2008 Annual Performance Evaluation Report Volume 1

Baldwin Park Operable Unit of the San Gabriel Valley

Superfund Sites

Los Angeles County, California

Prepared for:

Baldwin Park Operable Unit Cooperating Respondents

Prepared by

AMEC Geomatrix, Inc.
1401 17th Street
Suite 600
Denver, CO 80202

ERM – West, Inc.
1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596

April 10, 2009

Project No. 7190.007

TABLE OF CONTENTS

Page

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLES

TABLE OF CONTENTS
(Continued)

FIGURES

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

VOLUME 2

APPENDIX A

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS
(Continued)

ABBREVIATIONS

1,1-DCE	1,1-Dichloroethene
1,2-DCA	1,2-Dichloroethane
1,2,3-TCP	1,2,3-Trichloropropane
AAWC	Azusa Agricultural Water Company
AJ	Aerojet
ALR	Azusa Land Reclamation
AMEC	AMEC Geomatrix
ARARs	Applicable or Relevant and Appropriate Requirements
AVWC	Azusa Valley Water Company
bgs	below ground surface
BPOU	Baldwin Park Operable Unit
BPOUSC	Baldwin Park Operable Unit Steering Committee
CC	Conrock Company
CDM	Camp, Dresser, and McKee
CDWC	California Domestic Water Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC	Covina Irrigation Company
COC	Chemical of Concern
COI	City of Industry
CRs	Cooperating Respondents

TABLE OF CONTENTS
(Continued)

DPH	California Department of Public Health
DQO	Data Quality Objectives
EDB	Ethylene Dibromide
EPA	U.S. Environmental Protection Agency
ERM	ERM-West, Inc.
ESD	Explanation of Significant Differences
FSP	Field Sampling Plan
ft/d	Feet Per Day
ft/ft	Feet Per Foot
f.k.a	Formerly Known As
GAC	Granular Activated Carbon
gpm	gallons per minute
HLA	Harding Lawson Associates
ISEP®	Calgon Ionic Separation Process
LACO	Los Angeles County
LACDPW	Los Angeles County Department of Public Works
LACSD	Los Angeles County Sanitation Districts
LDC	Laboratory Data Consultants
LPGAC	Liquid-Phase Granular Activated Carbon
LPVCWD	La Puente Valley County Water District
MCL	Maximum Contaminant Level
MICR	Maximum Individual Cancer Risk
msl	Mean Sea Level
NDMA	N-Nitrosodimethylamine
NL	Drinking Water Notification Level
ng/L	Nanograms Per Liter
PCE	Tetrachloroethene
PE	Performance Evaluation
PRP	Potentially Responsible Party
PSEP	Performance Standards Evaluation Plan
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RI	Remedial Investigation
ROD	Record of Decision
RMSE	Root-mean squared error
RWQCB	Regional Water Quality Control Board – Los Angeles Region
SA	Subarea
SCAQMD	South Coast Air Quality Management District
SGVWC	San Gabriel Valley Water Company
SOW	Statement of Work
SMR	Self Monitoring Reports
SVOC	Semi-Volatile Organic Compound
SWS	Suburban Water Systems
TIC	Tentatively Identified Compound

TABLE OF CONTENTS
(Continued)

TCE	Trichloroethene
UAO	Unilateral Administrative Order
μg/L	Micrograms Per Liter
UV	Ultraviolet
VCWD	Valley County Water District
VOC	Volatile Organic Compound
VPGAC	Vapor Phase Granulated Activated Carbon
WE	Water Entity
WY	Water Year

2008 ANNUAL PERFORMANCE EVALUATION REPORT
Baldwin Park Operable Unit
San Gabriel Valley, California

1.0 INTRODUCTION

This document presents the 2008 Annual Performance Evaluation (PE) Report for the Baldwin Park Operable Unit (BPOU) of the San Gabriel Valley Superfund Sites, located in the San Gabriel Basin, Los Angeles County, California. This report was prepared jointly by Geomatrix Consultants, Inc. (Geomatrix) and ERM-West, Inc. (ERM), on behalf of the BPOU Cooperating Respondents (CRs). The CRs are:

- Aerojet-General Corporation
- Azusa Land Reclamation Company, Inc. (ALR)
- Fairchild Holding Corporation[1]
- Hartwell Corporation
- Chemical Waste Management (as successor to Oil and Solvent Process Company)
- Reichhold, Inc.
- Winco Enterprises Inc. (formerly known as [f.k.a.] Wynn Oil Company)

This report meets the requirements for the Annual PE Report, as required by Unilateral Administrative Order 2000-13 (UAO) and the supporting Statement of Work (SOW), issued by the U.S. Environmental Protection Agency (EPA) Region IX on June 30, 2000 and amended on February 28, 2002.

1.1 BACKGROUND

Beginning in 1979, volatile organic compounds (VOCs) were detected in groundwater within the San Gabriel Basin (the Basin). In May 1984, four areas of groundwater contamination were listed as San Gabriel Valley Areas 1-4 on EPA's National Priorities List based on available water-quality data. Subsequent investigation by EPA and others revealed widespread VOC contamination in the Basin. As a result, EPA subsequently divided the Basin into seven Remedial Investigation (RI) areas to focus characterization on the extent of

1 Fairchild Holding Corporation and the Fairchild Corporation filed for bankruptcy on March 18, 2009. At this juncture, the status of Fairchild's continuing participation in the BPOU project is at best uncertain. Fairchild has not participated in the funding of this Annual Report.

contamination and plan remedial actions. EPA later designated some of these RI areas as operable units. RI Area 5 was designated as the BPOU.

Although many of the figures provided in this report depict a generalized boundary to the area of impacted groundwater in the BPOU (Figure 1-1), the precise boundary of the BPOU has not been determined, but an approximate boundary is presented to provide a point of reference on the figures.

Since 1986, EPA, various Potentially Responsible Parties (PRPs), and numerous other entities have compiled and evaluated groundwater-quality data from the Basin. Initial field investigations conducted by EPA in the BPOU included the installation and sampling of one multiport monitoring well and the sampling of water supply wells. In 1990, EPA issued a Basin-wide Technical Plan that described options for remediation of VOC plumes through the Basin. In 1992, EPA published an Interim RI Report for the Basin.

In 1993, EPA issued a Feasibility Study Report for the BPOU. This report evaluated various remedial alternatives for the remediation of groundwater in the BPOU. In 1994, EPA issued a Record of Decision (ROD) for the BPOU interim remedy. The ROD identified 17 chemicals of concern (COCs), all of which were VOCs. EPA's selected remedy consisted of pumping and treating approximately 19,000 gallons per minute (gpm) of contaminated groundwater. In approximately 1995, the Baldwin Park Operable Unit Steering Committee (BPOUSC) began to perform pre-remedial design activities, including additional characterization of the extent of VOC-contaminated groundwater and the development of a groundwater extraction plan. Eight multiport monitoring wells were installed and sampled and 26 existing water-supply and monitoring wells were sampled to provide additional characterization of the extent of VOC contamination in the BPOU. The results of these pre-remedial design activities were submitted to EPA in the Draft Pre-Remedial Design Report, dated December 1996 (Camp, Dresser, and McKee [CDM], 1996). The groundwater extraction plan was revised on several occasions. Following review and comment by EPA, the Draft Final Pre-Remedial Design Report, dated September 1997 (CDM, 1997) was issued.

In mid-1997 and then in 1998, certain constituents that were not previously considered as COCs in the ROD, perchlorate, N-nitrosodimethylamine (NDMA), and 1,4 dioxane, were discovered in groundwater within the BPOU. Consequently, EPA requested that the BPOUSC characterize the distribution of these constituents, as well as conduct further characterization of VOCs in groundwater within the BPOU. As a result, the BPOUSC installed and sampled four additional multiport monitoring wells and conducted additional groundwater sampling to evaluate the extent of VOCs, perchlorate, NDMA, and 1,4-dioxane in groundwater in the BPOU.

The results of these investigations and several groundwater extraction plan options were presented to EPA in the Addendum to the Pre-Remedial Design Report, dated January 14, 1999 (Harding Lawson Associates [HLA], 1999). Throughout 1999, these groundwater extraction plan options were refined and new options were formulated. These changes were made in response to comments from EPA and the Main San Gabriel Basin Watermaster (Watermaster). This resulted in a range of candidate groundwater extraction plans with total groundwater extraction rates ranging from 19,500 to 21,500 gpm.

In May 1999, EPA issued an Explanation of Significant Differences (ESD) to supplement the 1994 ROD. The ESD depicted an extended southern portion of the BPOU plume, in Subarea 3, to reflect the results of the additional investigations, and added perchlorate, NDMA, and 1,4 dioxane to the list of COCs. In June 2000, EPA issued the UAO, requiring various PRPs (identified in the UAO as “Respondents”), including but not limited to the CRs, to design, construct, and operate the BPOU interim remedy identified in the ROD, as revised by the ESD. In addition, beginning in the late 1990s, various water agencies, producers, and other water entities (collectively, the “Water Entities” or “WEs”) with regulatory oversight and/or financial or other interests in the BPOU groundwater filed lawsuits or asserted claims against the BPOU PRPs for damages allegedly suffered as a result of contamination of the groundwater and water supply wells in the BPOU area. Thereafter, the CRs entered into negotiations with the WEs, which culminated in March 2002 with the CRs and WEs executing the BPOU Project Agreement to implement the BPOU Project. The BPOU Project Agreement was declared effective as of May 9, 2002.

While the BPOU Project Agreement negotiations were underway, the CRs prepared the Remedial Design/Remedial Action Work Plan and the Conceptual Design Report for the implementation of the remedy (HLA, 2000a and HLA, 2000b). The Preliminary Design Report was prepared by the WEs and submitted to EPA in April, 2001 (Watermaster, 2001).

In January 2006, EPA’s Remedial Project Manager notified the Cooperating Respondents that EPA was concerned about the detection of 1,2,3,-trichloropropane (1,2,3-TCP) in certain wells within the BPOU. This compound does not have a federal MCL, but does have a California state notification level of 5 nanograms per liter (ng/L). In response to EPA’s requirements, the CRs funded a further modification of the Subarea 1 VCWD Lante Treatment Plan to include Liquid-Phase Granular Activated Carbon (LPGAC) treatment to address EPA’s concerns about the presence of 123-TCP.

In August 2006, EPA requested that the CRs include in the BPOU monitoring program additional sampling for non-COC VOCs and non-target volatile and semi-volatile compounds (Tentatively Identified Compounds, or TICs) including 1,2,3-TCP. In response to EPA’s request, the CRs provided a proposal for non-COC groundwater analysis and reporting in a technical memorandum dated August 24, 2006 (Geomatrix, 2006a). This proposal included the following:

- Information on sampling and analysis of 1,2,3-TCP;
- A proposal for reporting results for non-COC VOCs in a subset of multiport monitoring wells located upgradient of each Subproject ("early warning" wells);
- A proposal for monitoring of non-target VOCs and semi-volatile organic compounds (SVOCs) in a subset of multiport monitoring wells located upgradient of each Subproject ("early warning" wells), and;
- A proposal for periodic analysis of 1,2,3-TCP in Subarea 3.

EPA approved the August 24, 2006, proposal in a letter dated September 13, 2006, subject to the addition of several additional wells. The complete requirements for non-COC groundwater analysis and reporting were summarized in a technical memorandum dated September 29, 2006 (ERM, 2006).

On October 3, 2006, EPA provided a letter approving the BPOU Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) subject to submittal of final versions of these documents with the complete requirements for non-COC groundwater analysis and reporting. Final versions of the QAPP and FSP were submitted in November 2006 (Geomatrix, 2006b; Stetson, 2006a) and were approved by EPA in a letter dated February 12, 2007. In the February 12, 2007, letter EPA also requested that a data management plan be prepared as an addendum to the QAPP. The report, Data Management Plan for the Baldwin Park Operable Unit Performance Standards Evaluation Plan Monitoring Program was submitted to EPA on May 17, 2007 (Laboratory Data Consultants, Inc. [LDC] 2007).

The FSP for Air, Brine, and Treated Water was submitted to EPA on August 14, 2006 (Stetson 2006b) and the corresponding QAPP for Air, Brine, and Treated Water was submitted on March 16, 2007 (Geomatrix, 2007a).

