to be observed during 2012 at MAFB-041, which is downgradient from the landfill cap and approximately 350 feet downgradient from the base boundary. TCE and 1,2-DCA were detected at 17 and 3.7 µg/L, respectively, in MAFB-041 during 2Q12. TCE was detected at 5.2 µg/L in 2Q12, at MAFB-284, which is between the Site 7 landfill and MAFB-41. The TCE concentrations in MAFB-041 decreased to a level in 2012 similar to those measured in 2005 through 2007 after peaking at 48 µg/L in 2010 (Appendix C).

In 2011, elevated TCE concentrations were observed in the mid-plume area in extraction well 7-EW-2 (20 µg/L) and adjacent monitoring well MAFB-394 (13 µg/L) (these wells are on a biennial schedule and were not sampled in 2012). The estimated capture zone based on the potentiometric contours shown on Figure 5-1 suggests that the entire plume width in the vicinity of 7-EW-2 is captured.

MAFB-446 was installed during 2008 in the mid-plume area between 7-EW-2 and 7-EW-1, along the axis of the plume to gauge remedial progress between the extraction wells. In samples collected at MAFB-446 in 2011, TCE and PCE were detected at concentrations of 34 and 4.4 µg/L, respectively. These concentrations decreased relative to the previous sample (2Q09), which contained concentrations of TCE and PCE at 57 and 9.3 µg/L, respectively. MAFB-444, where TCE was detected at 1.9 µg/L, constrains the ACL volume to the east, and MAFB-300, where TCE was not detected during 2012, constrains the ACL volume to the west in the mid-plume area.

Groundwater extraction well 7-EW-1 continued to effectively remove mass from the toe of the plume during 2012. Since 7-EW-1 was returned to service in late 2006, TCE concentrations at MAFB-372B, downgradient from 7-EW-1, have decreased from 13 µg/L to 5.7 µg/L (in 2Q11, not scheduled for sampling in 2012). Two groundwater monitoring wells were installed in 2008 near the toe of the plume. MAFB-445 was installed in Unit B approximately 750 feet east of 7-EW-1. TCE has not been detected exceeding the cleanup level in the five samples collected at MAFB-445 since the well was installed. MAFB-448 was installed southeast of MAFB-372B in an attempt to bound the downgradient extent of the plume. However, the baseline sample for MAFB-448 contained TCE exceeding the cleanup level (7.1 µg/L). The TCE concentration at MAFB-448 increased to a maximum concentration of 9.0M µg/L in 4Q09 but has since decreased to a concentration (4.4 µg/L) less than that ACL in 2Q12. Monitoring well MAFB-464 was installed in 2011 downgradient of the southern extent of the Site 7 plume. Based on 4Q12 groundwater elevation data, the downgradient portion of the ACL plume lies within the 7-EW-1 capture zone.

To fulfill mining reclamation requirements, an emergent marsh has been constructed west of the Site 7 plume toe with some overlap of the plume margin. The marsh encompasses approximately 40 acres and has water depths of up to approximately 3 feet. The area is outlined on Figure 5-1. The surface impoundment of water began circa 2005 and is believed to have resulted in increased recharge of the underlying water table. Recharge may continue to increase as the wetland contains water for more time each year, and an increase in the size of a groundwater mound associated with the recharge may change groundwater flow near the southwestern portion of the Site 7 plume. Groundwater elevations in nearby

wells MAFB-371C, MAFB-373C, and MAFB-447, were used to evaluate the impacts of the marsh on groundwater levels. The groundwater elevations appear to have spiked in 4Q10, when water levels were higher than in 4Q09 by approximately 1.5 to 3 feet; however, this groundwater elevation increase was measured in nearly all wells gauged in the vicinity and, therefore, is not likely representative of groundwater elevation being effected by infiltration from the marsh. During 2011 and 2012, the water table appears to have returned to a level similar to 2009, suggesting that the marsh has not significantly changed groundwater flow behavior. The Air Force will continue to review groundwater elevation data in this area.

5.3 CONCLUSIONS AND RECOMMENDATIONS

The Site 7 groundwater extraction and treatment system successfully operated in 2012 to remove mass from the groundwater contaminant plume. Contaminant concentrations in Site 7 wells are decreasing or stable. Water level and concentration data from the Site 7 wells have been used to characterize the VOC plume and to show that the plume is likely completely captured by extraction wells 7-EW-1 and 7-EW-2 (Figure 5-1). The objectives for the remedial action at Site 7 are being achieved. The emergent marsh constructed west of the Site 7 plume toe has not significantly changed groundwater flow behavior.

Flow rates at Site 7 extraction wells should be evaluated and optimized to maintain capture at the toe of the ACL plume.

MAFB-147, MAFB-256, and MAFB-262 have been recommended for decommissioning in 2013 (URS, 2013a).

To more closely monitor the southern extent of the TCE plume, monitoring well MAFB-464 was installed near the toe of the Site 7 Plume in 2011. Quarterly sampling at this well should continue in 2013. Groundwater monitoring for 2013 will take place in accordance with the *2013 Groundwater Monitoring Program Sampling Plan* (URS, 2013b).

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6.0 MAIN BASE/SAC AREA REMEDIAL PERFORMANCE MONITORING PROGRAM

This section discusses the remediation history of the MBSA Plume and describes the groundwater extraction and treatment system. Additionally, this section discusses the performance monitoring for the groundwater extraction and treatment system for the MBSA Plume for 2012. Table 6-1 includes COCs and their respective cleanup levels identified for the MBSA Plume, and a summary of COC detections for 2012. Figure 6-1 shows the layout of the treatment system. Figures 6-2 through 6-11 show the extents of ACL plumes in the different HSGs. Figure 6-12 illustrates the cumulative volume of water treated and VOC mass removed by the MBSA treatment system, as well as historical system influent concentrations. Figures 6-13 and 6-14 show cross-sectional lithology and plume data.

The MBSA Plume is approximately 3.4 miles long and consists of two commingled plumes. Contaminants have been found in monitoring wells in three HSG units of the Laguna Formation as deep as 260 feet bgs (approximately 185 feet below the water table). The deepest contamination occurs below the northwest base boundary and continues downgradient to the southwest.

6.1 MAIN BASE/SAC AREA PLUME REMEDIAL HISTORY

The remedial action for the MBSA Plume as outlined in the *Superfund Record of Decision: Soil Operable Unit Sites and Groundwater Operable Unit Plumes* (AFBCA, 1996), includes groundwater extraction, air stripping with off-gas treatment (carbon adsorption) as necessary, injection, and groundwater monitoring. The remedial system has been operating since 1998.

Construction of Phase I of the groundwater extraction and treatment system for the MBSA Plume was completed in early spring 1998. The MBSA system began continuous operation in April 1998. Phase I of groundwater remediation of the MBSA Plume emphasized mass removal from “hot spots” in the MBSA Plume that were identified on Mather property. A hot spot is defined as an area having contaminant concentrations at least 10 times the ACL for one or more contaminants. Twelve extraction wells were initially installed and operated as part of the Phase I MBSA treatment system.

As part of the initial Phase II/III system expansion, completed in January 2000, 12 additional extraction wells were installed and connected to the system. The Phase II wells were installed in hot spots west of Mather, and the Phase III extraction wells were installed to more aggressively remediate groundwater near source areas at Mather, particularly at Sites 23C and 57. During 2Q01, three additional Phase III extraction wells (EW-6ABu, EW-7B, and EW-3D) were installed; these three extraction wells were brought online during 3Q01.

During 2Q02, eight extraction wells (MBS EW-4Bu, MBS EW-4D, MBS EW-5D, MBS EW-6D, MBS EW-9B, MBS EW-10B, MBS EW-11B, and MBS EW-12AB) were installed as part of the Phase IV expansion of the MBSA remedial action. The objective of the Phase IV expansion was to augment the existing extraction system, primarily in the off-base portions of the MBSA Plume, and to increase the area of hydraulic capture by the extraction wells installed under the previous three groundwater remediation phases. The Phase IV extraction wells were brought online in September 2002.

A supplemental Phase IV extraction well, MBS EW-12B, was installed in September 2004 to capture the toe of the plume in Unit B. Startup for EW-12B occurred in May 2005 but damage to the sump in the bottom of the well prevented the well from running continuously. A packer was installed in the sump to keep sediment from entering the screen from deeper in the sump, and the well was redeveloped in early December 2005. With the exception of routine maintenance issues, EW-12B has run continuously since that time. MBS EW-1A and MBS EW-2A were replaced by two slightly deeper new wells, MBS EW-7ABu and MBS EW-2AR, which began operation in March 2005.

Extraction well MBS EW-13BuB was installed near the intersection of Happy Lane and Kiefer Boulevard in late 2007, and began operation in April 2008. The purpose of MBS EW-13BuB was to address the known extent of the Southwest Lobe of the MBSA Plume that was beyond the capture of the other extraction wells. MBS EW-13BuB has screened intervals in the upper B unit (Bu), and at two depths in the Unit B, called shallow (Bs) and deep (Bd) Unit B. Where Unit Bu exists, it is distinct from and lies above the rest of Unit B. The terms shallow B (Bs) and deep B (Bd) are relative terms within Unit B and are not distinct HSG units.

A CZA for the plume was completed in 2007 (MWH, 2007a) and a focused CZA for TCE in the Southwest Lobe was completed in 2009 (MWH, 2009b).

Figure 6-1 shows the layout of the groundwater extraction and treatment system as of December 2012, including extraction wells, injection wells, and underground piping. The system received EPA concurrence on the OPS finding in 2011 (EPA, 2011).

6.2 MAIN BASE/SAC AREA TREATMENT SYSTEM AND PLUME MONITORING

The performance of the MBSA Plume groundwater extraction and treatment system is monitored to ensure compliance with discharge requirements and to ensure the objectives of the remedial action are met. The primary objectives of the remedial action as stated in the MBSA ROD (AFBCA, 1996) and explanation of significant difference documents (AFBCA, 2010a) are as follows:

- **Remediation:** Remove contaminant mass from the groundwater plume and remediate the plume to the ACLs for all COCs (Table 6-1).
- Comply with discharge requirements for the treated water.
- Comply with air-emission requirements.

Secondary objectives have also been adopted for the remedial action; these objectives are management strategies being used to meet the primary ROD objectives and include:

- **Capture:** Capture the contaminant plume and extract the contaminated groundwater for remediation.
- **System Performance:** Operate extraction wells to efficiently extract TCE.

Water quality in groundwater monitoring wells, extraction wells, and the West Drainage Canal is monitored to evaluate the effects of extraction on the plume and of discharge to the receiving water in the West Drainage Canal. The objectives of the water quality monitoring include:

- In conjunction with water level measurements, demonstrating that the zones of influence of the extraction wells are adequate to capture (at a minimum) the plume that exceeds 5.0 µg/L of TCE.
- Monitoring remediation of the plume by monitoring changes in contaminant concentrations.
- Removing contaminants from groundwater effectively and efficiently.
- Demonstrating that treated groundwater does not exceed discharge standards and that its discharge does not degrade the receiving water quality.
- Demonstrating compliance with air emissions standards.

The MBSA Plume monitoring network in 2012 consisted of groundwater monitoring wells and piezometers completed in HSG Units A, B, and D in addition to the 26 operating extraction wells, 4 injection wells, and the treatment plant.

The following subsections describe monitoring activities and results for 2012.

6.2.1 Operations, Maintenance, and Monitoring of Extraction Wells, Groundwater Treatment Plant, and Injection Wells

The MBSA Plume groundwater treatment system, including extraction wells, injection wells, and the treatment plant, operated in accordance with the *Revision to the Final Addendum to the Operations and Maintenance Manual for the Groundwater Extraction and Treatment System for the Main Base/SAC Area Plume* (MWH, 2010d).

Extraction Wells. During 2012, monitoring of the extraction wells included sampling at MBS EW-2AR (all other active extraction wells are on a biennial sample frequency) and semiannual depth-to-groundwater measurements from the following 26 active MBSA extraction wells, organized by HSG position:

- Extraction wells screened across the water table and Unit Bu: EW-1ABu, EW-1Bu, EW-2AR, EW-2ABu, EW-4ABu, EW-4Bu, EW-5ABu, and EW-39ABuB
- HSG Unit Bu/B: EW-1B, EW-2B, EW-3B, EW-4B, EW-5B, EW-6B, EW-7B, EW-9B, EW-10B, EW-11B, EW-12B, and EW-13BuB
- HSG Unit D: EW-1D, EW-2D, EW-3D, EW-4D, EW-5D, and EW-6D

The following wells, shown on Figure 6-1, are no longer used for extraction and did not operate in 2012: 39EW02, 19EW01, EW-1A, EW-2A (replaced by EW-2AR), EW-3A, EW-3Bu, EW-4A, EW-5A, EW-6ABu, EW-7ABu, EW-8B, and EW-12AB. Depth-to-groundwater measurements were collected from these non-operating extraction wells in 2012.

Groundwater samples collected from the extraction wells during 2012 were analyzed for VOCs by EPA Method SW8260B; this method includes analyses for benzene, toluene, ethylbenzene, and total xylenes for selected extraction wells (in accordance with the 2012 sampling plan) that are located near known or suspected fuel source areas (Montgomery Watson, 2001b). Table 6-1 presents VOC data for the MBSA monitoring program. Table 6-2 presents the quarterly average flow rate and volatile COC concentration and the yearly mass removed for each extraction well (in most cases, estimated from 2011 analytical data).

Groundwater Treatment Plant. Table 6-2 presents the quarterly average flow rate, quarterly influent concentrations, and total mass removed for 2012 by the MBSA treatment plant. Water samples were collected quarterly from the air stripper influent and analyzed for VOCs, TPH, general minerals, and metals. Water samples were collected monthly in 2012 from the air stripper effluent for VOCs and quarterly for TPH, general minerals, and metals analyses. Table 6-3 presents data for effluent and discharge monitoring. Appendix A includes results from all sampling events in 2011 and 2012.

During 2012, the treatment system effluent complied with discharge standards, except the November 2012 effluent pH measurement of 8.71 pH units (which exceeded the acceptable range of 6.5 to 8.5). This measurement was greater than the maximum effluent pH value by 0.21 pH units; all other pH measurements since discharge began in September 2011, including the October and December 2012, were compliant with the instantaneous maximum limit.

Figure 6-12 shows the cumulative VOC mass removed, volume of water treated, and total VOC influent concentrations for the MBSA treatment plant. During 2012, the Mather MBSA GWTP extracted and treated approximately 1,471 gpm of groundwater containing VOCs, although the plant has a design treatment capacity of 2,200 gpm. Through 2012, the plant has treated more than 9.7 billion gallons of water and has removed approximately 3,786 pounds of VOCs since operation began in 1998. The average air emission discharge rate from the strippers for 2012 was 0.23 lbs/day of ROCs plus PCE (which is not regulated as an ROC), and the maximum observed emission rate was 0.24 lbs/day of ROCs plus PCE (Appendix D), well under the air ROC emission standard of 10 lbs/day.

Injection Wells. In 2012, all four injection wells received treated water from the groundwater treatment system. Table 6-2 presents quarterly average flow rates for each injection well. The injection capacity of the system has diminished and is no longer sufficient to handle the entire volume of treated groundwater. To address this problem, the Air Force has begun a gradual transition to surface water discharge (see next paragraph/section). Water sample collection is not required from the injection wells because the injected water is treated to discharge treatment standards, as verified by the analytical data from the air stripper effluent samples.

Surface Water Discharge. Prior to September 2011, all extracted and treated groundwater was reinjected into the aquifer using injection wells, except for water used for irrigation of road side landscaping at Mather by Sacramento County. Due to injection well operations and maintenance issues that have restricted well capacity, the Air Force proposed discharging treated groundwater into the nearby West Drainage Canal that ultimately flows to Morrison Creek, a tributary to the Sacramento River.

The Central Valley Regional Water Quality Control Board (CVWB) issued a Notice of Applicability Limited Threat Waste Discharge Requirements Order No. R5-2008-0082-013 in August 2011 authorizing a monthly average discharge of up to 500 gpm (monthly average) to the West Drainage Canal (Morrison Creek), with temporary flows up to 2,200 gpm upon written CVWB concurrence. In its 3Q12 Surface Water Discharge Report, the Air Force notified CVWB of its intent to increase the monthly average rate up to 1,000 gpm to maintain optimal remediation system performance, because the surface water discharge over the last year increased from approximately 300 to 500 gpm to keep the groundwater treatment system running with all desired extraction wells and to avoid treatment plant shutdowns (URS, 2013c). In a letter dated 13 December 2012, CVWB concurred with the temporary increase in discharge to the West Drainage Canal of up to 750 gpm until 1 April 2013 (CVWB, 2012). In this letter, CVWB states that it anticipates issuing a revised Notice of Applicability prior to April 2013 that will provide concurrence with the proposed discharge of up to 1,000 gpm.

During 4Q12, an average of approximately 473 gpm was discharged to Morrison Creek via the West Drainage Canal (also known as West Ditch). Table 6-3 presents data for receiving water monitoring.

6.2.2 Plume Monitoring and Distribution

Changes in plume distributions for the water table/Unit Bu and HSG Units B and D are discussed below. Because 2012 was not a biennial sampling year, many wells were not sampled. Table 6-1 provides a 2012 analytical detection summary for wells that monitor the MBSA Plume. Appendix C presents time-concentration plots of TCE, PCE, and CCl_4 for the monitored wells through 4Q12.

Water Table. Figures 6-2 through 6-5 illustrate the distribution of TCE, PCE, CCl_4, and 1,1-DCE, respectively, in wells screened at or just below the water table as well as estimated capture zones based on 4Q12 water table elevation contours. These compounds were the only COCs detected at concentrations exceeding cleanup levels in the water table portion of the MBSA Plume in 2011 and 2012. The wells shown on these figures are screened in Units A, Bu, and B. The size and distribution of the water table COC plumes in 2012 are based largely on data collected in 2011 because relatively few wells were

sampled during 2012. Plume boundaries are consistent with previous years, and do not extend beyond Mather boundaries.

In the portion of the plume farthest in the regionally upgradient direction (to the northeast), COCs were only detected above cleanup levels at groundwater monitoring well MAFB-405 (TCE at 22 µg/L and CCl_4 at 0.8 µg/L) in 2011. COCs at this location are only partially captured by MBS39ABuB. Two extraction wells in this area, MBS EW-12AB and MBS EW-7ABu, were turned off in late 2009 and did not have any COC detections exceeding ACLs in 2011 or 2012. However, MBS EW-7ABu will be restarted to capture COC mass in the area of MAFB-405.

The downgradient parts of the TCE and CCl_4 plumes exceeding ACLs are only partially captured by extraction wells in these areas (Figures 6-2 and 6-4). However, the concentrations in these areas are near the ACLs and it is likely that this contamination is captured downgradient at base-boundary extraction well MBS EW-13BuB. The capture zone for the water table (Unit Bu) at MBS EW-13BuB is not shown on the water table figures because this well is also screened in Unit B. However, Figure 6-6 shows the estimated capture zone for MBS EW-13BuB in Unit B, and Figure 6-2 shows deflected water table contours in this area, supporting the assessment that MBS EW-13BuB likely is capturing the portions of water table plumes that are not captured by MBS EW-1Bu and MBS EW-4Bu.

Dry Water Table Wells and Data Quality Objectives. The continued overall decline in water levels has left many former water table wells dry, making them no longer useful for evaluating groundwater quality. Appendix I contains a list of wells that were dry during at least one of the gauging events in 2012. Assuming continued decline of water levels, these wells are not expected to permanently recover. The primary water quality data objectives for in-plume water table wells are to monitor progress toward cleanup and/or to serve as performance monitoring wells for adjacent extraction wells where applicable. Objectives for remaining wells include delineation of the boundaries of the ACL plumes. Areas for the MBSA Plume where dry water table wells may be impacting these data quality objectives and where selected dry wells potentially may need to be replaced are discussed below.

The first area includes six dry wells located southwest of the Site 57 area and west of the former base boundary. The dry wells have included MAFB-121, MAFB-122, MAFB-123, MAFB-124, MAFB-159, and MBS PZ-59. These wells were not scheduled for sampling in 2012; however, all of these wells contained sufficient water for sampling. Two of the wells, MAFB-123 and MAFB-159 are co-located with Unit B wells (MAFB-176 and MAFB-174, respectively) that have been reclassified as water table wells as water levels have declined. These formerly submerged Unit B wells have replaced wells MAFB-123 and MAFB-159 to monitor the upper portion of the saturated aquifer.

MAFB-121 had TCE at concentrations between 5 and 10 µg/L before the well went dry in 2008. This well is co-located with a Unit B well, MAFB-173, but there is approximately 37 feet of vertical separation between the base of the screen for MAFB-121 (-14.8 feet msl) and the top of the screen for MAFB-173 (-51.3 feet msl). TCE at MAFB-173 has remained less than the ACL during the time MAFB-121 has been dry. MAFB-121 is near the margin of the interpreted capture zone of MBS EW-1Bu and MBS EW-4Bu. Because the well is on a biennial sample frequency, it will be sampled in 2013 if there is sufficient water to allow collection of a viable sample. This location will be further evaluated in the 2013 annual groundwater monitoring report.

The second area includes in-plume and plume boundary defining water table wells in the Site 57 Area. The occasionally dry water table wells and piezometers include MAFB-201, MAFB-202, MAFB-203, MAFB-204, MAFB-206, MAFB-207, MAFB-208, MAFB-209, MAFB-210, MBS PZ-01, and PZ-04. Of these wells, only MAFB-208 and MAFB-209 were dry in 2012 (during the 4Q12 gauging event). Piezometers MBS PZ-01 and PZ-04 are used to gauge water levels in the vicinity of MBS EW-2AR,

MBS EW-2ABu, MBS EW-3A, MBS EW-4ABu, and MBS EW-5ABu, and the remaining wells are currently on a biennial sampling schedule. All of these wells were designated as in-plume, plume-boundary, or extraction well performance monitoring wells when water levels were approximately 19 feet higher than 2012 levels. As water levels have declined, the Air Force has installed three replacement water table wells; MAFB-417 (replacing MAFB-208), MAFB-418 (replacing former piezometer MBS PZ-03), and MAFB-420 (replacing former piezometer MBS PZ-02). It is important to note that all of the remaining wells, MAFB-201, MAFB-202, MAFB-203, MAFB-204, MAFB-206, MAFB-207, MAFB-209, and MAFB-210 are co-located with Unit B wells (MAFB-216, MAFB-217, MAFB-218, MAFB-219, MAFB-223, MAFB-224, MAFB-225, and MAFB-226, respectively).

The Unit B wells in this area are designed to monitor coarse sand and gravels of the middle unit of the Laguna Formation (Unit B channel-fill deposits), whereas the water table wells are designed to monitor finer-grained silt and silty sand of the overlying upper unit of the Laguna Formation (Unit A overbank deposits). The declining water table is encroaching upon the stratigraphic boundary between Unit A and Unit B. An important consideration in replacing water table wells in this area is whether a replacement well is needed or possible in Unit A, or whether a replacement well is appropriate in uppermost Unit B, depending on the thickness of any remaining saturated portion of Unit A. Among the higher priority wells to consider for replacement are in-plume wells MAFB-207 and MAFB-210 (for TCE and CCl_4; Figures 6-2 and 6-4, respectively), and downgradient boundary defining wells MAFB-201 and MAFB-202. Well MAFB-201 also serves as a performance monitoring well for nearby extraction well MBS EW-1ABu. Based on a stratigraphic analysis, there appears to be an adequate thickness remaining in the saturated interval of Unit A beneath wells MAFB-202, MAFB-207, and MAFB-210 to consider a viable replacement well within Unit A. A replacement well for MAFB-201 within Unit A is not practical as the current water table elevation is within 1 to 2 feet of the boundary between Unit A and Unit B at this location. All of these wells contained sufficient water for sampling in 2012 and are not being considered for replacement in 2013. However, the Air Force will continue to evaluate groundwater elevations in this area and replacement of these wells will be re-evaluated in the 2013 annual groundwater monitoring report.

The third area includes seven dry wells in upgradient areas north (or in the case of MAFB-33, just west) of the Site 18/59 area in the general vicinity of the intersection of Macready Avenue and Mather Boulevard. The dry wells in this area include MAFB-033, MAFB-092, MAFB-160, MAFB-187, MAFB-188, MAFB-212, and MAFB-244. Well MAFB-160 already has been replaced with wells MAFB 428 and MAFB-439, and well MAFB-188 already has been replaced by well MAFB-419. The remaining hydraulically upgradient wells in this group, MAFB-092, MAFB-187, and MAFB-244 are neither in-plume nor plume boundary defining wells for the water table with respect to the VOC plume. MAFB-187 is scheduled to be decommissioned in 2013 (URS, 2013a). The remaining well, MAFB-212, is currently on reserve sampling status. Historic contaminant concentrations in well MAFB-212 have been below cleanup levels since the 2Q02 sampling event. In addition, this well is co-located with Unit B well MAFB-228 and a replacement well for MAFB-212 would encroach within approximately 15 vertical feet of the underlying Unit B well. As such, a replacement well is not being considered for well MAFB-212. Well MAFB-033 has monitored a portion of the upgradient TCE plume. TCE concentrations in this well declined from a high of 240 µg/L in 4Q01 to 6.9 µg/L in 2Q09. In 2011 the groundwater table rose in to the screened interval of the well and the TCE concentration in the sample collected was 7.9 µg/L. This well is an in-plume well with respect to TCE (Figure 6-2) and also serves as a boundary well for the CCl_4 plume (Figure 6-4). Well MAFB-033 is also co-located with an underlying Unit B well (MAFB-101). Wells MAFB-092, and MAFB-187 are not necessary to monitor TPH related to releases from Site 29, as MAFB-314 and MAFB-419 are adequate for this monitoring.

Unit B. Figures 6-6 through 6-8 illustrate the distribution of TCE, PCE, and CCl_4, respectively, in Unit B, as well as estimated capture zones based on 4Q12 Unit B elevation contours. These figures do not include data from wells that are screened across the water table or monitoring wells that are screened in Unit Bu.

The above compounds were the only COCs detected above cleanup levels during 2011 and 2012 in Unit B of the MBSA Plume. The size and distribution of the Unit B COC plumes in 2012 are based largely on data collected in 2011 because relatively few wells were sampled during 2012; accordingly, the plume boundaries are similar to those in 2011. Notable results from 2012 are discussed below.

COC concentrations in several Unit B groundwater extraction wells along Old Placerville Road were lower in 2011 and 2012 than in previous samples. These wells include MBS EW-1B, MBS EW-4B, (biennial sampling frequency) MBS EW-6B, and MBS EW-8B. MBS EW-1B contained no COCs above cleanup levels in 2008 or 2009, but the 2011 sample contained PCE at a concentration of 5.1 µg/L. No COCs were detected above the cleanup level at EW-4B in 2011. The past five consecutive samples from MBS EW-6B, dating back to 4Q07, have not contained COCs above cleanup levels. MBS EW-8B was turned off in February 2010 and the PCE concentration remained relatively stable at less than 1.5 µg/L through 2011. The annual sample collected in 2012 contained PCE at 2.8 µg/L.

The interpreted extent of the Unit B CCl_4 ACL plume (Figure 6-8) for 2012 is has not changed since 2011, as most of the wells are on a biennial sampling frequency and were not sampled in 2012. Several wells at which CCl_4 was detected slightly above the ACL in 2008, declined in concentration in 2009, but increased again in 2011. At the regionally upgradient portion of the plume, this change was observed at groundwater monitoring well MAFB-249. For the western portion of the plume (beyond the Mather boundary), this decline followed by an increase in CCl_4 concentrations was observed at groundwater monitoring wells (in order from east to west, in the direction of the regional gradient) MAFB-175, MAFB-346Bd, MAFB-381B, and MAFB-312. At the upgradient portion of the Southwest Lobe, declining CCl_4 concentrations previously observed at MAFB-167, MBS PZ-55B, MAFB-266, and MAFB-268 in 2009 and 2010 returned in 2011 samples to levels similar to those observed in 2008.

The MBSA Plume CZA (MWH, 2007a; MWH, 2009a) identified one area (Area 3) where the Unit B MCL volume was both undefined and uncaptured. Since the 2007 CZA report was issued, several new groundwater monitoring wells and one new extraction well were installed in this area, also known as the Southwest Lobe of the MBSA Plume. The installation of three triple-completion monitoring wells (MAFB-429Bu/Bs/Bd, MAFB-431Bd/Ds/Dd, and MAFB-434Bu/Bs/Bd) and groundwater extraction well MBS EW-13BuB were described in the *Annual and Fourth Quarter 2007 Groundwater Monitoring Report* (MWH, 2008). Three additional dual-completion groundwater monitoring wells (MAFB-449Bs/Bd, MAFB-457Bs/Bd, and MAFB-458Bs/Bd) were installed in 2008 in an attempt to delineate the VOC (primarily TCE) plume exceeding cleanup levels. All three sets of wells were constructed with a well casing screened in the shallow Unit B (Bs) gravels and another screened in the deep Unit B sands. These wells are on a biennial sampling schedule and were not sampled in 2012; they are scheduled to be sampled in 2013. No COCs have been detected greater than cleanup levels at the easternmost well, MAFB-449, or at MAFB-457Bd or MAFB-458Bs. TCE was detected at a concentration greater than the cleanup level at MAFB-457Bs and MAFB-458Bd, most recently at 11 µg/L and 7.5 µg/L, respectively, in 2011.

In response to the detections at MAFB-457Bs and MAFB-458Bd, 16 additional off-base wells (OFB-69 through OFB-84; Figure 2-1 and Figure 7-1) were sampled for VOCs in 2Q09 to supplement the existing monitoring data in this area. OFB-72 is owned by Teichert and operates intermittently, filling a holding tank with water that is used to fill water trucks for dust control in the aggregate mine areas. OFB-72 has been sampled quarterly since 2Q09 and TCE concentrations have decreased from just under 4 µg/L to a relatively stable level in the eight quarterly samples in 2011 and 2012 at approximately 2 µg/L. OFB-80, approximately 840 feet downgradient from OFB-72, is also sampled quarterly and no VOCs have been detected in this well. One additional off-base well, OFB-85, was sampled annually in 2011 and 2012; no VOCs were detected in either sample.

As a result of the TCE detections at OFB-72, two dual-completion groundwater monitoring wells (MAFB-460Bs/Bd and MAFB-461Bs/Bd) were installed downgradient from the Southwest Lobe in 4Q09. Both wells were constructed with screened intervals in shallow and deep Unit B, similar to regionally upgradient monitoring wells MAFB-449Bs/Bd, MAFB-457Bs/Bd, and MAFB-458Bs/Bd. MAFB-460 and MAFB-461, along with other Southwest Lobe monitoring wells are shown in cross-sectional view on Figure 6-13. MAFB-460 was located downgradient from the observed TCE detections at MAFB-457Bs and MAFB-458Bd and upgradient of OFB-72. Quarterly samples collected in 2012 from these wells contained concentrations of TCE ranging from 1.7 µg/L to 2.2 µg/L for MAFB-460Bs, similar, but slightly lower than concentrations reported in 2011. TCE concentrations were between 0.3 µg/L and 0.9 µg/L at MAFB-460Bd in 2012, but were not detected in 2011. MAFB-461 is located slightly southwest of MAFB-460 and closer to several off-base pumping wells (OFB-79, OFB-80, and OFB-85). No VOCs were detected in the initial sample collected from MAFB-461Bs or MAFB-461Bd. However, TCE has been detected at low concentrations (from 0.2 to 0.43 µg/L) in all subsequent samples and was detected at concentrations of 0.2 µg/L to 0.3 µg/L in all 2012 samples collected from MAFB-461Bs. Quarterly samples collected from MAFB-461Bd in 2012 contained no detectable TCE. These wells help to define the ACL volume, the boundary of which lies between MAFB-457/MAFB-458 and MAFB-460. These wells also provide vertical definition for TCE, as any concentrations detected in the deeper wells were below reporting limits and much lower than concentrations detected in the shallower wells. To help delineate the vertical extent of the plume downgradient from MBS EW-13BuB, a D zone monitoring well (MAFB-462) was installed adjacent to the MAFB-460 location in 2011. The quarterly samples collected from MAFB-462, contained no detectable amounts of COCs. This location is scheduled for quarterly sampling in 2013.

The estimated capture area associated with MBS EW-13BuB is slightly smaller relative to that of 2011, and a small portion of the Southwest Lobe TCE plume may be beyond the estimated 2012 capture zone (Figure 6-6). The groundwater table in this area is relatively flat, and the precise location of the toe of the plume and the limit of capture is difficult to interpret. This issue will continue to be assessed in 2013 with continued monitoring of water levels and TCE concentrations in this area.

Unit D. Figures 6-9 through 6-11 illustrate the Unit D ACL plumes for TCE, PCE, and CCl_4, respectively, for 4Q12, as well as estimated capture zones based on 4Q12 Unit D elevation contours. No other COCs were detected above cleanup levels during 2012 in Unit D. With the exception of CCl_4, the majority of the ACL volume in Unit D decreased or remained stable in 2012 as a result of continued groundwater extraction and removal of VOCs (Table 6-2) by the MBSA extraction system.

One area of uncertainty identified in the MBSA Plume CZA (MWH, 2007a; MWH, 2009a) was the deeper portion of Unit D beneath groundwater monitoring well MAFB-102 and extraction wells MBS EW-1D, MBS EW-2D, and MBS EW-3D; this area was designated in the report as Area 1. Two wells were installed in 2007 to monitor this area. The first, MAFB-430, was installed in the LMT between, and deeper than, MBS EW-1D and MBS EW-3D. CCl_4 was detected at 0.77 µg/L in the 2Q09 sample from MAFB-430, was not detected in the sample collected in 2010, and was detected at 0.6 µg/L and 0.5 µg/L (equal to the ACL) in the 2Q11 and 2Q12 samples, respectively. PCE has also been detected in historic samples collected from MAFB-430; however, PCE concentrations have recently been less than the ACL (4Q12 = 1.9 µg/L). The second well, MAFB-435, was installed near the intersection of Routier Road and Old Placerville Road (co-located with MAFB-180), to provide vertical constraint to the PCE and CCl_4 concentrations observed at MAFB-180. PCE and CCl_4 were detected above cleanup levels in all four samples collected from MAFB-435 in 2012. PCE and CCl_4 concentrations observed at MAFB-435 have been as high as 15 µg/L (3Q09) and 2.7 µg/L (2Q09), respectively, but decreased to 10 and 1.5 µg/L, respectively, by 4Q12. COC concentrations at MAFB-435 (10 µg/L PCE and 1.5 µg/L CCl_4) are less than those observed in shallower Unit D well MAFB-180 (55 µg/L PCE and 2.9 µg/L CCl_4).

In October and November 2011, two new groundwater monitoring wells (MAFB-463D and MAFB-463Dd) were installed to provide additional water quality information on plume extent in Area 1. MAFB-463D was installed at a depth similar to MAFB-181, between MAFB-181 and MBS EW-6D (Figure 6-14). MAFB-463Dd was installed in the same borehole, but at a depth similar to MAFB-435 (Figure 6-14). Samples collected from these wells in December 2011 contained minor concentrations of PCE. The concentration increased in MAFB-463D each quarter in 2012, with the 4Q12 sample containing PCE at 17 µg/L (and CCl_4 at 2.7 µg/L). Both of these 2012 concentrations exceed respective ACLs. The initial sample collected from deeper well MAFB-463Dd (4Q11) contained estimated concentrations of PCE and chloroform at 0.2 µg/L each. No COCs were detected in the 4Q12 sample from MAFB-463Dd. These wells will be sampled quarterly in 2013. The increased PCE concentrations at MAFB-463D have extended the interpreted downgradient extent of this plume to the southwest relative to the 2011 interpretation, and the increased CCl_4 concentrations at MAFB-463D have resulted in the joining of two CCl_4 ACL plumes.

From late 2008 to 2009, the Air Force measured water levels more frequently from several wells in Area 1 to better understand seasonal patterns in the vertical gradient. It was determined that the direction of the vertical gradient varies through time and is likely controlled by seasonal patterns of regional pumping. Gradients were downward during the period of lowest water levels, corresponding roughly to June through October 2009 when regional pumping was greatest. The gradient neutralized in late fall, and by the end of the year the gradient direction was once again upward. The implication of this focused water level study is that the potential for downward contaminant migration (Unit D to deep Unit D) does exist during part of the year but that upward gradients during the rest of the year mitigate the net vertical transport of contaminants. Another mitigating factor is the relatively low concentrations of PCE and CCl_4 (approximately twice the ACL), such that dilution, which would be associated with any downward migration to deeper water-bearing zones, would prevent subsequent contaminant migration at concentrations significantly exceeding cleanup levels in Area 1.

Another location identified as an area of uncertainty in the 2007 CZA (MWH, 2007a) was the area around Unit D groundwater monitoring wells MAFB-102 and FFS MW15-6 (CZA Area 2). Two new monitoring wells, MAFB-441 and MAFB-442, were installed in 2008, to characterize the horizontal and vertical extents, respectively, of TCE and CCl_4 detections at MAFB-102 and FFS MW15-6. No notable VOC detections have been reported in samples collected since 4Q08 at MAFB-441 or MAFB-442. It should be noted that since 4Q08 VOC detections at MAFB-102 and FFS MW15-6 have been within historical ranges with the exception of an all-time high CCl_4 detection at FFS MW15-6 (2.5 µg/L in 2Q09). The previous maximum concentration was 1.0 µg/L, observed in 3Q01, 4Q05, and 2Q08. The 2Q11 CCl_4 concentration was 0.9 µg/L.

The area around MAFB-318 was identified in the 2007 CZA (MWH, 2007a) as CZA Area 4, a location where capture was uncertain. The subsequent CZA update (MWH, 2009a) concluded that capture of the plume in this area is likely. The 2012 sample from MAFB-318 contained CCl_4 at a concentration of 6.6 µg/L, which is the new maximum concentration at this well. Unit D groundwater monitoring wells, including MAFB-388Ds, MAFB-443 (installed as a result of the 2007 CZA), MAFB-336, and MAFB-382D, are located regionally downgradient from MAFB-318, and CCl_4 has not been detected at a concentration greater than the cleanup level at any of these wells.

The lobe of the Unit D CCl_4 ACL plume extending off base to the west (Figure 6-11) generally has increased in area but decreased slightly in maximum concentrations in 2011 relative to 2010, and remained stable between 2011 and 2012. Figure 6-14 depicts a cross-section in this area of the plume; this cross-section will be updated to extend to the off base water supply wells for the 2013 annual groundwater report. It appears that the extension of this lobe may be due to extraction at MBS EW-6D, as well as production at water supply wells OFB-04 (Moonbeam), OFB-51 (Juvenile Hall No. 1), and OFB-52 (Juvenile Hall No. 2). However, the 2012 CCl_4 concentration detected at MAFB-318 was the

highest CCl_4 concentration detected beyond the boundaries of Mather. CCl_4 concentrations at MAFB-318 have shown a gradually increasing trend since approximately 2002 with a more drastic increase after approximately 2009, reaching 6.6 µg/L in 2012 (a similar increase in PCE concentrations occurred during the same period). This concentration of CCl_4 is not seen in any other Unit D well, and is in the range of CCl_4 concentrations detected in wells beneath known Mather source areas. This contamination is within the interpreted combined capture zone for MBS-EW6D, OFB-04 and the two Juvenile Hall wells, and MBS EW-6D is located between OFB-04 and most of the ACL CCl_4 plume. Water produced from OFB-04, OFB-51, and OFB-52 is treated with granular-activated carbon (GAC). To assess this area further in 2013, the wells in this area will be monitored as presented in the *2013 Mather Groundwater Monitoring Program Sampling Plan* (URS, 2013b) with the exception of the addition of annual sampling at MAFB-346D, which has not been sampled since 2Q09.

6.3 CONCLUSIONS AND RECOMMENDATIONS

The treatment system is effectively removing mass from the MBSA Plume and appears to provide hydraulic control for nearly the entire plume. One exception to this successful remediation is the CCl_4 plume between OFB-04 and OFB-51 and OFB-52, which likely is being captured and remediated by the GAC systems at those locations. Data collected in 2012 demonstrate that this hydraulic control includes all but approximately 2 percent of the COC plume at the water table near MAFB-405, and approximately 2 percent of the TCE ACL plume in Unit B at the toe of the Southwest Lobe.

Four MBSA Plume groundwater extraction wells were turned off in early 2010 as a result of recommendations in the *Annual and Fourth Quarter 2008 Groundwater Monitoring Report* (MWH, 2009a). The four wells were MBS EW-12AB, MBS EW-7ABu, MBS EW-6ABu, and MBS EW-8B. Rebound of COC concentrations has not been observed in sample data for these wells since shutdown. However, MBS EW-7ABu will be restarted due to concentration increases at MAFB-405. With the exception of the MAFB-405 location and approximately 2 percent of the Southwest Lobe that appears to be beyond capture, the MBSA Plume groundwater extraction and treatment system is successfully implementing the remedy and achieving the objectives of the remedial action. It is recommended that extraction well flow rates be monitored and optimized in 2013 to improve capture and optimize remediation of the MBSA Plume.

MAFB-006, MAFB-099, MAFB-108, MAFB-150, MAFB-162, MAFB-163, MAFB-187, MAFB-253, MAFB-344, MAFB-416, and MBS 39MW01 have been recommended for decommissioning in 2013 (URS, 2013a).

With the exception of increasing the sampling frequency at MAFB-346D from reserved to annual, sampling should continue according to the sampling frequencies outlined in the *2013 Mather Groundwater Monitoring Program Sampling Plan* (URS, 2013b).

7.0 OFF-BASE WATER SUPPLY WELL MONITORING PROGRAM

Of the 10 large drinking water wells included in the Off-base Monitoring Program, 8 are owned by the California American Water Company (Cal Am) and 2 are owned by the County of Sacramento (Figure 7-1). Cal Am wells OFB-27, OFB-31, OFB-32, OFB-49, OFB-54, OFB-55, and OFB-56 (and their associated monitoring wells) were sampled quarterly in 2012 (URS, 2013b).

Cal Am well OFB-04 (also called Moonbeam) was scheduled to be sampled quarterly in 2012 but that plan was changed to monthly after the May (2Q12) sample results indicated that CCl_4 exceeded one-quarter of the MCL. The two county-owned wells (OFB-51 and OFB-52, also known as the Juvenile Hall wells) were sampled quarterly, and the treatment system associated with these two wells was sampled monthly. All samples were analyzed for VOCs using EPA Method 524.2.

The 2012 analytical results (shown in Table 7-1 for quarterly samples and Table A-1 for all samples) for Mather COCs are summarized below. Detailed descriptions of supply well monitoring, including monthly maintenance activities at the GAC systems, are provided in monthly Off-base Wellhead Treatment System and Supply Well Sampling reports.

7.1 SUPPLY WELL MONITORING AND MAINTENANCE

Maintenance activities and sampling results for Mather COCs and for the 10 large drinking water wells and the Juvenile Hall Treatment System are summarized below.

- **OFB-04 – Moonbeam:** Sample results for CCl_4 were variable, ranging from not detected to 0.66 µg/L. May sample results indicated that CCl_4 exceeded one-quarter of the MCL (at 0.17 µg/L). Only the June and August samples contained CCl_4 at concentrations exceeding the MCL (0.52 µg/L and 0.66 µg/L, respectively). Cal Am shut down the well on 20 July 2012, upon receiving the June sample results. A GAC system was installed for this well per Revision 1 of the Contingency Plan (AFRPA, 2008). The well, with wellhead treatment, was restarted on 27 November 2012.
- **OFB-27 – Mars:** The well was not sampled in 3Q12 because the well was offline for rehabilitation. It returned to operation in 4Q12. TCE was detected at an estimated concentration of 0.043 µg/L in the 2Q12 sample. PCE was detected at an estimated concentration of 0.099 µg/L in the 4Q12 sample. These were the only COCs detected in 2012.
- **OFB-31 – Gould:** The well was not sampled in 2012 because the well was offline.
- **OFB-32 – Nut Plains:** PCE was detected in 1Q12, 2Q12, and 4Q12 samples at estimated concentrations ranging from 0.053 µg/L to 0.1 µg/L.
- **OFB-49 – Oaken Bucket:** No COCs were detected during 2012.
- **OFB-54 – South Port:** PCE was detected in the 4Q12 sample at an estimated concentration of 0.069 µg/L. 1,1-DCE was detected in 1Q12, 2Q12, and 4Q12 samples at estimated concentrations ranging from 0.22 µg/L to 0.38 µg/L.
- **OFB-55 – Westporter:** No COCs were detected during 2012.
- **OFB-56 – Tallyho #2:** No COCs were detected during 2012.

Drinking water wells OFB-51 (Juvenile Hall No. 1) and OFB-52 (Juvenile Hall No. 2) are owned by the County of Sacramento and supply water to the County's Branch Center complex. One dual-canister GAC treatment system serves both wells. The 2012 analytical results from these wells are summarized below:

- **OFB-51 – Juvenile Hall No. 1:** The primary contaminant detected in the OFB-51 wellhead samples during 2012 was CCl_4, which was detected in each of the quarterly samples at concentrations ranging from not-detected to 1.5 µg/L (a new maximum). The 4Q12 sample contained trace concentrations of PCE, and cis-1,2-DCE (at estimated concentrations of 0.062 µg/L and 0.077 µg/L, respectively) (Table 7-1).
- **OFB-52 – Juvenile Hall No. 2:** The primary contaminant detected in the OFB-52 wellhead samples during 2012 was also CCl_4, which was not detected in 1Q12 but was detected in 2Q12 through 4Q12 at concentrations ranging from of 0.25 µg/L to 1.1 µg/L (a new maximum). Trace detections of TCE, PCE, 1,1-DCA, and cis-1,2-DCE were also reported in the 2012 samples (Table 7-1).
- **OFB-51/52 – Treatment System Sampling:** The treatment system is equipped with a dual-canister GAC system that treated water at an average flow rate of 13.6 gpm during 2012. Monthly samples were collected from the treatment system influent and mid-GAC and analyzed using EPA Method 524.2 for drinking water. CCl_4 was detected in monthly treatment system influent samples at concentrations ranging from less than the detection limit to 1.2 µg/L. Trace detections of TCE, PCE, cis-1,2-DCE, and 1,1-DCA were also reported in one or more influent samples in 2012. The samples collected from the mid-GAC location in January and February contained CCl_4 at a concentration of 0.34 µg/L. A carbon change-out was performed on 20 March 2012 and with the exception of the December mid-GAC sample, which contained CCl_4 at an estimated concentration of 0.085 µg/L, the remaining 2012 mid-GAC samples did not contain detectable amounts of CCl_4.

Analytical results, including those from all 10 supply wells in the program, are reported in monthly letter reports to the Air Force Civil Engineer Center, regulatory agencies, Sacramento County Department of Water Resources, and Cal Am. The monthly reports include results from monthly or quarterly samples collected at the wellhead, between GAC canisters, and from treated effluent, as needed.

7.2 ANNUAL MONITORING OF PRIVATE WATER SUPPLY WELLS

Samples were collected from 29 of 37 scheduled private water supply wells during 2012 (Table 7-1). Note that none of the wells listed in the Happy Lane and Old Placerville Road vicinity are used for potable water supply; in the 1980s, the Air Force paid Citizens Utilities Company of California (now Cal Am) to install a water main to serve those well owners. OFB-08, OFB-09, OFB-31, OFB-46, OFB-70, and OFB-83 were not operable during the sampling event in 2012. OFB-03 was not sampled because permission was not granted. OFB-68 was not sampled because it (and the building it served) was destroyed by the owner. Analytical data from the wells sampled are presented in Table A-1, and detections are summarized below:

- **OFB-06 – 4294 Happy Lane:** No VOCs were detected in 2012. The results are consistent with historical results. The well pump was removed after the 2003 sampling event and the well is no longer used. Sampling has been accomplished with a bailer since 2004. The well extends to just below the water table.
- **OFB-07 – 4274 Happy Lane:** TCE, PCE, and cis-1,2,DCE were detected at concentrations of 1.6 µg/L, 0.3 µg/L, and 0.3 µg/L, respectively, during 2Q12. These concentrations are similar to those detected in 2011. This well is used for irrigation and fish ponds; it is not used as a potable water supply.
- **OFB-08 –** The well was not sampled in 2011 or 2012 because the well was not operating.

- **OFB-09 – 4095 Happy Lane:** The well has not been sampled since 2009 because the wellhead has been damaged and the well is not operable. TCE and PCE were detected at 0.55 and 0.17F µg/L in 2009. Those results were consistent with other recent historical results since 2005. The maximum TCE concentration at this well was 71 µg/L in 1996, but TCE concentrations at OFB-09 have been less than the MCL since 2001. The decline in TCE at this well was likely a result of water infiltration after expansion of the Granite siltation ponds nearby.
- **OFB-12 – 4016 Happy Lane:** TCE and PCE were detected at 1.7 and 1.1 µg/L, respectively. The results are consistent with historical data. This well is used solely for irrigation purposes; it is not used as a potable water supply.
- **OFB-17 – 3900 Happy Lane:** VOCs were not detected during 2012. Historically, trace detections of TCE were reported in samples collected from this well.
- **OFB-24 – 9970 Old Placerville Road:** PCE was reported at 2.0 µg/L and TCE was reported at 0.7 µg/L in the sample collected in 2Q12. Historically, detections of PCE have been sporadic in this well. PCE has ranged from less than the detection limit to 24 µg/L. This well is used solely for irrigation purposes; it is not used as a potable water supply.
- **OFB-39 – 9760 Jackson Highway:** VOCs were not detected during 2012, consistent with historical results.
- **OFB-40 – 9880 Jackson Highway:** VOCs were not detected during 2012, consistent with historical results.
- **OFB-43 – 9932 Jackson Highway:** VOCs were not detected during 2012, consistent with historical results.
- **OFB-46 – 10180 Jackson Highway:** The well was not sampled during 2011 or 2012 because the electrical service to the pump was destroyed by fire and not repaired at the time of the sampling events.
- **OFB-47 – 10221 Jackson Highway:** VOCs were not detected during 2012, consistent with historical results.
- **OFB-48 – 10175 Jackson Highway:** VOCs were not detected during 2011, consistent with historical results.
- **OFB-53 – 10204 Jackson Highway:** VOCs were not detected during 2012, consistent with historical results.
- **OFB-57 – 9815 Jackson Highway:** VOCs were not detected during 2012, consistent with historical results.
- **OFB-67 – 9721 Farm Lane:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-69:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-70**: The well was not sampled in 2012 because the electrical connection to the pump could not be accomplished. No COCs were detected during 2011.
- **OFB-71:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-72:** PCE and TCE were detected in all four quarterly samples at concentrations ranging from 0.1 to 0.3 µg/L (estimated) and 1.6 to 2.1 µg/L, respectively. Trace detections (less than or equal to 0.2 µg/L) of cis-1,2-DCE were also reported in the 2Q12, 3Q12, and 4Q12 samples.

Water from this well is used for dust control on mining roads and possibly for dust control on conveyor belts; it is not used as a potable water supply.

- **OFB-73:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-74:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-75:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-76:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-77:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-78:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-79:** VOCs were not detected during quarterly sampling in 2012, consistent with previous results.
- **OFB-80:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-81:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-82:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-83:** The well was not sampled in 2012 because it was not operating. VOCs were not detected during 2011.
- **OFB-84:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-85:** VOCs were not detected during 2012, consistent with previous results.
- **OFB-86:** VOCs were not detected during 2012, consistent with previous results.

7.3 OFF-BASE PLUME DISTRIBUTIONS

The MBSA Plume extends westward beyond the Mather boundary (Section 6.0) and is found off Mather at concentrations above ACLs in HSG Units B and D. Figures 6-5 through 6-11 show the distribution of contaminants and the configuration of the off-base portion of the MBSA Plume during 2012 in HSG Units B and D. Pumping at off-base production wells OFB-72 and OFB-85 may influence the migration of the southwest lobe portion of the TCE plume and pumping at water supply wells OFB-04, OFB-51, and OFB-52 are influencing the CCl_4 plume west of the former base boundary. Refer to Section 6.0 for a description of the MBSA Plume.

The Site 7 Plume also extends off base southwestward from the Site 7 Landfill (Section 5.0), and is found in the water table and HSG Units B and C. Figure 5-1 shows the distribution of contaminants and configuration of the Site 7 Plume. Refer to Section 5 for a description of the Site 7 Plume.

7.4 CONCLUSIONS AND RECOMMENDATIONS

Based on analysis of the groundwater analytical data collected during 2012, there were no changes in the potential threat to any public or private water supply well that would indicate the need to revise sampling frequencies (with the exception of the Moonbeam well) or update the Contingency Plan (AFRPA, 2008). However, a revision to the Contingency Plan is in preparation in 2013. In addition to updated references, the revision adds an appendix addressing the private wells sampled by the Air Force (see Section 7.2).

8.0 ANALYTICAL DATA QUALITY SUMMARY

This section summarizes the QA/QC results for groundwater well samples collected and data generated in support of AC&W, MBS, landfill, Site 7, and off-base groundwater monitoring, as well as the AC&W, MBS, Site 7, and off-base treatment system performance monitoring for 2012. Data quality was evaluated by examining both the field and analytical programs. Sampling and analytical protocols for groundwater and performance monitoring during 2012 are documented in the *2012 Groundwater Monitoring Program Sampling Plan* (URS, 2012a).

Data were reviewed and qualified using the criteria in the Sampling and Analysis Plan. Precision and accuracy were evaluated from field and laboratory QC samples as well as analytical calibrations. The calculated relative percent difference from matrix spike/matrix spike duplicates (MS/MSD) and field and laboratory duplicate pairs provided information on the precision of chemical analyses and field sampling procedures. Evaluation of the percent recoveries of spiked analytes in laboratory control samples (LCS), MS/MSDs, and surrogates provided information on accuracy. Additionally, the initial and continuing calibration results and interference check solutions provided information on analytical accuracy. External contamination was assessed through the evaluation of method blanks, trip blanks (TBs), and continuing calibration blanks (metals analyses). Comparability of the data was ensured by having project personnel follow standardized field procedures described in the Field Sampling Plan (URS, 2012a) and having laboratories follow EPA analytical methods. The completeness of the data is the measurement of the amount of valid data for each method and matrix (expressed as a percentage). Completeness and integrity of data were evaluated by validating all the project data, ensuring that all the analytical request were met, noting whether samples were received in proper condition, and verification that analyses were performed within the appropriated holding times.

Data results flagged as estimated (J) or (M) or having an estimated reporting limit (RL) (UJ) are acceptable and usable but should be used with an understanding of the limitations (potential bias) during data interpretation. Data results flagged with “F” were detected between the RL and detection limit (DL) and are also considered estimated concentrations. Furthermore, data flagged “B or BF” should be considered not detected; the result is an artifact of external contamination and does not represent site conditions.

Note: The Quality Assurance Project Plan (QAPP) defines blank contamination only when a blank result exceeded half of the RL; however, because all data are reported to the method detection limit, URS assessed the reported blank value as reported (even if the result was below half of the RL). Per the QAPP, if the sample result is less than 5 times the concentration in the associated blank sample, the result is flagged with a “B” to indicate that the result should be considered not detected and is attributed to blank contamination. For common laboratory contaminants, sample results less than 10 times the blank sample concentration are qualified as not detected.

8.1 2012 DATA

URS staff collected groundwater samples from 28 field efforts from January through December 2012: GSAP 1Q12 through 4Q12, OFB 01M12 (January 2012) through 12M12 (December 2012) and OM 01M12 through 12M12. These results were validated in accordance with the procedures described in the SAP Part II QAPP, (MWH, 2010e). Method E524.2 for VOC samples were analyzed by Agricultural & Priority Pollutant Laboratory, Inc. in Clovis, California; Methods E821R02012 and E821R02013 for toxicity by Aquatic Bioassay Consulting Laboratories, Inc. in Ventura, California; and all other groundwater samples by Curtis & Tompkins in Berkeley, California. The data were evaluated at a minimum on the following parameters:

- Sample integrity#
- Initial calibration*
- Second source standard#
- Continuing calibration#
- Blank analysis#
- LCS#
- MS recoveries and relative percent differences#
- Surrogate spikes recoveries#
- RLs*
- Data completeness*

  * = All criteria were met for this parameter.
  # = See below for parameter not meeting criteria.

The following samples were collected:

General Chemistry

- Alkalinity by Method A2320 (33 normal sample [NS] , 2 field duplicate [FD], and 1 MS/MSD)
- TDS by Method A2540C (33 NS and 2 FD)
- Total hardness by E130.2 (14 NS)
- Total suspended solids (TSS) by Method E160.2 (13 NS, 1 FD, and 1 MS/MSD)
- Method E300.0 (Chloride – 33 NS, 2 FD, and 4 MS/MSD), (Fluoride- 9 NS, 1FD, and 2 MS/MSD), (Nitrite-24 NS, 1 FD, and 2 MS/MSD), (Sulfate- 33 NS, 2 FD, and 4MS/MSD)
- Sulfide by Method E376.2 (9 NS, 1 FD, and 2 MS/MSD)

Total Petroleum Hydrocarbons

- Diesel oil by modified Method M8015D (20 NS, 3 FD, and 2 MS/MSD)
- Gasoline by modified Method M8015V (33 NS, 4 FD, 3 MS/MSD, and 9 TB)

Metals

- Hexavalent chromium by Method SW7196A (13 NS, 2 FD, and 5 MS/MSD)
- Mercury by Method SW7470A (21 NS, 6 FD, and 7 MS/MSD)
- Filtered metals by Method SW6010B (7 metal suite, 32 NS, 3 FD, 6 MS/MSD), (15 metal suite, 23 NS, 4 FD, and 7 MS/MSD), (Nickel only, 8 NS, 1FD, and 1 MS/MSD)
- Filtered metals by Method SW6020 (15 metals suite, 7 NS, 2 FD, 2 MS/MSD), (Lead only, 10 NS,
  1 MS/MSD), (Selenium only, 4 NS, 2 MS/MSD), and (Thallium only, 23 NS, 4 FD, and 7 MS/MSD)
- Dissolved metals by Method SW6020 (Lead only, 6 NS, 1 FD, and 3 MS/MSD) and (Selenium only, 9 NS, 1 FD, and 2 MS/MSD)

Volatile Organic Compounds

- Volatiles by Method E524.2 (111 NS, 11 FD, 7 MS/MSD and 18 TB)
- Volatiles by Method SW8260B (264 NS, 26 FD, 11 MS/MSD, and 24 TB)

Toxicity

- Acute toxicity by Method E821R02012 (1 NS) and chronic toxicity by Method E821R02013 (1 NS)

Based on the validation performed, all data for 2012 are acceptable and can be used for data interpretation. However, data flagged as an estimated concentration (J or M), an estimated RL (UJ), detected between DL and RL (F), and not detected (B) are acceptable and useable but should be used with an understanding of limitations (potential bias) during data interpretation. Data flagged "B" of "BF" should be considered "not detected." The result is most likely attributed to external contamination. Table 8-1 provides completeness by Method for 2012 data. Table 8-2 presents qualified NS results for 2012.

General Chemistry

- **Method A2320:** No results for alkalinity are qualified.
- **Method A2540C:** A total of 10 TDS results are qualified as estimated concentrations. Six results are qualified for poor laboratory duplicate precision, and four additional results are qualified for poor LCS/LCS duplicate (LCSD) precision.
- **Method E130.2**: No results for total hardness are qualified.
- **Method E160.2:** A total of four results for TSS are qualified. Three results are qualified for poor LCS/LCSD precision and one result is qualified for poor MS/MSD precision.
- **Method E300.0:** One fluoride result is qualified as an estimated concentration because it was detected between the DL and RL.
- **Method E376.2:** One sulfide result is qualified due to poor field duplicate precision.

Total Petroleum Hydrocarbons

- **Modified Method M8015D:** A total of 15 TPH-d results are qualified. Eleven diesel results are qualified as not detected because of method blank contamination; these results are also detected between the RL and DL. Three results are qualified as estimated concentrations because they are detected between the DL and RL and one diesel result is qualified because the sample pattern does not match the standard pattern.
- **Modified Method M8015V:** A total of 30 TPH-g results are qualified. Twenty-eight results are qualified as not detected due to external contamination; these results are also detected between the RL and DL. Two additional results are qualified as estimated concentration because they are detected between the DL and RL.

Metals

- **Method SW6010B:** A total of 61 metals are qualified. Thirty-two results are qualified as estimated concentrations because they are detected between the RL and DL; three of these results are also qualified because of poor field duplicate precision. Seventeen results are qualified as not detected due to external contamination; these 17 results are also detected between the DL and RL. Seven results are qualified as estimated concentrations because the serial dilution did not meet the

project criteria. Two results are qualified as estimated reporting limits due to low analytical spike recoveries and three results are qualified for potential low bias due to low MS recoveries.

- **Method SW6020:** A total of 40 results are qualified. Sixteen results are qualified as not detected due to external contamination; these results are also detected between the RL and DL. Nineteen results are qualified as estimated concentrations because they are detected between the DL and RL. Three results are qualified as estimated because of poor field duplicate precision; two of these three results are also reported between the DL and RL. One result is qualified as estimated concentration due to a serial dilution not meeting criteria and another result is qualified because the MS did not meeting criteria.
- **Method SW7196A:** Two results for hexavalent chromium are qualified as estimated concentrations because they are detected between the DL and RL.
- **Method SW7470A:** A total of 14 results are qualified for mercury. Twelve results are qualified as not detected due to external contamination; these results are also detected between the DL and RL. Two results are qualified as estimated concentrations because they are detected between the DL and RL.

Volatile Organic Compounds

- **Method E524.2**: A total of 188 results were qualified. One hundred and thirty-eight results are qualified as estimated concentrations because they are detected between the RL and DL. Twelve additional results, also detected between the DL and RL, are qualified as not detected due to external contamination. Sixteen results are qualified for potential low bias due to matrix interference indicated by low MS recoveries. Two results are qualified as estimated concentrations due to high MS recoveries; one of these two results is also detected between the DL and RL. Two results are qualified as estimated concentrations due to poor field duplicate precision; one of these two results is also detected between the DL and RL. Eighteen results are qualified as estimated RLs due to second source standards not meeting criteria.
- **Method SW8260B:** A total of 234 results are qualified. One hundred and thirteen results are considered estimated concentrations because they are detected between the DL and RL. Twenty-two results are qualified as not detected due to external contamination (B, BF); twenty-one of these results are also reported between the DL and RL and three of these results were also qualified due the second source standard not meeting criteria. Thirty-four results are qualified as estimated concentrations due to surrogate spikes not meeting criteria; fifteen of these 34 results are detected between the DL and RL. Fifteen results are qualified due to low continuing calibration standard or second source standards recoveries; three of these results are also qualified because they were detected between the DL and RL and/or a surrogate spike not meeting criteria. Forty-five results for two samples (44 UJ and 1 J) are qualified as potential low bias due to bubbles in the sample containers. Four results are qualified as estimated concentrations due to poor field duplicate precision; one of these four results are also detected between the DL and RL. One sample result is qualified as an estimated concentration due to a low MS recovery.

Toxicity

- **Methods E821R02012 and E821R02013:** No data are qualified.

9.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This section highlights observations noted in monitoring programs at Mather during 2012. These programs include landfill post-closure performance monitoring and NEP monitoring; performance monitoring of groundwater extraction and treatment systems for the AC&W, Site 7, and MBSA plumes; and off-base water supply well monitoring.

9.1 NORTHEAST PLUME AND LANDFILLS

A summary of activities and observations based on monitoring performed in 2012 are as follows:

- 4Q12 began the 17th year of post-closure sample collection and analysis at closed LF-03 and LF-04 and represented the 11th year of quarterly post-closure sampling round for the landfill at Site 7. Landfill post-closure monitoring wells were sampled quarterly, semiannually, or annually for the required list of analytes.
- Groundwater levels in all accessible NEP and landfill monitoring wells were measured semiannually (2Q12 and 4Q12).
- The lateral and vertical extents of the downgradient boundary of the ACL volume of the NEP are adequately characterized by the current monitoring network.
- For the NEP, concentrations of COCs at or greater than cleanup levels in 2012 were restricted to the area near MAFB-132, MAFB-133, MAFB-398, MAFB-398C, MAFB-400, and MAFB-465. The 2012 sample results at Unit C monitoring well MAFB-398C indicate that the increase in deeper contaminant concentrations may have reversed.
- For evaluation monitoring at LF-03 and LF-04 during 2012, a new well with a PVC screen (MAFB-465) was installed between MAFB-132 and LF-04 to determine whether the elevated chromium and nickel concentrations, relative to background concentrations, detected in water table wells are associated with stainless steel screens or a potential release from the landfill. Initial sample results indicate that the metals are not landfill-related. This evaluation will continue by sampling quarterly for metals at the new well through 3Q13.
- For WP-07 during 2012, no non-VOC detections exceeded calculated background values.

Based on the results of NEP performance monitoring data, the following activities are recommended for monitoring:

- Continue sampling the evaluation monitoring wells for chromium at an annual frequency (except for MAFB-132, which will be sampled semiannually) and for nickel at a semiannual frequency as stated in the 2013 groundwater sampling plan (URS, 2013b) with the following exception:
  - To confirm initial results and further evaluate whether elevated chromium and nickel concentrations, relative to the calculated background ranges, detected in groundwater are a result of the deterioration of stainless steel screen material, continue to sample MAFB-465 quarterly for metals though 3Q13.
  - If no sample can be collected from MAFB-140 in 2013, then MAFB-139 should be sampled as a replacement location.
- PCE and cis-1,2-DCE concentrations should continue to be monitored to maintain an understanding of plume extent and continue to assess near-source evidence of potentially continuing VOC contributions to the NEP from LF-03 and LF-04.

- Decommission MAFB-128 (currently not sampled) in accordance with the *2012/2013 Groundwater Well Decommissioning Work Plan* (URS, 2013a).

9.2 AC&W PLUME

A summary of activities and observations based on monitoring performed in 2012 are as follows:

- Monitoring and gauging continued in 2012 and provided data for (1) evaluation of groundwater elevations, (2) verification of plume capture, and (3) progress of TCE remediation.
- The AC&W treatment system operated at an average flow rate of 100 gpm during most of 2012 and the system removed approximately 2.5 pounds of TCE.
- No VOCs were detected in the monthly air stripper effluent samples. The quarterly receiving water samples collected at Mather Lake (ACW R-2) contained no detected VOCs during 2012. Inspections of Mather Lake have indicated no detrimental effect on the receiving waters since discharge to the lake began in 1997. All air emissions and surface water discharge complied with ARARs for the site.
- The highest TCE concentrations detected in the AC&W Plume during 2012 were observed at monitoring well MAFB-453 and extraction wells ACW AT-1 and AT-2, respectively. Remediation of the plume is progressing, and TCE concentrations are generally declining in the downgradient monitoring and extraction wells while increasing in upgradient wells.
- On 29 December 2012, the plant stopped operation due to electrical vandalism. The plant was repaired and restarted in time for annual/biennial sampling in 2Q13.

Based on the results of AC&W performance monitoring data, the following activities are recommended for monitoring and system operations:

- Return the AC&W groundwater extraction and treatment system to service and operate under 2012 operational parameters.
- Continue to collect samples during 2013 at planned frequencies using analytical methods outlined in the *2013 Mather Groundwater Monitoring Program Sampling Plan* (URS, 2013b). As 2013 is a biennial sampling year, 2Q13 sampling will include all wells currently sampled for the AC&W Plume. These results will be used to assess the effects of the system shutdown on the AC&W Plume.
- ACW EW-6R should be shut down due to the decrease in TCE concentrations to less than ACL and should to be sampled semiannually for two years to assess potential concentration rebound.
- Flow rates and capture at all AC&W extraction wells should be evaluated and possibly modified to optimize capture of the downgradient part of the plume and remediation in the upgradient part of the plume.
- Decommission AC&W monitoring and extraction as recommended in the *2012/2013 Groundwater Well Decommissioning Work Plan* (URS, 2013a), if 2Q13 sampling results indicate decommissioning is still appropriate.

9.3 SITE 7 PLUME

A summary of activities and observations based on monitoring performed in 2012 are as follows:

- The Site 7 groundwater extraction treatment system operated with two extraction wells during 2012. The extraction wells operated at a combined average flow rate of 45 gpm and removed approximately 3.7 pounds of VOCs from groundwater.
- In the perched zone, which occurs at roughly 50 feet bgs (approximately 25 feet above msl), the only concentrations of VOCs observed exceeding cleanup levels for the underlying aquifer were in samples collected from wells 7-BV-02, 7-BV-08, 7-PZ-37P.
- Granite has constructed and seasonally filled a 40-acre emergent marsh on the west side of the Site 7 Plume footprint starting in about 2005. Water depths in the marsh are up to 3 feet. The marsh is expected to result in increased recharge to the underlying aquifer but does not appear to have changed local groundwater flow direction to any measurable extent.

Based on the results of Site 7 performance monitoring data, the following activities are recommended for monitoring and system operations:

- Flow rates at Site 7 extraction wells should be evaluated and optimized to maintain capture at the toe of the ACL plume.
- Continue to collect samples during 2013 at planned frequencies using analytical methods outlined in the *2013 Mather Groundwater Monitoring Program Sampling Plan* (URS, 2013b).
- Decommission MAFB-147, MAFB-256, and MAFB-262 as recommended in the *2012/2013 Groundwater Well Decommissioning Work Plan* (URS, 2013a).

9.4 MAIN BASE/SAC AREA PLUME

A summary of activities and observations based on monitoring performed in 2012 are as follows:

- The MBSA treatment system consisted of 26 active extraction wells, the treatment plant, and four injection wells in 2012. The treatment plant received an average of 1,471 gpm and removed approximately 118 pounds of VOCs from groundwater. The treated water was either injected into deep aquifer units, diverted to surface water, or used by the county for roadside irrigation. During 2012, the treatment system effluent and receiving water sampling results complied with discharge standards with the exception of one pH measurement.
- The leading edge of the Southwest Lobe remained defined by multiple-completion monitoring wells MAFB-460Bs/Bd and MAFB-461Bs/Bd. However, approximately 2 percent of the Unit B TCE plume may be beyond capture.
- Groundwater potentiometric surface maps indicate that the hot spots of the MBSA Plume within each HSG unit were captured. The majority of the plume in 2012 was captured.
- The CCl_4 ACL plume increased in area in 2012 as it appears to be drawn toward MBS EW-6D, OFB-04, OFB-51, and OFB-52, but is still restricted to the upper part of Unit D.

Based on results of the evaluation of the MBSA monitoring data, the following activities are recommended for performance monitoring and system operations:

- Restart MBS EW-7ABu to capture COCs exceeding ACLs at MAFB-405.
- Continue collecting samples at all monitoring and extraction wells at frequencies outlined in the *2013 Mather Groundwater Monitoring Program Sampling Plan* (URS, 2013b).

- Monitor and optimize extraction well flow rates in 2013 to improve capture and optimize remediation of the MBSA Plume.
- Decommission wells as recommended in the *2012/2013 Groundwater Well Decommissioning Work Plan* (URS, 2013a).

9.5 OFF-BASE WATER SUPPLY WELLS

Ten high-volume off-base groundwater production wells were sampled in 2013 to monitor for evidence of VOC contaminants originating at Mather. Influent and mid-GAC samples were collected monthly for the wellhead treatment system at the Juvenile Hall supply wells. A carbon change-out was performed at the Juvenile Hall treatment system on 20 March 2012. May sample results for OFB-04 (Moonbeam) indicated that the CCl_4 concentration exceeded one-quarter the ACL. The June and August samples contained CCl_4 at concentrations exceeding the ACL. Cal Am shut down the well on 20 July 2012, upon receiving the June sample results, and a GAC system was installed for this well per Revision 1 of the Contingency Plan (AFRPA, 2008). The well, with wellhead treatment, was restarted on 27 November 2012. As in years past, CCl_4 was the primary contaminant detected at the Juvenile Hall and Moonbeam wells during 2012.

Samples were also collected from 29 privately owned water supply wells during 2012. Sixteen private wells were sampled for the first time in 2009 and another two for the first time in 2010; these 18 wells are downgradient from the Southwest Lobe of the MBSA Plume. Of those 18 wells, only OFB-72 had detections of a COC at a concentration near an ACL, including TCE at a maximum concentration of 2.1 µg/L in 2Q12.

Based on 2012 monitoring results, continue to collecting samples at planned frequencies using analytical methods outlined in the *2013 Mather Groundwater Monitoring Program Sampling Plan* (URS, 2013b).

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URS, 2013a. *2012/2013 Groundwater Well Decommissioning Work Plan for the Former Mather AFB, Sacramento County, California. Final*. January.