1.2 OVERVIEW OF THE RESPONSE ACTION

The UAO and SOW direct the Respondents to design, construct, and implement the remedy described in the ROD and ESD, and to achieve the Performance Standards in accordance with the UAO. The WEs are designing, constructing, and operating (either directly or through contractors) groundwater extraction and treatment facilities (Subprojects), which provide for groundwater extraction and treatment in two general areas of the BPOU (Figure 1-2). The treated groundwater is supplied for direct potable use.

Upon completion of the various Subprojects, a total of approximately 23,250 gpm of groundwater will be extracted, 7,000 gpm from the northern portion of the plumes (Subarea 1), and 16,250 gpm from the southern portion of the plumes (Subarea 3). Extracted groundwater will be treated using a treatment train that is designed to remove all COCs to levels acceptable for direct use. The treatment train varies among the treatment plants but generally consists of a series of contaminant treatment processes including air stripping and/or LPGAC to remove VOCs, ion exchange to remove perchlorate, and ultraviolet (UV)/oxidation to remove 1,4-dioxane and NDMA.

1.3 SUMMARY OF REMEDIAL ACTION OBJECTIVES AND PERFORMANCE STANDARDS

Two of the key performance standards are defined in the UAO as follows:

> *The remedial objectives of the Baldwin Park OU are to prevent future increases in, and begin to reduce concentrations of, trichloroethene, tetrachloroethene, carbon tetrachloride, and other VOCs, along with perchlorate, N-nitrosodimethylamine, and 1,4-dioxane in groundwater in the Baldwin Park area (hereafter referred to as contaminants or contaminated groundwater) by limiting further migration of contaminated groundwater into clean and less contaminated areas or depths that would benefit most from additional protection and by removing contaminants from the aquifer.*

The BPOU Project involves the design, installation, operation, and maintenance of groundwater extraction systems in two areas of the BPOU. The two areas are designated in the ROD and ESD as Subarea 1 (the upper area) and Subarea 3 (the lower area). Remedial objectives for the two Subareas are described below.

1.3.1 Subarea 1 Remedial Objectives

In Subarea 1, the movement of COCs in groundwater will be limited by groundwater extraction at rates and locations that will establish the necessary groundwater flow field, such that the resultant capture zone limits migration from known or suspected source areas and depths and removes chemical mass. Source areas and depths include locations believed to contain a significant mass of soil contamination (i.e., vadose zone) or a subsurface source of dissolved-phase groundwater contamination. In Subarea 1, the remedial objectives are designed to prevent groundwater near source areas with higher concentrations of COCs from moving downgradient toward areas with lower concentrations of COCs. As part of the groundwater extraction process, chemical mass will be removed from Subarea 1 groundwater.

1.3.2 Subarea 3 Remedial Objectives

In Subarea 3, the movement of COCs in groundwater will be limited by groundwater extraction at rates and locations that will establish the necessary groundwater flow field to reduce the potential for groundwater containing unacceptable concentrations of tetrachloroethene (PCE), trichloroethene (TCE), carbon tetrachloride, perchlorate, NDMA, 1,4-dioxane or other COCs from moving into areas where these chemicals are not present at unacceptable concentrations. As part of the groundwater extraction process, chemical mass will be removed from Subarea 3 groundwater.

1.3.3 Performance Standards

Two distinct performance standards have been derived from the Remedial Objectives cited above: 1) limit further migration of COCs in groundwater, and 2) remove COCs from groundwater. Achievement of these performance standards will prevent future increases in concentrations, begin to reduce concentrations, and prevent the spread of COCs from more contaminated areas to less contaminated areas. These two performance standards are described in more detail below.

1.3.3.1 Performance Standard 1 - Limit Migration of Chemicals of Concern

The BPOU extraction plan was developed using an EPA-approved three-dimensional finite-element groundwater flow model, DYNFLOW. In 2002, the model was updated using a similar code, FEFLOW. The construction and calibration of this model relies on many years of data collection activities in the BPOU, including water level measurements and water-quality sampling. The model was calibrated using water level data from a 20-year period (1982 to 2002). Following calibration, the model was run in a forward/predictive manner to select locations and depths of groundwater extraction wells that would allow the remedy to achieve the objectives described above. Review of geophysical logs from exploratory borings at the extraction well locations as well as logs from other wells in the BPOU suggested the presence of relatively thick, fine-grained layers that can be correlated across Subarea 3 but that do not extend north to Subarea 1. These layers are present at approximately -200 and -500 feet msl. As a result, the well screened intervals for new extraction wells in Subarea 3 were designed so that they could capture the entire vertical extent of contaminated groundwater without creating hydraulic connections across these layers. Therefore, shallow extraction wells were screened above the layer at -500 feet msl and deep extraction wells were screened below the layer at -500 feet msl. Aquifer testing in the extraction wells confirmed that the layer at -500 feet msl acts as a confining unit that provides hydraulic separation between the shallow and deep elevation intervals. In 2005, the groundwater flow model was modified to incorporate the confining units in Subarea 3. The groundwater flow model is updated annually with quarterly pumping and recharge data that are compiled from various sources. The CR group will continue to make refinements to the groundwater model to incorporate the results of field testing and other information, such as aquifer testing at new extraction and production wells, and thereby improve the model's ability to simulate observed groundwater conditions in localized areas. Updates and refinements to the groundwater model will be reported in Annual PE Reports. The calibrated model is the primary tool that will be used to assess system performance in terms of limiting the migration of COCs.

1.3.3.2 Performance Standard 2 - Removal of Chemical Mass

This performance standard, removal of chemical mass, will be met through extraction and treatment of groundwater from the BPOU plumes. Documentation of the removal of chemical mass will use measured flow rates from groundwater extraction wells and results of water-quality sampling and analysis for these same extraction wells. Using these data, the mass removal for selected COCs will be estimated on an annual basis. Cumulative chemical mass removed from the aquifer will also be reported.

1.4 APPROACH TO PERFORMANCE MONITORING AND EVALUATION

Performance monitoring and evaluation focuses on the operation of the proposed groundwater extraction system as it relates to: 1) limiting further migration of groundwater contamination into less contaminated areas, and 2) removing chemical mass from groundwater. This approach involves both short-term and long-term evaluation of extraction system performance. Short-term performance evaluations will rely heavily on the use of groundwater modeling to demonstrate that extraction well operation is limiting further migration of groundwater contamination into less contaminated areas. Other short-term performance evaluation activities will include assessments of changes in groundwater flow conditions, temporal and spatial changes in groundwater quality, and the estimation of chemical mass removal by extraction wells. Short-term performance evaluations will be documented in Annual PE Reports.

Evaluations of long-term performance of the BPOU Project will be reported in Five-Year Reviews as described in the Performance Standards Evaluation Plan (PSEP) (Geomatrix, 2004a). Time-concentration analyses for COCs will be the primary measure of long-term remedy performance. In addition, groundwater modeling and particle tracking will be used to support the evaluation of long-term remedy performance. The model will be used with other data interpretation techniques such as potentiometric maps, well hydrographs, and time-concentrations plots for selected wells to validate observed concentration trends for COCs. The goals for long-term performance evaluations are to determine whether: 1) water quality in areas located downgradient of the Subarea 1 extraction system, but upgradient of the Subarea 3 extraction system, is improving over time, 2) concentrations of COCs in Subarea 3 extraction wells are decreasing over time, 3) water quality in Subarea 1, upgradient of the extraction wells, is improving over time, and 4) concentrations of COCs in Subarea 1 extraction wells are decreasing over time.

1.5 CONTENT OF PERFORMANCE EVALUATION REPORTS

As outlined in the PSEP, the Annual PE Reports should generally contain the following:

- BPOU-wide potentiometric maps to assist in evaluating changes in groundwater flow patterns in the BPOU;
- Groundwater plume maps and chemical cross sections and an evaluation of any changes in the extent of groundwater contamination within the BPOU;
- Time-concentration plots for selected key constituents for selected monitoring wells;
- Contaminant mass-removal estimates for each extraction well using average flow rates and water-quality sampling results from the extraction wells;
- Results of computer model simulations of extraction system performance and a description of any refinements to groundwater flow models used to evaluate system performance;
- An overall assessment of remedial system performance in relation to Performance Standards established for the BPOU Project; and
- Recommendations for changes to the monitoring program outlined in the PSEP including scheduled changes to the monitoring frequency or monitoring locations.

Although not specifically outlined in the PSEP, EPA has requested that Annual PE Reports also address the performance of the BPOU Project relative to "other project requirements" associated with the implementation of the BPOU Project. These “other project requirements” are not considered performance standards, as they do not directly relate to the remedial objectives of the BPOU Project as defined by EPA, but rather relate to the operational performance of, or discharge requirements for, the various Subprojects following construction. Consequently, only those "other project requirements" that are considered "Other Potential Performance Standards" during system operation are addressed in this Annual PE Report. These “Other Potential Performance Standards” include the following:

- Achievement of treated-water effluent requirements in accordance with California Department of Public Health (DPH; formerly the Department of Health Services ([DHS]) Drinking Water Operating permits;
- Air-emission monitoring requirements in accordance with EPA Applicable or Relevant and Appropriate Requirements (ARARs);

- Monitoring and reporting of brine discharges to the Los Angeles County Sanitation Districts (LACSD) system in accordance with Industrial Waste Discharge permits; and

- Demonstration of proper disposal of waste associated with treatment operations. Applicable waste streams include, but are not limited to, spent granular activated carbon and spent ion exchange resins.

2.0 STATUS OF REMEDIAL ACTIONS

This section presents the status of remedial actions undertaken in 2008 to implement the BPOU interim remedy. These actions include operation of the Valley County Water District (VCWD) Lante Subproject in Subarea 1; operation of the La Puente Valley County Water District (LPVCWD) Subproject; operation of the San Gabriel Valley Water Company (SGVWC) B6 Subproject; and startup testing and operation of the SGVWC B5 Subproject in Subarea 3. The status of the BPOU Subprojects is also described in the monthly progress reports submitted to EPA pursuant to Paragraph 85, Section XV of the UAO.

2.1 SUBAREA 1 REMEDIAL ACTION STATUS

Subarea 1 remedial actions consist of groundwater extraction from the VCWD SA1-1, SA1-2, and SA1-3 (Lante) wells and treatment at the VCWD Lante Treatment Plant, which is owned and operated by VCWD. The report, “Revised Draft Interim Remedial Action Report” (Stetson, 2005), prepared and submitted to EPA in March 2005, provides a summary of the VCWD Lante Subproject background, construction, and completion activities. Construction of the VCWD Lante Treatment Plant began in 2002 and was completed in 2005. The original construction activities included drilling and equipping two new extraction wells (SA1-1 and SA1-2), re-equipping the SA1-3 (Lante) well, installing associated piezometers, constructing raw and treated water pipelines, and constructing the treatment plant. Additional construction work in 2006 and 2007 included adding LPGAC treatment and replacing the resin-based vapor control system with vapor-phase granular activated carbon (VPGAC). The treatment plant consists of four air-stripping towers and associated VPGAC off-gas treatment units for VOC removal, LPGAC for 1,2,3-TCP removal, two regenerable ion exchange carousels (Calgon Ionic Separation Process [ISEP®]) for perchlorate removal, and four UV/oxidation units for 1,4-dioxane and NDMA removal. A majority of the treated water is conveyed via a treated water pipeline to Suburban Water Systems (SWS) Plant 121. A portion of the treated water is conveyed to the VCWD distribution system.

On November 11, 2005, DPH issued domestic water supply Permit Amendment 1910009PA-003, authorizing VCWD to operate the VCWD Lante Treatment Plant. In January 2006, 1,2,3-TCP was detected in the VCWD extraction wells. Subsequent testing confirmed the presence of 1,2,3-TCP. Beginning on February 21, 2006, VCWD began discharging treated water to Big Dalton Wash while a 1,2,3-TCP treatment technology was selected and constructed. LPGAC was selected as the treatment technology and the design and construction of a LPGAC system was completed in Spring 2007. LPGAC startup testing was completed in May 2007 and on July 18, 2007, DPH issued an amended permit to VCWD to resume delivering potable water.

As a result of operational problems, the resin-based off-gas control system was removed and replaced with VPGAC. A temporary VPGAC system was installed while a permanent system was designed and constructed. The temporary system was operational in June 2007 and the permanent system became fully operational in April 2008. The permanent VPGAC system consists of four 20,000 pound adsorbers with associated heaters operated in parallel.

The air strippers also experienced operational problems with calcium carbonate precipitation in the towers and packing. Tower cleaning was initiated in October 2007 and was completed in February 2008. A study was conducted to evaluate precipitation mitigation alternatives that included anti-scalent dosing, acid cleaning, and packing replacement. Anti-scalent testing began in October 2008 and will be completed in early 2009. One air stripper was acid washed in December 2008 to test the efficacy and cost of this alternative. Acid wash testing results will be evaluated in 2009.