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TABLES

TABLE 2-1

Groundwater Well Reference List
Former Mather Air Force Base
Sacramento County, California

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
7-BV-01	PERCHED	73.48	72.45	13.45	3.45	SITE 7
7-BV-02	PERCHED	72.68	70.22	8.22	-6.78	SITE 7
7-BV-03	PERCHED	75.92	70.66	33.66	23.66	SITE 7
7-BV-04	PERCHED	76.72	69.94	20.94	5.94	SITE 7
7-BV-05	PERCHED	74.63	70.99	22.99	7.99	SITE 7
7-BV-06	PERCHED	71.84	72.88	18.88	8.88	SITE 7
7-BV-07	PERCHED	71.72	71.91	32.91	17.91	SITE 7
7-BV-08	PERCHED	78.46	71.38	26.88	6.88	SITE 7
7-BV-09	PERCHED	84.06	67.71	21.21	6.21	SITE 7
7-BV-10	PERCHED	82.25	67.89	30.89	15.89	SITE 7
7-BV-11	PERCHED	76.22	71.23	25.23	10.23	SITE 7
7-BV-12	PERCHED	76.45	74.18	26.18	11.18	SITE 7
7-BV-13	PERCHED	75.51	74.90	34.90	19.90	SITE 7
7-BV-14	PERCHED	73.90	72.77	20.77	5.77	SITE 7
7-BV-15	PERCHED	81.58	67.30	25.30	5.30	SITE 7
7-BV-16	PERCHED	78.61	66.22	18.22	3.22	SITE 7
7-BV-17	PERCHED	71.86	73.69	25.69	10.69	SITE 7
7-BV-18	PERCHED	76.90	76.84	19.84	9.84	SITE 7
7-BV-19	PERCHED	75.77	68.32	16.32	6.32	SITE 7
7-BV-20	PERCHED	76.42	68.25	9.25	-0.75	SITE 7
7-BV-21	PERCHED	73.35	73.21	17.21	9.21	SITE 7
7-BV-22	PERCHED	76.33	76.61	43.61	28.61	SITE 7
7-BV-23	PERCHED	77.15	77.14	16.64	6.64	SITE 7
7-BV-24	PERCHED	74.77	72.04	7.04	-2.96	SITE 7
7-EW-1	B	43.51	41.31	-70.69	-118.69	SITE 7
7-EW-2	B	54.13	51.53	-23.47	-63.47	SITE 7
7-IW-01	B	76.40	75.65	-29.35	-89.35	SITE 7
7-IW-02	B	78.53	78.01	-26.99	-86.99	SITE 7
7-IW-03	B	79.51	79.01	-20.99	-80.99	SITE 7
7-IW-04	B	79.95	79.25	-25.75	-52.75	SITE 7
7-PZ-23	B	80.11	77.70	-41.30	-51.30	SITE 7
7-PZ-24	B	78.64	76.20	-43.80	-54.20	SITE 7
7-PZ-25	B	80.38	78.00	-41.25	-51.25	SITE 7
7-PZ-26	B	78.24	78.30	-36.70	-46.70	SITE 7
7-PZ-37	WT	75.80	73.50	-6.20	-22.20	SITE 7
7-PZ-37P	PERCHED	75.63	73.50	26.00	11.00	SITE 7
7-PZ-38P	PERCHED	56.99	53.89	28.89	13.89	SITE 7
7-PZ-39	C	60.92	58.02	-79.98	-89.98	SITE 7
7-PZ-40	C	56.11	53.16	-21.84	-31.84	SITE 7
7-PZ-41	C	56.11	53.16	-46.84	-56.84	SITE 7
ACW AT-1	C	130.91	129.27	13.27	-36.73	AC&W
ACW AT-2	C	124.28	122.40	7.40	-47.60	AC&W
ACW AT-3	C	122.46	120.54	5.54	-49.46	AC&W
ACW AT-4	D	126.06	126.06	-73.94	-113.94	AC&W
ACW EW-1	C	125.17	124.02	8.02	-51.98	AC&W
ACW EW-2	C	122.47	121.31	1.31	-58.69	AC&W
ACW EW-3	C	125.41	124.26	-0.74	-60.74	AC&W
ACW EW-4	C	115.39	114.66	-15.34	-75.34	AC&W
ACW EW-5	C	114.52	113.11	-16.89	-76.89	AC&W
ACW EW-6	C	128.11	126.95	-3.05	-63.05	AC&W
ACW EW-6R	C	127.97	126.83	21.83	-58.17	AC&W
ACW IW-1	C	128.23	127.09	32.09	-47.91	AC&W

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
ACW IW-2	C	120.16	119.00	14.00	-56.00	AC&W
ACW IW-3	C	122.83	121.68	26.68	-53.32	AC&W
ACW IW-4	C	122.79	121.56	31.56	-58.44	AC&W
ACW IW-5	C	121.74	120.58	15.58	-54.42	AC&W
ACW IW-6	C	113.01	112.01	7.01	-72.99	AC&W
ACW IW-7	C	130.16	129.00	29.00	-51.00	AC&W
ACW IW-8	C	130.49	129.29	29.29	-50.71	AC&W
ACW PZ-01	C	109.03	108.91	-56.09	-71.09	AC&W
ACW PZ-02	C	110.25	110.10	-54.90	-69.90	AC&W
ACW PZ-03	C	116.68	116.58	-48.42	-63.42	AC&W
ACW PZ-04	C	108.35	108.35	-56.73	-71.73	AC&W
ACW PZ-05	C	115.20	114.47	-47.53	-62.53	AC&W
ACW PZ-06	WT/C	121.62	118.50	-1.50	-16.50	AC&W
ACW PZ-06C	C	121.62	118.50	-51.50	-61.50	AC&W
ACW PZ-07	WT/C	127.91	125.50	0.50	-14.50	AC&W
ACW PZ-07C	C	127.91	125.50	-44.50	-54.50	AC&W
ACW PZ-08	WT/C	123.75	121.00	3.00	-12.00	AC&W
ACW PZ-08C	C	123.75	121.00	-39.00	-49.00	AC&W
ACW PZ-09	WT/C	126.77	123.80	3.80	-11.20	AC&W
ACW PZ-09C	C	126.77	123.80	-36.20	-46.20	AC&W
ACW PZ-10	WT	129.19	126.70	6.70	-8.30	AC&W
ACW PZ-10C	C	129.19	126.70	-33.30	-43.30	AC&W
FFS MW15-6	D	79.60	79.60	-95.40	-100.40	MBP
MAFB-005*	WT/B	137.64	134.54	29.04	9.04	LF04
MAFB-006	WT/B	98.34	95.80	14.30	-3.70	MBP
MAFB-012	WT/B	96.52	95.37	18.37	-1.63	MBP
MAFB-013	WT/B	92.21	92.21	14.21	-5.79	MBP
MAFB-033	WT/Bu	80.88	80.88	6.88	-13.12	MBP
MAFB-039	PERCHED	75.00	72.71	8.71	-11.29	SITE 7
MAFB-041	B	73.64	72.28	-27.72	-47.72	SITE 7
MAFB-042	B	74.98	73.74	-16.26	-36.26	SITE 7
MAFB-043	C	75.15	73.24	-34.76	-54.76	SITE 7
MAFB-044	PERCHED	76.30	73.70	13.70	-6.30	SITE 7
MAFB-046	PERCHED	68.60	67.05	-2.95	-22.95	SITE 7
MAFB-047	WT/Bu	77.24	75.93	0.93	-19.07	MBP
MAFB-048	WT	75.63	74.26	4.26	-15.74	MBP
MAFB-053	C	131.33	130.15	-26.85	-46.85	AC&W
MAFB-054	WT/C	118.68	117.28	7.28	-12.72	AC&W
MAFB-056	D	74.17	72.33	-104.67	-124.67	SITE 7
MAFB-058	D	75.52	73.86	-97.14	-117.14	SITE 7
MAFB-059	B	69.62	67.53	-92.47	-112.47	SITE 7
MAFB-060	D	77.48	76.32	-98.68	-118.68	MBP
MAFB-061	D	78.43	77.37	-106.63	-126.63	MBP
MAFB-062	D	80.06	78.92	-102.08	-122.08	MBP
MAFB-063	D	76.09	74.60	-100.40	-120.40	MBP
MAFB-064*	D	134.9	133.76	-41.24	-61.24	LF04
MAFB-065*	D	136.74	134.8	-60.2	-80.2	LF04
MAFB-066	Dd	93.51	92.48	-154.52	-174.52	MBP
MAFB-067	D	129.41	127.88	-62.12	-82.12	AC&W
MAFB-068	D	131.44	129.27	-77.73	-97.73	AC&W
MAFB-069	D	133.87	133.87	-73.13	-93.13	AC&W
MAFB-070	D	123.60	122.25	-60.75	-80.75	AC&W
MAFB-071	D	131.48	129.87	-70.13	-90.13	AC&W
MAFB-072	D	117.07	116.00	-79.00	-99.00	AC&W
MAFB-073	B	92.76	91.62	-20.38	-40.38	MBP
MAFB-075*	WT/B	135.83	134.78	43.68	23.78	LF04
MAFB-078	D	126.64	123.89	-71.11	-86.11	AC&W
MAFB-080	D	121.52	118.72	-103.28	-118.28	AC&W
MAFB-082	WT/C	122.02	118.17	14.67	-0.33	AC&W

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MAFB-090	WT/Bu	80.01	80.00	3.70	-11.30	MBP
MAFB-092	WT	84.94	82.51	5.51	-9.49	MBP
MAFB-093	WT/B	93.38	93.38	6.38	-8.62	MBP
MAFB-094	B	90.41	90.51	-1.10	-16.10	MBP
MAFB-096	WT/B	92.72	92.93	5.93	-9.07	MBP
MAFB-097	WT/B	90.03	90.03	1.03	-13.97	MBP
MAFB-099	WT	84.72	84.71	7.71	-7.29	MBP
MAFB-101	B	83.61	80.68	-35.32	-50.32	MBP
MAFB-102	D	83.03	80.55	-107.45	-122.45	MBP
MAFB-103	D	74.82	72.36	-97.64	-112.64	MBP
MAFB-104	D	73.72	73.67	-122.33	-137.33	MBP
MAFB-105	WT	84.47	84.47	7.47	-7.53	MBP
MAFB-107	WT/B	96.88	96.78	5.48	-9.52	MBP
MAFB-108	WT/B	94.61	94.60	13.60	-1.40	MBP
MAFB-109*	WT/C	120.59	120.48	32.48	17.48	LF03
MAFB-110	WT/B	113.55	110.90	26.90	11.90	LF03
MAFB-111*	WT/B	127.65	125.53	22.53	7.53	LF03
MAFB-112	WT/C	121.09	118.26	15.26	-4.74	LF03
MAFB-115	WT/B	91.47	91.54	4.54	-10.46	MBP
MAFB-116	WT/B	89.94	89.94	3.94	-11.06	MBP
MAFB-121	WT	77.37	74.67	0.17	-14.83	MBP
MAFB-122	WT	73.44	73.42	2.42	-12.58	MBP
MAFB-123	WT	77.19	74.47	-0.53	-15.53	MBP
MAFB-124	WT	69.69	69.60	-0.40	-15.40	MBP
MAFB-125	WT/B	92.46	92.46	9.46	-5.54	MBP
MAFB-126	WT/B	94.22	94.22	8.22	-6.78	MBP
MAFB-127	WT/C	117.60	117.60	-0.40	-15.40	LF04
MAFB-128	WT/B	122.28	119.73	9.73	-5.27	LF04
MAFB-129	WT/C	116.93	116.93	3.93	-11.07	LF04
MAFB-130*	WT/B	114.99	112.98	29.98	14.98	LF03
MAFB-131*	WT/B	125.61	123.53	29.52	14.52	LF03
	C	125.61	123.53	4.03	-9.97	
MAFB-132*	WT/B	131.21	129.28	39.28	24.28	LF04
	C	131.21	129.28	14.28	-0.72	
MAFB-133*	WT/B	128.21	126.15	29.14	14.14	LF03
	C	128.21	126.15	3.65	-10.35	
MAFB-136*	WT/B	133.15	131.18	49.17	34.17	LF04
	C	133.15	131.18	23.68	9.68	
MAFB-139	WT/C	132.69	130.04	13.04	-1.96	LF04
MAFB-140*	WT/C	140.32	136.86	21.86	6.86	LF04
MAFB-141*	WT/B	139.14	137.2	46.19	31.19	LF04
	C	139.14	137.2	20.7	6.7	
MAFB-147	B	75.46	74.41	-29.56	-44.56	SITE 7
MAFB-148	B	77.04	74.41	-29.59	-44.59	SITE 7
MAFB-149	WT/B	74.53	71.93	-23.07	-38.07	SITE 7
MAFB-150	WT/B	94.02	91.50	8.50	-6.50	MBP
MAFB-151	WT/B	98.71	98.71	11.71	-3.29	MBP
MAFB-152	WT/B	89.80	89.76	3.76	-11.24	MBP
MAFB-154	WT/B	94.53	94.53	0.53	-14.47	MBP
MAFB-155	WT/B	92.20	92.20	-0.80	-15.80	MBP
MAFB-156	WT	74.92	74.95	-2.05	-17.05	MBP
MAFB-157	WT	74.15	71.44	-5.56	-20.56	MBP
MAFB-158	WT/Bu	79.44	77.06	0.06	-14.94	MBP
MAFB-159	WT	79.87	77.23	0.73	-14.27	MBP
MAFB-160	WT	84.89	82.35	7.35	-7.65	MBP
MAFB-162	WT	87.57	87.52	12.52	-2.48	MBP
MAFB-163	WT	91.66	87.66	11.66	-3.34	MBP
MAFB-164	B	76.31	74.13	-56.87	-71.87	MBP
MAFB-165	B	80.95	78.34	-50.16	-65.16	MBP

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MAFB-166	B	79.94	77.18	-41.82	-56.82	MBP
MAFB-167	B	78.42	75.99	-41.01	-56.01	MBP
MAFB-168	WT/Bu	75.15	72.78	-27.22	-42.22	MBP
MAFB-169	B	80.38	80.32	-46.68	-61.68	MBP
MAFB-170	B	79.76	79.76	-46.29	-61.29	MBP
MAFB-171	B	79.20	76.85	-40.15	-55.15	MBP
MAFB-172	WT/Bu	75.35	73.11	-19.89	-34.89	MBP
MAFB-173	B	77.35	74.74	-51.26	-66.26	MBP
MAFB-174	WT/Bu	79.59	76.93	-24.07	-39.07	MBP
MAFB-175	B	73.58	73.54	-63.46	-78.46	MBP
MAFB-176	Bu	76.90	74.30	-28.70	-43.70	MBP
MAFB-177	B	69.70	69.70	-67.30	-82.30	MBP
MAFB-178	D	95.46	95.40	-97.16	109.60	MBP
MAFB-179	D	97.34	94.69	-65.31	-80.31	MBP
MAFB-180	D	74.82	74.87	-97.13	-112.13	MBP
MAFB-181	D	74.13	71.42	-118.58	-133.58	MBP
MAFB-184	PERCHED	74.71	71.96	21.96	6.96	SITE 7
MAFB-185	PERCHED	75.62	72.95	20.95	5.95	SITE 7
MAFB-187	WT	86.74	84.14	8.14	-6.86	MBP
MAFB-188	WT	85.24	82.64	6.64	-8.36	MBP
MAFB-189	PERCHED	75.57	73.09	21.09	6.09	SITE 7
MAFB-191	D	125.24	125.14	-109.86	-124.86	AC&W
MAFB-193	C	125.99	123.58	-29.42	-44.42	AC&W
MAFB-194	C	126.71	124.04	-40.96	-55.96	AC&W
MAFB-195	C	120.40	118.42	-43.58	-58.58	AC&W
MAFB-196	C	122.37	119.58	-35.42	-50.42	AC&W
MAFB-197	WT/C	106.60	108.12	4.12	-10.88	AC&W
MAFB-198	C	106.27	107.48	-56.52	-71.52	AC&W
MAFB-199	WT/Bu	79.11	76.10	-3.90	-18.90	MBP
MAFB-200	WT	80.28	77.20	-2.80	-17.80	MBP
MAFB-201	WT/Bu	78.75	79.00	-1.00	-16.00	MBP
MAFB-202	WT	82.70	79.50	-0.50	-15.50	MBP
MAFB-203	WT	78.76	79.00	-1.00	-16.00	MBP
MAFB-204	WT	83.31	80.30	0.30	-14.70	MBP
MAFB-205	WT	80.54	77.40	-2.60	-17.60	MBP
MAFB-206	WT	80.62	77.60	1.60	-13.40	MBP
MAFB-207	WT	79.62	79.63	-0.51	-15.40	MBP
MAFB-208	WT	83.34	80.40	0.40	-14.60	MBP
MAFB-209	WT	82.53	79.70	1.70	-13.30	MBP
MAFB-210	WT	83.33	80.20	0.20	-14.80	MBP
MAFB-211	WT	78.93	75.70	-1.30	-16.30	MBP
MAFB-212	WT	86.36	83.40	3.40	-11.60	MBP
MAFB-214	WT	85.53	85.53	5.53	-9.47	MBP
MAFB-215	B	80.30	77.20	-57.80	-72.80	MBP
MAFB-216	B	78.98	78.90	-36.10	-51.10	MBP
MAFB-217	B	82.17	79.20	-40.80	-55.80	MBP
MAFB-218	B	79.05	79.10	-47.90	-62.90	MBP
MAFB-219	B	83.21	80.20	-44.80	-59.80	MBP
MAFB-220	B	80.67	77.40	-47.60	-62.60	MBP
MAFB-221	Bu	77.01	74.10	-23.90	-33.90	MBP
MAFB-222	B	78.84	75.90	-42.10	-57.10	MBP
MAFB-223	B	80.49	77.60	-42.40	-57.40	MBP
MAFB-224	B	79.38	79.70	-47.30	-62.30	MBP
MAFB-225	B	82.53	79.60	-36.40	-51.40	MBP
MAFB-226	B	82.85	79.80	-41.20	-56.20	MBP
MAFB-227	B	81.72	78.80	-41.20	-56.20	MBP
MAFB-228	B	86.45	83.30	-36.70	-51.70	MBP
MAFB-229	B	84.21	84.50	-30.50	-45.50	MBP
MAFB-230	B	85.10	85.10	-25.90	-40.90	MBP

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MAFB-231	B	85.71	86.00	-24.00	-39.00	MBP
MAFB-232	B	90.15	90.40	-4.60	-19.60	MBP
MAFB-233	B	93.61	93.50	-3.50	-18.50	MBP
MAFB-234	B	89.12	86.10	-19.60	-33.90	MBP
MAFB-235	D	81.90	78.90	-81.10	-91.10	MBP
MAFB-239	D	79.28	76.20	-103.80	-118.80	MBP
MAFB-240	D	79.40	76.50	-108.50	-123.50	MBP
MAFB-241	D	80.39	77.50	-122.50	-137.50	MBP
MAFB-242	D	78.98	76.00	-91.00	-106.00	MBP
MAFB-243	D	77.04	74.40	-135.60	-145.60	MBP
MAFB-244	WT	85.76	85.80	4.80	-10.20	MBP
MAFB-246	WT/Bu	84.51	84.51	-5.50	-15.50	MBP
MAFB-247	WT/B	79.18	79.20	-37.80	-52.80	MBP
MAFB-248	WT/B	80.69	80.60	-29.40	-44.40	MBP
MAFB-249	B	86.15	86.20	-23.80	-38.80	MBP
MAFB-250	D	85.77	85.60	-101.40	-116.40	MBP
MAFB-251	WT	75.66	75.60	1.60	-13.40	MBP
MAFB-258	WT/Bu	71.51	71.50	-18.50	-33.50	MBP
MAFB-259	Bu	71.69	69.00	-32.00	-37.00	MBP
MAFB-260	Bu	66.37	63.87	-23.13	-33.13	MBP
MAFB-261	Bu	68.91	69.00	-36.00	-51.00	MBP
MAFB-263	Bu	69.30	69.40	-34.60	-44.60	MBP
MAFB-264	WT/Bu	81.34	78.90	-11.10	-26.10	MBP
MAFB-265	B	84.70	84.70	-38.80	-53.80	MBP
MAFB-266	B	75.44	72.90	-62.60	-77.60	MBP
MAFB-267	B	72.02	69.30	-78.70	-93.70	MBP
MAFB-268	B	69.28	63.30	-68.70	-83.70	MBP
MAFB-269	B	68.92	69.00	-81.00	-96.00	MBP
MAFB-270	B	65.41	65.50	-95.50	-110.50	MBP
MAFB-271	B	65.27	65.20	-78.80	-93.80	MBP
MAFB-272	B	74.38	74.38	-67.12	-82.12	MBP
MAFB-273	B	75.71	75.70	-45.30	-60.30	MBP
MAFB-274	B	84.88	82.50	-30.50	-45.50	MBP
MAFB-276	WT/B	86.72	86.70	-3.80	-13.80	NEP
MAFB-277	WT/B	88.10	88.10	0.60	-14.40	NEP
MAFB-278	WT/B	94.04	94.00	12.00	2.00	NEP
MAFB-280	B	91.91	91.90	-17.10	-27.10	MBP
MAFB-281	B	90.31	90.30	-9.70	-24.70	MBP
MAFB-282	B	86.48	86.50	-13.50	-28.50	MBP
MAFB-283	B	77.96	75.00	-54.00	-69.00	SITE 7
MAFB-284	B	76.20	73.30	-41.70	-56.70	SITE 7
MAFB-285	C	70.80	70.80	-34.30	-49.20	SITE 7
MAFB-288*	B	127.01	124.78	-13.22	-28.22	LF04
MAFB-289*	WT/B	106.41	106.4	27.4	12.4	LF03
MAFB-290	D	68.50	68.20	-127.80	-137.80	MBP
MAFB-291	D	74.39	74.34	-98.66	-113.66	MBP
MAFB-292	D	75.71	75.70	-99.30	-114.30	MBP
MAFB-293	D	65.35	65.40	-165.60	-180.60	MBP
MAFB-294*	D	135.65	133.47	-61.53	-76.53	LF04
MAFB-296	D	68.19	68.20	-96.80	-106.80	MBP
MAFB-297	C	39.74	36.60	-68.90	-83.90	SITE 7
MAFB-300	C	41.18	39.00	-33.00	-43.00	SITE 7
MAFB-301	C	125.27	125.17	-37.83	-52.83	AC&W
MAFB-302	C	108.07	107.95	-47.55	-62.55	AC&W
MAFB-303	C	116.28	116.14	-46.86	-61.86	AC&W
MAFB-304	C	120.75	120.72	-34.28	-49.28	AC&W
MAFB-305	C	108.85	108.19	-51.81	-66.81	AC&W
MAFB-306	C	124.64	124.13	-30.87	-45.87	AC&W
MAFB-308	B	81.56	81.56	-28.44	-43.44	MBP

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MAFB-309	B	69.56	69.64	-75.36	-90.36	MBP
MAFB-310	B	63.99	63.92	-91.08	-106.08	MBP
MAFB-311	B	59.08	59.08	-104.92	-119.92	MBP
MAFB-312	B	70.21	70.21	-124.79	-139.79	MBP
MAFB-313	B	74.08	74.08	-79.92	-94.92	MBP
MAFB-314	D	81.61	81.63	-93.37	-108.37	MBP
MAFB-315	D	69.54	69.61	-129.39	-139.39	MBP
MAFB-316	D	63.9	63.86	-161.14	-176.14	MBP
MAFB-317	D	59.12	59.12	-175.88	-185.88	MBP
MAFB-318	D	70.43	70.43	-174.57	-184.57	MBP
MAFB-319	D	65.51	65.50	-134.55	-149.55	MBP
MAFB-320	D	81.75	81.75	-123.25	-138.25	MBP
MAFB-321	Dd	65.40	65.40	-174.60	-184.60	MBP
MAFB-322	B	58.86	58.86	-114.14	-129.14	MBP
MAFB-323	B	69.32	69.32	-122.68	-132.68	MBP
MAFB-324	B	65.24	65.24	-82.26	-97.26	MBP
MAFB-325	B	68.59	68.58	-81.42	-96.42	MBP
MAFB-326	D	58.91	58.91	-170.09	-185.09	MBP
MAFB-327	D	69.48	69.48	-184.02	-199.02	MBP
MAFB-328	D	65.23	65.28	-124.72	-134.72	MBP
MAFB-329	D	68.59	68.64	-126.36	-136.36	MBP
MAFB-330	B	70.8	70.70	-124.30	-139.30	MBP
MAFB-331	B	70.99	71.00	-124.00	-139.00	MBP
MAFB-332	D	70.68	70.63	-147.37	-154.37	MBP
MAFB-336	D	69.92	69.87	-200.13	-210.13	MBP
MAFB-337	Dd	58.80	57.01	-279.99	-289.99	MBP
MAFB-338	Dd	65.00	65.00	-245.00	-255.00	MBP
MAFB-339	WT/B	86.76	86.80	11.80	-8.20	MBP
MAFB-340	WT/B	89.14	89.16	11.16	-8.84	MBP
MAFB-341	WT/B	86.92	86.92	8.92	-11.08	MBP
MAFB-342	WT/B	88.44	87.70	9.70	-10.30	MBP
MAFB-343	WT/B	87.88	87.32	12.32	-7.68	MBP
MAFB-344	WT/B	89.85	89.65	11.65	-8.35	MBP
MAFB-345	Dd	67.33	67.72	-315.28	-325.28	MBP
MAFB-346Bd	B	67.13	67.73	-122.11	-132.27	MBP
MAFB-346Bs	B	67.32	67.73	-70.67	-80.67	MBP
MAFB-346D	D	67.04	67.73	-177.27	-187.27	MBP
MAFB-347	LMT	68.73	68.73	-422.27	-432.27	MBP
MAFB-348B	B	68.55	68.55	-101.45	-111.45	MBP
MAFB-348Dd	Dd	68.55	68.55	-245.45	-255.45	MBP
MAFB-348Ds	D	68.55	68.55	-171.45	-181.45	MBP
MAFB-349	LMT	69.80	69.79	-365.22	-375.22	MBP
MAFB-350	LMT	64.94	64.94	-371.06	-381.06	MBP
MAFB-351Bd	B	64.61	64.61	-143.39	-153.39	MBP
MAFB-351Bs	B	64.61	64.61	-66.89	-76.89	MBP
MAFB-351D	D	64.61	64.61	-191.39	-201.39	MBP
MAFB-352D	Dd	67.67	67.67	-228.33	-238.33	MBP
MAFB-352LM	LMT	67.75	67.62	-382.38	-392.38	MBP
MAFB-353	LMT	68.33	68.33	-361.67	-371.67	MBP
MAFB-354B	B	68.22	68.22	-136.78	-146.78	MBP
MAFB-354D	D	68.22	68.22	-221.78	-231.78	MBP
MAFB-355B	B	54.60	54.60	-133.40	-143.40	MBP
MAFB-355D	D	54.60	54.60	-228.70	-238.70	MBP
MAFB-356B	B	67.58	67.58	-138.42	-148.42	MBP
MAFB-356Dd	Dd	67.58	67.58	-284.42	-294.42	MBP
MAFB-356Ds	D	67.58	67.58	-232.42	-242.42	MBP
MAFB-357D	D	89.43	89.43	-80.57	-90.57	MBP
MAFB-357Dd	Dd	89.44	89.43	-170.57	-180.57	MBP
MAFB-357Ds	D	89.44	89.43	-120.57	-130.57	MBP

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MAFB-358B	B	88.59	87.60	-37.40	-47.40	MBP
MAFB-358D	D	88.61	87.60	-82.40	-92.40	MBP
MAFB-359	WT/Bu	77.84	76.43	2.93	-37.07	MBP
MAFB-360	B	80.45	77.25	-63.75	-73.75	MBP
MAFB-361	B	77.55	77.35	-47.65	-57.65	MBP
MAFB-362	B	80.44	80.34	-56.66	-66.66	MBP
MAFB-363	B	78.64	75.84	-59.16	-69.16	MBP
MAFB-364B	B	74.47	74.47	-75.53	-85.53	MBP
MAFB-364D	D	74.47	74.47	-118.53	-128.53	MBP
MAFB-365B	B	72.61	72.96	-82.04	-92.04	MBP
MAFB-365D	D	72.61	72.96	-127.04	-137.04	MBP
MAFB-366B	B	69.28	69.28	-80.72	-90.72	MBP
MAFB-366D	D	69.28	69.28	-110.72	-120.72	MBP
MAFB-367	D	70.42	70.42	-145.08	-155.08	MBP
MAFB-368B	B	67.13	67.13	-102.87	-112.87	MBP
MAFB-368D	D	67.13	67.13	-172.87	-182.87	MBP
MAFB-369	D	69.72	69.72	-138.40	-148.40	MBP
MAFB-371C	C	43.84	38.86	-51.6	-66.74	SITE 7
MAFB-371D	D	43.84	38.86	-104.6	-114.6	SITE 7
MAFB-372B	B	46.74	41.74	-49.69	-64.69	SITE 7
MAFB-372D	D	46.74	41.74	-86.69	-96.69	SITE 7
MAFB-373C	C	47.10	43.63	-42.56	-63.36	SITE 7
MAFB-373D	D	47.10	43.63	-87.56	-103.36	SITE 7
MAFB-374	D	90.78	86.32	-83.68	-93.68	MBP
MAFB-375	D	67.61	67.61	-102.39	-112.39	MBP
MAFB-376	D	56.17	56.17	-123.83	-133.83	MBP
MAFB-377	D	75.14	75.14	-119.36	-129.36	MBP
MAFB-378B	B	81.48	81.48	-32.52	-42.52	MBP
MAFB-378D	D	81.48	81.48	-88.52	-98.52	MBP
MAFB-379B	B	69.42	69.42	-80.58	-90.58	MBP
MAFB-379D	D	69.42	69.42	-140.58	-150.58	MBP
MAFB-380B	B	66.20	66.20	-98.30	-108.30	MBP
MAFB-380D	D	66.20	66.20	-141.80	-151.80	MBP
MAFB-381B	B	72.72	70.00	-70.00	-80.00	MBP
MAFB-381D	D	72.72	70.00	-165.00	-175.00	MBP
MAFB-382B	B	69.13	69.13	-85.87	-100.87	MBP
MAFB-382D	D	69.13	69.13	-175.87	-185.87	MBP
MAFB-383B	B	75.63	72.58	-72.42	-82.42	MBP
MAFB-383D	D	75.64	72.58	-137.42	-147.42	MBP
MAFB-384B	B	87.76	87.76	1.76	-18.24	MBP
MAFB-384D	D	87.76	87.76	-77.24	-87.24	MBP
MAFB-385B	B	62.32	62.32	-109.68	-119.68	MBP
MAFB-385D	D	62.32	62.32	-159.68	-169.68	MBP
MAFB-386B	B	69.73	69.40	-100.60	-110.60	MBP
MAFB-386D	D	69.73	69.40	-180.60	-190.60	MBP
MAFB-387B	B	70.11	70.25	-119.75	-139.75	MBP
MAFB-387Dd	D	70.11	70.25	-259.75	-269.75	MBP
MAFB-387Ds	D	70.11	70.25	-214.75	-224.75	MBP
MAFB-388B	B	62.77	62.77	-132.23	-142.23	MBP
MAFB-388Dd	D	62.77	62.77	-267.23	-277.23	MBP
MAFB-388Ds	D	62.77	62.77	-222.23	-232.23	MBP
MAFB-389	WT/B	96.99	93.84	3.84	-21.16	NEP
MAFB-390	WT/B	93.50	90.62	0.62	-24.38	NEP
MAFB-391	C	74.68	71.88	-33.12	-43.12	SITE 7
MAFB-392	C	56.99	53.89	-26.11	-36.11	SITE 7
MAFB-393	C	56.17	52.77	-22.23	-32.23	SITE 7
MAFB-394	C	55.17	51.87	-22.13	-32.13	SITE 7
MAFB-395	C	58.83	55.43	-22.57	-37.57	SITE 7
MAFB-396	B	60.92	58.02	-31.98	-46.98	SITE 7

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MAFB-397	Dd	81.26	81.26	-153.74	-163.74	MBP
MAFB-398*	WT/B	128.67	125.85	8.85	3.85	LF03
MAFB-398C*	C	126.67	125.85	-23.65	-33.65	LF03
MAFB-399*	C	125.3	122.77	-27.23	-37.23	NEP
MAFB-400*	C	134.39	131.79	-13.21	-23.21	NEP
MAFB-401	WT/C	128.44	125.80	20.80	-9.20	AC&W
MAFB-402	WT/C	135.66	133.00	18.00	-12.00	AC&W
MAFB-403	WT/C	132.21	129.30	19.30	-10.70	AC&W
MAFB-404	WT/B	89.35	89.30	2.30	-17.70	MBP
MAFB-405	WT/B	88.28	88.28	0.28	-19.72	MBP
MAFB-406	WT/B	81.42	81.42	-1.58	-16.58	MBP
MAFB-407	WT/Bu	85.57	85.50	-5.00	-15.00	MBP
MAFB-408	WT/C	126.99	127.00	20.00	-10.00	AC&W
MAFB-409	WT/B	80.66	80.50	-5.00	-20.00	NEP
MAFB-410	WT/A	84.49	81.50	-3.50	-18.50	MBP
MAFB-411	WT/B	79.67	79.62	-8.38	-23.38	MBP
MAFB-412	WT/B	82.81	79.92	-6.18	-24.09	MBP
MAFB-413	WT/B	78.08	75.03	-10.92	-25.92	SITE 7
MAFB-414	WT	83.86	84.68	16.86	-18.14	MBP
MAFB-415	WT/B	87.61	87.46	-5.54	-25.54	MBP
MAFB-416	WT/B	88.44	88.35	1.35	-18.65	MBP
MAFB-417	WT/B	82.66	80.06	-13.94	-28.94	MBP
MAFB-418	WT	81.67	81.59	-12.91	-26.91	MBP
MAFB-419	WT/B	84.62	82.52	-1.48	-21.48	MBP
MAFB-420	WT	80.81	80.69	-14.31	-29.31	MBP
MAFB-421	WT/B	84.88	84.83	-8.17	-23.17	MBP
MAFB-422	WT/Bu	82.00	81.85	-12.15	-27.15	MBP
MAFB-423	WT/Bu	78.52	78.60	-16.40	-36.40	MBP
MAFB-423B	B	78.52	78.60	-74.40	-89.40	MBP
MAFB-424	WT/C	80.54	78.07	-13.93	-28.93	SITE 7
MAFB-425	WT	69.57	69.24	-17.76	-32.76	MBP
MAFB-426	B	64.86	64.86	-135.14	-145.14	MBP
MAFB-427	B	66.62	66.57	-133.43	-143.43	MBP
MAFB-428	WT/B	88.53	86.07	-9.93	-25.93	MBP
MAFB-429Bd	B	70.86	70.86	-92.14	-107.14	MBP
MAFB-429Bs	B	70.86	70.86	-62.14	-77.14	MBP
MAFB-429Bu	WT/B	70.86	70.86	-34.14	-44.14	MBP
MAFB-430	LMT	80.55	77.54	-183.46	-193.46	MBP
MAFB-431Bd	Bd	69.79	69.79	-98.20	-113.20	MBP
MAFB-431Dd	Dd	69.79	69.79	-158.2	-168.2	MBP
MAFB-431Ds	Ds	69.79	69.79	-134.40	-144.20	MBP
MAFB-432	WT/C	126.47	123.43	-11.57	-26.57	AC&W
MAFB-433	WT/C	112.84	112.84	-17.16	-32.16	AC&W
MAFB-434Bd	Bd	69.79	66.99	-107.01	-117.01	MBP
MAFB-434Bs	Bs	69.79	66.99	-76.01	-91.01	MBP
MAFB-434Bu	WT/Bu	69.79	66.99	-38.01	-53.01	MBP
MAFB-435	Dd	74.75	74.75	-175.25	-185.25	MBP
MAFB-436	WT	83.10	83.10	-9.40	-24.40	MBP
MAFB-437Dd	Dd	66.78	66.78	-228.22	-263.22	MBP
MAFB-437Ds	Ds	66.78	66.78	-118.22	-143.22	MBP
MAFB-438*	WT	137.59	134.74	15.74	0.74	NEP
MAFB-439	WT	86.20	83.20	-6.80	-21.80	MBP
MAFB-440	WT	78.17	74.90	-15.10	-30.10	MBP
MAFB-440P	PERCHED	78.17	74.90	24.90	14.90	SITE 7
MAFB-441	D	79.93	79.90	-129.10	-139.10	SITE 7
MAFB-442	D	83.33	80.30	-179.70	-189.70	MBP
MAFB-443	D	70.46	70.40	-195.60	-205.60	MBP
MAFB-444	B	55.65	52.90	-40.10	-50.10	SITE 7
MAFB-445	B	48.12	45.10	-48.90	-58.90	SITE 7

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MAFB-446	C	50.17	47.10	-37.90	-52.90	SITE 7
MAFB-447	C	44.71	41.80	-43.20	-58.20	SITE 7
MAFB-448	B	49.34	45.90	-39.10	-54.10	SITE 7
MAFB-449Bd	Bd	52.72	49.30	-110.70	-120.70	MBP
MAFB-449Bs	Bs	52.72	49.30	-69.70	-84.70	MBP
MAFB-450	WT/Bu	75.43	72.00	-27.00	-42.00	MBP
MAFB-451	B	71.41	71.30	-58.70	-73.70	MBP
MAFB-452B	B	74.41	74.30	-63.70	-78.70	MBP
MAFB-452Bu	WT/Bu	74.41	74.30	-20.70	-35.70	MBP
MAFB-453	WT	122.16	119.10	-7.90	-22.90	AC&W
MAFB-453C	C	122.16	119.10	-40.90	-50.90	AC&W
MAFB-454	WT	125.71	122.50	-9.50	-24.50	AC&W
MAFB-454C	C	125.71	122.50	-33.50	-48.50	AC&W
MAFB-455	WT	119.67	119.70	-15.30	-30.30	AC&W
MAFB-456	WT	124.32	124.30	-13.70	-28.70	AC&W
MAFB-456C	C	124.32	124.30	-43.70	-53.70	AC&W
MAFB-457Bd	Bd	44.08	41.00	-121.00	-131.00	MBP
MAFB-457Bs	Bs	44.08	41.00	-80.00	-95.00	MBP
MAFB-458Bd	Bd	37.66	34.70	-117.30	-132.30	MBP
MAFB-458Bs	Bs	37.66	34.70	-80.30	-95.30	MBP
MAFB-459D	D	62.99	63.00	-197.00	-212.00	MBP
MAFB-459Dd	Dd	62.99	63.00	-257.00	-267.00	MBP
MAFB-460Bd	Bd	58.62	58.50	-121.50	-131.50	MBP
MAFB-460Bs	Bs	58.62	58.50	-93.50	-108.50	MBP
MAFB-461Bd	Bd	70.36	70.30	-137.70	-147.70	MBP
MAFB-461Bs	Bs	70.36	70.30	-106.70	-121.70	MBP
MAFB-462	B	60.34	60.64	-171.36	-181.36	MBP
MAFB-463D	D	72.57	72.95	-141.05	-151.05	MBP
MAFB-463Dd	Dd	72.62	72.95	-197.05	-207.05	MBP
MAFB-464	D	48.5	46.25	-57.75	-67.75	SITE 7
MAFB-465	WT/C	131.01	128.15	8.15	-6.85	LF04
MBS 19EW01	B	84.37	81.70	-105.50	-145.50	MBP
MBS 19MW01	Bu	83.90	81.20	-28.80	-43.80	MBP
MBS 19MW02	Bu	82.89	80.20	-28.80	-43.80	MBP
MBS 19MW03	D	83.28	80.40	-94.60	-109.60	MBP
MBS 19MW04	D	83.06	80.10	-94.40	-109.40	MBP
MBS 39ABuB	WT/B	80.82	85.58	11.58	-38.42	MBP
MBS 39EW02	B	88.68	85.53	-23.02	-38.02	MBP
MBS 39MW01	WT	85.50	85.50	5.50	-9.50	MBP
MBS 39MW02	WT	85.51	85.51	5.51	-9.49	MBP
MBS 39MW03	Bu	85.30	85.30	-17.70	-32.70	MBP
MBS 39MW04	Bu	85.40	85.40	-14.60	-29.60	MBP
MBS EW-10B	B	65.11	69.62	-70.38	-110.38	MBP
MBS EW-11B	B	63.49	68.05	-81.95	-121.95	MBP
MBS EW-12AB	WT/B	84.36	88.57	-1.43	-41.43	MBP
MBS EW-13BuB	Bu	71.32	69.97	-30.03	-45.03	MBP
	Bs	71.32	69.97	-70.03	-85.03	MBP
	Bd	71.32	69.97	-94.03	-114.03	MBP
MBS EW-1A	WT	81.93	87.73	14.73	-5.27	MBP
MBS EW-1B	B	76.27	75.70	-23.30	-63.30	MBP
MBS EW-1Bu	WT/Bu	75.23	74.44	-9.56	-29.56	MBP
MBS EW-1D	D	83.87	82.00	-74.5	-104.5	MBP
MBS EW-2A	WT	74.53	79.63	2.63	-17.37	MBP
MBS EW-2B	B	78.58	83.67	-54.33	-79.33	MBP
MBS EW-2AR	WT/A	77.77	78.91	-9.09	-39.09	MBP
MBS-EW2Bu	Bu	73.92	79.13	-8.87	-33.87	MBP
MBS EW-2D	D	75.43	74.89	-105.11	-145.11	MBP
MBS EW-3A	WT	75.54	80.73	3.73	-16.27	MBP
MBS EW-3B	B	76.39	80.93	-24.07	-84.07	MBP

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MBS EW-3Bu	Bu	74.38	74.11	-20.89	-35.89	MBP
MBS EW-3D	D	79.41	77.79	-85.21	-125.21	MBP
MBS EW-4A	WT/B	82.13	87.11	10.11	-29.89	MBP
MBS EW-4B	B	76.59	75.16	-44.84	-74.84	MBP
MBS EW-4Bu	WT/Bu	76.36	74.06	-10.94	-50.94	MBP
MBS EW-4D	D	82.06	86.28	-78.72	-103.72	MBP
MBS EW-5A	WT/B	83.45	88.59	9.59	-30.41	MBP
MBS EW-5B	B	65.88	71.28	-65.72	-95.72	MBP
MBS EW-5D	D	68.16	69.83	-107.17	-142.17	MBP
MBS EW-6B	B	68.84	74.09	-75.91	-115.91	MBP
MBS EW-6D	D	63.51	67.93	-156.07	-181.07	MBP
MBS EW-7B	B	77.29	77.29	-47.71	-87.71	MBP
MBS EW-8B	B	67.53	72.70	-33.30	-63.30	MBP
MBS EW-9B	B	76.53	74.58	-45.42	-85.42	MBP
MBS EW1ABu	WT/Bu	81.00	79.37	4.37	-30.63	MBP
MBS EW2ABu	WT/Bu	75.62	80.04	5.04	-34.96	MBP
MBS EW4ABu	WT/Bu	74.21	79.28	4.28	-35.72	MBP
MBS EW5ABu	WT/Bu	73.79	79.04	3.04	-36.96	MBP
MBS EW6ABu	WT	81.75	79.78	-2.22	-42.22	MBP
MBS EW7ABu	WT/Bu	85.57	86.83	-4.17	-34.17	MBP
MBS IW-501	LMT	87.06	84.71	-255.29	-315.29	MBP
MBS IW-502	LMT	86.57	84.05	-265.95	-325.95	MBP
MBS IW-503	LMT	85.54	83.69	-266.31	-326.31	MBP
MBS IW-504	LMT	81.21	81.21	-278.79	-378.79	MBP
MBS PZ-01	WT	79.76	79.80	-4.20	-14.20	MBP
MBS PZ-04	WT	80.14	80.60	-4.40	-14.40	MBP
MBS PZ-05	B	78.87	76.50	-48.50	-58.50	MBP
MBS PZ-06	B	79.85	77.40	-47.60	-57.60	MBP
MBS PZ-07	B	83.48	83.90	-51.10	-61.10	MBP
MBS PZ-08	B	84.41	84.90	-60.10	-70.10	MBP
MBS PZ-09	B	87.42	87.46	-21.54	-31.54	MBP
MBS PZ-10	B	87.7	87.70	-21.30	-31.30	MBP
MBS PZ-11	B	62.27	62.30	-55.70	-65.70	MBP
MBS PZ-12	LMT	84.48	84.80	-295.20	-305.20	MBP
MBS PZ-13	Dd	83.33	84.00	-166.00	-176.00	MBP
MBS PZ-14	LMT	83.00	83.60	-286.40	-301.40	MBP
MBS PZ-15	LMT	81.67	82.20	-290.80	-300.80	MBP
MBS PZ-16	B	82.16	82.60	-47.40	-57.40	MBP
MBS PZ-17	D	76.86	74.50	-123.50	-133.50	MBP
MBS PZ-18	D	77.02	74.80	-122.20	-132.20	MBP
MBS PZ-19	WT	82.06	79.60	-15.40	-25.40	MBP
MBS PZ-20	Bu	79.42	76.90	-21.60	-31.60	MBP
MBS PZ-21	WT/Bu	76.43	73.90	-15.30	-25.30	MBP
MBS PZ-22	WT/Bu	77.43	75.20	-16.00	-26.00	MBP
MBS PZ-37	B	73.32	73.32	-96.68	-106.68	MBP
MBS PZ-38	B	73.68	73.68	-74.32	-93.32	MBP
MBS PZ-39	B	70.86	70.86	-77.14	-87.14	MBP
MBS PZ-40	B	71.37	71.37	-55.63	-65.63	MBP
MBS PZ-41	B	74.05	74.05	-51.45	-61.45	MBP
MBS PZ-42D	B	71.37	71.37	-95.63	-105.63	MBP
MBS PZ-42S	B	71.37	71.37	-39.63	-49.63	MBP
MBS PZ-43	B	77.93	75.00	-55.00	-65.00	MBP
MBS PZ-44	B	77.63	77.63	-23.37	-33.37	MBP
MBS PZ-46	B	79.20	79.20	-30.30	-40.30	MBP
MBS PZ-47	B	79.82	79.60	-30.40	-40.40	MBP
MBS PZ-48D	B	82.15	81.80	-73.20	-83.20	MBP
MBS PZ-48S	B	82.15	81.80	-38.20	-48.20	MBP
MBS PZ-49D	LMT	80.29	80.29	-285.71	-295.71	MBP
MBS PZ-49S	B	80.29	80.29	-46.71	-56.71	MBP

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
MBS PZ-50D	LMT	83.48	83.48	-298.52	-308.52	MBP
MBS PZ-50S	Dd	83.48	83.48	-81.52	-91.52	MBP
MBS PZ-51	D	81.01	78.36	-93.64	-103.64	MBP
MBS PZ-52	D	85.95	83.56	-90.44	-100.44	MBP
MBS PZ-53	D	86.05	83.02	-101.98	-116.98	MBP
MBS PZ-54	D	80.37	80.37	-95.63	-105.63	MBP
MBS PZ-55B	B	76.39	73.30	-68.70	-78.70	MBP
MBS PZ-55Bu	Bu	76.39	73.30	-26.70	-36.70	MBP
MBS PZ-57B	B	90.86	86.43	-27.20	-37.20	MBP
MBS PZ-57D	D	90.35	86.43	-83.57	-93.57	MBP
MBS PZ-58	D	71.06	86.27	-99.23	-109.23	MBP
MBS PZ-59	WT/A	67.98	71.06	-8.94	-23.94	MBP
MBS PZ-59B	WT/A	67.98	71.06	-12.02	-27.02	MBP
MB-1	NA	UNK	UNK	262.00	517.00	ON-BASE SUPPLY WELL
MB-2	NA	UNK	UNK	186.00	476.00	ON-BASE SUPPLY WELL
MB-3	NA	UNK	UNK	294.00	489.00	ON-BASE SUPPLY WELL
MB-4	NA	UNK	UNK	246.00	490.00	ON-BASE SUPPLY WELL
OFB-03	Dd/LMT	UNK	UNK	UNK	UNK	OFB - (Granite)
OFB-04	D/Dd/LMT	UNK	UNK	UNK	UNK	OFB- (CalAm; Moonbeam)
OFB-06	NA	UNK	UNK	UNK	UNK	OFB - (private; 4294 HL)
OFB-07	NA	UNK	UNK	UNK	UNK	OFB - (private; 4274 HL)
OFB-08	NA	UNK	UNK	UNK	UNK	OFB - (private; 4122 HL)
OFB-09	NA	UNK	UNK	UNK	UNK	OFB - (private; 4095 HL)
OFB-11	NA	UNK	UNK	UNK	UNK	OFB- (private; 4070 HL)
OFB-12	NA	UNK	UNK	UNK	UNK	OFB - (private; 4016 HL)
OFB-17	NA	UNK	UNK	UNK	UNK	OFB - (private; 3900 HL)
OFB-22	NA	UNK	UNK	UNK	UNK	OFB - (private; 9910 OPR)
OFB-23	NA	UNK	UNK	UNK	UNK	OFB - (private; 9960 OPR)
OFB-24	NA	UNK	UNK	UNK	UNK	OFB - (private; 9970 OPR)
OFB-27	D	UNK	UNK	UNK	UNK	OFB - (CalAm; Mars)
OFB-31	D/LMT	UNK	UNK	UNK	UNK	OFB - (CalAm; Gould)
OFB-32	D/LMT	UNK	UNK	UNK	UNK	OFB - (CalAm; Nut Plains)
OFB-39	NA	UNK	UNK	UNK	UNK	OFB - (Teichert; 9760 JH)
OFB-40	NA	UNK	UNK	UNK	UNK	OFB - (private; 9880 JH)
OFB-41	NA	UNK	UNK	UNK	UNK	OFB - (private; 9890 JH)
OFB-42	NA	UNK	UNK	UNK	UNK	OFB - (Teichert; between 9932 and
OFB-43	NA	UNK	UNK	UNK	UNK	OFB - (Teichert; 9932 JH)
OFB-44	NA	UNK	UNK	UNK	UNK	OFB - (Teichert; 9940 JH)
OFB-45	NA	UNK	UNK	UNK	UNK	OFB - (Teichert; 10004 JH)
OFB-46	NA	UNK	UNK	UNK	UNK	OFB - (private; 10180 JH)
OFB-47	NA	UNK	UNK	UNK	UNK	OFB - (private; 10221 JH)
OFB-48	NA	UNK	UNK	UNK	UNK	OFB - (private; 10175 JH)
OFB-49	NA	UNK	UNK	UNK	UNK	OFB - (CalAm; Oaken Bucket)
OFB-51	WT/B/D	UNK	UNK	UNK	UNK	OFB - (Juvenile Hall No 1)
OFB-52	WT/B/D	UNK	UNK	UNK	UNK	OFB - (Juvenile Hall No 2)
OFB-53	NA	UNK	UNK	UNK	UNK	OFB - (private; 10204 JH)
OFB-54	B/D	UNK	UNK	UNK	UNK	OFB - (CalAm; South Port)
OFB-55	B/D/Dd	UNK	UNK	UNK	UNK	OFB - (CalAm; Westporter)
OFB-56	B/D/Dd	UNK	UNK	UNK	UNK	OFB - (CalAm; Tallyho #2)
OFB-57	NA	UNK	UNK	UNK	UNK	OFB - (private; 9815 JH)
OFB-67	NA	UNK	UNK	UNK	UNK	OFB (private; 9721 Farm Lane)
OFB-68	NA	UNK	UNK	UNK	UNK	OFB (private; 4575 Bradshaw Road)
OFB-69	NA	UNK	UNK	UNK	UNK	OFB
OFB-70	NA	UNK	UNK	UNK	UNK	OFB
OFB-71	NA	UNK	UNK	UNK	UNK	OFB
OFB-72	NA	UNK	UNK	UNK	UNK	OFB
OFB-73	NA	UNK	UNK	UNK	UNK	OFB
OFB-74	NA	UNK	UNK	UNK	UNK	OFB
OFB-75	NA	UNK	UNK	UNK	UNK	OFB

TABLE 2-1 (Continued)

Well ID	Hydro-Stratigraphic Unit	Top of Protective Casing Elevation (ft msl)	Ground Surface Elevation (ft msl)	Top of Screen (ft msl)	Base of Screen (ft msl)	Study-Area or OFB Supply Well (Owner; Address)
OFB-76	NA	UNK	UNK	UNK	UNK	OFB
OFB-77	NA	UNK	UNK	UNK	UNK	OFB
OFB-78	NA	UNK	UNK	UNK	UNK	OFB
OFB-79	NA	UNK	UNK	UNK	UNK	OFB
OFB-80	NA	UNK	UNK	UNK	UNK	OFB
OFB-81	NA	UNK	UNK	UNK	UNK	OFB
OFB-82	NA	UNK	UNK	UNK	UNK	OFB
OFB-83	NA	UNK	UNK	UNK	UNK	OFB
OFB-84	NA	UNK	UNK	UNK	UNK	OFB
OFB-85	NA	UNK	UNK	UNK	UNK	OFB
OFB-86	NA	UNK	UNK	UNK	UNK	OFB

Notes:

* = well was resurveyed in 2-13
AC&W = Aircraft Control and Warning Plume
CalAm = California-American Water Company
ft msl = feet mean sea level
ft bgs = feet below ground surface
GOLF = Golf Course Area
HL = Happy Lane
JH = Jackson Highway
LF = Landfill
LMT = Laguna Mehrten Transition
MBP = Main Base/SAC Area Plume
NA = Not Available
NEP = Northeast Plume
NS = Not Surveyed
OPR = Old Placerville Road
UNK = Unknown
WTZPERCH = Perched Water Table

TABLE 2-2

Sitewide Groundwater-Level Calculations
Fourth Quarter 2012
Former Mather Air Force Base
Sacramento County, California

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
7-BV-01	SITE 7	PERCHED	73.48	3.45	25.99	22.54	28.18	24.73	
7-BV-02	SITE 7	PERCHED	72.68	-6.78	23.41	30.19	24.68	31.46	
7-BV-04	SITE 7	PERCHED	76.72	5.94	26.68	20.74	27.78	21.84	
7-BV-06	SITE 7	PERCHED	71.84	8.88	26.94	18.06	27.83	18.95	
7-BV-08	SITE 7	PERCHED	78.45	6.88	26.45	19.57	27.98	21.10	
7-BV-13	SITE 7	PERCHED	75.51	19.90	26.16	6.26	28.63	8.73	
7-EW-1	SITE 7	B	43.51	-115.69	-37.76	77.93	-43.79	71.90	
7-EW-2	SITE 7	B	54.13	-63.47	-52.57	10.90	-50.67	12.80	
7-IW-01	SITE 7	B	76.40	-89.35	-20.58	68.77	-24.03	65.32	
7-IW-02	SITE 7	B	78.53	-86.99	-19.73	67.26	33.94	120.93	
7-IW-03	SITE 7	B	79.51	-80.99	-20.73	60.26	31.56	112.55	
7-IW-04	SITE 7	B	79.95	-52.75	38.99	91.74	49.26	102.01	
7-PZ-23	SITE 7	B	80.11	-51.30	-21.64	29.66	-24.01	27.29	
7-PZ-24	SITE 7	B	78.64	-54.20	-21.41	32.79	-23.57	30.63	
7-PZ-25	SITE 7	B	80.38	-51.25	-21.16	30.09	-23.44	27.81	
7-PZ-26	SITE 7	B	78.24	-46.70	-20.98	25.72	-23.21	23.49	
7-PZ-37	SITE 7	WT	75.80	-22.20	-21.65	0.55	**-22.54**	-0.34	dry in 4Q
7-PZ-37P	SITE 7	PERCHED	75.63	11.00	27.19	16.19	29.57	18.57	
7-PZ-38P	SITE 7	PERCHED	56.99	13.89	31.29	17.40	30.94	17.05	
7-PZ-39	SITE 7	C	60.92	-89.98	-22.16	67.82	-24.66	65.32	
7-PZ-40	SITE 7	C	56.11	-31.84	-23.84	8.00	-25.85	5.99	
7-PZ-41	SITE 7	C	56.11	-56.84	-23.92	32.92	-25.89	30.95	
ACW AT-1	AC&W	C	130.91	-36.73	-8.98	27.75	-24.80	11.93	
ACW AT-2	AC&W	C	124.28	-47.60	-11.02	36.58	-21.28	26.32	
ACW AT-3	AC&W	C	122.46	-49.46	-11.31	38.15	-13.64	35.82	
ACW AT-4	AC&W	D	126.06	-113.94	-11.14	102.80	-13.88	100.06	
ACW EW-1	AC&W	C	125.17	-51.98	-12.01	39.97	-24.85	27.13	
ACW EW-2	AC&W	C	122.47	-58.69	-13.14	45.55	-22.28	36.41	
ACW EW-3	AC&W	C	125.41	-60.74	-14.21	46.53	-27.72	33.02	
ACW EW-4	AC&W	C	115.39	-75.34	-15.01	60.33	-18.55	56.79	
ACW EW-5	AC&W	C	114.52	-76.89	-14.19	62.70	-17.43	59.46	
ACW EW-6	AC&W	C	128.11	-63.05	-15.34	47.71	-20.61	42.44	
ACW EW-6R	AC&W	C	127.97	-58.17	-15.94	42.23	-42.57	15.60	
ACW PZ-01	AC&W	C	109.03	-71.09	-14.75	56.34	-18.12	52.97	
ACW PZ-02	AC&W	C	110.25	-69.90	-14.67	55.23	-12.10	57.80	
ACW PZ-03	AC&W	C	116.68	-63.42	-15.27	48.15	-18.81	44.61	
ACW PZ-04	AC&W	C	108.35	-71.73	-14.90	56.83	-18.26	53.47	
ACW PZ-05	AC&W	C	115.20	-62.53	-15.26	47.27	-18.70	43.83	
ACW PZ-06	AC&W	WT/C	121.62	-16.50					Dry
ACW PZ-06C	AC&W	C	121.62	-61.50	-13.75	47.75	-16.99	44.51	
ACW PZ-07	AC&W	WT/C	127.91	-14.50					Dry
ACW PZ-07C	AC&W	C	127.91	-54.50	-13.16	41.34	-16.22	38.28	
ACW PZ-08	AC&W	WT/C	123.75	-12.00					Dry
ACW PZ-08C	AC&W	C	123.75	-49.00	-10.72	38.28	-13.57	35.43	
ACW PZ-09	AC&W	WT/C	126.77	-11.20	-10.88	0.32	**-13.26**	-2.06	dry in 4Q
ACW PZ-09C	AC&W	C	126.77	-46.20	-10.40	35.80	-11.20	35.00	
ACW PZ-10	AC&W	WT	129.19	-8.30			-7.13	1.17	Dry in 2Q
ACW PZ-10C	AC&W	C	129.19	-43.30	-8.78	34.52	-11.40	31.90	
FFS MW15-6	MBP	D	79.60	-100.40	-15.07	85.33	-17.50	82.90	
MAFB-005	LF04	WT/B	137.64	9.04	22.89	13.85	21.74	12.70	
MAFB-006	MBP	WT/B	98.34	-3.70	7.93	11.63	6.80	10.50	
MAFB-012	MBP	WT/B	96.52	-1.63	6.28	7.91	4.23	5.86	
MAFB-013	MBP	WT/B	92.21	-5.79	2.66	8.45	1.15	6.94	
MAFB-033	MBP	WT/Bu	80.88	-13.12	-10.68	2.44	-12.37	0.75	
MAFB-039	SITE 7	PERCHED	75.00	-11.29	**-21.85***	-10.56	29.94	41.23	
MAFB-041	SITE 7	B	73.64	-47.72	-21.18	26.54	-22.77	24.95	
MAFB-042	SITE 7	WT/B	74.98	-36.26	-21.14	15.12	-23.26	13.00	
MAFB-043	SITE 7	C	75.15	-54.76	-19.63	35.13	-22.24	32.52	
MAFB-044	SITE 7	PERCHED	76.30	-6.30	30.00	36.30	31.09	37.39	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MAFB-046	SITE 7	PERCHED	68.60	-22.95	6.03	28.98	8.52	31.47	
MAFB-047	MBP	WT/Bu	77.24	-19.07	-13.45	5.62	-15.28	3.79	
MAFB-048	MBP	WT	75.63	-15.74	-10.32	5.42	-12.50	3.24	
MAFB-053	AC&W	C	131.33	-46.85	-11.91	34.94	-14.66	32.19	
MAFB-054	AC&W	WT/C	118.68	-12.72	-10.97	1.75	**-13.94**	-1.22	Dry in 4Q
MAFB-056	SITE 7	D	74.17	-124.67	-21.37	103.30	-23.89	100.78	
MAFB-058	SITE 7	D	75.52	-117.14	-20.75	96.39	-23.50	93.64	
MAFB-059	SITE 7	B	69.62	-112.47	-21.46	91.01	-23.03	89.44	
MAFB-060	MBP	D	77.48	-118.68	-19.53	99.15	-22.22	96.46	
MAFB-061	MBP	D	78.43	-126.63	-19.20	107.43	-21.90	104.73	
MAFB-062	MBP	D	80.06	-122.08	-19.29	102.79	-21.91	100.17	
MAFB-063	MBP	D	76.09	-120.40	-19.84	100.56	-22.41	97.99	
MAFB-064	LF04	D	134.90	-61.24	5.13	66.37	2.39	63.63	
MAFB-065	LF04	D	136.74	-80.20	5.62	85.82	2.15	82.35	
MAFB-066	MBP	Dd	93.51	-174.52	-14.44	160.08	-16.72	157.80	
MAFB-067	AC&W	D	129.41	-82.12	-9.02	73.10	-11.92	70.20	
MAFB-068	AC&W	D	131.44	-97.73	-9.57	88.16	-12.18	85.55	
MAFB-069	AC&W	D	133.87	-93.13	-8.96	84.17	-11.50	81.63	
MAFB-070	AC&W	D	123.60	-80.75	-10.34	70.41	-13.25	67.50	
MAFB-071	AC&W	D	131.48	-90.13	-10.57	79.56	-13.62	76.51	
MAFB-072	AC&W	D	117.07	-99.00	-9.66	89.34	-13.13	85.87	
MAFB-073	MBP	B	92.76	-40.38	4.68	45.06	3.35	43.73	
MAFB-075	LF04	WT/B	135.83	23.78	26.21	2.43	25.10	1.32	
MAFB-078	AC&W	D	126.64	-86.11	-11.25	74.86	-13.43	72.68	
MAFB-080	AC&W	D	121.52	-118.28	-14.27	104.01			no read in 4Q
MAFB-082	AC&W	WT/C	122.02	-0.33	0.92	1.25	1.04	1.37	
MAFB-090	MBP	WT/Bu	80.01	-11.30	-10.28	1.02	**-11.86**	-0.56	Dry in 4Q
MAFB-092	MBP	WT	84.94	-9.49	-6.77	2.72			Dry in 4Q
MAFB-093	MBP	WT/B	93.38	-8.62	0.48	9.10	-0.95	7.67	
MAFB-094	MBP	WT/B	90.41	-15.99	-2.25	13.74	-3.71	12.28	
MAFB-096	MBP	WT/B	92.72	-9.07	-0.03	9.04	-1.59	7.48	
MAFB-097	MBP	WT/B	90.03	-14.00	-3.02	10.98	-4.61	9.39	
MAFB-099	MBP	WT	84.72	-7.29	**-7.54**	-0.25	**-7.49**	-0.20	Dry
MAFB-101	MBP	B	83.61	-50.32	-11.04	39.28	-12.72	37.60	
MAFB-102	MBP	D	83.03	-122.45	-17.56	104.89	-20.02	102.43	
MAFB-103	MBP	D	74.82	-112.64	-19.58	93.06	-22.33	90.31	
MAFB-104	MBP	D	73.72	-137.33	-20.77	116.56	-22.62	114.71	
MAFB-105	MBP	WT	84.47	-7.53	**-9.29**	-1.76			Dry
MAFB-107	MBP	WT/B	96.88	-9.52	8.62	18.14	6.49	16.01	
MAFB-108	MBP	WT/B	94.61	-1.40	-1.18	0.22	**-2.13**	-0.73	Dry in 4Q
MAFB-109	LF03	WT/C	120.59	17.48	30.41	12.93	29.66	12.18	
MAFB-110	LF03	WT/B	113.55	11.90					Dry
MAFB-111	LF03	WT/B	127.65	7.53	13.63	6.10	10.62	3.09	
MAFB-112	LF03	WT/C	121.09	0.26	**-0.93**	-1.19			Dry
MAFB-115	MBP	WT/B	91.47	-10.46	-1.52	8.94	-3.19	7.27	
MAFB-116	MBP	WT/B	89.94	-11.06	-5.20	5.86	-7.17	3.89	
MAFB-121	MBP	WT	77.37	-14.83	-14.09	0.74	**-15.07**	-0.24	Dry in 4Q
MAFB-122	MBP	WT	73.44	-12.58	-10.60	1.98	-11.36	1.22	
MAFB-123	MBP	WT	77.19	-15.53	-15.11	0.42	-14.92	0.61	
MAFB-124	MBP	WT	69.69	-15.40	-13.21	2.19	-13.99	1.41	
MAFB-125	MBP	WT/B	92.46	-5.54	-1.11	4.43	-2.80	2.74	
MAFB-126	MBP	WT/B	94.22	-6.78	2.57	9.35	0.34	7.12	
MAFB-127	LF04	WT/C	117.60	-15.40	-7.67	7.73	-10.49	4.91	
MAFB-128	LF04	WT/B	122.28	-5.27	4.32	9.59	**-5.47**	-0.20	Dry in 4Q
MAFB-129	LF03	WT/C	116.93	-11.07	-7.19	3.88	-10.11	0.96	
MAFB-130	LF03	WT/B	114.99	14.98	15.43	0.45	**14.36**	-0.62	Dry in 4Q
MAFB-131	LF03	WT/B	125.61	-9.97	15.50	25.47	14.87	24.84	
MAFB-132	LF04	WT/B	131.21	-7.22	5.64	12.86	3.37	10.59	
MAFB-133	LF03	WT/B	128.21	-10.35	3.40	13.75	-0.07	10.28	
MAFB-136	LF04	WT/B	133.15	9.68	13.05	3.37	12.17	2.49	
MAFB-139	LF04	WT/C	132.69	-1.96					Dry
MAFB-140	LF04	WT/C	140.32	6.86	7.28	0.42	7.29	0.43	
MAFB-141	LF04	WT/B	139.14	6.70	**4.38**	-2.32	**4.52**	-2.18	Dry
MAFB-147	SITE 7	B	75.46	-78.60					Dry
MAFB-148	SITE 7	B	77.04	-44.59	-20.23	24.36	-22.25	22.34	
MAFB-149	SITE 7	WT/B	74.53	-38.07	-20.50	17.57	-22.51	15.56	
MAFB-150	MBP	WT/B	94.02	-6.50	5.07	11.57	3.73	10.23	
MAFB-151	MBP	WT/B	98.71	-3.29	7.11	10.40	3.59	6.88	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MAFB-152	MBP	WT/B	89.80	-11.24	-1.98	9.26			under large puddle
MAFB-154	MBP	WT/B	94.53	-14.47	3.07	17.54	1.67	16.14	
MAFB-155	MBP	WT/B	92.20	-15.80	0.49	16.29	-0.81	14.99	
MAFB-156	MBP	WT	74.92	-17.05	-9.33	7.72	-11.31	5.74	
MAFB-157	MBP	WT	74.15	-20.56	-8.35	12.21	-9.21	11.35	
MAFB-158	MBP	WT/Bu	79.44	-14.94	-1.34	13.60	-9.30	5.64	
MAFB-159	MBP	WT	79.87	-14.27	-12.81	1.46	-13.62	0.65	
MAFB-160	MBP	WT	84.89	-7.65	**-8.15**	-0.50	**-8.26**	-0.61	Dry
MAFB-162	MBP	WT	87.57	-2.48	-1.20	1.28	-2.39	0.09	
MAFB-163	MBP	WT	91.66	-3.34	-1.33	2.01	-2.85	0.49	
MAFB-164	MBP	B	76.31	-71.87	-10.29	61.58	-12.48	59.39	
MAFB-165	MBP	B	80.95	-65.16	-10.46	54.70	-12.85	52.31	
MAFB-166	MBP	B	79.94	-56.82	-11.31	45.51	-13.68	43.14	
MAFB-167	MBP	B	78.42	-56.01	-13.68	42.33	-15.48	40.53	
MAFB-168	MBP	WT/Bu	75.15	-42.22	-15.21	27.01	-16.89	25.33	
MAFB-169	MBP	B	80.38	-61.68	-10.97	50.71	-12.96	48.72	
MAFB-170	MBP	B	79.76	-61.29	-10.79	50.50	-13.11	48.18	
MAFB-171	MBP	B	79.20	-55.15	-12.77	42.38	-14.70	40.45	
MAFB-172	MBP	WT/Bu	75.35	-34.89	-14.74	20.15	-16.02	18.87	
MAFB-173	MBP	B	77.35	-66.26	-14.50	51.76	-15.86	50.40	
MAFB-174	MBP	Bu	79.59	-39.07	-12.80	26.27	-13.69	25.38	
MAFB-175	MBP	B	73.58	-78.46	-11.22	67.24	-12.93	65.53	
MAFB-176	MBP	Bu	76.90	-43.70	-14.10	29.60	-13.91	29.79	
MAFB-177	MBP	B	69.70	-82.30	-15.34	66.96	-16.15	66.15	
MAFB-178	MBP	D	95.46	-109.60	-15.46	94.14	-17.85	91.75	
MAFB-179	MBP	D	97.34	-80.31	-9.64	70.67	-12.22	68.09	
MAFB-180	MBP	D	74.82	-112.13	-19.99	92.14	-21.71	90.42	
MAFB-181	MBP	D	74.13	-133.58	-20.50	113.08	-22.33	111.25	
MAFB-184	SITE 7	PERCHED	74.71	6.96	29.57	22.61	30.10	23.14	
MAFB-185	SITE 7	PERCHED	75.62	5.95	30.96	25.01	31.36	25.41	
MAFB-187	MBP	WT	86.74	-6.86	**-7.19**	-0.33	**-7.35**	-0.49	Dry
MAFB-188	MBP	WT	85.24	-8.36	**-8.94**	-0.58	**-9.40**	-1.04	Dry
MAFB-189	SITE 7	PERCHED	75.57	6.09	29.29	23.20	30.13	24.04	
MAFB-191	AC&W	D	125.24	-124.86	-13.93	110.93	-17.34	107.52	
MAFB-193	AC&W	C	125.99	-44.42	-12.07	32.35	-15.12	29.30	
MAFB-194	AC&W	C	126.71	-55.96	-14.20	41.76	-17.34	38.62	
MAFB-195	AC&W	C	120.40	-58.58	-14.28	44.30	-17.19	41.39	
MAFB-196	AC&W	C	122.37	-50.42	-10.17	40.25	-12.88	37.54	
MAFB-197	AC&W	WT/C	106.60	-10.88	**-11.40**	-0.52	**-11.38**	-0.50	Dry
MAFB-198	AC&W	C	106.27	-71.52	-15.82	55.70	-19.35	52.17	
MAFB-199	MBP	WT/Bu	79.11	-18.90	-7.00	11.90	-11.00	7.90	
MAFB-200	MBP	WT	80.28	-17.80	-2.02	15.78	-14.22	3.58	
MAFB-201	MBP	WT/Bu	78.75	-16.00	-6.93	9.07	-11.73	4.27	
MAFB-202	MBP	WT	82.70	-15.50	-12.16	3.34	-14.04	1.46	
MAFB-203	MBP	WT	78.76	-16.00	-12.17	3.83	-14.25	1.75	
MAFB-204	MBP	WT	83.31	-14.70	-9.98	4.72	-12.64	2.06	
MAFB-205	MBP	WT	80.54	-17.60	-10.46	7.14	-12.55	5.05	
MAFB-206	MBP	WT	80.62	-13.40	-10.69	2.71	-12.70	0.70	
MAFB-207	MBP	WT	79.62	-15.37	-11.27	4.10	-12.77	2.60	
MAFB-208	MBP	WT	83.34	-14.60	-13.35	1.25	**-14.84**	-0.24	Dry in 4Q
MAFB-209	MBP	WT	82.53	-13.30	-12.22	1.08	**-13.61**	-0.31	Dry in 4Q
MAFB-210	MBP	WT	83.33	-14.80	-11.81	2.99	-13.40	1.40	
MAFB-211	MBP	WT	78.93	-16.30	-10.39	5.91	-12.26	4.04	
MAFB-212	MBP	WT	86.36	-11.60	-10.21	1.39	**-11.71**	-0.11	Dry in 4Q
MAFB-214	MBP	WT	85.53	-9.47	-7.42	2.05	-8.69	0.78	
MAFB-215	MBP	B	80.30	-72.80	-12.67	60.13	-14.56	58.24	
MAFB-216	MBP	B	78.98	-51.10	-11.71	39.39	-14.03	37.07	
MAFB-217	MBP	B	82.17	-55.80	-12.23	43.57	-14.06	41.74	
MAFB-218	MBP	B	79.05	-62.90	-11.44	51.46	-13.51	49.39	
MAFB-219	MBP	B	83.21	-59.80	-10.60	49.20	-12.66	47.14	
MAFB-220	MBP	B	80.67	-62.60	-10.44	52.16	-12.54	50.06	
MAFB-221	MBP	Bu	77.01	-33.90	-10.34	23.56	-11.52	22.38	
MAFB-222	MBP	B	78.84	-57.10	-10.57	46.53	-12.51	44.59	
MAFB-223	MBP	B	80.49	-57.40	-10.71	46.69	-12.72	44.68	
MAFB-224	MBP	B	79.38	-62.30	-11.54	50.76	-13.53	48.77	
MAFB-225	MBP	B	82.53	-51.40	-12.29	39.11	-13.75	37.65	
MAFB-226	MBP	B	82.85	-56.20	-11.90	44.30	-13.61	42.59	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MAFB-227	MBP	B	81.72	-56.20	-10.48	45.72	-12.27	43.93	
MAFB-228	MBP	B	86.45	-51.70	-10.20	41.50	-11.70	40.00	
MAFB-229	MBP	B	84.21	-45.50	-10.03	35.47	-11.61	33.89	
MAFB-230	MBP	B	85.10	-40.90	-7.97	32.93	-9.40	31.50	
MAFB-231	MBP	B	85.71	-39.00	-7.79	31.21	-9.26	29.74	
MAFB-232	MBP	WT/B	90.15	-19.60	-4.68	14.92	-6.06	13.54	
MAFB-233	MBP	WT/B	93.61	-18.50	1.83	20.33	0.40	18.90	
MAFB-234	MBP	B	89.12	-33.90	-7.69	26.21	-8.84	25.06	
MAFB-235	MBP	D	81.90	-91.10	-17.28	73.82	-19.61	71.49	
MAFB-239	MBP	D	79.28	-118.80	-20.06	98.74	-21.97	96.83	
MAFB-240	MBP	D	79.40	-123.50	-19.82	103.68	-22.37	101.13	
MAFB-241	MBP	D	80.39	-137.50	-18.86	118.64	-21.32	116.18	
MAFB-242	MBP	D	78.98	-106.00	-19.17	86.83	-21.47	84.53	
MAFB-243	MBP	D	77.04	-145.60	-19.67	125.93	-22.16	123.44	
MAFB-244	MBP	WT	85.76	-10.20	-8.02	2.18	-9.43	0.77	
MAFB-246	MBP	WT/Bu	84.51	-15.50	-10.45	5.05	-11.91	3.59	
MAFB-247	MBP	WT/B	79.18	-52.80	-13.73	39.07	-15.27	37.53	
MAFB-248	MBP	WT/B	80.69	-44.40	-11.80	32.60	-13.25	31.15	
MAFB-249	MBP	B	86.15	-38.80	-9.10	29.70	-10.36	28.44	
MAFB-250	MBP	D	85.77	-116.40	-14.38	102.02	-16.48	99.92	
MAFB-251	MBP	WT	75.66	-13.40	-2.22	11.18	-3.40	10.00	
MAFB-257	SITE 7	PERCHED	76.26	-15.20					Dry
MAFB-258	MBP	WT/Bu	71.51	-33.50	-16.17	17.33	-17.65	15.85	
MAFB-259	MBP	Bu	71.69	-37.00	-14.90	22.10	-16.38	20.62	
MAFB-260	MBP	Bu	66.37	-33.13	-16.80	16.33	-18.01	15.12	
MAFB-261	MBP	Bu	68.91	-51.00	-14.56	36.44	-15.39	35.61	
MAFB-263	MBP	Bu	69.30	-44.60	-14.59	30.01	-14.20	30.40	
MAFB-264	MBP	WT/Bu	81.34	-26.10	-10.42	15.68	-12.19	13.91	
MAFB-265	MBP	B	84.70	-53.80	-10.41	43.39	-11.90	41.90	
MAFB-266	MBP	B	75.44	-77.60	-15.37	62.23	-17.02	60.58	
MAFB-267	MBP	B	72.02	-93.70	-20.42	73.28	-21.75	71.95	
MAFB-268	MBP	B	69.28	-83.70	-16.02	67.68	-17.26	66.44	
MAFB-269	MBP	B	68.92	-96.00	-14.62	81.38	-15.74	80.26	
MAFB-270	MBP	B	65.41	-110.50	-18.12	92.38	-18.65	91.85	
MAFB-271	MBP	B	65.27	-93.80	-8.31	85.49	-10.02	83.78	
MAFB-272	MBP	B	74.38	-82.12	-7.97	74.15	-9.77	72.35	
MAFB-273	MBP	B	75.71	-60.30	-7.89	52.41	-9.70	50.60	
MAFB-274	MBP	B	84.88	-45.50	-9.07	36.43	-10.63	34.87	
MAFB-276	NEP	WT/B	86.72	-13.80	-5.90	7.90	-7.93	5.87	
MAFB-277	NEP	WT/B	88.10	-14.40	-6.17	8.23	-8.44	5.96	
MAFB-278	NEP	WT/B	94.04	2.00					Dry
MAFB-280	MBP	B	91.91	-27.10	1.08	28.18			4Q -cap was off casing filled with water
MAFB-281	MBP	B	90.31	-24.70	-0.86	23.84	-2.24	22.46	
MAFB-282	MBP	B	86.48	-28.50	-6.23	22.27	-7.51	20.99	
MAFB-283	SITE 7	B	77.96	-69.00	-20.23	48.77	-22.29	46.71	
MAFB-284	SITE 7	B	76.20	-56.70	-20.88	35.82	-22.92	33.78	
MAFB-285	SITE 7	C	70.80	-49.20	-20.43	28.77	-22.59	26.61	
MAFB-288	LF04	B	127.01	-28.22	-2.27	25.95	-5.15	23.07	
MAFB-289	LF03	WT/B	106.41	12.40	16.67	4.27	14.37	1.97	
MAFB-290	MBP	D	68.50	-137.80	-16.70	121.10	-18.01	119.79	
MAFB-291	MBP	D	74.39	-113.66	-14.31	99.35	-15.57	98.09	
MAFB-292	MBP	D	75.71	-114.30	-11.54	102.76	-13.03	101.27	
MAFB-293	MBP	D	65.35	-180.60	-22.86	157.74	-25.01	155.59	
MAFB-294	LF04	D	135.65	-76.53	-2.17	74.36	-4.87	71.66	
MAFB-296	MBP	D	68.19	-106.80	-17.10	89.70	-18.44	88.36	
MAFB-297	SITE 7	C	39.74	-83.90	-21.65	62.25	-22.91	60.99	
MAFB-300	SITE 7	C	41.18	-69.00	-22.67	46.33			no access in 4Q
MAFB-301	AC&W	C	125.27	-52.83	-14.81	38.02	-18.57	34.26	
MAFB-302	AC&W	C	108.07	-62.55	-15.13	47.42	-18.51	44.04	
MAFB-303	AC&W	C	116.28	-61.86	-13.98	47.88	-17.25	44.61	
MAFB-304	AC&W	C	120.75	-49.28	-15.36	33.92	-19.02	30.26	
MAFB-305	AC&W	C	108.85	-66.81	-13.65	53.16	-16.96	49.85	
MAFB-306	AC&W	C	124.64	-45.87	-14.06	31.81	-17.81	28.06	
MAFB-308	MBP	B	81.56	-43.44	-9.58	33.86	-11.25	32.19	
MAFB-309	MBP	B	69.56	-90.36	-6.25	84.11	-8.10	82.26	
MAFB-310	MBP	B	63.99	-106.08	-7.48	98.60	-9.32	96.76	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MAFB-311	MBP	B	59.08	-119.92	-14.88	105.04	-16.81	103.11	
MAFB-312	MBP	B	70.21	-139.79	-20.78	119.01	-20.87	118.92	
MAFB-313	MBP	B	74.08	-94.92	-14.22	80.70	-15.72	79.20	
MAFB-314	MBP	D	81.61	-108.37	-31.39	76.98	-31.93	76.44	
MAFB-315	MBP	D	69.54	-139.39	-15.11	124.28	-16.31	123.08	
MAFB-316	MBP	D	63.90	-176.14	-17.84	158.30	-18.89	157.25	
MAFB-317	MBP	D	59.12	-185.88	-19.26	166.62	-22.30	163.58	
MAFB-318	MBP	D	70.43	-184.57	-22.70	161.87	-26.24	158.33	
MAFB-319	MBP	D	65.51	-149.50	-18.88	130.62	-20.56	128.94	
MAFB-320	MBP	D	81.75	-138.25	-16.58	121.67	-18.26	119.99	
MAFB-321	MBP	Dd	65.41	-184.60	-24.25	160.35	-24.17	160.43	
MAFB-322	MBP	B	58.86	-129.14	-11.00	118.14	-12.90	116.24	
MAFB-323	MBP	B	69.32	-132.68	-18.70	113.98	-20.26	112.42	
MAFB-324	MBP	B	65.24	-97.26	-8.12	89.14	-9.76	87.50	
MAFB-325	MBP	B	68.59	-96.42	-7.96	88.46	-9.76	86.66	
MAFB-326	MBP	D	58.91	-185.09	-17.81	167.28	-19.90	165.19	
MAFB-327	MBP	D	69.48	-199.02	-21.61	177.41	-29.98	169.04	
MAFB-328	MBP	D	65.23	-134.72	-18.78	115.94	-19.77	114.95	
MAFB-329	MBP	D	68.59	-136.36	-15.82	120.54	-17.40	118.96	
MAFB-330	MBP	B	70.80	-139.30	-19.35	119.95	-21.34	117.96	
MAFB-331	MBP	B	70.99	-139.00	-20.29	118.71	-22.59	116.41	
MAFB-332	MBP	D	70.68	-154.37	-20.74	133.63	-22.78	131.59	
MAFB-336	MBP	D	69.92	-210.13	-22.49	187.64	-25.52	184.61	
MAFB-337	MBP	Dd	58.80	-289.99	-19.35	270.64	-21.71	268.28	
MAFB-338	MBP	Dd	65.00	-255.00	-26.62	228.38	-21.89	233.11	
MAFB-339	MBP	WT/B	86.76	-8.20	-5.58	2.62	-7.02	1.18	
MAFB-340	MBP	WT/B	89.14	-8.84	-4.56	4.28	-6.04	2.80	
MAFB-341	MBP	WT/B	86.92	-11.08	-2.90	8.18	-4.35	6.73	
MAFB-342	MBP	WT/B	88.44	-10.30	-3.36	6.94	-4.73	5.57	
MAFB-343	MBP	WT/B	87.88	-7.68	-4.80	2.88	-6.26	1.42	
MAFB-344	MBP	WT/B	89.85	-8.35	-1.50	6.85	-2.95	5.40	
MAFB-345	MBP	Dd	67.33	-325.28	-23.10	302.18	-25.42	299.86	
MAFB-346Bd	MBP	Bd	67.13	-132.27	-19.23	113.04	-20.65	111.62	
MAFB-346Bs	MBP	Bs	67.32	-80.67	-19.00	61.67	-20.37	60.30	
MAFB-346D	MBP	D	67.04	-187.27	-23.46	163.81	-25.80	161.47	
MAFB-347	MBP	LMT	68.73	-432.27	-21.45	410.82	-23.61	408.66	
MAFB-348B	MBP	B	68.55	-111.45	-12.68	98.77	-14.16	97.29	
MAFB-348Dd	MBP	Dd	68.55	-255.45	-22.76	232.69	-23.26	232.19	
MAFB-348Ds	MBP	Ds	68.55	-181.45	-21.82	159.63	-23.80	157.65	
MAFB-349	MBP	LMT	69.80	-375.22	-21.98	353.24	-28.54	346.68	
MAFB-350	MBP	LMT	64.94	-381.06	-23.13	357.93	-27.27	353.79	
MAFB-351Bd	MBP	Bd	64.61	-153.39	-17.54	135.85	-20.06	133.33	
MAFB-351Bs	MBP	Bs	64.61	-76.89	-15.23	61.66	-16.90	59.99	
MAFB-351D	MBP	D	64.61	-201.39	-23.15	178.24	-27.30	174.09	
MAFB-352D	MBP	Dd	67.67	-238.33	-21.18	217.15	-20.84	217.49	
MAFB-352LM	MBP	LMT	67.75	-392.38	-19.73	372.65	-21.90	370.48	
MAFB-353	MBP	LMT	68.33	-371.67	-21.37	350.30	-24.75	346.92	
MAFB-354B	MBP	B	68.22	-146.78	-18.48	128.30	-20.03	126.75	
MAFB-354D	MBP	D	68.22	-231.78	-20.45	211.33	-23.90	207.88	
MAFB-355B	MBP	B	54.60	-143.40	-16.60	126.80	-18.94	124.46	
MAFB-355D	MBP	D	54.60	-238.70	-18.77	219.93	-21.99	216.71	
MAFB-356B	MBP	B	67.58	-148.42	-19.78	128.64	-21.71	126.71	
MAFB-356Dd	MBP	Dd	67.58	-294.42	-21.66	272.76	-24.43	269.99	
MAFB-356Ds	MBP	Ds	67.58	-242.42	-21.59	220.83	-24.33	218.09	
MAFB-357D	MBP	D	89.43	-90.57	-12.07	78.50	-14.17	76.40	
MAFB-357Dd	MBP	Dd	89.44	-180.57	-16.96	163.61	-19.30	161.27	
MAFB-357Ds	MBP	Ds	89.44	-130.57	-16.49	114.08	-18.77	111.80	
MAFB-358B	MBP	B	88.59	-47.40	-5.17	42.23	-6.61	40.79	
MAFB-358D	MBP	D	88.61	-92.40	-13.33	79.07	-15.45	76.95	
MAFB-359	MBP	WT/Bu	77.84	-37.07	-13.17	23.90	-15.57	21.50	
MAFB-361	MBP	B	77.55	-57.65	-12.25	45.40	-14.20	43.45	
MAFB-362	MBP	B	80.44	-66.66	-10.55	56.11	-12.64	54.02	
MAFB-363	MBP	B	78.64	-69.16	-10.51	58.65	-12.47	56.69	
MAFB-364B	MBP	B	74.47	-85.53	-13.38	72.15	-14.27	71.26	
MAFB-364D	MBP	D	74.47	-128.53	-20.37	108.16	-22.89	105.64	
MAFB-365B	MBP	B	72.61	-92.04	-13.21	78.83	-13.74	78.30	
MAFB-365D	MBP	D	72.61	-137.04	-22.22	114.82	-23.10	113.94	
MAFB-366B	MBP	B	69.28	-90.72	-9.90	80.82	-10.48	80.24	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MAFB-366D	MBP	D	69.28	-120.72	-19.68	101.04	-21.12	99.60	
MAFB-367	MBP	D	70.42	-155.08	-20.76	134.32	-21.72	133.36	
MAFB-368B	MBP	B	69.90	-112.87	-15.94	96.93	-17.50	95.37	
MAFB-368D	MBP	D	70.03	-182.87	-20.18	162.69	-23.11	159.76	
MAFB-369	MBP	D	69.72	-148.40	-21.45	126.95	-23.00	125.40	
MAFB-371C	SITE 7	C	43.84	-66.74	-22.31	44.43	-24.07	42.67	
MAFB-371D	SITE 7	D	43.84	-114.60	-22.25	92.35	-24.19	90.41	
MAFB-372B	SITE 7	B	46.74	-64.69	-22.69	42.00	-24.82	39.87	
MAFB-372D	SITE 7	D	46.74	-96.69	-22.62	74.07	-24.67	72.02	
MAFB-373C	SITE 7	C	47.10	-62.15	-22.30	39.85	-24.57	37.58	
MAFB-373D	SITE 7	D	47.10	-103.36	-22.30	81.06	-24.41	78.95	
MAFB-374	MBP	D	90.78	-93.68	-13.45	80.23	-15.35	78.33	
MAFB-375	MBP	D	67.61	-112.39	-16.58	95.81	-10.19	102.20	
MAFB-376	MBP	D	56.17	-133.83	-18.12	115.71	-19.96	113.87	
MAFB-377	MBP	D	75.14	-124.86	-21.57	103.29	-23.41	101.45	
MAFB-378B	MBP	B	81.48	-42.52	-7.25	35.27	-9.43	33.09	
MAFB-378D	MBP	D	81.48	-98.52	-13.39	85.13	-16.70	81.82	
MAFB-379B	MBP	B	69.42	-90.58	-9.69	80.89	-11.62	78.96	
MAFB-379D	MBP	D	69.42	-150.58	-20.02	130.56	-21.03	129.55	
MAFB-380B	MBP	B	66.20	-108.30	-9.65	98.65	-11.26	97.04	
MAFB-380D	MBP	D	66.20	-151.80	-20.06	131.74	-21.57	130.23	
MAFB-381B	MBP	B	72.72	-80.00	-15.98	64.02	-17.08	62.92	
MAFB-381D	MBP	D	72.72	-175.00	-22.97	152.03	-25.44	149.56	
MAFB-382B	MBP	B	69.13	-100.87	-18.51	82.36	-20.97	79.90	
MAFB-382D	MBP	D	69.13	-185.87	-22.44	163.43	-24.78	161.09	
MAFB-383B	MBP	B	75.63	-82.42	-16.52	65.90	-17.91	64.51	
MAFB-383D	MBP	D	75.63	-147.42	-21.26	126.16	-23.11	124.31	
MAFB-384B	MBP	WT/B	87.76	-18.24	-2.20	16.04	-3.55	14.69	
MAFB-384D	MBP	D	87.76	-87.24	-11.64	75.60	-13.70	73.54	
MAFB-385B	MBP	B	62.32	-119.68	-10.11	109.57	-11.53	108.15	
MAFB-385D	MBP	D	62.32	-169.68	-20.33	149.35	-21.55	148.13	
MAFB-386B	MBP	B	69.73	-110.60	-19.67	90.93	-22.11	88.49	
MAFB-386D	MBP	D	69.73	-190.60	-23.12	167.48	-24.49	166.11	
MAFB-387B	MBP	B	70.11	-139.75	-18.17	121.58	-19.88	119.87	
MAFB-387Dd	MBP	Dd	70.11	-269.75	-20.80	248.95	-23.90	245.85	
MAFB-387Ds	MBP	Ds	70.11	-224.75	-20.43	204.32	-23.61	201.14	
MAFB-388B	MBP	B	62.77	-142.23	-18.18	124.05	-20.43	121.80	
MAFB-388Dd	MBP	Dd	62.77	-277.23	-20.73	256.50	-24.64	252.59	
MAFB-388Ds	MBP	Ds	62.77	-232.23	-19.90	212.33	-24.12	208.11	
MAFB-389	NEP	WT/B	96.99	-21.16	-9.76	11.40	-12.71	8.45	
MAFB-390	NEP	WT/B	93.50	-24.38	-10.98	13.40	-13.96	10.42	
MAFB-391	SITE 7	C	74.68	-43.12	-20.83	22.29	-22.82	20.30	
MAFB-392	SITE 7	C	56.99	-36.11	-20.69	15.42	-22.81	13.30	
MAFB-393	SITE 7	C	56.17	-32.23	-21.80	10.43	-24.12	8.11	
MAFB-394	SITE 7	C	55.17	-32.13	-24.55	7.58	-26.12	6.01	
MAFB-395	SITE 7	C	58.83	-37.57	-22.11	15.46	-24.28	13.29	
MAFB-396	SITE 7	B	60.92	-46.98	-22.11	24.87	-24.33	22.65	
MAFB-397	MBP	Dd	81.26	-164.00	-16.04	147.96	-19.80	144.20	
MAFB-398	LF03	WT/B	128.67	3.85	21.81	17.96	18.22	14.37	
MAFB-398C	LF03	C	126.67	-33.65	2.47	36.12	-1.30	32.35	
MAFB-399	LF03	C	125.30	-37.23	0.25	37.48	-2.80	34.43	
MAFB-400	LF04	C	134.39	-23.21	1.11	24.32	-1.80	21.41	
MAFB-401	AC&W	WT/C	128.44	-9.20	-7.96	1.24	**-10.34**	-1.14	Dry in 4Q
MAFB-402	AC&W	WT/C	135.66	-12.00	-8.92	3.08	-11.09	0.91	
MAFB-403	AC&W	WT/C	132.21	-10.70	-9.39	1.31	**-11.04**	-0.34	Dry in 4Q
MAFB-404	MBP	WT/B	89.35	-17.70	-4.28	13.42	-5.79	11.91	
MAFB-405	MBP	WT/B	88.28	-19.72	-5.12	14.60	-6.56	13.16	
MAFB-406	MBP	WT/B	81.42	-16.58	-8.86	7.72	-11.12	5.46	
MAFB-407	MBP	WT/Bu	85.57	-15.00	-7.26	7.74	-8.71	6.29	
MAFB-408	AC&W	WT/C	126.99	-10.00	-6.64	3.36	-9.04	0.96	
MAFB-409	NEP	WT/B	80.66	-19.50	-9.77	9.73	-11.82	7.68	
MAFB-410	MBP	WT/A	84.49	-18.50	-10.77	7.73	-12.41	6.09	
MAFB-411	MBP	WT/B	79.67	-23.38	-12.09	11.29	-14.05	9.33	
MAFB-412	MBP	WT/B	82.81	-24.09	-14.01	10.08	-17.20	6.89	
MAFB-413	LF07	WT/B	78.08	-28.97	-20.78	8.19	-22.73	6.24	
MAFB-414	MBP	WT	83.86	-18.14	-11.88	6.26	-13.54	4.60	
MAFB-415	MBP	WT/B	87.61	-25.54	-5.01	20.53	-6.45	19.09	
MAFB-416	MBP	WT/B	88.44	-18.65	-2.05	16.60	-3.53	15.12	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MAFB-417	MBP	WT/B	82.66	-28.94	-12.77	16.17	-14.35	14.59	
MAFB-418	MBP	WT	81.67	-26.91	-11.30	15.61	-13.49	13.42	
MAFB-419	MBP	WT/B	84.62	-21.48	-9.03	12.45	-10.52	10.96	
MAFB-420	MBP	WT	80.81	-29.31	-11.83	17.48	-14.07	15.24	
MAFB-421	MBP	WT/B	84.88	-23.17	-8.14	15.03	-9.49	13.68	
MAFB-422	MBP	WT/Bu	82.00	-27.15	-10.92	16.23	-12.41	14.74	
MAFB-423	MBP	WT/Bu	78.52	-36.40	-13.37	23.03	-14.90	21.50	
MAFB-423B	MBP	B	78.52	-89.40	-16.96	72.44	-19.30	70.10	
MAFB-424	SITE 7	WT/C	80.54	-28.93	-5.29	23.64	-18.49	10.44	
MAFB-425	MBP	WT	69.57	-32.76	-16.13	16.63	-17.63	15.13	
MAFB-426	MBP	B	64.86	-145.14	-18.68	126.46	-21.00	124.14	
MAFB-427	MBP	B	66.62	-143.43	-18.57	124.86	-20.74	122.69	
MAFB-428	MBP	WT/B	88.53	-24.93	-9.13	15.80	-10.67	14.26	
MAFB-429Bd	MBP	Bd	70.86	-107.14	-21.08	86.06	-22.82	84.32	
MAFB-429Bs	MBP	Bs	70.86	-77.14	-21.10	56.04	-22.80	54.34	
MAFB-429Bu	MBP	WT/Bu	70.86	-44.14	-21.09	23.05	-22.82	21.32	
MAFB-430	MBP	LMT	80.55	-193.46	-16.03	177.43	-19.42	174.04	
MAFB-431Bd	MBP	Bd	69.79	-113.20	-25.51	87.69	-22.40	90.80	
MAFB-431Dd	MBP	Dd	69.79	-168.20	-21.92	146.28	-23.58	144.62	
MAFB-431Ds	MBP	Ds	69.79	-144.20	-21.94	122.26	-23.61	120.59	
MAFB-432	AC&W	WT/C	126.47	-26.57	-14.12	12.45	-17.18	9.39	
MAFB-433	AC&W	WT/C	112.84	-32.16	-15.43	16.73	-18.80	13.36	
MAFB-434Bd	MBP	Bd	69.79	-117.01	-21.88	95.13	-23.16	93.85	
MAFB-434Bs	MBP	Bs	69.79	-91.01	-21.43	69.58	-22.85	68.16	
MAFB-434Bu	MBP	WT/Bu	69.79	-53.01	-19.75	33.26	-21.24	31.77	
MAFB-435	MBP	Dd	74.75	-185.25	-19.67	165.58	-21.17	164.08	
MAFB-436	MBP	WT	83.10	-24.40	-9.05	15.35	-10.20	14.20	
MAFB-437Dd	MBP	Dd	66.78	-263.22	-21.97	241.25	-22.52	240.70	
MAFB-437Ds	MBP	Ds	66.78	-143.22	-19.27	123.95	-20.69	122.53	
MAFB-438	NEP	WT	137.59	0.74	7.06	6.32	4.93	4.19	
MAFB-439	MBP	WT	86.20	-21.80	-9.61	12.19	-11.05	10.75	
MAFB-440	SITE 7	WT	78.17	-30.10	-18.11	11.99	-20.01	10.09	
MAFB-440P	SITE 7	PERCHED	78.17	14.90	30.28	15.38	30.75	15.85	
MAFB-441	MBP	D	79.93	-139.10	-16.68	122.42	-19.10	120.00	
MAFB-442	MBP	D	83.33	-189.70	-17.75	171.95	-20.34	169.36	
MAFB-443	MBP	D	70.46	-205.60	-20.86	184.74	-24.54	181.06	
MAFB-444	SITE 7	B	55.65	-50.10	-22.44	27.66	-29.85	20.25	
MAFB-445	SITE 7	B	48.12	-58.90	-22.82	36.08	-25.17	33.73	
MAFB-446	SITE 7	C	50.17	-52.90	-21.77	31.13	-24.18	28.72	
MAFB-447	SITE 7	C	44.71	-58.20	-20.92	37.28	-23.35	34.85	
MAFB-448	SITE 7	B	49.34	-54.10	-22.88	31.22	-25.26	28.84	
MAFB-449Bd	MBP	Bd	52.72	-120.70	-21.83	98.87	-23.15	97.55	
MAFB-449Bs	MBP	Bs	52.72	-84.70	-21.56	63.14	-22.82	61.88	
MAFB-450	MBP	WT/Bu	75.43	-42.00	-14.86	27.14	-16.43	25.57	
MAFB-451	MBP	B	71.41	-73.70	-16.91	56.79	-18.49	55.21	
MAFB-452B	MBP	B	74.41	-78.70	-15.68	63.02	-17.10	61.60	
MAFB-452Bu	MBP	WT/Bu	74.41	-35.70	-15.54	20.16	-16.87	18.83	
MAFB-453	AC&W	WT	122.16	-22.90	-10.78	12.12	-12.47	10.43	
MAFB-453C	AC&W	C	122.16	-50.90	-9.87	41.03	-12.59	38.31	
MAFB-454	AC&W	WT	125.71	-24.50	-12.40	12.10	-9.30	15.20	
MAFB-454C	AC&W	C	125.71	-48.50	-12.40	36.10	-15.15	33.35	
MAFB-455	AC&W	WT	119.67	-30.30	-15.46	14.84	-18.89	11.41	
MAFB-456	AC&W	WT	124.32	-28.70	-15.00	13.70	-18.29	10.41	
MAFB-456C	AC&W	C	124.32	-53.70	-14.97	38.73	-18.32	35.38	
MAFB-457Bd	MBP	Bd	44.08	-131.00	-22.71	108.29	-23.83	107.17	
MAFB-457Bs	MBP	Bs	44.08	-95.00	-21.96	73.04	-23.12	71.88	
MAFB-458Bd	MBP	Bd	37.66	-132.30	-22.78	109.52	-23.80	108.50	
MAFB-458Bs	MBP	Bs	37.66	-95.30	-21.85	73.45	-22.92	72.38	
MAFB-459D	MBP	D	62.99	-212.00	-22.57	189.43	-26.35	185.65	
MAFB-459Dd	MBP	Dd	62.99	-267.00	-21.51	245.49	-25.74	241.26	
MAFB-460Bd	MBP	Bd	58.62	-131.50	-23.05	108.45	-23.98	107.52	
MAFB-460Bs	MBP	Bs	58.62	-108.50	-22.83	85.67	-23.62	84.88	
MAFB-461Bd	MBP	Bd	70.36	-147.70	-23.57	124.13	-24.36	123.34	
MAFB-461Bs	MBP	Bs	70.36	-121.70	-22.83	98.87	-23.84	97.86	
MAFB-462	MBP	B	60.34	-181.36	-21.96	159.40	-22.82	158.54	
MAFB-463D	MBP	D	72.57	-151.05	-19.36	131.69	-20.54	130.51	
MAFB-463Dd	MBP	Dd	72.62	-207.05	-19.88	187.17	-21.25	185.80	
MAFB-464	SITE 7	D	48.50	-67.75	-21.74	46.01	-23.31	44.44	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MAFB-465	LF04	WT/C	131.01	-6.85	--	--	-0.84	6.01	
MBS 19EW01	MBP	B	84.37	-63.80	-8.98	54.82	-10.58	53.22	
MBS 19MW01	MBP	Bu	83.90	-43.80	-11.46	32.34	-11.46	32.34	
MBS 19MW02	MBP	Bu	82.89	-43.80	-9.85	33.95	-11.57	32.23	
MBS 19MW03	MBP	D	83.28	-109.60	-26.84	82.76	-27.66	81.94	
MBS 19MW04	MBP	D	83.06	-109.40	-22.92	86.48	-24.14	85.26	
MBS 39ABuB	MBP	WT/B	80.82	-38.42	-21.48	16.94	-18.49	19.93	
MBS 39EW02	MBP	B	88.68	-38.02	-5.90	32.12	-6.83	31.19	
MBS 39MW01	MBP	WT	85.50	-9.00	-8.37	0.63	**-9.60**	-0.60	Dry in 4Q
MBS 39MW02	MBP	WT	85.51	-9.49	-8.39	1.10	**-9.65**	-0.16	Dry in 4Q
MBS 39MW03	MBP	Bu	85.30	-32.70	-8.58	24.12	-9.83	22.87	
MBS 39MW04	MBP	Bu	85.40	-29.60	-8.33	21.27	-9.65	19.95	
MBS EW-10B	MBP	B	65.11	-110.38	-20.97	89.41	-21.91	88.47	
MBS EW-11B	MBP	B	63.49	-121.95	-30.56	91.39	-33.14	88.81	
MBS EW-12AB	MBP	WT/B	84.36	-41.43	-3.63	37.80	-5.15	36.28	
MBS EW-12B	MBP	B	66.95	-144.52	-28.29	116.23	-30.33	114.19	
MBS EW-13BuB	MBP	Bu	71.32	-114.03	-37.16	76.87	-33.47	80.56	
MBS EW-1A	MBP	WT	81.93	-5.27	**-5.80**	-0.53	**-10.86**	-5.59	Dry
MBS EW1ABu	MBP	WT/Bu	81.00	-30.63	-12.95	17.68	-15.83	14.80	
MBS EW-1B	MBP	B	76.27	-63.30	-25.05	38.25	-29.20	34.10	
MBS EW-1Bu	MBP	WT/Bu	75.23	-29.56	-14.53	15.03	-17.62	11.94	
MBS EW-1D	MBP	D	83.87	-104.50	-69.22	35.28	-66.48	38.02	
MBS EW-2A	MBP	WT	74.53	-17.37	-10.33	7.04			no read in 4Q
MBS EW2ABu	MBP	WT/Bu	75.62	-34.96	-17.61	17.35	-20.65	14.31	
MBS EW-2AR	MBP	WT/A	77.77	-39.09	-17.75	21.34	-20.77	18.32	
MBS EW-2B	MBP	B	78.58	-79.33	-55.87	23.46	-58.14	21.19	
MBS EW-2Bu	MBP	Bu	73.92	-33.87	-13.26	20.61	-18.55	15.32	
MBS EW-2D	MBP	D	75.43	-145.11	-32.90	112.21	-35.17	109.94	
MBS EW-3A	MBP	WT	75.54	-16.27	-9.15	7.12			no read in 4Q
MBS EW-3B	MBP	B	76.39	-84.07	-13.04	71.03	-15.23	68.84	
MBS EW-3Bu	MBP	Bu	74.38	-35.89	-14.59	21.30	-16.56	19.33	
MBS EW-3D	MBP	D	79.41	-125.21	-83.69	41.52	-91.04	34.17	
MBS EW-4A	MBP	WT/B	82.13	-29.89	-3.70	26.19	-5.22	24.67	
MBS EW4ABu	MBP	WT/Bu	74.21	-35.72	-16.44	19.28	-25.01	10.71	
MBS EW-4B	MBP	B	76.59	-74.84	-15.66	59.18	-16.71	58.13	
MBS EW-4Bu	MBP	WT/Bu	76.36	-50.94	-16.80	34.14	-18.19	32.75	
MBS EW-4D	MBP	D	82.06	-103.72	-85.67	18.05	-93.36	10.36	
MBS EW-5A	MBP	WT/B	83.45	-30.41	-3.50	26.91	-4.90	25.51	
MBS EW5ABu	MBP	WT/Bu	73.79	-36.96	-16.49	20.47	-23.19	13.77	
MBS EW-5B	MBP	B	65.88	-95.72	-26.07	69.65	-26.90	68.82	
MBS EW-5D	MBP	D	68.16	-142.17	-35.32	106.85	-37.09	105.08	
MBS EW6ABu	MBP	WT	81.75	-42.22	-6.95	35.27	-11.96	30.26	
MBS EW-6B	MBP	B	68.84	-115.91	-22.40	93.51	-25.23	90.68	
MBS EW-6D	MBP	D	63.51	-181.07	-39.78	141.29	-43.48	137.59	
MBS EW7ABu	MBP	WT/Bu	85.57	-34.17	-5.76	28.41	-3.48	30.69	
MBS EW-7B	MBP	B	77.29	-87.71	-15.31	72.40	-18.03	69.68	
MBS EW-8B	MBP	B	67.53	-63.30	-9.97	53.33	-11.78	51.52	
MBS EW-9B	MBP	B	76.53	-85.42	-35.76	49.66	-38.86	46.56	
MBS IW-501	MBP	LMT	87.06	-315.29	36.56	351.85	62.56	377.85	
MBS IW-502	MBP	LMT	86.57	-325.95	64.01	389.96	62.66	388.61	
MBS IW-503	MBP	LMT	85.54	-326.31	46.61	372.92	29.90	356.21	
MBS IW-504	MBP	LMT	81.21	-378.79	16.05	394.84	17.06	395.85	
MBS PZ-01	MBP	WT	79.76	-14.20	-10.62	3.58	-13.04	1.16	
MBS PZ-04	MBP	WT	80.14	-14.40	-12.42	1.98	-13.97	0.43	
MBS PZ-05	MBP	B	78.87	-58.50	-10.81	47.69	-12.71	45.79	
MBS PZ-06	MBP	B	79.85	-57.60	-11.12	46.48	-12.90	44.70	
MBS PZ-07	MBP	B	83.48	-61.10	-14.60	46.50	-16.18	44.92	
MBS PZ-08	MBP	B	84.41	-70.10	-10.97	59.13	-13.04	57.06	
MBS PZ-09	MBP	B	87.42	-31.54	-5.40	26.14	-6.80	24.74	
MBS PZ-10	MBP	B	87.70	-31.30	-5.40	25.90	-6.84	24.46	
MBS PZ-11	MBP	B	62.27	-65.70	-9.00	56.70	-11.02	54.68	
MBS PZ-12	MBP	LMT	84.48	-305.20	-14.05	291.15	-15.52	289.68	
MBS PZ-13	MBP	Dd	83.33	-176.00	-14.68	161.32	-16.22	159.78	
MBS PZ-14	MBP	LMT	83.00	-301.40	-13.32	288.08	-14.70	286.70	
MBS PZ-15	MBP	LMT	81.67	-300.80	-13.53	287.27	-14.89	285.91	
MBS PZ-16	MBP	B	82.16	-57.40	-9.93	47.47	-11.40	46.00	
MBS PZ-17	MBP	D	76.86	-133.50	-23.20	110.30	-25.58	107.92	
MBS PZ-18	MBP	D	77.02	-132.20	-17.31	114.89	-20.83	111.37	