The process to replace the ISEP® with single pass ion exchange was initiated in 2008. A request for proposal was released in January 2008 and bids were received and evaluated in April and May of 2008. The work was awarded to RC Foster and a notice to proceed was issued in August. California Environmental Quality Act (CEQA) work associated with the single pass ion exchange was completed in September and design work is expected to be completed in February 2009. As part of the ISEP® replacement work, nitrate treatment alternatives were also evaluated (Malcolm Pirnie, 2008).

Other VCWD Lante Treatment Plant improvements or evaluations initiated in 2008 included:

- A nitrate analyzer was installed as required by the drinking water permit;
- ISEP® programming problems were diagnosed and corrected;
- A lower cost salt alternative from California Supreme Salt was evaluated but found to contain too high a concentration of fines causing filtration problems. Use of this salt was discontinued; and
- A peroxide analyzer was installed and work to better manage and monitor chlorine residuals was initiated.

Technical performance reports are prepared under Provision 42 of the DPH operating permit and are required to be submitted annually to DPH. The most recent of these reports, "2007 Annual Technical Performance Report for the Lante Plant" (Stetson, 2008a), describes the status and performance of the VCWD Lante Treatment Plant for the period February 1, to December 31, 2007. In addition, VCWD submits monthly compliance reports to DPH; these compliance reports are included in monthly progress reports provided to EPA.

In 2008, VCWD treated 7,878 acre-feet of water with an average flowrate of 4,869 gpm (Table 2-1). Production was slightly less than the prior year's average flowrate of 4,963 gpm.

2.2 SUBAREA 3 REMEDIAL ACTION STATUS

Subarea 3 remedial actions consist of the LPVCWD, SGVWC B6, and SGVWC B5 Subprojects that are designed to extract and treat an average flowrate of 16,250 gpm (design capacity 18,100 gpm) as discussed below.

2.2.1 La Puente Valley County Water District Subproject Status

The LPVCWD Subproject extracts, treats, and delivers water to the public under a DPH permit that was issued on February 15, 2001, and subsequently amended as Permit No. 04-16-02PA-000 issued on May 8, 2002. The LPVCWD Subproject consists of extraction wells LPVCWD 2 and LPVCWD 3, two air strippers and associated off-gas treatment for VOC removal, an ISEP® carousel for perchlorate removal, and UV/oxidation for 1,4-dioxane and NDMA removal operating at a capacity of up to 2,500 gpm. Treated water is conveyed to LPVCWD's distribution system and, when available, a portion of the treated water is also provided to SWS.

To address sanding problems in LPVCWD 2 and 3, a new well, LPVCWD 5, was drilled and installed in 2007. LPVCWD 5 was equipped, developed, and tested in 2008. On December 19, 2008, DPH issued an amended permit to allow LPVCWD 5 to be used as a drinking water source. The well became operational in January 2009 and will be LPVCWD's primary water supply well, with LPVCWD 2 and 3 used as backup water supply wells. The LPVCWD 5 well installation activities are summarized in, "Well No. 5 Well Completion Report" prepared by Stetson and submitted in final on July 2, 2008 (Stetson 2008b).

To mitigate perchlorate-bearing brine discharges to the LACSD brine line, the LPVCWD Subproject Committee approved replacing the ISEP® with single pass ion exchange equipment. The single pass ion exchange system was designed and construction was largely completed in 2008. The single pass system was constructed by RC Foster and Layne-Christiansen supplied the ion exchange equipment. A draft Compliance Test Plan and Operation, Maintenance, and Monitoring Plan for the single pass ion exchange were prepared and submitted to DPH for review. The single pass system is expected to be operational in Spring 2009.

Technical performance reports are prepared under Provision 33 of the DPH operating permit and are required to be submitted annually to DPH. The most recent of these reports, "Technical Performance Report (2007 – 2008) for the La Puente Valley County Water District Treatment Facility" (Stetson, 2008c), describes the status and performance of the LPVCWD facility for the period May 1, 2007, to April 30, 2008. In addition, LPVCWD submits monthly compliance reports to DPH; these compliance reports are included in monthly progress reports provided to EPA.

Treatment system improvements or evaluations initiated in 2008 included:

- Air strippers were inspected to evaluate scaling potential;
- Air flow meters were installed to assist with monitoring air stripper performance; and
- Plans are being developed to decommission the ISEP® system.

In 2008, approximately 3,762 acre-feet of groundwater were extracted and treated for an average annual flowrate of 2,326 gpm (Table 2-1). This average annual flowrate exceeded the EPA approved extraction rate of 2,250 gpm and was generally consistent with the prior year's production (3,951 acre-feet and 2,449 gpm).

2.2.2 San Gabriel Valley Water Company B6 Subproject Status

The SGVWC B6 Subproject remedial action consists of groundwater extraction from the SGVWC B25A, B25B, B26A, and B26B wells (with B6C and B6D included as backup wells) and treatment at the SGVWC B6 Treatment Plant, which is owned and operated by SGVWC. Construction of the SGVWC B6 Subproject began in 2002 and the SGVWC B6 Treatment Plant was completed in 2005. Construction activities included drilling, installing, and equipping the new extraction wells, installing associated piezometers, constructing raw and treated water pipelines, and constructing the treatment plant. The treatment plant consists of four air-stripping towers and associated carbon off-gas treatment units for VOC removal, two ISEP® carousels for perchlorate removal, and four UV/oxidation units for 1,4-dioxane and NDMA removal. Treated water is conveyed to the SGVWC distribution system. The "Interim Remedial Action Report" (Stetson, 2004) prepared and submitted to EPA in September 2004 provides a summary of SGVWC B6 Subproject background, construction, and completion activities.

On June 8, 2005, DPH issued domestic water supply Permit Amendment No. 1910039PA-002, authorizing SGVWC to operate the SGVWC B6 Treatment Plant using the existing onsite B6C and B6D wells. SGVWC began delivering potable water from the SGVWC B6 Treatment Plant to customers on July 12, 2005. The permit was further amended by DPH with Permit Amendment No. 1910039-004 on February 17, 2006, to incorporate the operation of offsite wells B25A, B25B, B26A, and B26B.

To mitigate perchlorate-bearing brine discharges to the LACSD brine line, the SGVWC B6 Subproject Committee approved replacing the ISEP® with single pass ion exchange equipment. The single pass ion exchange design was initiated in June 2008 and will be completed in early 2009. Bids were solicited in July and Siemens was selected to supply the ion exchange equipment. Since there is limited space at the SGVWC B6 Treatment Plant, the ion exchange equipment will be constructed on three properties that were purchased on the north side of Corak Street. Geotechnical work was completed on the properties in July and existing structures were demolished in the fall of 2008. CEQA work related to the single ion exchange project was filed and the public review process closed on October 6, 2008, without any comments received.

Technical performance reports are prepared under Provision 15 of the DPH operating permit and are required to be submitted annually to DPH. The most recent report, "Technical Performance Report for the San Gabriel Valley Water Company Plant B6 Water Treatment Facility" (Stetson, 2008d), describes the status and performance of the SGVWC B6 Treatment Plant for the period April 1, 2007, to March 31, 2008. In addition, SGVWC submits monthly compliance reports to DPH; these compliance reports are included in monthly progress reports provided to EPA.

Treatment system improvements or evaluations initiated in 2008 included:

- Off-gas heaters were monitored and repaired so that they operate consistently;
- Raw water inorganic chemistry was evaluated for calcification potential and the air strippers were inspected for scaling; and
- California Supreme Salt was evaluated but found to contain too high a concentration of fines causing filtration and ISEP® resin problems. Use of this salt was discontinued.

In 2008, the SGVWC B6 Subproject extracted and treated approximately 10,414 acre-feet of water with an average annual flowrate of 6,443 gpm (Table 2-1). This average annual flowrate was just under the EPA approved extraction rate of 6,500 gpm and was less than the prior year's annual average flowrate of 7,235 gpm. The decrease in production was largely due to repairs required to remove fines from the ISEP® resin beginning in November. Up to and through November 2008, the extraction rate for the B6 Subproject exceeded the EPA approved extraction rate of 6,500 gpm.

2.2.3 San Gabriel Valley Water Company B5 Subproject Status

The SGVWC B5 Subproject remedial actions consist of groundwater extraction from the SGVWC B5B, B5E, and City of Industry (COI) 5 wells and treatment at the SGVWC B5 Treatment Plant, which is owned and operated by SGVWC. The treatment plant consists of LPGAC for VOC removal, single-pass ion exchange for perchlorate removal, and UV/oxidation units for 1,4-dioxane and NDMA removal. The "Interim Remedial Action Report" (Stetson, 2006c) prepared and submitted to EPA in September 2006 provides a summary of SGVWC B5 Subproject background, construction, and completion activities. Construction was largely completed in early 2007.

Startup testing conducted to support permitting was largely completed in March 2007. The 97-005 documents were prepared in draft. A draft permit amendment was prepared and the public review period was held from March 3, to April 6, 2008. No comments were received during the public review process and DPH issued amended drinking water permit 1910039PA-008 for the SGVWC B5 Treatment Plant on April 21, 2008. SGVWC began delivering potable water to their system on July 8, 2008. Prior to delivering potable water, extracted water was treated and discharged to the San Gabriel River.

During 2008, SGVWC B5B and B5E were the primary production wells. Well COI 5 was equipped and tested in May 2008 but is still undergoing DPH review. As part of their review, DPH is requiring that potentiometric data be collected in the vicinity of the COI 5 well and that quarterly water samples be collected for TIC analysis. An amended permit including COI 5 as a drinking water source is expected from DPH in early 2009.

In 2008, the SGVWC B5 Subproject extracted and treated approximately 9,209 acre-feet of water with an average flowrate of 5,635 gpm (Table 2-1), more than double last year's production (4,036 acre-feet and 2,455 gpm) but less than the EPA approved extraction rate of 7,000 gpm.

3.0 PERFORMANCE MONITORING ACTIVITIES

As described in the PSEP, monitoring activities for the assessment of the interim remedy performance consist of two phases. The first phase consisted of baseline potentiometric and water-quality monitoring prior to extraction well startup and was completed in April 2005. The second phase involves more frequent potentiometric and water-quality monitoring (referred to as the BPOU-wide monitoring in the PSEP) during startup and initial operation of the extraction wells, followed by reduced monitoring frequencies after several years of continuous operation. The second phase of monitoring began in April 2005, although not all of the extraction wells were fully operational at that time. Potentiometric monitoring was performed on an increased frequency, as required, from April 2005 through November 2006. Water-quality monitoring was performed on an increased frequency, as required, during all of 2006. As described in Section 1.1 of this report, the CRs recommended several modifications to the PSEP, including reduced monitoring frequencies, in technical memoranda dated August 24, September 29, and November 2, 2006 (Geomatrix, 2006a; ERM, 2006; Geomatrix, 2006c) and the changes were incorporated into the final versions of the FSP and QAPP dated November 6, 2006 (Stetson, 2006a; Geomatrix, 2006b). The FSP and QAPP were approved with the modifications to the PSEP by EPA in a letter dated February 12, 2007. In accordance with the approved modifications to the PSEP, reduced monitoring frequencies and several other changes to monitoring activities began in December 2006, as follows:

- Potentiometric monitoring in piezometers and multiport wells was reduced from monthly to quarterly beginning in December 2006.
- Water quality sampling at MW 5-24, MW 5-25, MW 5-26, and MW 5-27 was reduced from quarterly to semi-annual beginning in Spring 2007.
- Low-flow sampling was implemented at the Key Well beginning in 2007 to reduce the volume of purge water requiring disposal.
- At the request of EPA, annual monitoring for “non-target” VOC and SVOC tentatively identified compounds (TICs) was implemented in a subset of the multiport wells and in VCWD Big Dalton beginning in 2007.
- At the request of EPA, annual monitoring for non-COC VOCs (including analysis of ethylene dibromide [EDB] by EPA Method 504.1) was implemented in a subset of the multiport wells and in VCWD Big Dalton in 2007.
- At the request of EPA, annual monitoring for 1,2,3-TCP was implemented in a subset of the multiport wells beginning in Fall 2006.