TABLE 2-2 (Continued)

Well ID	Study Area	Hydro-Statigraphic Zone	Reference Elevation (topc ft. msl)	Base of Screen (ft. msl)	Calculated Groundwater Elevation (ft. msl)				
					2nd Quarter 2012	2nd Quarter 2012 Water Column Thickness	4th Quarter 2012	4th Quarter 2012 Water Column Thickness	4th Quarter 2012 Comments
MBS PZ-19	MBP	WT	82.06	-25.40	-8.95	16.45	-12.88	12.52	
MBS PZ-20	MBP	Bu	79.42	-31.60	-13.22	18.38	-15.28	16.32	
MBS PZ-21	MBP	WT/Bu	76.43	-25.30	-14.88	10.42	-16.55	8.75	
MBS PZ-22	MBP	WT/Bu	77.43	-26.00	-14.90	11.10	-15.39	10.61	
MBS PZ-37	MBP	B	73.32	-106.68	-12.08	94.60	-13.36	93.32	
MBS PZ-38	MBP	B	73.68	-93.32	-21.22	72.10	-12.63	80.69	
MBS PZ-39	MBP	B	70.86	-87.14	-10.44	76.70	-12.03	75.11	
MBS PZ-40	MBP	B	71.37	-65.63	-9.49	56.14	-11.28	54.35	
MBS PZ-41	MBP	B	74.05	-61.45	-10.05	51.40	-11.96	49.49	
MBS PZ-42D	MBP	B	71.37	-105.63	-10.44	95.19	-12.08	93.55	
MBS PZ-42S	MBP	B	71.37	-49.63	-10.32	39.31	-11.97	37.66	
MBS PZ-43	MBP	B	77.93	-65.00	-9.81	55.19	-11.86	53.14	
MBS PZ-44	MBP	B	77.63	-33.37	-11.37	22.00	-13.84	19.53	
MBS PZ-46	MBP	B	79.20	-40.30	-11.90	28.40	-13.61	26.69	
MBS PZ-47	MBP	B	79.82	-40.40	-10.96	29.44	-13.18	27.22	
MBS PZ-48D	MBP	B	82.15	-83.20	-16.75	66.45	-18.64	64.56	
MBS PZ-48S	MBP	B	82.15	-48.20	-10.78	37.42	-12.33	35.87	
MBS PZ-49D	MBP	LMT	80.29	-295.71	-12.15	283.56	-14.56	281.15	
MBS PZ-49S	MBP	B	80.29	-56.71	-9.11	47.60	-10.93	45.78	
MBS PZ-50D	MBP	LMT	83.48	-308.52	-15.05	293.47	-16.47	292.05	
MBS PZ-50S	MBP	Dd	83.48	-91.52	-10.04	81.48	-11.63	79.89	
MBS PZ-51	MBP	D	81.01	-103.64	-19.16	84.48	-21.46	82.18	
MBS PZ-52	MBP	D	85.95	-100.44	-10.95	89.49	-12.56	87.88	
MBS PZ-53	MBP	D	86.05	-116.98	-13.21	103.77	-15.06	101.92	
MBS PZ-54	MBP	D	80.37	-105.63	-14.15	91.48	-15.68	89.95	
MBS PZ-55B	MBP	B	76.39	-78.70	-14.76	63.94	-16.26	62.44	
MBS PZ-55Bu	MBP	Bu	76.39	-36.70	-14.84	21.86	-16.34	20.36	
MBS PZ-57B	MBP	B	90.86	-24.07	-4.11	19.96			no read in 4Q
MBS PZ-57D	MBP	D	90.35	-93.57	-12.30	81.27	-14.33	79.24	
MBS PZ-58	MBP	D	71.06	-109.23	-20.46	88.77	-21.26	87.97	
MBS PZ-59	MBP	WT/A	67.98	-23.94	-14.87	9.07	-15.77	8.17	
MBS PZ-59B	MBP	B	67.98	-97.02	-14.91	82.11	-16.11	80.91	

Note: **bold** values are below the lower screen elevation and are not used in analyses
* = value questionable based on historic and surrounding data

TABLE 2-3

Summary of Well Maintenance 2012
Former Mather Air Force Base
Sacramento County, California

Date	Maintenance Activity
Main Base/SAC Area	
2/28/2012	EW 2D Remove and install pump andmotor
4/6/2012	EW 2B replaced flow meter
5/16/2012	EW 5B and EW 6B replaced flow meters
5/31/2012	MCC onsite to troubleshoot County irrigation controls to MBS GWTP
6/4/2012	Replaced Flow meter at County's irrigation vault. O'Dell's serviced Irrigation pump at MBS GWTP
6/12/2012	Performed maintenance and lubrication on motors and bearings at MBS GWTP
6/28/2012	Replaced 3 phase protection relay at MBS GWTP
7/19/2012	EW 3D replace pump and motor
8/31/2012	Install overload protection component at MBS GWTP
9/13/2012	Installed new pH probe at the pH panel at MBS GWTP
9/17/2012	EW 4Bu replaced network cards
9/19/2012	39EW 1A/Bu removed MOV and put spool in place
9/20/2012	Performed maintenance and lubrication on motors and bearings at MBS GWTP
9/21/2012	Tighten down packing on irrigation pump at MBS GWTP
9/28/2012	Updated site spill plan
10/10/2012	IW-502 replaced and configured water level transducer
10/30/2012	EW 12B replaced check valve
10/31/2012	EW 12B replaced PLC (MCC onsite) and ball valve
11/7/2012	EW 12B replaced backup battery in the PLC
11/21/2012	EW 2D replaced network cards
11/28/2012	EW 1B and EW 2D replaced network fiber optical rack
11/29/2012	IW 502 and IW 503 install new level transducers
12/10/2012	EW 4B installed new level transducer
12/12/2012	Performed maintenance and lubrication on motors and bearings at MBS GWTP
12/18/2012	EW 2A/Bu replaced level display
12/26/2012	EW 4Bu replaced network cards
Site 7	
5/7/2012	7EW-2 Replaced motor and pump
6/12/2012	Performed maintenance and lubrication on motors and bearings at GWTP
7/3/2012	MCC onsite to check programing issue at GWTP
7/20/2012	7EW-1 Redeveloped well
9/20/2012	Performed maintenance and lubrication on motors and bearings at GWTP
9/28/2012	Updated site spill plan
11/8/2012	7EW-2 replaced MOV
12/12/2012	Performed maintenance and lubrication on motors and bearings at GWTP
12/18/2012	Removed Influent flow meter and sent in for repair at GWTP
AC&W	
6/12/2012	Performed maintenance and lubrication on Motors and bearings at GWTP
9/20/2012	Performed maintenance and lubrication on Motors and bearings at GWTP
9/28/2012	Updated site spill plan
11/21/2012	EW 3 flow meter preplaced
12/12/2012	Performed maintenance and lubrication on motors and bearings at GWTP
Off-Base	
3/20/2012	JH carbon change out
8/22/2012	Inspect the vessels at Moonbeam
10/9/2012	Initial Moonbeam carbon loading
10/12/2012	Moonbeam preformed Arsenic test for CalAM
11/5/2012	Remove carbon from Moonbeam and disinfect vessels (Carbon had elevated Arsenic concentrations and vessels had positive bacteria samples)
11/14/2012	Moonbeam carbon change out
11/27/2012	Moonbeam online with carbon
12/13/2012	Replace burst disks at Moonbeam

TABLE 2-4

ABANDONED AND TEMPORARILY ABANDONED GROUNDWATER WELLS
FORMER MATHER AIR FORCE BASE
SACRAMENTO COUNTY, CALIFORNIA

Well ID	Hydro Unit	Abandonment Date	Study Area	References
ABANDONED WELLS				
7-PZ-27	B	Nov-99	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
7-PZ-28	B	Nov-99	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
7-PZ-29	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II (pg. 48)
7-PZ-30	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II (pg. 48)
7-PZ-31	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
7-PZ-32	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
7-PZ-33	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II (pg. 48)
7-PZ-34	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
7-PZ-35	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
7-PZ-36	B	Jun-00	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
AC&W IW-1	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
AC&W IW-2	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
AC&W IW-3	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
AC&W IW-4	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
AC&W IW-5	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
AC&W IW-6	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
AC&W IW-7	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
AC&W IW-8	C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
CU EXPLORER	N/A	Oct-98	N/A	(Sac Co EHD Form)
FFS-EW7-1	B	Jul-99	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
FFS-MW7-1	B	Jul-99	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
FFS-MW7-2	B	Jul-99	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
FFS-MW7-3	N/A	Jul-99	Site 7	AR # 1981 Draft Final Annual and Fourth Quarter Basewide Groundwater Monitoring Report, 00, Vol I of II Table 2-7
FH-4 (old)	N/A	1985	N/A	AF Correspondence, 6-19-85
JTC (Site 62)	N/A	Oct-93	N/A	AFI, App J
MAFB-001	WT (B/C)	Jun-98	AC&W	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-002	WT (C)	Jun-98	AC&W	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-003	WT (C)	Jun-98	AC&W	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-004	WT/B (C?)	Jun-98	N/A	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-007	WT (B)	Oct-93	N/A	AFI, App J
MAFB-008	WT (A/B)	Oct-93	N/A	AFI, App J
MAFB-009	WT (Ap/B)	Oct-93	N/A	AFI, App J
MAFB-010	WT (A)	Oct-93	N/A	AFI, App J
MAFB-011	WT (A)	Oct-93	N/A	AFI, App J
MAFB-014	WT (B)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-015	WT (B)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-016	WT (B/C)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-017	WT (B/C)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-018	WT (B/C)	Jun-98	LF02	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-019	N/A	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-020	WT (B)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-021	WT (B)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-022	WT/B	May-09	LF05	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-023	WT (B)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-024	WT/B	Jun-98	LF03	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-025	WT (B)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-026	WT/B	Apr-09	LF03	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-027B	(Dry)	Jul-98	N/A	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-027C	WT	Jul-98	N/A	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)

TABLE 2-4 (Continued)

Well ID	Hydro Unit	Abandonment Date	Study Area	References
MAFB-028	WT	Jul-98	LF06	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-029	N/A	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-030	N/A	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-031	WT/B	Jul-98	MBP	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-032	N/A	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-034	WT	May-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-035	WT (A)	unknown	MBP	Group 2 RI - Volume 1 (AR#1624, p142 of 555).
MAFB-036	WT (A)	unknown	MBP	Additional Field Investigation Report, Volume 4 (AR#635, Appx J, p877 of 946).
MAFB-037	WT/Bu	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-038	N/A	Oct-93	N/A	AFI, App J
MAFB-040	WT (C)	As of 2Q 1991	N/A	Group 2 RI, Table 2-2
MAFB-045	WT (A/B)	Oct-93	Site 7	AFI, App J
MAFB-049	WT (B)	Jun-98	MBP	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-050	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-051	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-052	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-055	E	Nov-98	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-057	D	Jun-98	Site 7	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-074	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-076	WT/B	Jul-98	LF04	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.39)
MAFB-077	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-079	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-081	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-083	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-084	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-085	WT/B	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-086	WT/B	May-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-087	WT	May-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-088	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-089	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-091	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-095	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-098	N/A	Oct-93	N/A	AFI, App J
MAFB-100	B	Jul-98	NEP	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.39)
MAFB-106	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-113	WT/B	Apr-09	LF05	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-114	WT/B	Jul-98	NEP	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.39)
MAFB-117	B	Nov-98	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-119	B	Mar-03	Site 7	AR #2103 Final 2003 Groundwater Monitoring Program Evaluation Report (pg. 47)
MAFB-120	B	Mar-03	Site 7	AR #2103 Final 2003 Groundwater Monitoring Program Evaluation Report (pg. 47)
MAFB-135	WT	9/12/1996	LF04	LF Cert. Rept, App F
MAFB-137	WT/C	May-09	LF04	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-138	WT	9/12/1996	LF05	LF Cert. Rept, App F
MAFB-142	WT/C	May-09	LF06	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-143	WT/C	May-09	LF06	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-144	WT/C	May-09	LF06	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-146	B	Nov-98	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-161	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-182	WT/B	Jun-98	Site 7	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-183	WT/C	Apr-09	SITE 7	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.