As proposed by the CRs and approved by EPA, the requirements for monitoring of additional constituents including VOC and SVOC TICs, non-COC VOCs (including EDB), and 1,2,3-TCP were to be re-evaluated after the first sampling event. Results for these constituents in the

BPOU were presented in the 2007 Annual PE Report (Geomatrix and ERM, 2008). Based on the results, the CRs included recommendations for additional modifications to monitoring activities in the 2007 Annual PE Report (Geomatrix and ERM, 2008). The CRs refined the recommended modifications in a technical memorandum to EPA dated September 8, 2008 (AMEC Geomatrix, 2008). EPA approved the recommended modifications with several changes via e-mail correspondence on September 24, 2008, and the recommendations were implemented beginning in October 2008 as follows:

- Potentiometric monitoring in the multiport wells was reduced from quarterly to semi-annual.
- Water quality sampling in selected multiport wells was reduced from semi-annual to annual. Semi-annual sampling continued in MW5-03 (ports 5-10), MW5-19 (ports 3-5), MW5-24 (all ports), MW5-25 (all ports), MW5-26 (all ports), and MW 5-27 (all ports).
- Based on the distribution of 1,4-dioxane, the sampling frequency for 1,4-dioxane was reduced to annual and the number of monitoring locations for 1,4-dioxane was also reduced.
- Based on the limited detections of non-COC VOCs (including EDB) and VOC and SVOC TICs and also based on the redundancy between the PSEP and DPH sampling requirements, monitoring for these compounds will be eliminated from the PSEP monitoring program beginning in 2009. Results for non-COC VOCs (including EDB) and VOC and SVOC TICs will be reported by the WEs as part of their DPH monitoring requirements and the results will also be maintained the BPOU project database. In addition, the results for non-COC VOCs (including EDB) and VOC and SVOC TICs will be summarized in this and future Annual PE Reports.

Potentiometric monitoring, water-quality monitoring, and groundwater modeling activities that were completed in support of performance assessment activities during 2008 are discussed in the following sections.

3.1 POTENTIOMETRIC MONITORING

Potentiometric monitoring of wells included in the PSEP monitoring program continued to be conducted by the Watermaster and CRs throughout 2008. Locations of the wells included in the BPOU-wide potentiometric monitoring program are shown on Figure 3-1 and their monitoring schedules are presented in Table 3-1. The potentiometric monitoring frequency for multiport monitoring wells was adjusted in 2008 from quarterly to semi-annually as specified in Table 4.1 of the PSEP. Potentiometric monitoring completed for the PSEP monitoring program during 2008 included the following:

- Potentiometric data were collected quarterly in 11 extraction wells, with a few exceptions: COI 5 was not accessible for water level measurement during the fourth quarter of 2008. Potentiometric data were not collected during 2008 in

LPVCWD 3 because the well was not accessible for water level measurement during the scheduled monitoring event; however, quarterly water level measurements were collected in an adjacent extraction well, LPVCWD 2.

- Potentiometric data were collected quarterly in 16 piezometer clusters and three single piezometers with a few exceptions: one piezometer cluster (PZ1-1B S/D) was not accessible for water level measurements during the fourth quarter of 2008; one piezometer cluster (PZ3-CI5A S/D) was not accessible for water level measurements during the first, second, and fourth quarters of 2008.
- Potentiometric data were collected semi-annually in 18 multiport monitoring wells.
- Potentiometric data were collected weekly in one conventional monitoring well, the LACO Key Well.
- Potentiometric data were collected semi-annually in seven conventional monitoring wells with the following exceptions: monitoring wells AJ MW-2, MW-3, and MW-5 were dry during all of 2008 and AJ MW-4 was dry during the second half of 2008.
- Potentiometric data were collected semi-annually in 27 existing production wells.

In addition to the monitoring required by the PSEP, potentiometric data were also collected from various wells for other purposes. Quarterly monitoring at the MW 5-28 monitoring well cluster were used to supplement the PSEP monitoring program upgradient of SWS wellfields located to the east of the BPOU.

3.2 WATER-QUALITY MONITORING

Water-quality monitoring of new and existing wells included in the PSEP continued to be conducted by the Watermaster and the CRs throughout 2008. Locations of wells included in the BPOU-wide water-quality monitoring program are shown on Figure 3-2 and their monitoring schedules are presented in Table 3-2. Groundwater samples were analyzed for the 20 COCs listed in PSEP Table 2-1, including: 1,4-dioxane, NDMA, perchlorate, and VOCs. Groundwater samples were also analyzed for nitrate and sulfate because of their importance to treatment plant operations and potable use. Groundwater-quality monitoring completed for the PSEP monitoring program during 2008 included the following:

- Groundwater samples were collected quarterly from 11 extraction wells, with a few exceptions: groundwater samples were not collected in SA1-3 (Lante) in the first quarter of 2008 because this well was not in service during the scheduled sampling event (however, this well is routinely sampled to satisfy the DPH monitoring requirements of the VCWD drinking water permit); groundwater samples were not collected in COI 5 in the first, second, or fourth quarter of 2008 because this well was not in service during the scheduled sampling events.

- Groundwater samples were collected annually from selected ports at 14 multiport wells, with a few exceptions: the shallowest port in WHICO MP-1 (port 6) was dry during the 2008 sampling event.

- Groundwater samples were collected semi-annually from selected ports at six multiport wells, with the following exception: groundwater samples were not collected in the shallowest port in MW 5-03 (port 10) because the port was dry during the Spring and Fall sample events.

- Groundwater sampling for 1,4-dioxane was omitted inadvertently from the second semi-annual sampling event at the following multiport locations: MW 5-03 (ports 6-9), MW 5-19 (ports 4-5), MW 5-24 (ports 1-7), and MW 5-25 (ports 1-5).

- Groundwater samples were collected annually from six conventional monitoring wells with the following exceptions: groundwater samples were not collected in AJ MW-2 or AJ MW-3 because these wells were dry during the 2008 sampling events.

- Groundwater samples were collected annually from 16 production wells, with the following exception: groundwater samples were not collected in SWS 139W4 because the well was inaccessible during the 2008 sampling event. In five of the production wells that are currently inactive, discrete water-quality sampling was performed using dedicated low-flow sampling equipment that is installed at specific elevations within the well screened interval of each well.

- Groundwater sampling for 1,4-dioxane was omitted inadvertently from the following production wells: VCWD Big Dalton, VCWD Morada, and VCWD Paddy Lane.

In addition to groundwater-quality monitoring required by the PSEP, other groundwater-quality monitoring was performed to supplement the PSEP monitoring program during 2008 including the following:

- Groundwater-quality samples for the COCs and chemicals of interest were collected quarterly from the MW 5-28 monitoring well cluster. Groundwater-quality data at the MW 5-28 monitoring well cluster is used to supplement the PSEP monitoring program upgradient of SWS well fields that are located to the east of the BPOU.

As discussed in Section 1.1, EPA requested additional groundwater-quality monitoring that is not specified in the PSEP and, therefore, additional groundwater sampling was performed for the following:

- Annual groundwater-quality samples were collected for analysis of 1,2,3-TCP in MW 5-01 (ports 7-11 only), MW 5-05, MW 5-08, MW 5-15, MW 5-19, MW 5-20, and MW 5-23.

- Annual groundwater-quality samples were collected for analysis of non-COC VOCs and EDB in VCWD Big Dalton and in the following multiport wells: MW 5 01 (ports 7-11), MW 5-03 (ports 4-9; port 10 was dry), MW 5-05, MW 5 08 (ports 3-4), MW 5-

11, MW 5-13, MW 5-15, MW 5-19 (ports 4-5), MW 5-20 (ports 3-4), and MW 5-23 (ports 3-5).

- Annual groundwater-quality samples were collected for analysis of VOC and SVOC TICs in VCWD Big Dalton and in the following multiport wells: MW 5-01 (ports 7 11), MW 5-03 (ports 4-9; port 10 was dry), MW 5-05, MW 5-08 (ports 3-4), MW 5-11, MW 5-13, MW 5-15, MW 5-19 (ports 4-5), MW 5-20 (ports 3-4), and MW 5-23 (ports 3-5).

Results of the water-quality monitoring are presented in Section 5.2.

3.3 GROUNDWATER MODELING

As described in Section 6.1.1 of the PSEP (Geomatrix, 2004a), the BPOU groundwater model is the primary tool for assessing extraction system performance. Annual simulations consist of quarterly stress periods of basin-wide groundwater flow conditions. The BPOU groundwater model is described in the Comprehensive Groundwater Modeling Report, dated July 29, 2005 (Geomatrix, 2005). Previous updates to the model are described in the Addendum to the Comprehensive Groundwater Modeling Report, dated September 8, 2006, (Geomatrix, 2006d) and in a technical memorandum dated December 14, 2007 (Geomatrix, 2007b).

As part of the December 14, 2007, technical memorandum (Geomatrix, 2007b), the groundwater model was updated through the end of water year (WY) 2005-06. Since that time, the groundwater model was updated with recharge, pumping, and water level data through the end of WY2006-07 (ending June 2007). The most recent model update is described in the 2007 Annual PE Report (Geomatrix and ERM, 2008). EPA reviewed the technical memorandum dated December 14, 2007, and provided comments by e-mail on October 1, 2008. The CRs provided responses to the EPA's comments by e-mail on October 31, 2008.

Once the BPOU remedy is fully operational, performance evaluation simulations will be performed using the updated BPOU groundwater model and the transient particle tracking code, FETRAC, that is described in the Addendum to the Comprehensive Groundwater Modeling Report (Geomatrix, 2006d). The performance evaluation simulations will be conducted using the updated BPOU groundwater model to demonstrate that the remedy is limiting the migration of COCs in groundwater by simulating actual pumping conditions in the BPOU project extraction wells and current water level conditions.

4.0 TREATMENT PLANT MONITORING ACTIVITIES

This section summarizes methods used to monitor treatment plant performance. Treatment plant operational results are presented in Section 6.0.

4.1 SUBAREA 1 – VALLEY COUNTY WATER DISTRICT LANTE TREATMENT PLANT

The VCWD Lante Treatment Plant operated on a full-time basis in 2008, experiencing downtime associated with routine maintenance and unplanned operational interruptions. Raw water, partially treated water, and fully treated water were routinely sampled and analyzed for COCs, 1,2,3-TCP, inorganic chemicals, and other diagnostic parameters to evaluate the effectiveness of treatment processes and to monitor the quality of the fully treated water. Treated water was primarily delivered to SWS Plant 121, although after experiencing downtime the drinking water permit requires the discharge of treated water upon initial startup. Water-quality data, as obtained, are summarized in the DPH compliance reports appended to the monthly progress reports to EPA.

In August 2006, by mutual agreement among EPA, South Coast Air Quality Management District (SCAQMD), and VCWD, air stripper and off gas control system permits with SCAQMD were cancelled and EPA assumed compliance oversight with respect to operations formerly covered by the SCAQMD permits. The air stripper vapor abatement equipment consists of four 20,000-pound carbon adsorption systems equipped with heaters. Weekly air samples were collected from the influent and effluent, for each operating off-gas control unit until mid-November 2008. Thereafter, air compliance samples were collected according to the revised protocol approved by EPA on November 18, 2008. The revised protocol requires air sampling immediately after a carbon change out, monthly while the Maximum Individual Cancer Risk (MICR) control efficiency remains above 75%, and weekly when the control efficiency falls below 75%. All air samples were analyzed by EPA Method TO-15. 30,000 pounds of VPGAC from the temporary systems was changed out on February 4, 2008. The installation of the permanent VPGAC system was completed in March 2008 and heaters were installed in April 2008. VPGAC from the new permanent systems was not changed out in 2008.

The LPGAC system to treat 1,2,3-TCP became operational in July 2007 and the first carbon change out occurred from January to February, 2008; LPGAC was provided by Calgon. LPGAC was changed out again in August to September using carbon supplied by Siemens. Calgon and Siemens manage the LPGAC at facilities that are authorized to accept Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) wastes. As they are received, certificates of disposal are provided to EPA in the monthly progress reports.

Waste brine and water softener wastes produced by the ISEP® system were discharged under Industrial Wastewater Permit No. 16112 from the LACSD, issued on August 5, 2004. A revised permit was approved on January 10, 2008. Brine discharges occurred throughout 2008 while the treatment plant was operating. Quarterly brine discharge samples were collected and analyzed for VOCs, SVOCs, perchlorate, 1,4-dioxane, sulfide, oil and grease, chloride, alkalinity, calcium, magnesium, total toxic organics, suspended solids, and chemical oxygen demand. Quarterly Self Monitoring Reports (SMRs) were submitted to LACSD and EPA on or before April 15, July 15, and October 15, 2008, and January 15, 2009. The SMRs summarize flow, pH, and brine quality data collected during the quarter.