TABLE 2-4 (Continued)

Well ID	Hydro Unit	Abandonment Date	Study Area	References
MAFB-186	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-190	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-192	WT/C	May-09	AC&W	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-213	WT	May-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-236	WT	Jun-98	N/A	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-237	WT	Jul-98	N/A	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-238	WT	Jul-98	N/A	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-245	WT/Bu	May-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-252	WT	Jul-07	MBP	Well Destruction Permit #37011
MAFB-253	WT	Apr-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-254	WT/B	May-09	Site 7	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-255	WT/B	Apr-09	Site 7	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-257	WT (PERCH)	Nov-99	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-275	WT/Bu	Apr-09	NEP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-279	WT/B	Jun-98	MBP	AR#46 Update Pages, Basewide Annual and Fourth Quarter Groundwater Monitoring Draft Final Report, Vol I, II of II, 98 (pg.38)
MAFB-287	B	Nov-99	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-295	D	May-09	Site 7	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-298	B	Jul-99	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-299	B	Nov-09	Site 7	Annual and Fourth Quarter 2009 Groundwater Monitoring Report
MAFB-307	WT/B	May-09	LF02	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-333	WT/C	May-09	GOLF	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-334	WT/B	May-09	GOLF	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-335	WT/C	May-09	GOLF	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MAFB-370	C	Sep-11	Site 7	Letter Report for Decommissioning of Groundwater Well MAFB-370, former Mather Air Force Base, AFRPA. September 2010.
MBS PZ-2	WT	May-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
MBS PZ-3	WT	May-09	MBP	Final, Letter Report for Basewide Well and System Decommissioning Mather Air Force Base, California, MWH. July 2009.
TEMPORARILY ABANDONED WELLS				
MAFB-118	B	Jul-99	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-145	WT/B	Nov-98	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-147	B	NA	Site 7	
MAFB-256	WT (PERCH)	Nov-98	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-262	D	Nov-98	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8
MAFB-286	B	Nov-98	Site 7	AR#1689 Draft Basewide Annual and Fourth Quarter Groundwater Monitoring Report, Vol II of II, 99 Table 2-8

Notes:

? = Precise information unknown, information based on best estimates.
AC&W = Aircraft Control and Warning Plume
AF = Air Force
AFI = Additional Field Investigation
App = Appendix
AR = Administrative Record
ASC = Additional Site Characterization
GOLF = Golf Course Area
LF = Landfill
MBP = Main Base/SAC Area Plume
MW = Montgomery Watson
MWH = MWH Americas, Inc.
N/A = Not Applicable
RI = Remedial Investigation
Sac Co EHD = Sacramento County

TABLE 2-5

SCWA Production Well Totals

Well Name (SCWA)	Jan 2012 (MG)	Feb 2012 (MG)	Mar 2012 (MG)	Apr 2012 (MG)	May 2012 (MG)	Jun 2012 (MG)	Jul 2012 (MG)	Aug 2012 (MG)	Sep 2012 (MG)	Oct 2012 (MG)	Nov 2012 (MG)	Dec 2012 (MG)	Total (MG)
Branch Center System (combined production totals)													
Juvenile Hall 1 (OFB-51) Juvenile Hall 2 (OFB-52)	0.469	0.730	0.375	0.050	1.441	0.774	0.790	0.701	0.583	0.601	0.336	0.335	**7.183**
Mather System													
Main Plant (MB-1)*	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Norden (MB-2)*	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Bleckley (MB-3)*	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Femoyer (MB-4)*	0.023	0.017	0.021	0.059	0.027	0.047	--	--	--	--	--	--	**0.194**
Mather (FH-1)	0.616	0.410	0.530	0.372	4.286	6.957	8.653	7.784	5.482	3.843	0.353	4.527	**43.813**
Branch (FH-3)	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Kurtz (FH-4)	1.410	1.129	1.398	1.657	5.385	9.485	10.514	9.814	6.908	4.807	0.221	0.745	**53.473**
McRoberts (FH-5)	0.372	0.233	0.278	0.231	2.136	3.287	4.562	3.784	2.682	2.022	8.259	3.905	**31.751**
Housing Plant (FH-6)	0.514	0.508	0.588	0.391	4.738	7.035	8.634	7.578	5.903	4.379	0.312	--	**40.580**
Mather System Totals	**2.935**	**2.297**	**2.815**	**2.710**	**16.572**	**6.811**	**32.363**	**28.960**	**20.975**	**15.051**	**9.145**	**9.177**	**169.811**

Notes: All quantities are in millions of gallons.

* MB-1, MB-2, MB-3, & MB-4 Wells Abandoned September and October, 2012 per Sacramento County Code, Section 6.28.040 B Destruction of Supply Wells and Exploratory Holes (Borings). These wells will not be listed on future production reports.

-- = No flow for period
MG = million gallons
SCWA = Sacramento County Water Agency

TABLE 2-6

Cal Am Production Well Totals

Well Name	Jan 2012 (MG)	Feb 2012 (MG)	Mar 2012 (MG)	Apr 2012 (MG)	May 2012 (MG)	Jun 2012 (MG)	Jul 2012 (MG)	Aug 2012 (MG)	Sep 2012 (MG)	Oct 2012 (MG)	Nov 2012 (MG)	Dec 2012 (MG)	Total (MG)
Branch Center System (combined production totals)													
South Port (OFB-54)	--	0.020	0.013	0.002	3.365	4.702	0.670	0.067	0.798	6.371	0.007	0.016	**16.031**
Sutters Gold (OFB-61)	0.026	--	0.015	0.023	22.354	20.841	16.766	18.382	6.584	0.518	--	0.019	**85.528**
Tallyho #1 (OFB-58)	0.006	--	0.002	--	--	0.005	0.005	0.019	0.024	--	0.040	0.005	**0.106**
Tallyho #2 (OFB-56)	0.025	0.022	0.010	--	25.483	58.325	58.851	59.730	55.536	32.100	0.019	0.013	**290.114**
Westporter (OFB-55)	0.020	0.009	0.026	--	2.436	--	5.107	0.160	0.195	2.227	31.888	0.129	**42.197**
Wildrose (OFB-63)	13.043	14.615	13.037	14.919	12.465	9.670	17.987	22.290	18.596	15.582	1.438	11.706	**165.348**
Chettenham (OFB-66)	0.027	0.024	0.045	0.017	--	0.035	--	0.055	--	--	0.044	--	**0.247**
Gould (OFB-31)	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Mars (OFB-27)	9.262	5.839	22.566	22.015	23.289	22.532	20.727	--	--	--	4.295	9.204	**139.729**
Moonbeam (OFB-04)	0.445	4.519	3.932	6.511	17.194	23.243	16.372	0.024	--	4.620	2.371	20.007	**99.238**
Nut Plains (OFB-32)	24.452	19.904	9.998	13.030	36.083	38.061	39.243	39.083	34.667	31.231	36.000	17.431	**339.183**
Oaken Bucket (OFB-49)	--	--	--	--	--	--	14.898	43.851	39.457	33.894	11.397	0.269	**143.766**
Rockingham (OFB-35)	18.830	17.394	18.692	18.136	16.287	18.621	19.106	18.819	17.580	17.986	18.026	19.090	**218.567**
Countryside (OFB-65)	0.115	1.646	0.095	--	8.039	28.167	33.806	35.004	28.449	22.265	1.012	0.284	**158.882**
Caldera (OFB-70)	0.036	--	0.019	--	0.191	0.263	0.199	0.248	0.346	0.259	--	0.043	**1.604**
Montezuma (OFB-71)	0.036	0.142	0.030	0.051	0.040	0.010	0.015	0.070	0.013	0.017	0.024	0.014	**0.462**
Totals	**66.323**	**64.134**	**68.48**	**74.704**	**167.226**	**224.475**	**243.752**	**237.802**	**202.245**	**167.07**	**106.561**	**78.23**	**1701.002**

Notes:

Production totals shown represent all water pumped for the following purposes: to support the system, flushing, main breaks, and for sampling purposes.

MG = million gallons

-- = No flow for the period

TABLE 3-1

2012 Analytical Detection Summary
Northeast Plume COCs
Former Mather Air Force Base
Sacramento County, California

Contaminant of Concern	Cleanup Level (µg/L)
1,2-Dichloropropane	5.0
Carbon Tetrachloride	0.5
Chloromethane	3.0
Tetrachloroethene	5.0
cis-1,2-Dichloroethene	6.0

Well ID	Unit	Analyte	1Q12	2Q12	3Q12	4Q12
MAFB-111	WT/B	Tetracholorethene	NS	1.4	NS	NS
MAFB-112	WT/C	cis-1,2-Dichloroethene	NS	0.2J	NS	NS
		Tetracholorethene	NS	0.8	NS	NS
MAFB-132	WT/B	1,2-Dichloropropane	NS	0.1J	NS	0.1J
		cis-1,2-Dichloroethene	NS	**34**	NS	**38**
		Tetrachloroethene	NS	**35**	NS	**33**
MAFB-133	WT/B	cis-1,2-Dichloroethene	NS	2.1	NS	NS
		Tetrachloroethene	NS	**5.1**	NS	NS
MAFB-136	WT/B	cis-1,2-Dichloroethene	NS	2	NS	NS
		Tetrachloroethene	NS	2.2	NS	NS
MAFB-398	WT/B	cis-1,2-Dichloroethene	NS	0.7	NS	NS
		Tetrachloroethene	NS	**6.4**	NS	NS
MAFB-398C	C	1,2-Dichloropropane	NS	0.5J	NS	NS
		cis-1,2-Dichloroethene	NS	**6.6**	NS	NS
		Tetrachloroethene	NS	3.7	NS	NS
MAFB-399	C	cis-1,2-Dichloroethene	NS	3	NS	NS
		Tetrachloroethene	NS	4.3	NS	NS
MAFB-400	C	cis-1,2-Dichloroethene	NS	3.5	NS	NS
		Tetrachloroethene	NS	5	NS	NS
MAFB-465	WT/C	cis-1,2-Dichloroethene	NS	NS	NS	**28**
		Tetrachloroethene	NS	NS	NS	**22**

Notes: **Bold** values exceed the aquifer cleanup level for that compound
COC = contaminant of concern
J = estimated concentration
NS = not sampled

TABLE 3-2

2012 Analytical Detection Summary
Northeast Landfill Area Monitoring
Former Mather Air Force Base
Sacramento County, California

Well ID	Unit	Analyte	1Q12	2Q12	3Q12	4Q12
MAFB-111	WT/B	Nickel	NS	NS	NS	2.4FJ
		Tetrachloroethene	NS	1.4	NS	NS
		Trichloroethene	NS	0.1F	NS	NS
MAFB-112	WT/C	Chromium	NS	**18**	NS	NS
		cis-1,2-Dichloroethene	NS	0.2F	NS	NS
		Nickel	NS	**280**	NS	NS
		Tetrachloroethene	NS	0.8	NS	NS
		Trichloroethene	NS	0.1F	NS	NS
MAFB-129	WT/C	Chromium	NS	1.5F	NS	NS
		Nickel	NS	1.8F	NS	NS
MAFB-132	WT/B	1,2-Dichloroethane	NS	0.2F	NS	0.2F
		1,2-Dichloropropane	NS	0.1F	NS	0.1F
		Alkalinity	NS	230	NS	210
		Antimony	NS	**3.9J**	NS	NS
		Barium	NS	50	NS	54
		Beryllium	NS	0.34F	NS	NS
		Bicarbonate	NS	230	NS	210
		Chloride	NS	34	NS	30
		Chloroform	NS	NS	NS	0.1F
		Chromium	NS	7.2	NS	**31**
		cis-1,2-Dichloroethene	NS	34	NS	38
		Cobalt	NS	0.31F	NS	10
		Fluoride	NS	0.17	NS	0.11
		Manganese	NS	4.8	NS	250
		Mercury	NS	0.054BF	NS	NS
		Nickel	NS	**77**	NS	**240**
		Selenium	NS	0.51BF	NS	NS
		Sulfate	NS	5.3	NS	4.4
		Tetrachloroethene	NS	35	NS	33
		Total Dissolved Solids	NS	330	NS	300
		Trichloroethene	NS	7.2	NS	7.7
		Vanadium	NS	4.7	NS	2.3F
		Vinyl Chloride	NS	NS	NS	0.1F
MAFB-133	WT/B	Alkalinity	NS	95	NS	NS
		Barium	NS	21	NS	NS
		Bicarbonate	NS	95	NS	NS
		Chloride	NS	4.5	NS	NS
		Chromium	NS	0.85F	NS	NS
		cis-1,2-Dichloroethene	NS	2.1	NS	NS
		Fluoride	NS	0.2	NS	NS
		Sulfate	NS	11	NS	NS
		Tetrachloroethene	NS	5.1	NS	NS
		Thallium	NS	0.31F	NS	NS
		Total Dissolved Solids	NS	160	NS	NS
		Trichloroethene	NS	0.7	NS	NS
		Vanadium	NS	5.3	NS	NS

TABLE 3-2 (Continued)

Well ID	Unit	Analyte	1Q12	2Q12	3Q12	4Q12
MAFB-136	WT/B	Alkalinity	NS	65	NS	NS
		Antimony	NS	0.28F	NS	45
		Arsenic	NS	1.2	NS	NS
		Barium	NS	30	NS	NS
		Bicarbonate	NS	65	NS	NS
		Chloride	NS	32	NS	NS
		Chromium	NS	5	NS	NS
		cis-1,2-Dichloroethene	NS	2	NS	NS
		Fluoride	NS	0.2	NS	NS
		Manganese	NS	0.69F	NS	NS
		Nickel	NS	**32**	NS	**45**
		Sulfate	NS	10	NS	NS
		Tetrachloroethene	NS	2.2	NS	NS
		Total Dissolved Solids	NS	210	NS	NS
		Trichloroethene	NS	0.4F	NS	NS
		Vanadium	NS	5.4	NS	NS
MAFB-398	WT/B	Alkalinity	NS	240	NS	NS
		Antimony	NS	0.17F	NS	NS
		Barium	NS	40	NS	NS
		Bicarbonate	NS	240	NS	NS
		Chloride	NS	7.3	NS	NS
		Chromium	NS	0.82FJ	NS	NS
		cis-1,2-Dichloroethene	NS	0.7	NS	NS
		Fluoride	NS	0.11	NS	NS
		Sulfate	NS	12	NS	NS
		Sulfide	NS	0.09J	NS	NS
		Tetrachloroethene	NS	6.4	NS	NS
		Total Dissolved Solids	NS	310	NS	NS
		Trichloroethene	NS	0.8	NS	NS
		Vanadium	NS	7.2	NS	NS
MAFB-398C	C	1,2-Dichloropropane	NS	0.5F	NS	NS
		Alkalinity	NS	100	NS	NS
		Barium	NS	47	NS	NS
		Bicarbonate	NS	100	NS	NS
		Chloride	NS	7.8	NS	NS
		Chromium	NS	0.77FJ	NS	NS
		cis-1,2-Dichloroethene	NS	6.6	NS	NS
		Fluoride	NS	0.16	NS	NS
		Nickel	NS	0.81F	NS	NS
		Sulfate	NS	3.9	NS	NS
		Sulfide	NS	0.14	NS	NS
		Tetrachloroethene	NS	3.7	NS	NS
		Total Dissolved Solids	NS	170	NS	NS
		Trichloroethene	NS	0.9	NS	NS
		Vanadium	NS	3.5FJ	NS	NS
MAFB-399	C	Alkalinity	NS	160	NS	NS
		Barium	NS	30	NS	NS
		Bicarbonate	NS	160	NS	NS
		Chloride	NS	5.6	NS	NS
		Chromium	NS	0.64F	NS	NS
		cis-1,2-Dichloroethene	NS	3	NS	NS
		Fluoride	NS	0.17	NS	NS
		Sulfate	NS	4.9	NS	NS
		Tetrachloroethene	NS	4.3	NS	NS

TABLE 3-2 (Continued)

Well ID	Unit	Analyte	1Q12	2Q12	3Q12	4Q12
		Total Dissolved Solids	NS	140	NS	NS
		Trichloroethene	NS	0.7	NS	NS
		Vanadium	NS	6.9	NS	NS
MAFB-400	C	Alkalinity	NS	190	NS	NS
		Barium	NS	120	NS	NS
		Bicarbonate	NS	190	NS	NS
		Chloride	NS	55	NS	NS
		Chromium	NS	0.71F	NS	NS
		cis-1,2-Dichloroethene	NS	3.5	NS	NS
		Fluoride	NS	0.11	NS	NS
		Nickel	NS	1.8F	NS	NS
		Sulfate	NS	12	NS	NS
		Tetrachloroethene	NS	5J	NS	NS
		Total Dissolved Solids	NS	350J	NS	NS
		Trichloroethene	NS	1.3	NS	NS
		Vanadium	NS	4.1F	NS	NS

Note: Upper background limits for non-VOCs at the Northeast Landfill Area are present in Table 3-4.

B = analyte detected in an associated "blank" sample, considered not-detected.

F = estimated concentraion

J = estimated concentration below reporting limits

NS = not sampled

TABLE 3-3

2012 Analytical Detection Summary
Site 7 Landfill Monitoring
Former Mather Air Force Base
Sacramento County, California

Well ID	Unit	ANALYTE	1Q12	2Q12	3Q12	4Q12
7-BV-08		Tetrachloroethene	NS	0.9	NS	NS
		Trichloroethene	NS	7.3	NS	NS
7-PZ-37P	PERCHED	1,1-Dichloroethane	NS	0.3F	NS	NS
		1,1-Dichloroethene	NS	0.3F	NS	NS
		1,2-Dichlorobenzene	NS	0.4F	NS	NS
		1,4-Dichlorobenzene	NS	0.8	NS	NS
		Antimony	NS	0.31F	NS	NS
		Barium	NS	87	NS	NS
		Beryllium	NS	0.21F	NS	NS
		Cadmium	NS	0.42F	NS	NS
		Chlorobenzene	NS	1.8F	NS	NS
		Chromium	NS	0.66F	NS	NS
		cis-1,2-Dichloroethene	NS	0.9	NS	NS
		Cobalt	NS	0.26F	NS	NS
		Diesel	NS	430J	NS	NS
		Manganese	NS	960J	NS	NS
		Nickel	NS	6.7	NS	NS
		Tetrachloroethene	NS	1.4	NS	NS
		Trichloroethene	NS	5.2	NS	NS
		Vanadium	NS	5.6	NS	NS
MAFB-041	B	1,2-Dichloroethane	NS	3.7	NS	NS
		1,2-Dichloropropane	NS	3.2	NS	NS
		cis-1,2-Dichloroethene	NS	4.9	NS	NS
		Tetrachloroethene	NS	1.2	NS	NS
		Trichloroethene	NS	17	NS	NS
MAFB-149	WT/B	1,1-Dichloroethene	NS	0.5	NS	NS
		Arsenic	NS	1.8	NS	NS
		Barium	NS	26	NS	NS
		Chromium	NS	5	NS	NS
		Diesel	NS	17F	NS	NS
		Nickel	NS	10	NS	NS
		Tetrachloroethene	NS	0.2F	NS	NS
		Vanadium	NS	14	NS	NS
MAFB-284	B	1,2-Dichloroethane	NS	0.3FJ	NS	NS
		1,2-Dichloropropane	NS	0.4FJ	NS	NS
		Antimony	NS	0.15F	NS	NS
		Arsenic	NS	1.7	NS	NS
		Barium	NS	46	NS	NS
		Chromium	NS	6.2	NS	NS
		cis-1,2-Dichloroethene	NS	0.4FJ	NS	NS
		Diesel	NS	17F	NS	NS
		Tetrachloroethene	NS	1.1J	NS	NS
		Trichloroethene	NS	5.2J	NS	NS
		Vanadium	NS	12	NS	NS
MAFB-300	C	Trichloroethene	0.1F	NS	NS	NS

TABLE 3-3 (Continued)

Well ID	Unit	ANALYTE	1Q12	2Q12	3Q12	4Q12
MAFB-391	B	1,2-Dichloroethane	NS	0.3F	NS	NS
		1,2-Dichloropropane	NS	0.3F	NS	NS
		cis-1,2-Dichloroethene	NS	0.3F	NS	NS
		Tetrachloroethene	NS	0.3F	NS	NS
		Trichloroethene	NS	2.2	NS	NS
MAFB-413	WT/B	Barium	NS	49	NS	NS
		Chromium	NS	2.2F	NS	NS
		Vanadium	NS	8.2	NS	NS
MAFB-448	B	Tetrachloroethene	NS	1	NS	NS
		Trichloroethene	NS	4.5	NS	NS
MAFB-464	D	Tetrachloroethene	NS	NS	0.1F	NS
		Trichloroethene	NS	NS	1	1.1

Notes:

Upper backgrolund limits for non-VOCs at Site 7 are present in Tble 3-6.

Data from wells screened in the perched unit are not compared to water-table upper backgreound limits and are provided for comparison purposes only.

F = estimated concentration

J = estimated concentration below reporting limits

NS = not sampled

TABLE 3-4

Calculated Background Concentrations for Metals
Northeast Landfill Area
Former Mather Air Force Base
Sacramento County, California

Analyte	Number of Samples	Min	Max	Mean	Standard Deviation	95th Percentile	99th Percentile	Distribution	95% UCL on the Mean	UTL[a]	Upper Background	Wells with Concentrations Exceeding Upper Background Limit in 2012
Antimony	10	0.068	2.0	1.3	0.70	1.96	1.99	Normal	1.7	3.3	3.3	MAFB-132 (3.9J µg/L 2Q12)
Arsenic	11	0.13	5.6	1.8	1.6	4.2	5.3	Normal	2.6	6.2	6.2	None
Barium	62	8.8	516	137	145	354	486	Nonparametric	252	430	430	None
Beryllium	8	0.20	0.70	0.40	0.19	0.67	0.69	Normal	0.52	1.0	1.0	None
Cadmium	16	0.17	0.61	0.32	0.12	0.53	0.59	Normal	0.4	0.6	0.6	None
Calcium	4	9,040	19,800	15,410	4,771	19,560	19,752	Normal	N/A	39,952	39,952	NS
Chromium	27	1.0	15	3.3	3.0	8.7	14	Nonparametric	5.8	10	10	MAFB-112 (18 µg/L 2Q12) MAFB-132 (31 µg/L 4Q12)
Cobalt	2	0.06	0.22	0.14	0.11	0.21	0.22	N/A	N/A	N/A	ND	None
Copper	11	2.1	17	5.7	4.3	12	16	Lognormal[b]	8.3	27	27	None
Iron	3	73	503	341	234	497	502	N/A	N/A	N/A	ND	NS
Lead	30	1.3	9.2	2.9	1.9	7.3	9.2	Nonparametric	3.5	7.2	7.2	None
Magnesium	4	5,440	13,500	9,798	3,358	13,095	13,419	Normal	N/A	27,069	27,069	NS
Manganese	44	0.7	714	62	122	249	524	Lognormal	183	653	653	None
Mercury	2	0.11	0.11	0.11	0.0	N/A	N/A	N/A	N/A	N/A	ND	None
Nickel	28	1.3	4.0	2.3	0.60	3.6	3.9	Lognormal[b]	2.5	3.9	3.9	MAFB-112 (280 µg/L 2Q12) MAFB-132 (77 µg/L 2Q12, 240 µg/L 4Q12) MAFB-136 (32 µg/L 2Q12, 45 µg/L 4Q12)
Selenium	11	0.021	7.0	3.0	2.4	6.3	6.9	Normal	4.3	10	10	None
Silver	6	0.25	0.78	0.51	0.19	0.75	0.77	Normal	0.66	1.2	1.2	None
Sodium	4	7,850	10,400	9,088	1,213	10,312	10,382	Normal	N/A	15,326	15,326	NS
Thallium	1	1.2	1.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	None
Vanadium	32	4.9	10	6.6	0.92	7.7	9.3	Lognormal[b]	6.8	8.7	8.7	None
Zinc	30	4.6	1,130	72	202	109	837	Nonparametric	439	521	521	None

Notes:

All units are micrograms per liter (µg/L)

Background calculations were originally presented in the 2nd Quarter 2005 Mather Groundwater Monitoring Report (MWH, 2005).

[a] UTL is identified as the 95% UCL on the 95th percentile.

[b] Data follow both gamma and lognormal distributions. For the purposes of selecting a 95% UCL on the mean, the recommended value from the ProUCL program was utilized. For selecting a UTL, the lognormal value was utilized.

Max = maximum
Min = minimum
N/A = Not Applicable
ND = Not Determined
NS = Not Sampled. No samples analyzed for this constituent
UCL = Upper Confidence Limit
UTL = Upper Tolerance Limit

TABLE 3-5

Calculated Upper Background Concentration for General Mineral Constituents
Northeast Landfill Area
Former Mather Air Force Base
Sacramento County, California

Analyte	Units	Number of Samples	Min	Max	Mean	Standard Deviation	95th Percentile	99th Percentile	Distribution	95% UCL on the Mean	UTL[a]	Upper Background Limit	Wells Exceeding Background Limit in 2012
Alkalinity, bicarbonate	Mg/L	87	0.5	684	94	80	192	352	NON-PARAMETRIC	131	867	867	None
Alkalinity, carbonate	Mg/L	88	0.5	34.7	2.1	5.3	14	24	NON-PARAMETRIC	5.6	39	39	None
Alkalinity, total	Mg/L	104	26	684	94	73	180	295	NON-PARAMETRIC	125	864	864	None
Chloride	Mg/L	104	2.3	120	13	17	29	94	NON-PARAMETRIC	20	145	145	None
Fluoride	Mg/L	100	0.05	0.32	0.12	0.06	0.23	0.31	NON-PARAMETRIC	0.1	0.5	1	None
Hardness as CaCO3	Mg/L	4	0.5	93	26	45	80	90	GAMMA	337	225	225	None
Nitrogen, nitrate	Mg/L	48	0.89	20	3	3	3.80	13	NON-PARAMETRIC	3.8	26.0	26	None
Nitrogen, nitrate and nitrite	Mg/L	14	2.2	3.7	3	0.44	3.51	3.66	NORMAL	3.2	11.4	11	None
Solids, total dissolved	Mg/L	104	5	370	179	54	287	310	NON-PARAMETRIC	188	715	715	None
Sulfate	Mg/L	104	5.5	35	11	6	28	35	NON-PARAMETRIC	13	57	57	None
Sulfide, total	Mg/L	100	0.04	3.1	0.46	0.6	1.62	2.90	NON-PARAMETRIC	0.9	4.0	4	None

Notes:

[a] UTL is identified as the 95% UCL on the 95th Percentile.

Mg/L = milligrams per liter

Max = maximum

Min = minimum

UCL = Upper Confidence Limit

UTL = Upper Tolerance Limit

TABLE 3-6

Calculated Background Concentrations for Metals
Site 7 Landfill Area
Former Mather Air Force Base
Sacramento County, California

Analyte	Number of Samples	Min	Max	Mean	95% UCL on the Mean	UTL[a]	Upper Background Limit	Wells with Concentrations Exceeding Upper Background Limit in 2012
Antimony	14	< 60	< 60	NA	NA	NA	< 60	None
Arsenic	14	< 5.0	< 5.0	NA	NA	NA	< 5.0	None
Barium	14	25	693	130	391	715	715	None
Beryllium	14	< 3	< 3	NA	NA	NA	< 3	None
Cadmium	14	26	26	4	11.6	14.9	14.9	None
Calcium	2	19,900	118,000	68,950	NA	NA	ND	NS
Chromium	14	10	26	8	15.3	24.0	24.0	None
Cobalt	14	< 50	< 50	NA	NA	NA	< 50	None
Copper	14	12	12	5	6.3	10.3	10.3	None
Iron	2	29	29	32	NA	NA	29.1	NS
Lead	23	3	5	2	2.6	4.1	4.1	None
Magnesium	2	3,850	67,300	35,575	NA	NA	ND	NS
Manganese[b]	16	1	8,430	534	5,772	5,848	5,848	None
Mercury	14	0	0	0	0.1	0.2	0.2	None
Nickel	14	< 40	< 40	NA	NA	NA	< 40	None
Potassium	1	2,280	2,280	NA	NA	NA	ND	NS
Selenium	14	< 5.0	< 5.0	NA	NA	NA	< 5.0	None
Silver	14	< 10	< 10	NA	NA	NA	< 10	None
Sodium	1	32,400	32,400	NA	NA	NA	ND	NS
Thallium	23	< 1.0	< 1.0	NA	NA	NA	< 1.0	None
Vanadium	14	< 50	< 50	NA	NA	NA	< 50	None
Zinc	16	15	113	36	64	101	101	None
Background Calculations for Manganese in the Perched Zone at Site 7[c]								
Manganese	83	8	9,380	2,911	5,928	15,068	15,068	None

Notes:
All units are micrograms per liter (µg/L)
[a] UTL is identified as the 95% UCL on the 95th Percentile.
[b] Includes manganese data from wells MAFB-148, -183, and -254
[c] Includes manganese data from perched-zone wells 7-BV-01, 7-BV-02, 7-BV-04, 7-BV-06, 7-PZ-37P, 7-PZ-38P, MAFB-044, and MAFB-189
Min and Max were for detected analytes only. The Mean was calculated using values of 1/2 the reporting limit when a given analyte was not detecteed in a sample
Background calculations were originally presented in the 2nd Quarter 2005 Mather Groundwater Monitoring Report (MWH, 2005).
Max = maximum
Min = Minimum
NA = Not Applicable
ND = Not Determined
NS = Not Sampled. No samples analyzed for this constituent
UCL = Upper Confidence Limit
UTL = Upper Tolerance Limit
< = less than

TABLE 4-1

2012 Analytical Detection Summary
AC&W Plume COCs
Former Mather Air Force Base
Sacramento County, California

Contaminant of Concern			Cleanup Level (µg/L)			
Trichloroethene			5			
Well ID	**Unit**	**Analyte**	**1Q12**	**2Q12***	**3Q12**	**4Q12**
ACW AT-1	C	Trichloroethene	NS	**22J**	NS	NS
ACW AT-2	C	Trichloroethene	NS	**14J**	NS	NS
ACW EW-1	C	Trichloroethene	NS	**8.5J**	NS	NS
ACW EW-2	C	Trichloroethene	NS	2.5J	NS	NS
ACW EW-3	C	Trichloroethene	NS	2.4J	NS	NS
ACW EW-4	C	Trichloroethene	NS	0.1FJ	NS	NS
ACW EW-6R	C	Trichloroethene	4.2	3.7J	3.8J	3.4J
MAFB-301	C	Trichloroethene	NS	2.4J	NS	NS
MAFB-403	WT/C	Trichloroethene	NS	4.7J	NS	NS
MAFB-453	WT	Trichloroethene	NS	**28**	NS	NS

Note: **bold** values exceed the aquifer cleanup level
* J-flagged concentrations for 2Q12 contain a potential high-bias due to surrogate spike recovery issues.
J = estimated concentration
NS = not sampled

TABLE 4-2

2012 Operation Rates and TCE Mass Removal
By AC&W Plume Treatment System and Extraction Wells
Former Mather Air Force Base
Sacramento, County, California

Well	HSU	Set Point Flow Rate (gpm)	Quarterly Avg. Flow Rate (gpm)				TCE Concentration (µg/L)				Yearly TCE Mass Removed (lbs)
			1Q12	2Q12	3Q12	4Q12*	1Q12	2Q12	3Q12	4Q12	
ACW Plant Influent (ACW PTI)	-	-	97.4	102.2	101.1	94.0	7	5.8	6.4	6.1	2.74
ACW AT-1	WT/C	5.0	4.1	4.0	4.0	4.0	NS	22	NS	NS	0.39
ACW AT-2	WT/C	11.0	10.0	10.1	9.5	8.2	NS	14	NS	NS	0.58
ACW EW-1	WT/C	12.0	11.9	13.2	13.8	12.4	NS	8.5	NS	NS	0.48
ACW EW-2	WT/C	18.0	19.3	19.0	19.0	19.0	NS	2.5	NS	NS	0.21
ACW EW-3	WT/C	30.0	23.9	28.4	28.5	24.7	NS	2.4	NS	NS	0.28
ACW EW-6R	WT/C	26.0	28.2	27.5	26.3	25.7	4.2	4.3	3.8	3.4	0.46

Notes:

* October 2012 data was corrupted and non-recoverable.

The October flow rate used for quarterly average is the average of September 2012 and November 2012 flow rates.

Mass removed at plant calculated from quarterly influent samples. Mass removed at extraction wells calculated from scheduled sampling events at the well heads.

Discrepancies in estimates for mass removal for the plant and the sum of the extraction wells may exist and are considered normal.

µg/L = micrograms per liter

gpm = gallons per minute

HSU = hydrostartigraphic unit

lbs = pounds

NS = not sampled

TCE = trichloroethene

TABLE 4-3

2012 AC&W and Mather Lake Discharge Monitoring
Former Mather Air Force Base
Sacramento County, California

Date Sampled	Sample Location	Specific Conductivity (µmhos/cm)	pH (pH units)	Temperature (Degrees Celsius)	TCE Concentration (µg/L)	Total VOCs Concentration (µg/L)
01/03/12	R-2	144	7.59	10.8	<0.10	ND
01/03/12	AC&W Effluent	128	7.32	17	<0.10	ND
04/03/12	R-2	151	7.4	15.6	<0.10	ND
04/03/12	AC&W Effluent	102	7.81	18	<0.10	ND
07/02/12	R-2	151	7.8	25.3	<0.10	0.5[a]
07/02/12	AC&W Effluent	130	7.68	22.8	<0.10	ND
10/03/12	R-2	151	7.44	23.1	<0.10	ND
10/03/12	AC&W Effluent	89	8.05	21.8	<0.10	0.2[b]

Notes:

[a] chloroform

[b] chloromethane

AC&W = Aircraft Control and Warning
ND = no contaminants detected
pH = a measure of the activity of hydrogen ions
R-2 = Mather Lake downgradient sampling location (before spillway)
TCE = trichloroethane
VOC = volatile organic compounds
µg/L = micrograms per liter
µmhos/cm = micromhos per centimeter

TABLE 5-1

2012 Analytical Detection Summary
Site 7 Plume COCs
Former Mather Air Force Base
Sacramento County, California

Contaminant of Concern	Cleanup Level (µg/L)
1,1-Dichloroethene	6.0
1,2-Dichloroethane	0.5
1,4-Dichlorobenzene	5.0
Benzene	1.0
Chloromethane	3.0
Diesel	100.0
Tetrachloroethene	5.0
Trichloroethene	5.0
Vinyl Chloride	0.5
cis-1,2-Dichloroethene	6.0

Well ID	Unit	Analyte	1Q12	2Q12	3Q12	4Q12
7-BV-08		Tetrachloroethene	NS	0.9	NS	NS
		Trichloroethene	NS	**7.3**	NS	NS
7-PZ-37P	PERCHED	1,1-Dichloroethene	NS	0.3F	NS	NS
		1,4-Dichlorobenzene	NS	0.8	NS	NS
		cis-1,2-Dichloroethene	NS	0.9	NS	NS
		Diesel	NS	**430J**	NS	NS
		Tetrachloroethene	NS	1.4	NS	NS
		Trichloroethene	NS	**5.2**	NS	NS
MAFB-041	B	1,2-Dichloroethane	NS	**3.7**	NS	NS
		cis-1,2-Dichloroethene	NS	4.9	NS	NS
		Tetrachloroethene	NS	1.2	NS	NS
		Trichloroethene	NS	**17**	NS	NS
MAFB-149	WT/B	1,1-Dichloroethene	NS	0.5	NS	NS
		Diesel	NS	17F	NS	NS
		Tetrachloroethene	NS	0.2F	NS	NS
MAFB-284	B	1,2-Dichloroethane	NS	0.3FJ	NS	NS
		cis-1,2-Dichloroethene	NS	0.4FJ	NS	NS
		Diesel	NS	17F	NS	NS
		Tetrachloroethene	NS	1.1J	NS	NS
		Trichloroethene	NS	**5.2J**	NS	NS
MAFB-300	C	Trichloroethene	0.1F	NS	NS	NS
MAFB-391	C	1,2-Dichloroethane	NS	0.3F	NS	NS
		cis-1,2-Dichloroethene	NS	0.3F	NS	NS
		Tetrachloroethene	NS	0.3F	NS	NS
		Trichloroethene	NS	2.2	NS	NS
MAFB-413	WT/B	Diesel	NS	17F	NS	NS
MAFB-448	B	Tetrachloroethene	NS	1	NS	NS
		Trichloroethene	NS	4.5	NS	NS
MAFB-464	D	Tetrachloroethene	NS	0.1F	NS	NS
		Trichloroethene	NS	1.1	NS	NS

Notes:

Bold values exceed the aquifer cleanup level

COC = contaminant of concern

F = estimated concentration between detection limit and reporting limit

J = estimated concentration

NS = not sampled

µg/L = micrograms per liter

TABLE 5-2

2012 Operation Rates and Volatile Organic COC Mass Removed by the Site 7 Plume Treatment System and Extraction Wells Former Mather Air Force Base Sacramento County, California

WELL ID	HSU	Set Point Flow Rate (gpm)	Quarterly Avg. Flow Rate (gpm)				VOC Concentration (µg/L)				Yearly COC Mass Removed as VOCs (lbs)
			1Q12	2Q12	3Q12	4Q12	1Q12	2Q12	3Q12	4Q12	
Site 7 Plant Influent (PTI)	-	-	45.9	44.6	43.1	45.9	17.9	19.5	17.8	20.9	3.74
7-IW-01	B	20	18.3	14.7	8.5	8.9	N/A	N/A	N/A	N/A	N/A
7-IW-02	B	20	9.9	11.4	13.5	14.8	N/A	N/A	N/A	N/A	N/A
7-IW-03	B	20	6.6	6.1	6.7	6.1	N/A	N/A	N/A	N/A	N/A
7-IW-04	B	14	10.0	11.3	13.6	14.1	N/A	N/A	N/A	N/A	N/A
7-EW-1	C	28	15.3	17.3	15.9	19.8	NS	NS	NS	NS	N/A
7-EW-2	C	32	30.6	27.3	27.2	26.1	NS	NS	NS	NS	N/A

Notes:

COC - contaminant of concern
gpm - gallons per minute
HSU = hydrostatigraphic unit
ID = identification
lbs = pounds

N/A - not available
NS - not sampled
VOC - volatile organic compound
µg/L - micrograms per liter

TABLE 6-1

2012 Analytical Detection Summary
Main Base/SAC Area Plume COCs
Former Mather Air Force Base
Sacramento County, California

Contaminant of Concern	Cleanup Level (µg/L)
1,1-Dichloroethene	6.0
1,2-Dichloroethane	0.5
Benzene	1.0
Carbon Tetrachloride	0.5
Chloromethane	3.0
Diesel	100.0
Lead	15.0
Tetrachloroethene	5.0
Total Petroleum Hydrocarbons Gasoline	50.0
Xylenes	17.0
Trichloroethene	5.0
cis-1,2-Dichloroethene	6.0

Well ID	Unit	Analyte	1Q12	2Q12	3Q12	4Q12
FFS MW15-6	D	Carbon Tetrachloride	NS	**0.9**	NS	NS
		cis-1,2-Dichloroethene	NS	0.3F	NS	NS
		Tetrachloroethene	NS	4	NS	NS
		Trichloroethene	NS	**6.3**	NS	NS
MAFB-104	D	Carbon Tetrachloride	NS	**1**	NS	NS
		cis-1,2-Dichloroethene	NS	0.2F	NS	NS
		Tetrachloroethene	NS	**12**	NS	NS
		Trichloroethene	NS	2.4	NS	NS
MAFB-181	D	Carbon Tetrachloride	**3.8**	**2.9J**	**3.8**	**3**
		Tetrachloroethene	**28**	**27**	**26**	**24**
MAFB-214	WT	Tetrachloroethene	0.3F	NS	NS	NS
		Trichloroethene	0.1F	NS	NS	NS
MAFB-222	B	Carbon Tetrachloride	NS	**0.6**	NS	NS
		Tetrachloroethene	NS	3.5	NS	NS
		Trichloroethene	NS	1.5	NS	NS
MAFB-231	B	Tetrachloroethene	**8.2**	NS	NS	NS
		Trichloroethene	0.6	NS	NS	NS
MAFB-234	B	Tetrachloroethene	1.8	NS	NS	NS
MAFB-243	D	Carbon Tetrachloride	NS	**0.8**	NS	NS
		Tetrachloroethene	NS	2.1	NS	NS
		Trichloroethene	NS	0.9	NS	NS
MAFB-274	B	Tetrachloroethene	NS	NS	NS	1
		Trichloroethene	NS	NS	NS	0.1F
MAFB-318	D	Carbon Tetrachloride	NS	NS	NS	**6.6**
		Tetrachloroethene	NS	NS	NS	4.4
MAFB-322	B	Tetrachloroethene	NS	NS	NS	0.088F
MAFB-323	B	Tetrachloroethene	NS	NS	NS	0.076F
MAFB-324	B	Tetrachloroethene	0.19F	0.22	0.19F	0.25
MAFB-326	D	Carbon Tetrachloride	0.086F	NS	NS	0.19F
		Tetrachloroethene	NS	NS	NS	0.089F
MAFB-327	D	Carbon Tetrachloride	**1.1**	**1.3**	**1.9**	**1.1M**
		Tetrachloroethene	0.096F	0.15F	NS	0.14F
MAFB-328	D	Tetrachloroethene	0.098F	NS	0.12F	0.18F

TABLE 6-1 (Continued)

Contaminant of Concern	Cleanup Level (µg/L)
1,1-Dichloroethene	6.0
1,2-Dichloroethane	0.5
Benzene	1.0
Carbon Tetrachloride	0.5
Chloromethane	3.0
Diesel	100.0
Lead	15.0
Tetrachloroethene	5.0
Total Petroleum Hydrocarbons Gasoline	50.0
Xylenes	17.0
Trichloroethene	5.0
cis-1,2-Dichloroethene	6.0

MAFB-330	B	Carbon Tetrachloride	NS	**0.94**	NS	NS
		cis-1,2-Dichloroethene	NS	0.21F	NS	NS
		Tetrachloroethene	NS	0.64	NS	NS
		Trichloroethene	NS	0.8	NS	NS
MAFB-338	Dd	Benzene	0.054F	NS	NS	NS
		Tetrachloroethene	NS	NS	NS	0.11F
MAFB-349	LMT	Total Xylenes	NS	0.29F	NS	NS
MAFB-377	D	Carbon Tetrachloride	NS	NS	NS	**2.2**
		cis-1,2-Dichloroethene	NS	NS	NS	0.2
		Tetrachloroethene	NS	NS	NS	2.2
		Trichloroethene	NS	NS	NS	2.8
MAFB-397	Dd	Chloromethane	NS	0.1F	NS	NS
MAFB-407	WT/Bu	Tetrachloroethene	0.4JF	NS	NS	NS
MAFB-421	WT/B	Tetrachloroethene	2	NS	NS	NS
		Trichloroethene	0.3F	NS	NS	NS
MAFB-430	LMT	Carbon Tetrachloride	NS	**0.5F**	NS	NS
		Tetrachloroethene	NS	1.9	NS	NS
MAFB-435	Dd	Carbon Tetrachloride	**1.2**	**1.6**	**1.3J**	**1.5**
		Chloromethane	NS	NS	NS	0.1F
		Tetrachloroethene	**8.7**	**9**	**7.4J**	**10**
MAFB-436	WT	Carbon Tetrachloride	NS	0.2F	NS	NS
		Tetrachloroethene	NS	4.8	NS	NS
		Trichloroethene	NS	0.4	NS	NS
MAFB-460Bd	Bd	cis-1,2-Dichloroethene	0.2F	NS	NS	NS
		Trichloroethene	0.5	0.5	0.9	0.3F
MAFB-460Bs	Bs	cis-1,2-Dichloroethene	0.3F	0.2F	0.2FJ	0.2FJ
		Tetrachloroethene	0.4F	0.3F	0.3FJ	0.2FJ
		Trichloroethene	2.2	2.2	1.8J	1.7
MAFB-461Bs	Bs	cis-1,2-Dichloroethene	0.1F	NS	NS	NS
		Trichloroethene	0.2F	0.3F	0.3FJ	0.2F
MAFB-462	B	Chloromethane	0.2F	NS	NS	NS
MAFB-463D	D	Carbon Tetrachloride	0.4F	0.3F	0.4F	**2.7**
		Tetrachloroethene	**9.2**	**10**	**12**	**17**
		Trichloroethene	NS	0.3F	0.3F	0.1F
MAFB-463Dd	Dd	Tetrachloroethene	NS	0.2F	0.1F	NS
MBS 19EW01	B	Tetrachloroethene	NS	0.8	NS	NS
MBS 19MW01	Bu	Carbon Tetrachloride	NS	0.2F	NS	NS
		Tetrachloroethene	NS	1.5	NS	NS
MBS 39ABuB	WT/B	Tetrachloroethene	**5.3**	NS	NS	NS
MBS 39EW02	B	Tetrachloroethene	NS	1.9	NS	NS
		Trichloroethene	NS	0.1F	NS	NS

TABLE 6-1 (Continued)

Contaminant of Concern	Cleanup Level (µg/L)
1,1-Dichloroethene	6.0
1,2-Dichloroethane	0.5
Benzene	1.0
Carbon Tetrachloride	0.5
Chloromethane	3.0
Diesel	100.0
Lead	15.0
Tetrachloroethene	5.0
Total Petroleum Hydrocarbons Gasoline	50.0
Xylenes	17.0
Trichloroethene	5.0
cis-1,2-Dichloroethene	6.0

MBS 39MW02	WT	Tetrachloroethene	0.2F	NS	NS	NS
		Trichloroethene	0.5F	NS	NS	NS
MBS 39MW03	Bu	Tetrachloroethene	NS	2.1	NS	NS
MBS 39MW04	Bu	Tetrachloroethene	2.8J	NS	NS	NS
MBS EW-12AB	WT/B	Tetrachloroethene	NS	0.9	NS	NS
MBS EW-2AR	WT/A	1,1-Dichloroethene	NS	1.2	NS	NS
		1,2-Dichloroethane	NS	0.1F	NS	NS
		Carbon Tetrachloride	NS	**12**	NS	NS
		cis-1,2-Dichloroethene	NS	0.4F	NS	NS
		Tetrachloroethene	NS	**7.5**	NS	NS
		Trichloroethene	NS	**15**	NS	NS
MBS EW-5B	B	Carbon Tetrachloride	NS	0.4FJ	NS	NS
		Tetrachloroethene	NS	4.9J	NS	NS
MBS EW6ABu	WT	Tetrachloroethene	NS	0.2F	NS	NS
		Trichloroethene	NS	0.2F	NS	NS
MBS EW-6B	B	Carbon Tetrachloride	NS	0.1F	NS	NS
		Tetrachloroethene	NS	1.9	NS	NS
		Trichloroethene	NS	0.3F	NS	NS
MBS EW7ABu	WT/Bu	Tetrachloroethene	NS	1.5	NS	NS
		Trichloroethene	NS	0.3F	NS	NS
MBS EW-8B	B	Tetrachloroethene	NS	2.8	NS	NS
		Trichloroethene	NS	0.1F	NS	NS
MBS PZ-42S	B	Tetrachloroethene	NS	2.7	NS	NS

Notes:

Bold values exceed the aquifer cleanup level

Greater data value was used for samples with field duplicates

F = estimated concentration between detection limit and reporting limit

J = estimated concentration

M = matrix interference

NS = not sampled

µg/L = micrograms per liter

TABLE 6-2

2012 Operation Rates and Volatile Organic COC Mass Removed by Main Base/SAC Area Plume Treatment System and Extraction Wells Former Mather Air Force Base Sacramento County, California

Well	HSU	Set Point Flow Rate	Quarterly Avg. Flow Rate (gpm)				Volatile Organic COC Concentration (µg/L)				Volatile Organic COCs - Yearly Mass Removed (lbs)
			1Q12	2Q12	3Q12	4Q12	1Q12	2Q12	3Q12	4Q12	
Main Base/SAC Area Plume Treatment Plant Influent (MBS PTI)	-	-	1433.4	1485.3	1488.1	1476.5	12.9	14.1	11.5	12.9	117.6
MBS IW-501	LMT	250	212.5	184.5	175.4	223.5	N/A	N/A	N/A	N/A	N/A
MBS IW-502	LMT	280	348.9	326.8	310.6	272.9	N/A	N/A	N/A	N/A	N/A
MBS IW-503	LMT	480	578.5	529.3	499.9	492.1	N/A	N/A	N/A	N/A	N/A
MBS IW-504	LMT	40	19.7	18.2	6.7	15.8	N/A	N/A	N/A	N/A	N/A
MBS EW-2AR	WT/A	6	5.9	5.9	5.8	5.9	NS	37.7	NS	NS	0.97
MBS EW-1ABu	WT/Bu	8	7.7	8.9	9.7	9.8	NS	NS	NS	NS	2.70*
MBS EW-2ABu	WT/Bu	13	73.3	22.3	12.6	12.7	NS	NS	NS	NS	9.50*
MBS EW-4ABu	WT/Bu	10	8.0	7.5	9.1	7.4	NS	NS	NS	NS	1.52*
MBS EW-5ABu	WT/Bu	6	5.8	7.4	9.8	8.3	NS	NS	NS	NS	2.08*
39EW-1ABuB	WT/B	35	24.4	19.1	16.8	14.2	NS	NS	NS	NS	0.00
MBS EW-1B	B	80	57.5	65.0	68.6	68.2	NS	NS	NS	NS	1.85*
MBS EW-2B	B	100	13.4	96.3	98.1	97.4	NS	NS	NS	NS	9.04*
MBS EW-3B	B	70	69.7	74.7	79.2	79.3	NS	NS	NS	NS	4.65*
MBS EW-4B	B	50	33.2	33.4	33.7	27.8	NS	NS	NS	NS	0.59*
MBS EW-5B	B	48	18.6	18.4	18.5	39.3	NS	NS	NS	NS	1.08*
MBS EW-6B	B	60	58.1	88.4	98.9	66.5	NS	NS	NS	NS	0.99*
MBS EW-7B	B	40	34.3	33.1	32.5	31.5	NS	NS	NS	NS	0.82*
MBS EW-9B	B	90	87.8	83.4	81.6	85.0	NS	NS	NS	NS	2.85*
MBS EW-10B	B	100	81.0	80.4	80.4	80.2	NS	NS	NS	NS	9.11*

TABLE 6-2 (Continued)

Well	HSU	Set Point Flow Rate	Quarterly Avg. Flow Rate (gpm)				Volatile Organic COC Concentration (µg/L)				Volatile Organic COCs - Yearly Mass Removed (lbs)
			1Q12	2Q12	3Q12	4Q12	1Q12	2Q12	3Q12	4Q12	
MBS EW-11B	B	78	77.6	76.8	77.1	77.2	NS	NS	NS	NS	1.42*
MBS EW-12B	B	150	149.3	147.8	148.3	135.4	NS	NS	NS	NS	0.19*
MBS EW-13BuB	Bu/B	125	143.1	136.3	130.6	137.5	NS	NS	NS	NS	10.03*
MBS EW-1Bu	WT/Bu	5	4.0	6.5	4.8	9.0	NS	NS	NS	NS	0.07*
MBS EW-4Bu	WT/Bu	52	43.2	40.8	40.4	41.3	NS	NS	NS	NS	4.92*
MBS EW-1D	D	120	110.7	107.4	100.3	101.2	NS	NS	NS	NS	29.17*
MBS EW-2D	D	50	42.2	50.2	50.5	50.8	NS	NS	NS	NS	5.78*
MBS EW-3D	D	42	41.8	34.0	35.1	44.3	NS	NS	NS	NS	9.36*
MBS EW-4D	D	52	43.8	43.1	46.4	46.7	NS	NS	NS	NS	4.87*
MBS EW-5D	D	100	99.5	98.5	98.8	98.0	NS	NS	NS	NS	2.42*
MBS EW-6D	D	100	99.5	99.7	100.5	101.6	NS	NS	NS	NS	1.58*

Notes:

µg/L - micrograms per liter
Avg = average
COC - contaminant of concern
gpm - gallons per minute
HSU = hydrostratigraphic unit
lbs - pounds
N/A - not applicable
NS - not sampled
* Value calculated using volatile organic COC concentrations from 2Q12 samples.

TABLE 6-3

2012 Main Base/SAC Area and Morrison Creek Discharge Monitoring
Former Mather Air Force Base
Sacramento County, California

Date Sampled	Sample Location	Specific Conductivity (µmhos/cm)	pH (pH units)	Temperature (Degrees Celsius)	TCE Concentration (µg/L)	Total VOCs Concentration (µg/L)
01/03/12	MC-R1	129	7.48	10.4	<0.10	ND
01/03/12	MC-R2	145	7.44	15.2	<0.10	ND
01/03/12	MBS Effluent	231	7.47	16.3	<0.10	ND
04/03/12	MC-R1	113	7.1	12.5	<0.10	ND
04/03/12	MC-R2	118	7.32	12.6	<0.10	ND
04/03/12	MBS Effluent	208	7.73	18.9	<0.10	0.1F[a]
07/02/12	MC-R1	249	6.78	22.9	<0.10	ND
07/02/12	MC-R2	156	8.86	26.1	<0.10	ND
07/02/12	MBS Effluent	258	7.73	23.8	<0.10	0.9F[b]
08/07/12	MBS Effluent	255	7.99	24.1	NA	NA
09/04/12	MBS Effluent	251	8	21.7	NA	NA
10/03/12	MC-R1	204	7.21	22.5	<0.10	ND
10/03/12	MC-R2	143	8.59	26.4	<0.10	ND
10/03/12	MBS Effluent	326	8.1	21.2	<0.10	ND
11/07/12	MBS Effluent	248	8.71	20.5	NA	NA
12/05/12	MBS Effluent	280	8.02	19.2	NA	NA

Notes:

[a] chlorobenzene

[b] bromoform

F = estimated concentration

NA - not analyzed

ND = no contaminants detected

MBS = Main Base/SAC Area

MC-R1 = Morrison Creek upgradient sampling location

MC-R2 = Morrison Creek downgradient sampling location

µg/L = micrograms per liter

µmhos/cm = micromhos per centimeter

TABLE 7-1

2012 Analytical Detection Summary
Off-Base Monitoring Program
Former Mather Air Force Base
Sacramento County, California

Well ID	Unit	Plume	Analyte	1Q12	2Q12	3Q12	4Q12
MAFB-322	B	MBP	Chloroform	ND	ND	0.15F	0.19F
			Tetrachloroethene	ND	ND	ND	0.088F
MAFB-323	B	MBP	Chloroform	0.12F	0.21F	0.14F	0.21F
			Tetrachloroethene	ND	ND	ND	0.076F
MAFB-324	B	MBP	Bromodichloromethane	ND	ND	ND	0.12F
			Chloroform	0.34F	0.44F	0.35F	0.32F
			Tetrachloroethene	0.19F	0.22	0.19F	0.25
MAFB-326	D	MBP	Carbon Tetrachloride	0.086F	ND	ND	0.19F
			Tetrachloroethene	ND	ND	ND	0.089F
MAFB-327	D	MBP	Carbon Tetrachloride	1.1	1.3	1.9	1.1M
			Chloroform	0.07F	ND	0.14F	0.097F
			P-Cymene (p-Isopropyltoluene)	ND	ND	0.14F	ND
			Tetrachloroethene	0.096F	0.15F	ND	0.14F
MAFB-328	D	MBP	Chloroform	0.23F	0.34F	0.28F	0.26F
			Bromodichloromethane	0.065F	ND	0.053F	0.063F
			Tetrachloroethene	0.098F	ND	0.12F	0.18F
MAFB-330	B	MBP	1,1-Dichloroethane	ND	0.19F	ND	ND
			1,3,5-Trimethylbenzene	ND	0.036BF	ND	ND
			Carbon Tetrachloride	ND	0.94	ND	ND
			Chloroform	ND	0.17FJ	ND	ND
			cis-1,2-Dichloroethene	ND	0.21F	ND	ND
			Tetrachloroethene	ND	0.64	ND	ND
			Trichloroethene	ND	0.8	ND	ND
MAFB-337	Dd	MBP	All Analytes	ND	ND	ND	ND
MAFB-338	Dd	MBP	Benzene	0.054F	ND	ND	ND
			Tetrachloroethene	ND	ND	ND	0.11F
			Toluene	ND	ND	ND	0.13F
MAFB-378B	B	MBP	Chloroform	0.7	0.7	1.4	1
MAFB-378D	D	MBP	All Analytes	ND	ND	ND	ND
MAFB-397	Dd	MBP	Chloromethane	ND	0.1F	ND	ND
OFB-04		MBP	Carbon Tetrachloride	NS	0.17F	NS	NS
OFB-06			All Analytes	NS	ND	NS	NS
OFB-07			cis-1,2-Dichloroethene	NS	0.3F	NS	NS
			Tetrachloroethene	NS	0.3F	NS	NS
			Trichloroethene	NS	1.6	NS	NS
OFB-12		MBP	Tetrachloroethene	NS	1.1	NS	NS
			Trichloroethene	NS	1.7	NS	NS
OFB-17		MBP	All Analytes	NS	ND	NS	NS
OFB-24		MBP	Chloroform	NS	0.8	NS	NS
			Tetrachloroethene	NS	2	NS	NS
			Trichloroethene	NS	0.7	NS	NS
OFB-27		MBP	Bromodichloromethane	ND	ND	ND	0.03F
			Chloroform	0.24F	0.088F	ND	0.18F
			Tetrachloroethene	ND	ND	ND	0.099F
			Trichloroethene	ND	0.043F	ND	ND
OFB-32		MBP	Chloroform	0.063F	ND	ND	ND
			Hexachlorobutadiene	0.11BF	ND	ND	ND
			P-Cymene (p-Isopropyltoluene)	0.041BF	ND	ND	ND
			n-Butylbenzene	0.057BF	ND	ND	ND
			Tetrachloroethene	0.057F	0.053F	ND	0.1F

TABLE 7-1 (Continued)

Well ID	Unit	Plume	Analyte	1Q12	2Q12	3Q12	4Q12
OFB-39		SWL	All Analytes	NS	ND	NS	NS
OFB-40		Site 7	All Analytes	NS	ND	NS	NS
OFB-43		Site 7	All Analytes	NS	ND	NS	NS
OFB-47		Site 7	All Analytes	NS	ND	NS	NS
OFB-48		Site 7	All Analytes	NS	ND	NS	NS
OFB-49		MBP	All Analytes	NS	ND	ND	ND
OFB-51		MBP	Carbon Tetrachloride	ND	0.85	1.5	0.59
			Chloroform	ND	0.095F	ND	0.077F
			cis-1,2-Dichloroethene	ND	ND	ND	0.077F
			Tetrachloroethene	ND	ND	ND	0.062F
OFB-52		MBP	1,1-Dichloroethane	ND	0.066F	ND	ND
			Carbon Tetrachloride	ND	0.27	1.1	0.25
			Chloroform	ND	0.059F	ND	0.04F
			cis-1,2-Dichloroethene	ND	0.24F	ND	0.21F
			Tetrachloroethene	ND	0.096F	ND	0.17F
			Trichloroethene	ND	0.21	ND	0.11F
OFB-53		Site 7	All Analytes	NS	ND	NS	NS
OFB-54		MBP	1,1-Dichloroethene	0.22F	0.38F	ND	0.24F
			Bromodichloromethane	0.52	ND	ND	ND
			Bromoform	1.1	ND	ND	ND
			Chloroform	1.4	0.7	0.28F	0.56
			Dibromochloromethane	0.72	ND	ND	ND
			n-Butylbenzene	0.042BF	ND	ND	ND
			P-Cymene (p-Isopropyltoluene)	0.035BF	ND	ND	ND
			Tetrachloroethene	ND	ND	ND	0.069F
OFB-55		MBP	Chloroform	0.13F	0.16F	0.32F	0.14F
OFB-56		MBP	All Analytes	ND	ND	ND	ND
OFB-57		SWL	All Analytes	NS	ND	NS	NS
OFB-67		SWL	All Analytes	NS	ND	NS	NS
OFB-69		SWL	All Analytes	NS	ND	NS	NS
OFB-71		SWL	All Analytes	NS	ND	NS	NS
OFB-72		SWL	cis-1,2-Dichloroethene	ND	0.2F	0.2FJ	0.1FJ
			Tetrachloroethene	0.1F	0.3F	0.3FJ	0.3FJ
			Trichloroethene	1.6J	2.1	1.9J	1.7J
OFB-73		SWL	All Analytes	NS	ND	NS	NS
OFB-74		SWL	All Analytes	NS	ND	NS	NS
OFB-75		SWL	All Analytes	NS	ND	NS	NS
OFB-76		SWL	All Analytes	NS	ND	NS	NS
OFB-77		SWL	All Analytes	NS	ND	NS	NS
OFB-78		SWL	All Analytes	NS	ND	NS	NS
OFB-79		SWL	All Analytes	ND	ND	ND	ND
OFB-80		SWL	All Analytes	ND	ND	ND	ND
OFB-81		SWL	All Analytes	NS	ND	NS	NS
OFB-82		SWL	All Analytes	NS	ND	NS	NS
OFB-84		SWL	All Analytes	NS	ND	NS	NS
OFB-85		SWL	All Analytes	NS	ND	NS	NS
OFB-86		SWL	All Analytes	NS	ND	NS	NS

Notes:
B= Blank
F = estimated concentration between detection limit and reporting limit
J= estimated concentration
M= matrix interference
MBP = Main Base/SAC Area Plume
ND= not detected
NS = not sampled
SWL = Southwest Lobe

TABLE 8-1

Summary of Completeness by Method, 2012, Mather AFB

Method	Number of Samples[a]	Number of Analytes	Total Number of Results	Number of Estimated Results	Number of Rejected Results	Percent Completeness
General Chemistry						
A2320	33	4	132	0	0	100
A2540C	33	1	33	10	0	100
E130.2	14	1	14	0	0	100
E160.2	13	1	13	4	0	100
E300.0	99	33 (chloride and sulfate) 24 (nitrite) 9 (fluoride)	99	1	0	100
E376.2	9	1	9	1	0	100
Total Petroleum Hydrocarbons						
M8015D	20	1	20	15	0	100
M8015V	33	1	33	30	0	100
Metals						
SW6010B	63	23 (15 metals) 32 (7 metals) 8 (nickel only)	577	61	0	100
SW6020 (filtered and dissolved)	52	7 (15 metals) 16 (lead only) 13 (selenium only) 23 (thallium only)	157	40	0	100
SW7196A	13	1	13	2	0	100
SW7470A	21	1	21	14	0	100
Volatile Organic Compounds						
E524.2	111	59	6,549	188	0	100
SW8260B	264	204 (11 Analytes) 60 (35 Analytes)	4,344	234	0	100
Toxicity						
E821R02012	1	1	1	0	0	100
E821R02013	1	3	3	0	0	100