4.2 SUBAREA 3 – LA PUENTE VALLEY COUNTY WATER DISTRICT TREATMENT PLANT

The LPVCWD Treatment Plant operated on a full-time basis in 2008, experiencing periodic downtime associated with routine maintenance and infrequent and unplanned operational interruptions. Raw and treated water sampling was performed in accordance with the DPH permit and included weekly sampling for VOCs, perchlorate, 1,4-dioxane, NDMA, and various inorganic and physical parameters. The weekly sampling results are included in monthly progress reports submitted to DPH as a requirement of LPVCWD's drinking water permit. These results are also included in the monthly progress reports to EPA.

In August 2006, by mutual agreement among EPA, SCAQMD, and LPVCWD, air strippers and off-gas unit permits were cancelled and EPA assumed compliance oversight with respect to operations formerly covered by the SCAQMD permits. The VOC treatment equipment consists of a 30-foot tall air-stripping tower with a single 7,000 pound VPGAC adsorber and a 41-foot tall air-stripping tower with a single 20,400 pound VPGAC adsorber. Air compliance samples were collected weekly and analyzed by EPA Method TO-15 through April 24; thereafter air compliance samples were collected according to the revised protocol approved by EPA on April 24, 2008. The revised protocol requires air sampling immediately after a carbon change out and monthly thereafter. The VPGAC was changed out on January 16, March 28, June 4, August 14, October 21, and December 29, 2008 according to the 70-day change out criteria. All carbon was managed at the Carbon Activated Corporation (Carbon Activated) facility in Compton, California, which is authorized to accept CERCLA wastes. As they are received, copies of disposal manifests for change out of spent VPGAC are provided to EPA in the monthly progress reports.

Waste brine and water-softener wastes were discharged under temporary Industrial Wastewater Discharge Permit 17128 issued by LACSD. The temporary permit was issued while a new permit, due to a requested ownership change to BPOU, LLC., is under review by LACSD. Quarterly brine discharge sampling was performed for VOCs, SVOCs, perchlorate, 1,4-dioxane, sulfide, oil and grease, chloride, alkalinity, calcium, magnesium, total toxic organics, suspended solids, and chemical oxygen demand. Four quarterly SMRs were prepared and submitted to LACSD and EPA on or before April 15, July 15, and October 15, 2008, and January 15, 2009.

4.3 SUBAREA 3 – SAN GABRIEL VALLEY WATER COMPANY B6 TREATMENT PLANT

The SGVWC B6 Treatment Plant operated continuously in 2008, experiencing periodic downtime associated with routine maintenance and infrequent unplanned interruptions. The plant operated at about half capacity in November and December while ISEP® systems were being cleaned due to plugging from fines associated with the California Supreme salt. Production was primarily from SGVWC B25A, B25B, B26A, and B26B; SGVWC B6C and B6D were infrequently operated as standby drinking water sources.

Raw and treated water sampling was performed in accordance with the DPH permit and included sampling for COCs, inorganic chemicals, and other diagnostic parameters. Water-quality data are summarized in monthly reports to DPH and are included in the monthly progress reports to EPA.

In August 2006, by mutual agreement among EPA, SCAQMD, and SGVWC, permits for the four air strippers and off-gas units were cancelled and EPA assumed compliance oversight with respect to operations formerly covered by the SCAQMD permits. Air samples are collected weekly from the air inlet, mid-point, and outlet to the VPGAC vessels through April. Thereafter, air compliance samples were collected according to the revised protocol approved by EPA on April 24, 2008. The revised protocol requires air sampling immediately after a carbon change out, every two months while the MICR control efficiency is greater than 90%, monthly while the MICR control efficiency is less than 90% but greater than 75%, and weekly when MICR control efficiency is less than 75%. The air compliance sampling data were included in the monthly progress reports to EPA. Carbon change outs occurred in April (100,000 pounds) and August (20,000 pounds) 2008. The carbon was reactivated at Carbon Activated's facility in Compton, California, which is approved by EPA to accept CERCLA wastes. Copies of disposal manifests for change out of spent VPGAC are provided as they are received in monthly progress reports to EPA.

Waste brine and water-softener wastes produced by the ISEP® system were discharged under Industrial Wastewater Permit No. 16499 issued on February 17, 2004. Brine discharges occurred throughout 2008. Quarterly brine discharge sampling is required, and was performed for VOCs, SVOCs, perchlorate, 1,4-dioxane, sulfide, oil and grease, chloride, alkalinity, calcium, magnesium, total toxic organics, suspended solids, and chemical oxygen demand. Four quarterly SMRs that summarize 2008 discharges and brine quality data were submitted to LACSD and EPA on or before April 15, July 15, and October 15, 2008, and January 15, 2009.

4.4 SUBAREA 3 – SAN GABRIEL VALLEY WATER COMPANY B5 TREATMENT PLANT

The SGVWC B5 Treatment Plant operated continuously in 2008, experiencing periodic downtime associated with routine maintenance and infrequent unplanned interruptions. The plant discharged to waste until July 8, 2008, when it began delivering water to the SGCWC distribution system. Production was primarily from SGVWC B5B and B5E; COI 5 was only operated for testing and is not yet permitted as a drinking water source. SGVWC B5D was also used as a drinking water source in November and December while arrangements were made to change out the LPGAC; however, this well is not part of the extraction plan.

Raw and treated water sampling was performed in accordance with the DPH permit and included sampling for COCs, inorganic chemicals, and other diagnostic parameters. Water-quality data are summarized in monthly reports to DPH and are included in the monthly progress reports to EPA.

VOCs are removed using LPGAC and the carbon was replaced in February 2008 and again in July and August 2008. LPGAC was replaced and reactivated by Carbon Activated at their facility in Compton, California. Copies of disposal manifests for change out of spent LPGAC are provided as they are received in monthly progress reports to EPA.

Single pass ion exchange used to remove perchlorate was replaced in June and July 2008 using resins from Calgon, Siemens, and Purolite. Five additional single pass ion exchange vessels were changed out in the fall using resin from Purolite. Copies of disposal manifests for the change out of spent resins are provided as they are received in the monthly progress reports to EPA.

5.0 PERFORMANCE MONITORING RESULTS

Potentiometric and groundwater-quality monitoring data obtained for the PSEP monitoring program during 2008 were collected in support of performance monitoring during continued construction, testing, and operation of the BPOU remedy. Results of potentiometric and water-quality monitoring are presented in the following sections.

5.1 POTENTIOMETRIC MONITORING RESULTS

The primary objective of the potentiometric monitoring described in Section 3.1 is to verify that the BPOU groundwater flow model accurately reflects the observed flow field and to verify that the remedy is limiting further migration of COCs in groundwater. As noted in Section 6.1.2 of the PSEP, results from potentiometric monitoring are also used to develop potentiometric surface maps to assist in evaluating changes in groundwater flow patterns in the BPOU.

Key components of the assessment of potentiometric data include the following:

- Regional water level fluctuations due to basin-wide recharge and pumping conditions;
- Local-scale water level fluctuations due to ongoing groundwater production and extraction system pumping;
- Regional and local-scale lateral hydraulic gradients and flow directions; and
- Regional and local-scale vertical hydraulic gradients and flow directions.

Potentiometric monitoring results for 2008 are discussed in the following sections.

5.1.1 Water Level Fluctuations

Long-term regional water level conditions in the BPOU are evaluated using water level data for the LACO Key Well. Figure 5-1 shows the water levels measured in the Key Well from 1982 through 2008. During 2008, groundwater levels in the LACO Key Well continued to decline from approximately 209 feet mean sea level (msl) in January 2008 to approximately 201.5 feet msl in December 2008. Review of 2008 monitoring data suggests that the observed water level decline in the LACO Key Well occurred in response to below average recharge in 2008.

Figures 5-2 and 5-3 show water levels in multiport monitoring wells MW 5-03 and MW 5-20. The hydrographs for MW 5-03 and MW 5-20 represent water level conditions in Subarea 1, in the northern portion of the BPOU, and in Subarea 3, in the southern portion of the BPOU, respectively. As shown on Figures 5-2 and 5-3, water levels in both Subarea 1 and Subarea 3 declined in 2008 as compared to the prior year's recorded water levels. Water levels in Subarea 1 declined approximately 6 feet between December 2007 and June 2008, while water levels in Subarea 3 declined approximately 11 feet during the same period. Water level data depicted on Figure 5-2 indicate that all ports in MW5-03 exhibit similar trends. As shown on Figure 5-3, water levels in the deeper ports of MW 5-20 (Ports 1 – 4) exhibited higher rates of decline than the shallow ports during the period between December 2007 and June 2008. As discussed in Section 1.3.3.1, the difference in the observed water level trend between the shallow and deep ports is likely the result of confining units in Subarea 3 that provide hydraulic separation between pumping in the shallow and deep elevation intervals.

5.1.2 Lateral Hydraulic Gradients

Generalized potentiometric surface maps for the shallow and deep elevation intervals were developed based on water level data collected in the multiport monitoring wells to assess observed groundwater flow patterns and hydraulic gradients across the BPOU. Figures 5-4 and 5-5 show observed groundwater flow conditions in the shallow (above -500 feet msl) and deep (below -500 feet msl) elevation intervals in February/March 2008. Figures 5-6 and 5-7 show observed groundwater flow conditions in the shallow and deep elevation intervals in June 2008. Evaluation of observed groundwater flow patterns on a more detailed scale is limited by spatial variations in hydrostratigraphy and significant short-term water level fluctuations that occur in response to variations in local recharge and pumping.

As shown on Figures 5-6 through 5-9, groundwater flows towards the southwest, with a more westerly gradient in Subarea 3 in the vicinity of the SGVWC B5 Subproject and the California Domestic Water Company (CDWC) Bassett wellfield. In general, regional groundwater flow directions depicted on Figures 5-6 through 5-9 are similar to the westerly flow directions observed in 2007. This data is consistent with the variation in groundwater flow directions that have been described in past Annual PE Reports. Although it is difficult to generalize groundwater flow directions given the complexity of pumping influences in Subarea 3, groundwater flow directions are generally more southerly during higher water level conditions and are more westerly during lower water level conditions.

Regional-scale lateral hydraulic gradients were estimated using water levels measured in MW 5-03 and MW 5-20 during February/March and June 2008. Estimated lateral hydraulic gradients are summarized in Table 5-1. The following observations are presented based on the results shown in Table 5-1:

- Estimated lateral hydraulic gradients in the shallow elevation interval ranged from 3.8×10^{-4} to 5.2×10^{-4} toward the southwest.
- Estimated lateral hydraulic gradients in the deep elevation interval ranged from 7.0×10^{-4} to 1.0×10^{-3} toward the southwest.

- Lateral hydraulic gradients continue to be lower in the shallow elevation interval above -500 feet msl compared to lateral hydraulic gradients in the deep elevation interval below -500 feet msl.

5.1.3 Vertical Hydraulic Gradients

Water level measurements in multiport monitoring wells and piezometer clusters installed near extraction wells indicate that vertical hydraulic gradients vary throughout the BPOU. As discussed in Section 5.1.1, hydrographs shown on Figures 5-2 and 5-3 represent water level conditions in Subarea 1 (MW 5-03), in the northern portion of the BPOU, and in Subarea 3 (MW 5-20), in the southern portion of the BPOU, respectively. As shown on Figure 5-2, hydrographs for ports at different depths in MW 5-03 plot essentially on top of each other, indicating that there is no significant vertical hydraulic gradient in Subarea 1. However, as shown on Figure 5-3, hydrographs for ports at different depths in MW 5-20 are separated by up to 25 feet, indicating that there are significant downward vertical hydraulic gradients in Subarea 3.

Vertical hydraulic gradients calculated at selected multiport wells and piezometer clusters located in Subarea 1 and Subarea 3 are summarized in Table 5-2. The estimates summarized in Table 5-2 are based on semi-annual water level conditions in January/February 2008 and June/July 2008. As shown in Table 5-1, vertical hydraulic gradients continue to be lower in Subarea 1 compared to vertical hydraulic gradients in Subarea 3. Estimated vertical hydraulic gradients in Subarea 1 ranged from 7.3×10^{-4} upward to 1.7×10^{-3} downward. Estimated vertical hydraulic gradients in Subarea 3 ranged from 1.8×10^{-2} to 3.1×10^{-2} and are consistently downward.

5.2 GROUNDWATER QUALITY

Groundwater samples were collected from wells in the PSEP monitoring program to evaluate groundwater-quality conditions during continued construction, testing, and operation of the BPOU remedy. As described in Section 3.2, groundwater samples were analyzed for the 20 COCs listed in PSEP Table 2-1 including: 1,4-dioxane, NDMA, perchlorate, and VOCs. Groundwater samples were also analyzed for nitrate and sulfate because of their importance to treatment plant operations and potable use. As described in Section 3.2, other groundwater-quality monitoring was performed to supplement the PSEP monitoring program during 2008. Water-quality monitoring results for 2008 are discussed in the following sections.

5.2.1 Water-Quality Results

Water-quality results for the PSEP monitoring program in 2008 are summarized in Table 5-3. Table 5-3 also includes results from the MW 5-28 monitoring well cluster. An evaluation of the 20 COCs relative to their compliance with or exceedance of either California Maximum

Contaminant Levels (MCLs) or, if no MCL has been established, California Drinking Water Notification Levels (NLs) and their frequency of occurrence was submitted to EPA in the technical memorandum dated February 17, 2004 (Geomatrix, 2004b). This memorandum recommended that interpretations of the spatial distribution and temporal trends of COCs in groundwater focus on seven selected COCs including: 1,2-dichloroethane (1,2-DCA); 1,4-dioxane; carbon tetrachloride; NDMA; perchlorate; PCE; and TCE. These seven COCs were selected because they meet one or more of the following criteria:

- Observed concentrations of the compounds meet or exceed either MCLs or, if no MCL has been established, the NLs, as applicable;
- They occur relatively frequently in the BPOU; and
- They may be controlling compounds relative to effectiveness of treatment processes used in BPOU Treatment Plants.

Although this report contains approximate depictions of the interpreted current spatial distribution and concentration trends of the seven selected COCs in groundwater, such depictions are at best approximate and are further evaluated in Sections 5.2.3 and 5.2.4 as well as Section 4.0 of Appendix A.

Results for other water-quality monitoring that was performed at EPA request to supplement the PSEP monitoring program in 2008 are summarized as follows:

- Water-quality results for 1,2,3-TCP are presented in Table 5-4. Concentrations of 1,2,3-TCP were detected at levels that exceeded the NL (5 ng/L) at EPA MW 5-01 (port 7), MW 5-05 (port 3), and MW 5-15 (ports 1-2) in the mid-plume region. Concentrations of 1,2,3-TCP did not exceed the NL in Subarea 3 monitoring locations.
- Water-quality results for EDB analyses are presented in Table 5-5. EDB was not detected above the method reporting limit (RL).
- Water-quality results for non-COC VOCs are presented in Table 5-6. Nine non-COC VOCs were detected in various wells. Vinyl Chloride was detected in MW 5-03 port 9 at a level that exceeded the MCL (0.5 micrograms per liter [µg/L]). All other non-COC VOC results were below their respective MCL or NL.
- Water-quality results for VOC and SVOC TICs are presented in Table 5-7. Tetrachloroethene was tentatively identified at three locations at a concentration above the MCL using a SVOC analysis; this compound is currently monitored using EPA Method 8260 and is addressed by the remedy for VOC treatment within the BPOU. Seven other results were tentatively assigned a specific chemical association with no current regulatory standard or limit.

5.2.2 Data Validation and Data Quality Assessment

Data management activities for the BPOU Project are managed by LDC under contract to the Watermaster. LDC utilizes EDMSi, an EQUIS web-based database, for the management of historical data that was compiled from the EPA San Gabriel Basin database, CRs, WEs, and other relevant sources. New water-quality data that are collected for the PSEP monitoring program are reported to LDC by laboratories and are validated in EDMSi as part of the real-time automated Tier 1A/1B process and Tier 3 selection. As specified by the QAPP (Geomatrix, 2006b), Tier 1A/1B validation was performed by LDC on all water-quality data collected in support of the PSEP monitoring program and Tier 3 review was performed on approximately ten percent of the PSEP monitoring data. Results of the data validation are used to evaluate laboratory performance and ensure that data quality is acceptable to meet BPOU Project objectives.

Data qualifiers that were assigned during the Tier 1A/1B and Tier 3 reviews are shown with the groundwater-sampling results summarized in Table 5-3. Based on the data validation efforts and the evaluation of field quality control (QC) samples all analytical sample results are considered usable to support the BPOU Project Data Quality Objectives (DQOs). Final Tier 3 validation reports were submitted by LDC to the Watermaster on July 18, 2008, and February 12, 2009 (LDC, 2008, 2009). The Tier 3 results were submitted by the Watermaster to EPA via e-mail and are also posted on a secure LDC BPOU web portal.

5.2.3 Distribution of Selected Chemicals of Concern

Consistent with previous Annual PE Reports, water-quality data from wells screened at selected depths within the aquifer were interpreted using the three-dimensional geospatial modeling software, Earth Vision®. A detailed description of the approach used for the development of plume maps and chemical cross sections for the seven selected COCs is presented in Appendix A. Isoconcentration contours for these seven COCs are shown on the generalized distribution maps on Figures 5-8 through 5-14. The isoconcentration contours shown on the generalized distribution maps represent the composite lateral extent of each individual chemical at all depths in groundwater. The lateral distribution of the selected COCs is also shown in plan view at three specific elevation intervals in Appendix A. The three elevation intervals are as follows:

- Elevations between the water table (or potentiometric surface) and -200 feet msl;
- Elevations between -200 feet and -500 feet msl; and
- Elevations below -500 feet msl.

The plume maps for the three elevation intervals shown in Appendix A include two sets of isoconcentration contours on each map. Isoconcentration contours at “discrete” elevations are shown for thin slices through the plumes at -50, -350 and -550 feet msl. Isoconcentration contours for “composite” elevation intervals are also shown for thicker slices through the plumes in the intervals between the water table and -200 feet msl, between -200 and -500 feet msl, and below -500 feet msl.

Given the three-dimensional nature of the plumes, the reader is encouraged to consider the three-dimensional visualization that is inset in the corner of each figure when reviewing the two-dimensional plume maps and chemical cross sections. The three-dimensional visualizations provide the appropriate context within which to review the two-dimensional isoconcentration contours shown on each plume map and chemical cross section. It should be noted that the water-quality data used to create the three-dimensional plume interpretations are posted on the plume maps according to the composite elevation intervals described above. Therefore, in many instances the discrete contours may not appear to correspond to water-quality data that are within the composite elevation interval but that are either above or below the elevation of the discrete contours.

Chemical cross sections showing the vertical distribution of selected COCs along four discrete transects are also shown in Appendix A. Cross section A-A’ represents a north-south transect that is aligned generally with the longitudinal axis of the COC plumes. Cross sections B-B’, C-C’, and D-D’ represent east-west or northwest-southeast transects that are aligned generally perpendicular to the dominant groundwater flow direction in the BPOU. Cross sections B-B’, C-C’, and D-D’ show the distribution of the COC plumes in the upgradient, mid-plume, and downgradient areas of the BPOU and include various production wells that are vulnerable to lateral migration of the COC plumes toward the west or east.

The depictions of plume geometry presented in Appendix A and summarized on Figures 5-8 through 5-14 represent the estimates of the distribution of the COCs in the BPOU in 2008. However, as with any approach used to interpolate data between known data points, there are uncertainties and limitations to the approach that may result in alternative interpretations of the distribution of COCs in groundwater. These uncertainties and limitations are summarized as follows:

- For clarity, and as requested by EPA, we have depicted the seven principal COCs in separate plume maps at three elevations. Plumes for the various COCs overlap (and/or diverge) at various depths throughout the impacted areas.

- The plume maps and chemical cross sections attempt to depict the dynamic and temporally changing three-dimensional distribution of COCs in groundwater with static two-dimensional images. While these maps and cross sections show two-dimensional isoconcentration contours of the COC plumes in plan view and in profile, they represent interpolated approximations of the distribution of COCs in groundwater based on available data. The exact subsurface distribution of the COCs cannot be completely ascertained given these and other potential limitations. The spatial and temporal spread of the chemical data may not encompass the entire distribution of chemicals in the groundwater (i.e., additional assumptions are necessary as to chemical concentrations in areas that may not be completely represented by monitoring wells). In particular, results of the interpolation should be carefully evaluated in areas where available data are limited or concentrations change significantly over short distances.

- Alternative interpretations of the distribution of the COC plumes are possible and may differ from the plume depicted here by utilizing plumes drawn manually using professional judgment. For example, plume maps and chemical cross sections for certain COCs portray discontinuous plumes in areas where the plumes may in fact be continuous.

- As described in Appendix A, the plume interpretations generally incorporate water-quality data collected during March and April 2008. However, where data were not available for that time period, data from the next closest date during the January through December 2008 time period were utilized. While using such an expanded data set is helpful to some degree in the contouring exercise, it introduces additional uncertainties in comparing data taken from different time periods and assuming that the ultimate projection is a consistent one. Moreover, even using this temporally diverse data set, there are inevitable gaps in the existing data that limit our ability to define the distribution of COCs in groundwater completely. In addition, the EarthVision® software used to create the plume maps and chemical cross sections utilizes certain algorithms to interpolate or “fill in” data gaps in order to provide a more comprehensive picture of the distribution of COCs. Although the EarthVision® software objectively applies the selected interpolation scheme, other software and other interpolation schemes may be applied that may generate reasonable, yet differing, results, each appropriately honoring the available monitoring data. This is not a unique limitation of the EarthVision® software, but simply a limitation of any methodology with limited data. Consequently, the interpretation may result in differences between actual and interpreted concentrations at any given point in the Project area.

- The Duarte Fault is represented as a diffuse zone of faulting on the plume maps and chemical cross sections. However, no faulting was explicitly represented in any way in the 3D grid used to interpolate the plumes. The diffuse fault zone is considered to be a reasonable representation of the uncertainty in the fault’s location as it has several fault splays concealed beneath alluvial deposits.

- The northern-most limits of the COCs depicted on the plume maps are uncertain due to the limited amount of data available to the CR group from other EPA-named PRPs, including the Mobil/Lockheed/Valspar group, as well as other entities that may be PRPs in the northern portions of the BPOU. The most recent available data from several PRP monitoring wells located north of the Duarte Fault indicates detections of several COCs such as TCE and PCE. In some cases the most recent detections were at concentrations that exceeded MCLs. Because the most recent data available for some of these PRP wells are several years old, such results were not explicitly included in the 2008 interpretation of the distribution of the COC plumes. However, to present an interpretation of the distribution of the COC plumes that recognizes COC detections in the most recently available data from PRP monitoring wells north of the Duarte Fault, the isoconcentration contours for TCE and PCE are shown extending upgradient (north) to the Duarte Fault zone.

Evaluation of both the generalized plume maps shown on Figures 5-8 through 5-14 and the detailed elevation-specific plume maps and chemical cross sections that are shown in Appendix A resulted in the following general observations of the spatial distribution of COCs in the BPOU:

- The longitudinal extent of the longest COC plumes extends from north of the Duarte Fault zone in Subarea 1, approximately 7.5 miles towards the southwest, where the plumes terminate near the confluence of Avocado Creek and the San Gabriel River.
- The maximum lateral extent of the various COC plumes generally overlap throughout their extent, with the exception of the 1,4-dioxane plume, which has a much smaller lateral extent in comparison to other COC plumes.
- The vertical extent of the various COC plumes ranges from depths of approximately 600 feet below ground surface (bgs) to the north of Arrow Highway, in Subarea 1, to approximately 1,000 feet bgs in Subarea 3. The COC plume with the maximum vertical extent is carbon tetrachloride.
- As described in the 2007 Annual PE Report (Geomatrix, 2008), the 1,4-dioxane plume appears to be vertically disconnected in the area of MW 5-24 with the deeper portion separated by approximately 600 vertical feet from the shallower and more laterally extensive portion of the plume. These deeper detections of 1,4-dioxane are considered anomalous and may be the result of contamination introduced into the formation by the borehole mudcake during well construction.

In addition to the general observations described above, minor changes in the COC concentrations in various wells resulted in slightly different interpretations of the extents of the COC plumes compared to the previous year. In particular, concentrations of COCs in several wells that are located near the edges of the plumes changed relative the respective MCL (or NL); the concentrations of some COCs in some wells located near the edges of the plumes increased above MCLs (or NLs) whereas the concentrations of some COCs in some wells decreased below MCLs (or NLs). Such changes in concentration resulted in a slightly different location of the isoconcentration contours at the MCL (or NL) compared to the previous year. Changes in the concentrations of COCs relative to the MCL (or NL) that resulted in a different location of the isoconcentration contours at the MCL (or NL) compared to the previous year are as follows:

- In Subarea 1, the 1,2-DCA, 1,4-dioxane and carbon tetrachloride plumes do not appear to extend as far to the east compared to the previous year. The difference is due to lower concentrations of these three chemicals in ALR MW-9 and lower concentrations of carbon tetrachloride in MW 5-18 in 2008.