[a] Includes only normal samples

TABLE 8-2

2012 Qualified Results
Former Mather Air Force Base
Sacramento County, California

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
Method A2540C							
MBS PTI-0101-NS	1/3/2012	Total Dissolved Solids	190	10	MG/L	J	3C
MBS PTE SW-0401-NS	4/3/2012	Total Dissolved Solids	180	10	MG/L	J	3C
MBS PTI-0401-NS	4/3/2012	Total Dissolved Solids	170	10	MG/L	J	3C
MAFB-400-NS	5/4/2012	Total Dissolved Solids	350	10	MG/L	J	3C
MBS PTE SW-0701-NS	7/2/2012	Total Dissolved Solids	160	10	MG/L	J	3A
MBS PTI-0701-NS	7/2/2012	Total Dissolved Solids	160	10	MG/L	J	3A
7-PTE-0701-NS	7/2/2012	Total Dissolved Solids	230	10	MG/L	J	3A
7-PTI-0701-NS	7/2/2012	Total Dissolved Solids	240	10	MG/L	J	3A
ACW PTE-0701-NS	7/2/2012	Total Dissolved Solids	110	10	MG/L	J	3A
ACW PTI-0701-NS	7/2/2012	Total Dissolved Solids	96	10	MG/L	J	3A
Method E160.2							
MC-R2-0401-NS	4/3/2012	Total Suspended Solids	6	5	MG/L	J	3B
MC-R1-0701-NS	7/2/2012	Total Suspended Solids	7	5	MG/L	J	3A
MC-R1-1001-NS	10/3/2012	Total Suspended Solids	80	5	MG/L	J	3A
MC-R2-1001-NS	10/3/2012	Total Suspended Solids	6	5	MG/L	J	3A
Method E300.0							
MAFB-465-NS	11/30/2012	Fluoride	0.048	0.100	MG/L	F	6G
Method E376.2							
MAFB-398-NS	5/8/2012	Sulfide	0.000	0.040	MG/L	UJ	3D
Method E524.2							
JH INFLUENT-NS	1/25/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	M	2B-
		1,2,3-Trichlorobenzene	0.000	0.500	ug/L	M	2B-
		1,2,3-Trichloropropane	0.000	0.500	ug/L	M	2B-
		1,2-Dibromo-3-Chloroprop	0.000	2.000	ug/L	M	2B-
		1,2-Dibromoethane	0.000	0.500	ug/L	M	2B-
		1,3-Dichloropropane	0.000	0.500	ug/L	M	2B-
		Bromomethane	0.000	0.500	ug/L	M	2B-
		Dibromochloromethane	0.000	0.500	ug/L	M	2B-
		Styrene	0.000	0.500	ug/L	M	2B-
JH MID-GAC-NS	1/25/2012	Chloroform	0.067	0.500	ug/L	F	6G
		cis-1,2-Dichloroethene	0.180	0.500	ug/L	F	6G
JH2-NS	1/25/2012	Chloroform	0.070	0.500	ug/L	F	6G
JH2-NS	1/25/2012	cis-1,2-Dichloroethene	0.200	0.500	ug/L	F	6G
MAFB-322-NS	2/14/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
MAFB-323-NS	2/14/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
MAFB-323-NS	2/14/2012	Chloroform	0.120	0.500	ug/L	F	6G
MAFB-324-NS	2/16/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
MAFB-324-NS	2/16/2012	Chloroform	0.340	0.500	ug/L	F	6G
MAFB-324-NS	2/16/2012	Tetrachloroethene	0.190	0.200	ug/L	F	6G
MAFB-326-NS	2/14/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Carbon Tetrachloride	0.086	0.200	ug/L	F	6G
MAFB-327-NS	2/14/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Chloroform	0.070	0.500	ug/L	F	6G
		Tetrachloroethene	0.088	0.200	ug/L	F	6G
MAFB-328-NS	2/16/2012	Bromodichloromethane	0.065	0.500	ug/L	F	6G
		Chloroform	0.230	0.500	ug/L	F	6G
		Tetrachloroethene	0.098	0.200	ug/L	F	6G
MAFB-337-NS	2/14/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
MAFB-338-NS	2/16/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Benzene	0.054	0.500	ug/L	F	6G
MAFB-349-NS	2/14/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
JH INFLUENT-NS	2/29/2012	1,1-Dichloroethane	0.066	0.500	ug/L	F	6G
		Chloroform	0.097	0.500	ug/L	F	6G
		Tetrachloroethene	0.074	0.200	ug/L	F	6G
		Trichloroethene	0.088	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.170	0.500	ug/L	F	6G
JH MID-GAC-NS	2/29/2012	1,1-Dichloroethane	0.066	0.500	ug/L	F	6G
		Chloroform	0.130	0.500	ug/L	F	6G
JH MID-GAC-NS	2/29/2012	cis-1,2-Dichloroethene	0.180	0.500	ug/L	F	6G
MOONBEAM INFLUENT-NS	2/29/2012	Carbon Tetrachloride	0.120	0.200	ug/L	F	6G
		Chloroform	0.062	0.500	ug/L	F	6G
JH EFFLUENT-NS	2/29/2012	Chloroform	0.099	0.500	ug/L	F	6G
MARS-NS	2/29/2012	1,2-Dibromo-3-Chloroprop	0.000	2.000	ug/L	M	2B-
		2,2-Dichloropropane	0.000	0.500	ug/L	M	2B-
		Chloroform	0.240	0.500	ug/L	F	6G
NUT PLAINS-NS	2/29/2012	Chloroform	0.063	0.500	ug/L	F	6G
		Tetrachloroethene	0.057	0.200	ug/L	F	6G
SOUTH PORT-NS	2/29/2012	1,1-Dichloroethene	0.220	0.500	ug/L	F	6G
		Chloroform	0.380	0.500	ug/L	F	6G
WEST PORTER-NS	2/29/2012	Chloroform	0.130	0.500	ug/L	F	6G
JH INFLUENT-NS	3/28/2012	1,1-Dichloroethane	0.069	0.500	ug/L	F	6G
		Chloroform	0.055	0.500	ug/L	BF	1B,6G
		Tetrachloroethene	0.160	0.200	ug/L	F	6G
		Trichloroethene	0.190	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.240	0.500	ug/L	F	6G
		n-Butylbenzene	0.072	0.500	ug/L	BF	1B,6G
JH MID-GAC-NS	3/28/2012	1,1-Dichloroethane	0.088	0.500	ug/L	F	6G
		1,3,5-Trimethylbenzene	0.038	0.500	ug/L	F	6G
		Chloroform	0.068	0.500	ug/L	BF	1B,6G
		Hexachlorobutadiene	0.140	0.500	ug/L	BF	1B,6G
		P-Cymene (p-Isopropyltolu	0.034	0.500	ug/L	BF	1B,6G
		n-Butylbenzene	0.065	0.500	ug/L	BF	1B,6G
NUT PLAINS-NS	3/28/2012	Hexachlorobutadiene	0.110	0.500	ug/L	BF	1B,6G
		P-Cymene (p-Isopropyltolu	0.041	0.500	ug/L	BF	1B,6G
		n-Butylbenzene	0.057	0.500	ug/L	BF	1B,6G
SOUTH PORT-NS	3/28/2012	P-Cymene (p-Isopropyltolu	0.035	0.500	ug/L	BF	1B,6G
		n-Butylbenzene	0.042	0.500	ug/L	BF	1B,6G
JH INFLUENT-NS	4/24/2012	1,1-Dichloroethane	0.096	0.500	ug/L	F	6G
		Tetrachloroethene	0.053	0.200	ug/L	F	6G
		Trichloroethene	0.150	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.230	0.500	ug/L	F	6G
JH MID-GAC-NS	4/24/2012	1,1-Dichloroethane	0.130	0.500	ug/L	F	6G
		Chloroform	0.063	0.500	ug/L	F	6G
MAFB-323-NS	5/4/2012	Chloroform	0.210	0.500	ug/L	F	6G
MAFB-324-NS	5/4/2012	Chloroform	0.440	0.500	ug/L	F	6G
MAFB-327-NS	5/4/2012	Tetrachloroethene	0.150	0.200	ug/L	F	6G
MAFB-328-NS	5/4/2012	Chloroform	0.340	0.500	ug/L	F	6G
MAFB-330-NS	5/4/2012	1,3,5-Trimethylbenzene	0.036	0.500	ug/L	BF	1A,6G
		Chloroform	0.120	0.500	ug/L	FJ	3D,6G
		cis-1,2-Dichloroethene	0.210	0.500	ug/L	F	6G
MAFB-338-NS	5/4/2012	Toluene	0.130	0.500	ug/L	F	6G
MAFB-349-NS	5/4/2012	Total Xylenes	0.290	0.500	ug/L	F	6G
JH INFLUENT-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		1,1-Dichloroethane	0.092	0.500	ug/L	F	6G
		Chloroform	0.063	0.500	ug/L	F	6G
		Tetrachloroethene	0.066	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.300	0.500	ug/L	F	6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
JH MID-GAC-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		1,1-Dichloroethane	0.200	0.500	ug/L	F	6G
		Chloroform	0.130	0.500	ug/L	F	6G
JH1-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Chloroform	0.095	0.500	ug/L	F	6G
JH2-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		1,1-Dichloroethane	0.066	0.500	ug/L	F	6G
		Chloroform	0.059	0.500	ug/L	F	6G
		Tetrachloroethene	0.096	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.240	0.500	ug/L	F	6G
NUT PLAINS-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Tetrachloroethene	0.053	0.200	ug/L	F	6G
MARS-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Chloroform	0.088	0.500	ug/L	F	6G
		Trichloroethene	0.043	0.200	ug/L	F	6G
MOONBEAM-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Carbon Tetrachloride	0.170	0.200	ug/L	F	6G
TALLYHO#2-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
SOUTH PORT-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		1,1-Dichloroethene	0.380	0.500	ug/L	F	6G
WESTPORTER-NS	5/30/2012	1,1,2,2-Tetrachloroethane	0.000	0.500	ug/L	UJ	5A
		Chloroform	0.160	0.500	ug/L	F	6G
JH INFLUENT-NS	6/27/2012	P-Cymene (p-Isopropyltolu	0.084	0.500	ug/L	F	6G
		Trichloroethene	0.100	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.140	0.500	ug/L	F	6G
JH INFLUENT-NS	7/25/2012	Chloroform	0.050	0.500	ug/L	F	6G
JH MID-GAC-NS	7/25/2012	1,1-Dichloroethane	0.077	0.500	ug/L	F	6G
		1,2,3-Trichlorobenzene	0.000	0.500	ug/L	M	2B-
		1,2,3-Trichloropropane	0.000	0.500	ug/L	M	2B-
		1,2-Dibromo-3-Chloroprop	0.000	2.000	ug/L	M	2B-
		Bromomethane	0.000	0.500	ug/L	M	2B-
		Chloroform	0.120	0.500	ug/L	F	6G
		cis-1,2-Dichloroethene	0.041	0.500	ug/L	F	6G
		trans-1,3-Dichloropropene	0.000	0.500	ug/L	M	2B-
MOONBEAM-NS	8/1/2012	Chloroform	0.044	0.500	ug/L	F	6G
MAFB-322-NS	8/30/2012	Chloroform	0.150	0.500	ug/L	F	6G
MAFB-323-NS	8/29/2012	Chloroform	0.140	0.500	ug/L	F	6G
MAFB-324-NS	8/30/2012	Chloroform	0.350	0.500	ug/L	F	6G
		Tetrachloroethene	0.190	0.200	ug/L	F	6G
MAFB-327-NS	8/29/2012	Chloroform	0.140	0.500	ug/L	F	6G
MAFB-327-NS	8/29/2012	P-Cymene (p-Isopropyltolu	0.140	0.500	ug/L	F	6G
MAFB-328-NS	8/30/2012	Bromodichloromethane	0.053	0.500	ug/L	F	6G
		Chloroform	0.280	0.500	ug/L	F	6G
		Tetrachloroethene	0.120	0.200	ug/L	F	6G
JH INFLUENT-NS	8/31/2012	1,1-Dichloroethane	0.077	0.500	ug/L	F	6G
		Chloroform	0.049	0.500	ug/L	F	6G
		cis-1,2-Dichloroethene	0.110	0.500	ug/L	F	6G
JH MID-GAC-NS	8/31/2012	Chloroform	0.110	0.500	ug/L	F	6G
		cis-1,2-Dichloroethene	0.098	0.500	ug/L	F	6G
SOUTH PORT-NS	9/12/2012	Chloroform	0.250	0.500	ug/L	F	6G
WEST PORTER-NS	9/12/2012	Chloroform	0.320	0.500	ug/L	F	6G
JH MID-GAC-NS	9/26/2012	Chloroform	0.140	0.500	ug/L	F	6G
MAFB-322-NS	11/29/2012	Chloroform	0.190	0.500	ug/L	F	6G
		Tetrachloroethene	0.088	0.200	ug/L	F	6G
MAFB-323-NS	11/27/2012	Chloroform	0.210	0.500	ug/L	F	6G
		Tetrachloroethene	0.076	0.200	ug/L	F	6G
MAFB-324-NS	11/29/2012	Bromodichloromethane	0.120	0.500	ug/L	F	6G
		Chloroform	0.320	0.500	ug/L	F	6G
MAFB-326-NS	11/29/2012	Carbon Tetrachloride	0.190	0.200	ug/L	F	6G
MAFB-326-NS	11/29/2012	Tetrachloroethene	0.089	0.200	ug/L	F	6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
MAFB-327-NS	11/27/2012	Carbon Tetrachloride	1.100	0.200	ug/L	M	2B+
		Chloroform	0.097	0.500	ug/L	F	6G
		Tetrachloroethene	0.140	0.200	ug/L	F	6G
MAFB-328-NS	11/29/2012	Bromodichloromethane	0.063	0.500	ug/L	F	6G
		Chloroform	0.260	0.500	ug/L	F	6G
		Tetrachloroethene	0.180	0.200	ug/L	F	6G
MAFB-338-NS	11/29/2012	Tetrachloroethene	0.110	0.200	ug/L	F	6G
		Vinyl Chloride	0.190	0.500	ug/L	F	6G
MARS-NS	11/28/2012	Bromodichloromethane	0.030	0.500	ug/L	F	6G
		Chloroform	0.180	0.500	ug/L	F	6G
		Tetrachloroethene	0.099	0.200	ug/L	F	6G
NUT PLAINS-NS	11/28/2012	Tetrachloroethene	0.100	0.200	ug/L	F	6G
JH1-NS	11/28/2012	Chloroform	0.077	0.500	ug/L	F	6G
		Tetrachloroethene	0.062	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.031	0.500	ug/L	F	6G
JH2-NS	11/28/2012	Chloroform	0.040	0.500	ug/L	F	6G
		Tetrachloroethene	0.170	0.200	ug/L	F	6G
		Trichloroethene	0.110	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.210	0.500	ug/L	F	6G
SOUTH PORT-NS	11/28/2012	1,1-Dichloroethene	0.240	0.500	ug/L	F	6G
		Tetrachloroethene	0.069	0.200	ug/L	F	6G
JH INFLUENT-NS	11/28/2012	Carbon Tetrachloride	0.310	0.200	ug/L	J	3D
		Chloroform	0.053	0.500	ug/L	F	6G
		Tetrachloroethene	0.140	0.200	ug/L	F	6G
		Trichloroethene	0.068	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.110	0.500	ug/L	F	6G
JH MID-GAC-NS	11/28/2012	1,1-Dichloroethane	0.091	0.500	ug/L	F	6G
		Chloroform	0.120	0.500	ug/L	F	6G
		Tetrachloroethene	0.076	0.200	ug/L	F	6G
		cis-1,2-Dichloroethene	0.085	0.500	ug/L	MF	6G,2B+
MOONBEAM EFFLUENT-NS	11/28/2012	Chloroform	0.130	0.500	ug/L	F	6G
MOONBEAM MID-GAC-NS	11/28/2012	Chloroform	0.041	0.500	ug/L	F	6G
MOONBEAM-NS	11/28/2012	Carbon Tetrachloride	0.100	0.200	ug/L	F	6G
		Tetrachloroethene	0.089	0.200	ug/L	F	6G
MOONBEAM MID-GAC-NS	12/18/2012	Chloroform	0.160	0.500	ug/L	F	6G
JH INFLUENT-NS	12/18/2012	Chloroform	0.056	0.500	ug/L	F	6G
		cis-1,2-Dichloroethene	0.120	0.500	ug/L	F	6G
JH MID-GAC-NS	12/18/2012	1,1-Dichloroethane	0.110	0.500	ug/L	F	6G
		Carbon Tetrachloride	0.085	0.200	ug/L	F	6G
		Chloroform	0.110	0.500	ug/L	F	6G
		cis-1,2-Dichloroethene	0.089	0.500	ug/L	F	6G
Method M8015D							
7-PTI-0101-NS	1/3/2012	Diesel	21	50	UG/L	BF	1A,6G
MBS PTE SW-0101-NS	1/3/2012	Diesel	11	50	UG/L	BF	1A,6G
MBS PTI-0101-NS	1/3/2012	Diesel	14	50	UG/L	BF	1A,6G
7-PTE-0401-NS	4/3/2012	Diesel	20	50	UG/L	F	6G
MAFB-413-NS	5/2/2012	Diesel	21	50	UG/L	BF	1A,6G
7-PZ-37P-NS	5/8/2012	Diesel	430	53	UG/L	J	6F
MAFB-149-NS	5/8/2012	Diesel	17	51	UG/L	F	6G
MAFB-284-NS	5/8/2012	Diesel	17	50	UG/L	F	6G
MBS PTE SW-0701-NS	7/2/2012	Diesel	16	50	UG/L	BF	1A,6G
MBS PTI-0701-NS	7/2/2012	Diesel	9	50	UG/L	BF	1A,6G
7-PTE-0701-NS	7/2/2012	Diesel	14	50	UG/L	BF	1A,6G
MBS PTE SW-1001-NS	10/3/2012	Diesel	38	50	UG/L	BF	1A,6G
MBS PTI-1001-NS	10/3/2012	Diesel	14	50	UG/L	BF	1A,6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
7-PTE-1001-NS	10/3/2012	Diesel	34	51	UG/L	BF	1A,6G
7-PTI-1001-NS	10/3/2012	Diesel	16	51	UG/L	BF	1A,6G
Method M8015V							
7-PTE-0101-NS	1/3/2012	Gasoline	16	50	UG/L	BF	1A,6G
7-PTI-0101-NS	1/3/2012	Gasoline	31	50	UG/L	BF	1A,6G
MBS PTE SW-0101-NS	1/3/2012	Gasoline	17	50	UG/L	BF	1A,6G
MBS PTI-0101-NS	1/3/2012	Gasoline	28	50	UG/L	BF	1A,6G
MAFB-214-NS	3/6/2012	Gasoline	18	50	UG/L	BF	1A,6G
MAFB-231-NS	3/5/2012	Gasoline	19	50	UG/L	BF	1A,6G
MAFB-234-NS	3/5/2012	Gasoline	20	50	UG/L	BF	1A,6G
MAFB-407-NS	3/5/2012	Gasoline	15	50	UG/L	BF	1A,6G
MAFB-421-NS	3/5/2012	Gasoline	17	50	UG/L	BF	1A,6G
MBS 39ABuB-NS	3/5/2012	Gasoline	14	50	UG/L	BF	1A,6G
MBS 39MW02-NS	3/6/2012	Gasoline	17	50	UG/L	BF	1A,6G
MBS 39MW04-NS	3/5/2012	Gasoline	20	50	UG/L	BF	1A,6G
7-PTE-0401-NS	4/3/2012	Gasoline	24	50	UG/L	BF	1A,6G
7-PTI-0401-NS	4/3/2012	Gasoline	33	50	UG/L	BF	1A,6G
MBS PTE SW-0401-NS	4/3/2012	Gasoline	22	50	UG/L	BF	1A,6G
MBS PTI-0401-NS	4/3/2012	Gasoline	32	50	UG/L	BF	1A,6G
MAFB-413-NS	5/2/2012	Gasoline	15	50	UG/L	BF	1A,6G
MAFB-436-NS	5/4/2012	Gasoline	15	50	UG/L	BF	1B,6G
MBS 39EW02-NS	5/4/2012	Gasoline	12	50	UG/L	BF	1B,6G
7-PZ-37P-NS	5/8/2012	Gasoline	21	50	UG/L	BF	1B,6G
MAFB-149-NS	5/8/2012	Gasoline	30	50	UG/L	BF	1B,6G
MAFB-284-NS	5/8/2012	Gasoline	11	50	UG/L	BF	1B,6G
MBS PTE SW-0701-NS	7/2/2012	Gasoline	16	50	UG/L	BF	1A,6G
MBS PTI-0701-NS	7/2/2012	Gasoline	19	50	UG/L	BF	1A,6G
7-PTE-0701-NS	7/2/2012	Gasoline	11	50	UG/L	BF	1A,6G
7-PTI-0701-NS	7/2/2012	Gasoline	17	50	UG/L	BF	1A,6G
MBS PTI-1001-NS	10/3/2012	Gasoline	12	50	UG/L	F	6G
7-PTI-1001-NS	10/3/2012	Gasoline	15	50	UG/L	F	6G
MAFB-274-NS	11/8/2012	Gasoline	18	50	UG/L	BF	1A,6G
MAFB-419-NS	11/8/2012	Gasoline	26	50	UG/L	BF	1A,6G
Method SW6010B							
MBS PTE SW-0101-NF	1/3/2012	Barium	52.00	5.00	UG/L	J	6A
		Chromium	2.00	5.00	UG/L	F	6G
		Manganese	0.00	5.00	UG/L	M	2B-
MBS PTI-0101-NF	1/3/2012	Barium	54.00	5.00	UG/L	J	6A
		Chromium	2.00	5.00	UG/L	F	6G
		Selenium	3.80	10.00	UG/L	F	6G
7-PTE-0401-NF	4/3/2012	Calcium	30000.00	500.00	UG/L	M	2B-
		Manganese	0.18	5.00	UG/L	BF	1A,6G
		Zinc	6.50	20.00	UG/L	F	6G
7-PTI-0401-NF	4/3/2012	Zinc	4.80	20.00	UG/L	F	6G
ACW PTE-0401-NF	4/3/2012	Calcium	8900.00	500.00	UG/L	M	2B-
ACW PTI-0401-NF	4/3/2012	Manganese	0.20	5.00	UG/L	BF	1A,6G
		Zinc	8.00	20.00	UG/L	F	6G
MBS PTE SW-0401-NF	4/3/2012	Barium	56.00	5.00	UG/L	J	6A
		Chromium	3.50	5.00	UG/L	F	6G
MBS PTI-0401-NF	4/3/2012	Chromium	3.50	5.00	UG/L	F	6G
MAFB-133-NF	4/30/2012	Chromium	0.85	5.00	UG/L	F	6G
MAFB-398C-NF	4/30/2012	Chromium	0.52	5.00	UG/L	FJ	3D,6G
		Nickel	0.81	5.00	UG/L	F	6G
		Vanadium	2.30	5.00	UG/L	FJ	3D,6G
		Zinc	13.00	20.00	UG/L	BF	1A,6G
MAFB-399-NF	5/1/2012	Chromium	0.64	5.00	UG/L	F	6G
		Zinc	2.30	20.00	UG/L	BF	1A,6G
MAFB-413-NF	5/2/2012	Chromium	2.20	5.00	UG/L	F	6G
MAFB-400-NF	5/4/2012	Chromium	0.71	5.00	UG/L	F	6G
		Nickel	1.80	5.00	UG/L	F	6G
		Vanadium	4.10	5.00	UG/L	F	6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
MAFB-129-NF	5/8/2012	Chromium	1.50	5.00	UG/L	F	6G
		Nickel	1.80	5.00	UG/L	F	6G
MBS PTE SW-0701-NF	7/2/2012	Chromium	3.70	5.00	UG/L	F	6G
		Manganese	0.19	5.00	UG/L	F	6G
		Silver	0.00	5.00	UG/L	UJ	2E
		Zinc	4.20	20.00	UG/L	F	6G
MBS PTI-0701-NF	7/2/2012	Chromium	3.80	5.00	UG/L	F	6G
		Manganese	0.24	5.00	UG/L	F	6G
		Silver	0.00	5.00	UG/L	UJ	2E
		Zinc	5.70	20.00	UG/L	F	6G
7-PTE-0701-NF	7/2/2012	Manganese	0.56	5.00	UG/L	BF	1B,6G
7-PTI-0701-NF	7/2/2012	Zinc	7.30	20.00	UG/L	F	6G
ACW PTE-0701-NF	7/2/2012	Calcium	9800.00	500.00	UG/L	J	6A
		Magnesium	5100.00	500.00	UG/L	J	6A
		Zinc	4.40	20.00	UG/L	F	6G
ACW PTI-0701-NF	7/2/2012	Calcium	9200.00	500.00	UG/L	J	6A
		Magnesium	4800.00	500.00	UG/L	J	6A
		Zinc	6.90	20.00	UG/L	F	6G
MBS PTE SW-1001-NF	10/3/2012	Antimony	1.50	10.00	UG/L	BF	1A,6G
		Chromium	3.50	5.00	UG/L	F	6G
		Manganese	0.74	5.00	UG/L	BF	1A,6G
		Zinc	6.90	20.00	UG/L	BF	1A,6G
MBS PTI-1001-NF	10/3/2012	Chromium	3.50	5.00	UG/L	F	6G
		Zinc	11.00	20.00	UG/L	BF	1A,6G
ACW PTE-1001-NF	10/3/2012	Manganese	0.92	5.00	UG/L	BF	1A,6G
		Zinc	7.40	20.00	UG/L	BF	1A,6G
ACW PTI-1001-NF	10/3/2012	Manganese	0.68	5.00	UG/L	BF	1A,6G
		Zinc	9.70	20.00	UG/L	BF	1A,6G
7-PTE-1001-NF	10/3/2012	Manganese	0.39	5.00	UG/L	BF	1A,6G
		Zinc	8.70	20.00	UG/L	BF	1A,6G
7-PTI-1001-NF	10/3/2012	Manganese	2.10	5.00	UG/L	BF	1A,6G
		Zinc	9.20	20.00	UG/L	BF	1A,6G
MAFB-111-NF	11/6/2012	Nickel	2.40	5.00	UG/L	FJ	3D,6G
MAFB-132-NF	11/7/2012	Vanadium	2.30	5.00	UG/L	F	6G
Method SW6020							
MC-R1-0101-NF	1/3/2012	Lead	0.93	1.00	UG/L	BF	1A,6G
MC-R2-0101-NF	1/3/2012	Lead	0.69	1.00	UG/L	BF	1A,6G
		Selenium	0.32	1.00	UG/L	F	6G
MBS PTE SW-0401-NS	4/3/2012	Selenium	0.36	1.00	UG/L	BF	1A,6G
MC-R1-0401-NS	4/3/2012	Selenium	0.60	1.00	UG/L	BF	1A,6G
MC-R2-0401-NS	4/3/2012	Selenium	0.32	1.00	UG/L	F	6G
MAFB-133-NF	4/30/2012	Thallium	0.31	1.00	UG/L	F	6G
7-PZ-37P-NF	5/8/2012	Antimony	0.31	1.00	UG/L	F	6G
		Arsenic	0.86	1.00	UG/L	BF	1A,6G
		Beryllium	0.21	1.00	UG/L	F	6G
		Cadmium	0.42	1.00	UG/L	F	6G
		Chromium	0.66	1.00	UG/L	F	6G
		Cobalt	0.26	1.00	UG/L	F	6G
		Manganese	960.00	1.00	UG/L	J	6A
		Selenium	0.42	1.00	UG/L	BF	1A,6G
		Zinc	0.00	20.00	UG/L	M	2B-
MAFB-132-NF	5/9/2012	Antimony	0.27	1.00	UG/L	FJ	3D,6G
		Arsenic	0.69	1.00	UG/L	BF	1A,6G
		Selenium	0.38	1.00	UG/L	BF	1A,6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
MAFB-136-NF	5/9/2012	Antimony	0.28	1.00	UG/L	F	6G
		Manganese	0.69	1.00	UG/L	F	6G
		Selenium	0.72	1.00	UG/L	BF	1A,6G
MAFB-284-NF	5/8/2012	Antimony	0.15	1.00	UG/L	F	6G
		Selenium	0.41	1.00	UG/L	BF	1A,6G
MAFB-398-NF	5/8/2012	Antimony	0.15	1.00	UG/L	F	6G
		Arsenic	0.89	1.00	UG/L	BF	1A,6G
		Chromium	0.82	1.00	UG/L	FJ	3D,6G
		Manganese	0.73	1.00	UG/L	BF	1A,6G
		Selenium	0.26	1.00	UG/L	BF	1A,6G
MBS PTE SW-0701-NS	7/2/2012	Selenium	0.46	1.00	UG/L	F	6G
MC-R1-0701-NS	7/2/2012	Selenium	0.30	1.00	UG/L	F	6G
MC-R2-0701-NS	7/2/2012	Selenium	0.37	1.00	UG/L	F	6G
MBS PTE SW-0802-NS	8/7/2012	Lead	0.90	1.00	UG/L	BF	1A,6G
MC-R2-0802-NS	8/7/2012	Lead	0.47	1.00	UG/L	BF	1A,6G
MC-R1-1001-NS	10/3/2012	Lead	5.30	1.00	UG/L	J	3D
		Selenium	0.38	1.00	UG/L	F	6G
MAFB-465-NF	11/30/2012	Arsenic	0.62	1.00	UG/L	F	6G
		Chromium	0.43	1.00	UG/L	F	6G
		Copper	1.40	2.30	UG/L	BF	1A,6G
		Zinc	17.00	20.00	UG/L	F	6G
Method SW7196A							
MC-R2-0401-NS	4/4/2012	Chromium, Hexavalent	0.006	0.010	MG/L	F	6G
MBS PTE SW-0401-NS	4/3/2012	Chromium, Hexavalent	0.004	0.010	MG/L	F	6G
Method SW7470A							
MBS PTE SW-0401-NF	4/3/2012	Mercury	0.023	0.200	UG/L	BF	1A,6G
MBS PTI-0401-NF	4/3/2012	Mercury	0.036	0.200	UG/L	BF	1A,6G
MAFB-133-NF	4/30/2012	Mercury	0.043	0.200	UG/L	BF	1A,1F,6G
MAFB-398C-NF	4/30/2012	Mercury	0.059	0.200	UG/L	BF	1A,1F,6G
MAFB-399-NF	5/1/2012	Mercury	0.062	0.200	UG/L	BF	1A,1F,6G
MAFB-413-NF	5/2/2012	Mercury	0.057	0.200	UG/L	BF	1A,1F,6G
7-PZ-37P-NF	5/8/2012	Mercury	0.037	0.200	UG/L	BF	1A,6G
MAFB-132-NF	5/9/2012	Mercury	0.047	0.200	UG/L	BF	1A,6G
MAFB-136-NF	5/9/2012	Mercury	0.048	0.200	UG/L	BF	1A,6G
MAFB-149-NF	5/8/2012	Mercury	0.043	0.200	UG/L	BF	1A,6G
MAFB-284-NF	5/8/2012	Mercury	0.049	0.200	UG/L	BF	1A,6G
MAFB-398-NF	5/8/2012	Mercury	0.047	0.200	UG/L	BF	1A,6G
MBS PTE SW-1001-NF	10/3/2012	Mercury	0.130	0.200	UG/L	F	6G
MBS PTI-1001-NF	10/3/2012	Mercury	0.110	0.200	UG/L	F	6G
Method SW8260B							
7-PTE-0101-NS	1/3/2012	Bromomethane	0.0	10.0	UG/L	UJ	5B-
7-PTI-0101-NS	1/3/2012	1,1-Dichloroethane	0.5	1.0	UG/L	F	6G
		1,1-Dichloroethene	0.2	0.5	UG/L	F	6G
		1,2-Dichloropropane	0.3	1.0	UG/L	F	6G
		Bromomethane	0.0	10.0	UG/L	UJ	5B-
MBS PTE SW-0101-NS	1/3/2012	Bromomethane	0.0	10.0	UG/L	UJ	5B-
MBS PTI-0101-NS	1/3/2012	Bromomethane	0.0	10.0	UG/L	UJ	5B-
		Chloroform	0.2	0.5	UG/L	F	6G
MC-R1-0101-NS	1/3/2012	Bromomethane	0.0	10.0	UG/L	M	2B-
MAFB-300-NS	1/5/2012	Trichloroethene	0.1	0.5	UG/L	F	6G
7-PTE-0202-NS	2/7/2012	Bromomethane	0.0	10.0	UG/L	UJ	5A-
		Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	5A-
ACW PTE-0202-NS	2/7/2012	Bromomethane	0.0	10.0	UG/L	UJ	5A-
		Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	5A-
MBS PTE SW-0202-NS	2/7/2012	Bromomethane	0.0	10.0	UG/L	UJ	5A-
		Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	5A-
MAFB-181-NS	2/15/2012	Chloroform	0.2	0.5	UG/L	F	6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
MAFB-460Bd-NS	2/15/2012	cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G
		Tetrachloroethene	0.4	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.3	0.5	UG/L	F	6G
		Trichloroethene	0.2	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.1	0.5	UG/L	F	6G
MAFB-462-NS	2/15/2012	Chloroform	0.1	0.5	UG/L	F	6G
		Chloromethane	0.2	0.5	UG/L	F	6G
MAFB-463D-NS	2/14/2012	Carbon Tetrachloride	0.4	0.5	UG/L	F	6G
MAFB-463Dd-NS	2/14/2012	Chloroform	0.2	0.5	UG/L	F	6G
OFB-72-NS	2/15/2012	Tetrachloroethene	0.1	0.5	UG/L	F	6G
		Trichloroethene	1.6	0.5	UG/L	J	3D
MAFB-214-NS	3/6/2012	Tetrachloroethene	0.3	0.5	UG/L	F	6G
		Trichloroethene	0.1	0.5	UG/L	F	6G
MAFB-231-NS	3/5/2012	Chloroform	0.2	0.5	UG/L	BF	1B,6G
MAFB-234-NS	3/5/2012	Chloroform	0.2	0.5	UG/L	BF	1B,6G
MAFB-407-NS	3/5/2012	Chloroform	0.1	0.5	UG/L	BF	1B,6G
		Tetrachloroethene	0.4	0.5	UG/L	JF	6G,2C+
MAFB-421-NS	3/5/2012	Chloroform	0.1	0.5	UG/L	BF	1B,6G
		Trichloroethene	0.3	0.5	UG/L	F	6G
MBS 39ABuB-NS	3/5/2012	Chloroform	0.2	0.5	UG/L	BF	1B,6G
MBS 39MW02-NS	3/6/2012	Bromomethane	0.1	10.0	UG/L	F	6G
		Tetrachloroethene	0.2	0.5	UG/L	F	6G
		Trichloroethene	0.5	0.5	UG/L	F	6G
MBS 39MW04-NS	3/5/2012	1,1,1-Trichloroethane	0.0	1.0	UG/L	UJ	4D
		1,1,2,2-Tetrachloroethane	0.0	1.0	UG/L	UJ	4D
		1,1,2-Trichloroethane	0.0	1.0	UG/L	UJ	4D
		1,1-Dichloroethane	0.0	1.0	UG/L	UJ	4D
		1,1-Dichloroethene	0.0	0.5	UG/L	UJ	4D
		1,2-Dichlorobenzene	0.0	2.0	UG/L	UJ	4D
		1,2-Dichloroethane	0.0	0.5	UG/L	UJ	4D
		1,2-Dichloropropane	0.0	1.0	UG/L	UJ	4D
		1,3-Dichlorobenzene	0.0	3.0	UG/L	UJ	4D
		1,4-Dichlorobenzene	0.0	0.5	UG/L	UJ	4D
		Benzene	0.0	0.5	UG/L	UJ	4D
		Bromodichloromethane	0.0	1.0	UG/L	UJ	4D
		Bromoform	0.0	2.0	UG/L	UJ	4D
		Bromomethane	0.0	10.0	UG/L	UJ	4D
		Carbon Tetrachloride	0.0	2.0	UG/L	UJ	4D
		Chlorobenzene	0.0	2.5	UG/L	UJ	4D
		Chloroethane	0.0	5.0	UG/L	UJ	4D
		Chloroform	0.1	0.5	UG/L	BF	1B,6G
		Chloromethane	0.0	0.5	UG/L	UJ	4D
		Dibromochloromethane	0.0	1.0	UG/L	UJ	4D
		Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	4D
		Ethylbenzene	0.0	1.0	UG/L	UJ	4D
		Methylene Chloride	0.0	8.0	UG/L	UJ	4D
		Tetrachloroethene	2.8	0.5	UG/L	J	4D
		Toluene	0.0	1.0	UG/L	UJ	4D
		Total Xylenes	0.0	0.5	UG/L	UJ	4D
		Trichloroethene	0.0	0.5	UG/L	UJ	4D
		Trichlorofluoromethane	0.0	1.0	UG/L	UJ	4D
		Vinyl Chloride	0.0	0.5	UG/L	UJ	4D
		cis-1,2-Dichloroethene	0.0	0.5	UG/L	UJ	4D
		cis-1,3-Dichloropropene	0.0	1.0	UG/L	UJ	4D
		m,p-Xylenes	0.0	0.5	UG/L	UJ	4D
		o-Xylene	0.0	0.5	UG/L	UJ	4D
		trans-1,2-Dichloroethene	0.0	1.0	UG/L	UJ	4D
		trans-1,3-Dichloropropene	0.0	1.0	UG/L	UJ	4D
7-PTI-0401-NS	4/3/2012	1,1-Dichloroethane	0.5	1.0	UG/L	F	6G
		1,1-Dichloroethene	0.2	0.5	UG/L	F	6G
		1,2-Dichloropropane	0.3	1.0	UG/L	F	6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
MBS PTE SW-0401-NS	4/3/2012	Chlorobenzene	0.1	2.5	UG/L	F	6G
MBS PTI-0401-NS	4/3/2012	Chloroform	0.2	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G
MAFB-301-NS	5/1/2012	Trichloroethene	2.4	0.5	UG/L	J	3D
MAFB-222-NS	5/1/2012	Chloroform	0.2	0.5	UG/L	F	6G
MAFB-398C-NS	4/30/2012	1,2-Dichloropropane	0.5	1.0	UG/L	F	6G
MAFB-413-NS	5/2/2012	Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	5B-
MAFB-112-NS	5/2/2012	Trichloroethene	0.1	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G
MAFB-400-NS	5/4/2012	Tetrachloroethene	5.0	0.5	UG/L	J	3D
MAFB-436-NS	5/4/2012	Carbon Tetrachloride	0.2	0.5	UG/L	F	6G
		Chloroform	0.1	0.5	UG/L	F	6G
MBS 39EW02-NS	5/4/2012	Chloroform	0.2	0.5	UG/L	F	6G
		Trichloroethene	0.1	0.5	UG/L	F	6G
MBS 39MW03-NS	5/4/2012	Chloroform	0.2	0.5	UG/L	F	6G
7-PZ-37P-NS	5/8/2012	1,1-Dichloroethane	0.3	1.0	UG/L	F	6G
		1,1-Dichloroethene	0.3	0.5	UG/L	F	6G
		1,2-Dichlorobenzene	0.4	2.0	UG/L	F	6G
		Chlorobenzene	1.8	2.5	UG/L	F	6G
MAFB-104-NS	5/9/2012	Chloroform	0.2	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G
MAFB-111-NS	5/9/2012	Trichloroethene	0.1	0.5	UG/L	F	6G
MAFB-132-NS	5/9/2012	1,2-Dichloroethane	0.2	0.5	UG/L	F	6G
		1,2-Dichloropropane	0.1	1.0	UG/L	F	6G
MAFB-136-NS	5/9/2012	Trichloroethene	0.4	0.5	UG/L	F	6G
MAFB-149-NS	5/8/2012	Tetrachloroethene	0.2	0.5	UG/L	F	6G
MAFB-181-NS	5/9/2012	Carbon Tetrachloride	2.9	0.5	UG/L	J	2C+
		Chloroform	0.2	0.5	UG/L	FJ	2C+,6G
MAFB-284-NS	5/8/2012	1,2-Dichloroethane	0.3	0.5	UG/L	FJ	2C+,6G
		1,2-Dichloropropane	0.4	1.0	UG/L	FJ	2C+,6G
		Tetrachloroethene	1.1	0.5	UG/L	J	2C+
		Trichloroethene	5.2	0.5	UG/L	J	2C+
		cis-1,2-Dichloroethene	0.4	0.5	UG/L	FJ	2C+,6G
MAFB-391-NS	5/7/2012	1,2-Dichloroethane	0.3	0.5	UG/L	F	6G
		1,2-Dichloropropane	0.3	1.0	UG/L	F	6G
		Tetrachloroethene	0.3	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.3	0.5	UG/L	F	6G
MAFB-397-NS	5/9/2012	Chloromethane	0.1	0.5	UG/L	F	6G
MAFB-403-NS	5/8/2012	Trichloroethene	4.7	0.5	UG/L	J	2C+
MAFB-460Bs-NS	5/7/2012	Tetrachloroethene	0.3	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G
MAFB-461Bs-NS	5/7/2012	Trichloroethene	0.3	0.5	UG/L	F	6G
MAFB-463D-NS	5/9/2012	Carbon Tetrachloride	0.3	0.5	UG/L	F	6G
		Trichloroethene	0.3	0.5	UG/L	F	6G
MAFB-463Dd-NS	5/9/2012	Chloroform	0.1	0.5	UG/L	F	6G
		Tetrachloroethene	0.2	0.5	UG/L	F	6G
MBS 19EW01-NS	5/7/2012	Chloroform	0.3	0.5	UG/L	F	6G
MBS 19MW01-NS	5/9/2012	Carbon Tetrachloride	0.2	0.5	UG/L	F	6G
		Chloroform	0.3	0.5	UG/L	F	6G
ACW AT-1-NS	5/11/2012	Chloroform	0.2	0.5	UG/L	BF	1B,6G
		Trichloroethene	22.0	0.5	UG/L	J	2C+
ACW AT-2-NS	5/11/2012	Trichloroethene	14.0	0.5	UG/L	J	2C+
ACW EW-1-NS	5/11/2012	Trichloroethene	8.5	0.5	UG/L	J	2C+
ACW EW-2-NS	5/11/2012	Trichloroethene	2.5	0.5	UG/L	J	2C+
ACW EW-3-NS	5/11/2012	Trichloroethene	2.4	0.5	UG/L	J	2C+
ACW EW-4-NS	5/11/2012	Trichloroethene	0.1	0.5	UG/L	FJ	2C+,6G
ACW EW-6R-NS	5/11/2012	Trichloroethene	3.7	0.5	UG/L	J	2C+
FFS MW15-6-NS	5/10/2012	Chloroform	0.5	0.5	UG/L	B	1B
		cis-1,2-Dichloroethene	0.3	0.5	UG/L	F	6G
MAFB-430-NS	5/10/2012	Carbon Tetrachloride	0.5	0.5	UG/L	F	6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
MBS EW-2AR-NS	5/10/2012	1,2-Dichloroethane	0.1	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.4	0.5	UG/L	F	6G
MBS EW-5B-NS	5/10/2012	Carbon Tetrachloride	0.4	0.5	UG/L	FJ	6G,2C+,5B+
		Chloroform	0.4	0.5	UG/L	BF	1B,6G
		Tetrachloroethene	4.9	0.5	UG/L	J	2C+
MBS EW-6B-NS	5/10/2012	Carbon Tetrachloride	0.1	0.5	UG/L	F	6G
		Trichloroethene	0.3	0.5	UG/L	F	6G
MBS EW-12AB-NS	5/11/2012	Chloroform	0.1	0.5	UG/L	BF	1B,6G
MBS PZ-42S-NS	5/10/2012	Chloroform	0.4	0.5	UG/L	BF	1B,6G
MBS EW-6ABu-NS	5/15/2012	Tetrachloroethene	0.2	0.5	UG/L	F	6G
		Trichloroethene	0.2	0.5	UG/L	F	6G
MBS EW-7ABu-NS	5/15/2012	Chloroform	0.1	0.5	UG/L	F	6G
		Trichloroethene	0.3	0.5	UG/L	F	6G
MBS EW-8B-NS	5/15/2012	Chloroform	0.2	0.5	UG/L	F	6G
		Trichloroethene	0.1	0.5	UG/L	F	6G
OFB-07-NS	5/22/2012	Tetrachloroethene	0.3	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.3	0.5	UG/L	F	6G
OFB-67-NS	5/22/2012	1,1-Dichloroethene	0.0	0.5	UG/L	UJ	4D
		1,2-Dichloroethane	0.0	0.5	UG/L	UJ	4D
		1,2-Dichloropropane	0.0	1.0	UG/L	UJ	4D
		1,4-Dichlorobenzene	0.0	0.5	UG/L	UJ	4D
		Carbon Tetrachloride	0.0	0.5	UG/L	UJ	4D
		Chloroform	0.0	0.5	UG/L	UJ	4D
		Chloromethane	0.0	0.5	UG/L	UJ	4D
		Tetrachloroethene	0.0	0.5	UG/L	UJ	4D
		Trichloroethene	0.0	0.5	UG/L	UJ	4D
		Vinyl Chloride	0.0	0.5	UG/L	UJ	4D
		cis-1,2-Dichloroethene	0.0	0.5	UG/L	UJ	4D
OFB-72-NS	5/21/2012	Tetrachloroethene	0.3	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G
MAFB-243-NS	5/30/2012	Chloroform	0.2	0.5	UG/L	F	6G
MBS PTI-0701-NS	7/2/2012	Bromomethane	0.3	10.0	UG/L	BF	1A,6G,5A
		Chloroform	0.2	0.5	UG/L	F	6G
MC-R1-0701-NS	7/2/2012	Bromomethane	0.5	10.0	UG/L	BF	1A,6G,5A
MC-R2-0701-NS	7/2/2012	Bromoform	0.9	2.0	UG/L	F	6G
MC-R2-0701-NS	7/2/2012	Bromomethane	0.6	10.0	UG/L	BF	1A,6G,5A
7-PTE-0701-NS	7/2/2012	Bromomethane	0.7	10.0	UG/L	BF	1A,6G
7-PTI-0701-NS	7/2/2012	1,1-Dichloroethane	0.5	1.0	UG/L	F	6G
		1,1-Dichloroethene	0.2	0.5	UG/L	F	6G
		1,2-Dichloropropane	0.3	1.0	UG/L	F	6G
		Bromomethane	0.6	10.0	UG/L	BF	1A,6G
MBS PTE SW-0802-NS	8/7/2012	Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	5A-
7-PTE-0802-NS	8/7/2012	Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	5A-
ACW PTE-0802-NS	8/7/2012	Dichlorodifluoromethane	0.0	4.0	UG/L	UJ	5A-
ACW EW-6R-NS	8/30/2012	Trichloroethene	3.8	0.5	UG/L	J	2C+
MAFB-181-NS	8/29/2012	Chloroform	0.3	0.5	UG/L	BF	1A,6G
MAFB-435-NS	8/29/2012	Carbon Tetrachloride	1.3	0.5	UG/L	J	2C+
		Chloroform	0.1	0.5	UG/L	BF	1A,6G
		Tetrachloroethene	7.4	0.5	UG/L	J	2C+
MAFB-460Bs-NS	8/28/2012	Tetrachloroethene	0.3	0.5	UG/L	FJ	2C+,6G
		Trichloroethene	1.8	0.5	UG/L	J	2C+
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	FJ	2C+,6G
MAFB-461Bs-NS	8/28/2012	Trichloroethene	0.3	0.5	UG/L	FJ	2C+,6G
MAFB-463D-NS	8/29/2012	Carbon Tetrachloride	0.4	0.5	UG/L	F	6G
		Trichloroethene	0.3	0.5	UG/L	F	6G
MAFB-463Dd-NS	8/29/2012	Tetrachloroethene	0.1	0.5	UG/L	F	6G
MAFB-464-NS	8/28/2012	Tetrachloroethene	0.1	0.5	UG/L	F	6G
OFB-72-NS	8/28/2012	Tetrachloroethene	0.3	0.5	UG/L	FJ	2C+,6G
		Trichloroethene	1.9	0.5	UG/L	J	2C+
		cis-1,2-Dichloroethene	0.1	0.5	UG/L	FJ	2C+,6G
7-PTE-0901-NS	9/4/2012	1,4-Dichlorobenzene	0.1	0.5	UG/L	FJ	2C+,6G

TABLE 8-2 (Continued)

Sample Identification	Sample Date	Analyte	Result	Reporting Limit	Units	EPA Flag	Reason Code
MBS PTI-1001-NS	10/3/2012	Chloroform	0.3	0.5	UG/L	BF	1B,6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G
ACW PTE-1001-NS	10/3/2012	Chloromethane	0.2	0.5	UG/L	FJ	5B,6G
ACW PTI-1001-NS	10/3/2012	Trichloroethene	6.1	0.5	UG/L	J	2C+
ACW R2-1001-NS	10/3/2012	Chloroform	0.2	0.5	UG/L	BF	1A,6G
7-PTI-1001-NS	10/3/2012	1,1-Dichloroethane	0.4	1.0	UG/L	F	6G
		1,1-Dichloroethene	0.2	0.5	UG/L	F	6G
		1,2-Dichloropropane	0.3	1.0	UG/L	F	6G
MAFB-132-NS	11/7/2012	1,2-Dichloroethane	0.2	0.5	UG/L	F	6G
		1,2-Dichloropropane	0.1	1.0	UG/L	F	6G
		Chloroform	0.1	0.5	UG/L	F	6G
		Vinyl Chloride	0.1	0.5	UG/L	F	6G
MAFB-274-NS	11/8/2012	Chloroform	0.3	0.5	UG/L	F	6G
		Trichloroethene	0.1	0.5	UG/L	F	6G
		Trichlorofluoromethane	0.2	1.0	UG/L	F	6G
MAFB-318-NS	11/8/2012	Chloroform	0.4	0.5	UG/L	F	6G
MAFB-181-NS	11/26/2012	Chloroform	0.2	0.5	UG/L	F	6G
MAFB-460Bd-NS	11/26/2012	Trichloroethene	0.3	0.5	UG/L	F	6G
MAFB-460Bs-NS	11/26/2012	Tetrachloroethene	0.2	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	FJ	3D,6G
MAFB-461Bs-NS	11/26/2012	Trichloroethene	0.2	0.5	UG/L	F	6G
MAFB-463D-NS	11/26/2012	Chloroform	0.1	0.5	UG/L	F	6G
		Trichloroethene	0.1	0.5	UG/L	F	6G
OFB-72-NS	11/26/2012	Tetrachloroethene	0.3	0.5	UG/L	FJ	2C,6G
OFB-72-NS	11/26/2012	Trichloroethene	1.7	0.5	UG/L	J	2C
		cis-1,2-Dichloroethene	0.1	0.5	UG/L	FJ	2C,6G
ACW EW-6R-NS	11/30/2012	Trichloroethene	3.4	0.5	UG/L	J	2C+
MAFB-435-NS	11/30/2012	1,4-Dichlorobenzene	0.1	0.5	UG/L	F	6G
		Chloromethane	0.1	0.5	UG/L	F	6G
MAFB-465-NS	11/30/2012	1,2-Dichloroethane	0.2	0.5	UG/L	F	6G
		1,4-Dichlorobenzene	0.1	0.5	UG/L	F	6G
MBS PTE SW-1201-NS	12/5/2012	Methylene Chloride	0.4	2.0	UG/L	BF	1A,6G
7-PTE-1201-NS	12/5/2012	Methylene Chloride	0.3	2.0	UG/L	BF	1A,6G
MAFB-377-NS	12/18/2012	Chloroform	0.3	0.5	UG/L	F	6G
		cis-1,2-Dichloroethene	0.2	0.5	UG/L	F	6G

EPA Flag
B = Result considered not detected due to blank contamination
F = Result is less than the reporting limit but greater than the detection limit
M = Result is qualified due to matrix interference
J = Analyte concentration considered an estimated value because one or more quality control specification were not met.
UJ = reporting limit considered an estimated value because one or more quality control specifications were not met.

Units
mg/L = milligrams per liter
ug/L = micrograms per liter

Qualification Code
1A, 1B, 1F = blank contamination
2B+, 2B- = matrix spike recovery did not meet criteria
2C, 2C+ = surrogate spike recovery did not meet criteria
2E = analytical spike did not meet criteria
3A = laboratory control sample imprecision
3B = matrix spike imprecision
3C = laboratory duplicate imprecision
3D = field duplicate imprecision
4D = bubbles in sample container
5A, 5A- = second source calibration did not meet criteria
5B,5B+,5B- = continuing calibration verification recovery did not meet criteria
6A = serial dilution did not meet criteria
6G = Result is less than the reporting limit but greater than the detection limit
6F = sample pattern did not match standard pattern