- In Subarea 1, the lateral extent of the perchlorate plume appears to extend slightly farther to the east compared to the previous year due to higher concentrations of perchlorate in MW 5-19 and VCWD Morada in 2008.

- In the mid-plume area, the PCE and TCE plumes do not appear to extend as far to the west compared to the previous year due to lower concentrations of these two chemicals in CC E Durbin in 2008.

- In Subarea 3, the carbon tetrachloride, perchlorate, and TCE plumes appear to extend slightly farther downgradient to the south compared to the previous year due to higher concentrations in several wells in 2008. Compared to the previous year, the concentration of carbon tetrachloride is higher in MW 5-22; the concentration of perchlorate is slightly higher in MW 5-26; the concentration of TCE is higher in CDWC 3 and CDWC 14.

When reviewing the evaluation presented above, apparent changes in the interpreted spatial distribution of a particular COC plume from year to year should be considered with considerable caution. Historical variations in chemical concentrations have been observed seasonally and from year to year as basin water levels vary. In some instances, observed COC concentrations have fluctuated above and below MCLs (or NLs) and RLs (or DLs) during the span of one or two years or even from one sampling event to the next. Therefore, very slight changes in water quality results from one sampling event to the next may significantly alter the interpreted spatial extents of the COC plumes that are depicted on the plume maps and chemical cross sections. Therefore, while the apparent short-term changes in the interpreted plume extents may be representative of seasonal or annual changes, the apparent short-term changes should not be considered as representative of longer-term (multi-year) trends until such observations can be confirmed over several years. This is particularly important for wells located along the perimeter of the plumes.

It should be noted that carbon tetrachloride and NDMA were detected in MW-27 at concentrations that exceeded the MCL (or NL) in March 2008, as shown in Table 5-3. However, carbon tetrachloride and NDMA were not detected above the reporting limits during previous and subsequent monitoring events in MW 5-27. Because the October 2008 results for carbon tetrachloride and NDMA are considered to be more representative of the longer-term trend, the October results for carbon tetrachloride and NDMA were used to create the plume maps and chemical cross sections.

5.2.4 Temporal Trends

Temporal trends in chemical concentrations for the seven selected COCs were evaluated by developing time-concentration graphs for all wells in the PSEP water-quality monitoring network as presented on Figures 5-15 through 5-21. Time-concentration graphs were created for selected multiport wells included in the BPOU-wide water-quality monitoring program for the period from 1994 through December 2008 using available data in the BPOU Project database. The graphs include data that were collected for BPOU performance monitoring activities as well as DPH and the Regional Water Quality Control Board (RWQCB) monitoring requirements. Concentrations of chemicals detected in groundwater samples are plotted using closed circles; chemicals not detected in groundwater samples were plotted at the reporting limit using open circles. Groundwater-quality results in multiport monitoring wells are grouped on the time-concentration graphs according to port elevations in three elevation intervals as follows: between the water table and -200 feet msl, between -200 and -500 feet msl, and below -500 feet msl.

Based on a review of the time-concentration graphs shown on Figures 5-15 through 5-21, the following observations were noted:

- Monitoring wells MW 5-11, MW 5-13, and MW 5-18 are located in the upgradient area of the COC plumes, north of Arrow Highway in the Subarea 1 portion of the BPOU. These wells are considered to be general indicators of the quality of groundwater that is flowing toward downgradient extraction wells installed for the VCWD Lante Subproject. Concentrations of most COCs in these wells were generally consistent or or slightly lower in 2008 in comparison to previous years which have been, in most cases, generally decreasing since 1998.

- Monitoring wells MW 5-05, MW 5-08, and MW 5-15 are located in the mid-plume area of the COC plumes, downgradient of Subarea 1 and upgradient of Subarea 3. These wells are considered to be general indicators of the quality of groundwater that is flowing downgradient toward the SGVWC B5, SGVWC B6, and LPVCWD Subproject extraction wells. Concentrations of most COCs in MW 5-05 and MW 5-15, located towards the center of most plumes, generally remained elevated above the MCL or NL in 2008 as observed in previous years. Concentrations of COCs in MW 5-08, located on the western edge of the plume, were generally similar to observed concentrations for previous years although several COCs (1,2-DCA, PCE, and TCE) at that well location have decreased in concentration over the last three year period.

- Monitoring wells MW 5-19 and MW 5-23 are located within Subarea 3, upgradient of the SGVWC B5 Subproject extraction wells and the CDWC Bassett wellfield. These wells are considered to be general indicators of groundwater quality in the southern portion of the BPOU and representative of the quality of groundwater that is flowing downgradient toward the SGVWC B5 Subproject extraction wells and CDWC Bassett wellfield. In the shallowest elevation interval, above -200 feet msl, concentrations of COCs have been decreasing since 2001. In the elevation interval between -200 feet and -500 feet msl, concentrations of the COCs have remained relatively unchanged in MW5-19; COCs have generally increased in MW 5-23 in this depth interval. In the deep elevation interval, below -500 feet msl, concentrations of the COCs continued to remain below reporting limits in both MW 5-19 and MW 5-23, with the exception of carbon tetrachloride concentrations, which appear to have generally increased over time.

In addition, as summarized in Table 5-3, perchlorate in MW-26 and carbon tetrachloride and NDMA in MW-27 were detected at concentrations exceeding the MCL (or NL) in March 2008. Perchlorate was previously detected in MW-26 at concentrations below the MCL whereas carbon tetrachloride and NDMA have not been previously detected in MW5-27. In the subsequent October 2008 sampling event, perchlorate concentrations decreased below the MCL in MW5-26 and carbon tetrachloride and NDMA concentrations were not detected in MW5-27. As described in previous Annual PE Reports, such increases or decreases in the concentration of a particular COC during a single sampling event should not be considered as a significant change in the overall trend of chemical concentrations at a particular well. Historical variations in chemical concentrations have been observed seasonally and from year to year as basin water levels vary. In some instances, observed COC concentrations have fluctuated above and below MCLs (or NLs) and RLs (or DLs) during the span of one or two years or even from one sampling event to the next.

5.3 GROUNDWATER EXTRACTION AND CHEMICAL MASS REMOVAL

Monthly groundwater extraction volumes for 2008 were compiled from monthly reports submitted to DPH and EPA in monthly progress reports. Groundwater extraction volumes for all extraction wells that were operational in 2008 are shown in Table 2-1. Average monthly and average annual extraction rates are also provided in Table 2-1 together with design extraction rates for each extraction well, target operational extraction rates, and EPA-approved extraction rates for each well. Design extraction rates are based on the peak design capacity of the treatment plants whereas target operational extraction rates generally assume ten percent downtime for each well for treatment plant maintenance. The EPA-approved extraction rates shown in Table 2-1 are based on groundwater flow model simulations performed in 2000 and 2001 and represent the average extraction rates necessary to achieve the remedial action objectives.

Estimates of chemical mass removed from extracted groundwater in 2008 for the LPVCWD, SGVWC B6, and VCWD Lante Subprojects are presented in Section 6.0.

6.0 TREATMENT PLANT PERFORMANCE RESULTS

This section presents a summary of the operational performance results for those treatment plants that were operational in 2008.

6.1 SUBAREA 1 – VALLEY COUNTY WATER DISTRICT LANTE SUBPROJECT

As described earlier in this report, the VCWD Lante Treatment Plant operated throughout 2008. Approximately 7,878 acre-feet of groundwater were extracted and treated from the three production wells for an annualized production rate of about 4,869 gpm.

Water-quality data collected from the individual production wells and from the fully treated water are summarized in Table 6-1. Table 6-1 also includes the design concentrations and expected average influent concentrations for the VCWD Lante Treatment Plant together with applicable MCLs and NLs for the COCs. Raw water concentrations for the compounds reported in Table 6-1 did not exceed design concentrations. No COCs were detected at concentrations exceeding MCLs or NLs in the fully treated water. Figures 6-1 to 6-14 illustrate raw and treated water concentration trends relative to the applicable MCL or NL. In general, COC concentrations appeared to be relatively constant or decreasing in the three production wells. The one exception noted is a slight increase in 1,4-dioxane in well SA1-1 and an increase in 1,4-dioxane in the latter half of 2008 in SA1-3.

Average concentrations for untreated influent and fully treated water are summarized in Table 6-2. Mass removed was calculated by using the average raw water concentration for each COC from each of the three production wells and multiplying that result by the volume of water treated, with the appropriate dimensional conversion. In these calculations, concentrations below the detection limit were treated as zero. For the compounds considered, approximately 3,639 pounds of chemical mass were removed by the VCWD Lante Treatment Plant in 2008. This is less than the 4,725 pounds of mass removed in 2007, resulting from the generally lower raw water concentrations and the lower volume of water extracted in 2008. Consistent with the influent concentrations, perchlorate, TCE, PCE, 1,1-DCE and cis-1,2-DCE represent most of the total mass removed.

Inlet and exhaust air quality data for 2008 are summarized in Table 6-3 for the four air strippers and the resin and carbon off-gas abatement systems. As expected from water-quality data, PCE, TCE, 1,1-DCE, and cis-1,2-DCE were the primary VOCs detected in the vapor phase. Table 6-4 provides a summary of air risk and hazard calculated from compounds detected in the air exhaust. Risk was calculated using SCAQMD Tier 4 procedures and compared against ARARs. Calculated risk and hazard values were below ARARs for the MICR, acute hazard, chronic hazard, and cancer burden.

In 2008, the VCWD Treatment Plant discharged approximately 97,971,000 gallons of waste brine to the LACSD sewer with an annual average discharge rate of approximately 192 gpm. In general, discharges met permit requirements with the exception of infrequent and short-term pH excursions below the permit limit of 6.0. The low pH excursions continue to be assessed and corrected as they are identified. Brine flows and pH data are summarized in Table 6-5.

6.2 SUBAREA 3 – LA PUENTE VALLEY COUNTY WATER DISTRICT SUBPROJECT

In 2008, the average annual flowrate at the LPVCWD Treatment Plant was 2,326 gpm, which exceeded the target of 2,250 gpm prescribed by the extraction plan. Approximately 3,762 acre-feet of groundwater were extracted and treated from LPVCWD 2 and 3.

Water-quality data are summarized in Table 6-6. Figures 6-15 to 6-25 illustrate raw and treated water concentration trends relative to the applicable MCL or NL for selected COCs. All treated water concentrations were below the MCLs and NLs, with the exception of 1,2-DCA and CTC detected above MCLs on October 13, and 20, 2008. These detections were related to air stripper blower malfunctions. These malfunctions were diagnosed and corrected. The results of the process of identifying and correcting the air stripper malfunction were summarized in a November 3, 2008, letter to DPH (LPVCWD 2008). TCE was the only compound detected in the raw water at concentrations exceeding the design concentration and only in LPVCWD 2. In general, COC concentrations in the raw water were stable with the exception of TCE and NDMA, which showed decreasing trends in LPVCWD 2.

Average chemical concentrations for treatment plant influent and treated water are summarized in Table 6-7 together with the volume of water treated and the total mass removed per chemical. In these calculations, concentrations below the detection limit were treated as zero. For the COCs considered, approximately 896 pounds of chemical mass were removed from the aquifer. This is less than the 1,010 pounds removed in 2007, but still greater than the 587 pounds removed in 2006. The decrease in mass removal is largely due to the decrease in the annual extraction rate relative to 2007.

Air quality data collected weekly from the Small Tower and Large Tower inlet and outlet are summarized in Table 6-8. A summary of the air risk and hazard associated with the off-gas GAC systems is provided in Table 6-9. The MICR, acute hazard, chronic hazard, and cancer burden ARARs were not exceeded in 2008.

The LPVCWD Treatment Plant discharged approximately 8,518,000 gallons of waste brine to the LACSD sewer in 2008 with an average annual discharge rate of 16 gpm. Brine flows and pH data are summarized in Table 6-10. Discharges met permit requirements with the exception of short-term pH excursions above the permit limit of 10 during a three day span in

June and four days during which the pH was below the permit limit of 6.0 (two consecutive days February and two non-consecutive days in September). The pH excursions continue to be diagnosed and corrected as they occur.

6.3 SUBAREA 3 – SAN GABRIEL VALLEY WATER COMPANY B6 SUBPROJECT

In 2008, the average annual flowrate at the SGVWC B6 Treatment Plant was 6,443 gpm, which is slightly less than the EPA approved extraction rate of 6,500 gpm. It should be noted that the plant exceeded the extraction target through November when ISEP® resin cleaning required that the plant be run using one treatment train. Approximately 10,414 acre-feet of groundwater were extracted and treated.

SGVWC B6 Treatment Plant raw water-quality data are collected monthly and treated water data are collected weekly (Table 6-11). Table 6-11 also includes the design and expected average influent concentrations for the SGVWC B6 Treatment Plant together with applicable MCLs and NLs for the COCs. With the exception of carbon tetrachloride in SGVWC B26B and one occurrence in SGVWC B25B, raw water concentrations did not exceed design concentrations in the production wells. No COCs were detected at concentrations exceeding MCLs or NLs in the fully treated water. Figures 6-26 to 6-37 illustrate raw and treated water concentration trends relative to the applicable MCL or NL. COC concentrations in the raw waters were relatively constant through the year, with the exception of NDMA, which showed an increasing trend in SGVWC B26A.

Average chemical concentrations for raw influent and fully treated effluent are summarized in Table 6-12, together with the volume of water treated and the total mass removed per chemical. In these calculations, concentrations below the detection limit were treated as zero. For the compounds considered, approximately 2,453 pounds of chemical mass were removed from the aquifer, a slight increase from 2007 (2,302 pounds removed). Carbon tetrachloride, perchlorate, PCE, and TCE represented nearly 95 percent of the mass removed, with TCE and perchlorate alone accounting for over 70 percent of the mass removed.

SGVWC B6 Treatment Plant air quality data are summarized in Table 6-13. Table 6-14 provides summary of air risk and hazard calculated from compounds detected in the air exhaust. Risk was calculated using SCAQMD Tier 4 procedures and compared against ARARs. Average calculated risk values were below ARARs for MICR, acute hazard, chronic hazard, and cancer burden. The MICR, acute hazard, chronic hazard and cancer burden ARARs were not exceeded in 2008.

The SGVWC B6 Treatment Plant discharged approximately 58,043,000 gallons of waste brine to the LACSD sewer in 2008 with an average flowrate of 110 gpm. Brine flows and pH data are summarized in Table 6-15. Discharges met permit requirements with the exception of short-term pH excursions below the permit limit of 6.0 and exceedances of daily flow. The pH excursions continue to be diagnosed and corrected as causes are identified.

6.4 SUBAREA 3 – SAN GABRIEL VALLEY WATER COMPANY B5 SUBPROJECT

The SGVWC B5 Subproject discharged treated water to waste until July 2008, when the plant began delivering potable water under its drinking water permit. The average annual extraction rate was about 5,635 gpm, below the EPA approved extraction rate of 7,000 gpm; however, COI 5 was not operational in 2008. Approximately 9,209 acre-feet of water were extracted and treated.

Raw water-quality data for the SGVWC B5 Treatment Plant are provided in Table 6-16, which also includes the design and expected average influent concentrations for the SGVWC B5 Treatment Plant and applicable MCLs and NLs for the COCs. Raw water concentrations did not exceed design concentrations in the production wells. COCs were not detected at concentrations exceeding MCLs or NLs in the fully treated water, with the exception of 1,2-DCA detected at a concentration of 0.6 µg/L on October 10, 2008. However, 1,2-DCA was not detected in the LGAC combined effluent sample collected on the same day. Figures 6-38 to 6-46 show raw and treated water concentration trends relative to the applicable MCL or NL. Routine analysis of the SGVWC B5 production wells did not begin until July 2008. Because of the relatively limited data set, it is difficult to draw conclusions regarding chemical concentration trends. Based on the limited data, it appears that the COC concentrations in the raw water were relatively constant, with the exception of an increasing NDMA concentration in wells B5B and B5E in monthly samples collected during October through December 2008.

Average chemical concentrations for raw influent and fully treated effluent are summarized in Table 6-17, together with the volume of water treated and the total mass removed per chemical. In these calculations, concentrations below the detection limit were treated as zero. For the compounds considered, approximately 421 pounds of chemical mass were removed from the aquifer, compared to 119 pounds in 2007. Perchlorate and TCE represented approximately 80 percent of the mass removed. It should be noted that the mass removed calculations are based on the average concentrations in the production wells between July and the end of the year and the production values over the entire year (it assumes that the COC concentrations in the second half of the year are representative of the entire year).

7.0 EVALUATION OF REMEDY PERFORMANCE AND TREATMENT PLANT OPERATIONS

7.1 GROUNDWATER EXTRACTION SYSTEM PERFORMANCE

As described in the PSEP and Section 3.0 of this report, the evaluation of remedy performance involves both short-term and long-term evaluation of groundwater extraction system performance. Annual PE Reports will evaluate the short-term performance of the groundwater extraction system using groundwater modeling and empirical data to assess whether extraction well operation is limiting further migration of groundwater contamination into less contaminated areas. Groundwater extraction system performance is discussed in the following sections.

7.1.1 Extraction Well Performance

Based on step-drawdown testing, aquifer testing, and DPH-permitted operation, the VCWD Lante, LPVCWD, SGVWC B6, and SGVWC B5 Subproject wells are capable of achieving design extraction rates. Because of sanding problems at higher flow rates, LPVCWD operated both LPVCWD 2 and 3 extraction wells to achieve the target pumping rate of 2,250 gpm. To ensure a reliable water supply and provide flexibility if sanding or other problems arise, a new extraction well, LPVCWD 5, was installed in 2007 and will become operational in early 2009.

7.1.2 Groundwater-Quality Trends

Spatial and temporal trends in groundwater quality in the BPOU as observed during baseline monitoring are described in Sections 5.2.1.1 and 5.2.2.2. Given that the Subarea 1 VCWD - Lante and SGVWC B5 Subproject extraction wells are not yet operational at their target extraction rates, it is premature to assess groundwater-quality trends as they relate to groundwater extraction system performance. Future Annual PE Reports and Five-Year Reviews will provide further assessment of groundwater trends as they relate to groundwater extraction system performance.

7.1.3 Groundwater Extraction and Chemical Mass Removal

The VCWD, LPVCWD, and SGVWC B6 Treatment Plants operated on a full time basis in 2008. At the VCWD Lante Treatment Plant, operational restrictions imposed by the ISEP® systems due to high nitrate and sulfate concentrations in the SA1-1 and SA1-2 wells limited treatment capacity resulting in reduced extraction rates that did not meet the EPA approved extraction rate of 6,000 gpm. In addition, the VCWD Lante Subproject had other operational problems that limited treatment capacity including a pump failure in SA1-3 and air stripper calcification. The VCWD Lante Treatment Plant had an average annual extraction rate of 4,869 gpm compared to the EPA approved extraction rate of 6,000 gpm. The LPVCWD Treatment Plant achieved an annual average extraction rate of 2,326 gpm, exceeding the EPA approved extraction rate of 2,250 gpm. The B6 Treatment Plant exceeded the EPA approved extraction rate for much of the year, until experiencing backpressure problems with the ISEP® units. The average B6 extraction rate was 6,443 gpm, compared to the EPA approved extraction rate of 6,500 gpm. The SGVWC B5 Treatment Plant operated at an annual average flowrate of 5,635 gpm, compared to the EPA approved extraction rate of 7,000 gpm; however, it should be noted that the COI 5 well was not operational in 2008.

The chemical mass removed at the VCWD Lante, LPVCWD, SGVWC B6 and SGVWC B5 Treatment Plants was 3,639 pounds, 896 pounds, 2,453 pounds, and 421 pounds, respectively. The BPOU project-wide total mass removed in 2008 was 7,409 pounds. Since 2004, the cumulative mass removed is 22,713 pounds (Table 6-18).

7.1.4 Assessment of Migration Control

As discussed in Section 3.4.2, the assessment of migration control for the BPOU Project is dependent on the startup and continuous operation of all 11 extraction wells and all four treatment plants. Given that the Subarea 1 VCWD Lante and SGVWC B5 Subproject extraction wells are not yet operational at their target extraction rates, it is premature to assess groundwater-quality trends as they relate to groundwater extraction system performance. The CRs intend to conduct model simulations of hydraulic capture of BPOU Project extraction wells using the BPOU groundwater flow model once the extraction wells become operational on a continuous basis. The CRs will present the results of these simulations in future Annual PE Reports and Five-Year Reviews to assess groundwater extraction system performance as it relates to chemical migration control.

7.2 TREATMENT SYSTEM OPERATIONS

The treatment plant operations that were described in detail earlier in this report are summarized below.

7.2.1 Subarea 1 – Valley County Water District Lante Subproject

The VCWD Lante Treatment Plant operated under its DPH drinking water permit and delivered fully treated water to SWS. The treatment plant reliably treated extracted water to drinking water standards.

Improvements, operational problems, and issues that impacted operations and performance in 2008 and future operational issues include:

- Permanent VPGAC treatment systems were installed and became operational in 2008;

- The air-stripping towers continued to experience carbonate precipitation problems and acid washing of Tower 4 was tested;
- Anti-scalent testing began to determine if sequestering chemicals could be used to mitigate scaling without impacting other treatment processes;
- A design/built bid for constructing single pass ion exchange treatment was awarded and design work was initiated;
- Carbon change out criteria and an air compliance monitoring program was modified based on the reliable operation of the permanent VPGAC system;
- In 2009, operation will focus on maximizing the operation of well SA1-3 to maximize mass removal and decrease nitrate and sulfate in the combined influent raw water;
- Nitrate removal options using a modified ISEP® will be further evaluated; and
- Single pass ion exchange construction will begin in 2009.

7.2.2 Subarea 3 – La Puente Valley County Water District Subproject

The LPVCWD Subproject extracted and treated groundwater at an annual rate of about 2,326 gpm, exceeding the extraction target. The plant reliably treated raw water to drinking water standards for all COCs, with the exception of exceedances of 1,2-DCA and carbon tetrachloride in October 2008. Air stripper problems resulting in the exceedances were diagnosed and corrected.

Improvements, operational problems, and issues that impacted operations and performance in 2008 and future operational issues include:

- Single pass ion exchange equipment was selected, the single pass ion exchange design was completed, and the equipment installation was largely completed in 2008;
- LPVCWD 5 was equipped in 2008 and will become the primary extraction well for LPVCWD in early 2009;
- The single pass ion exchange equipment will be tested and become operational under an amended drinking water permit in 2009;
- Chemical dosing including peroxide, sodium hypochlorite, ortho/poly phosphate, and acid should be optimized once LPVCWD 5 and the single pass ion exchange come online; and
- Carbon change out criteria and the air compliance monitoring program should be finalized once LPVCWD 5 is operational.

7.2.3 Subarea 3 – San Gabriel Valley Water Company B6 Subproject

The SGVWC B6 Treatment Plant extracted and treated water at an annual rate of 6,443 gpm, slightly below the EPA approved extraction rate of 6,500 gpm. The plant reliably treated raw water to drinking water standards for all COCs.

Improvements, operational problems, and issues that impacted operations and performance in 2008 and future operational issues include:

- The single pass design was completed in 2008 and construction and permitting will be completed in 2009;
- Carbon change out criteria and the air compliance monitoring program will be finalized; and
- Work to optimize chemical dosing and other operational parameters should be initiated in 2009.

7.2.4 Subarea 3 – San Gabriel Valley Water Company B5 Subproject

The SGVWC B5 Treatment Plant operated at an average annual flowrate of 5,635 gpm. The plant reliably treated raw water to drinking water standards with the exception of one detection of 1,2-DCA in October; however, 1,2-DCA was not detected in the LGAC combined effluent on the same day.

Improvements, operational problems, and issues that impacted operations and performance in 2008 and future operational issues include:

- The B5 Treatment Plant LGAC use rates are high and these will be evaluated;
- Groundwater flow directions in the vicinity of COI 5 will be evaluated and water quality monitoring performed in accordance with the amended drinking water permit; and
- DPH will amend the drinking water permit to include well COI 5.

8.0 SUMMARY AND RECOMMENDATIONS

All extraction wells and treatment plants are expected to be permitted and operational following the issuance of an amended permit to include COI 5 as part of the SGVWC B5 Subproject. The amended permit is anticipated in 2009. Recommendations and operational issues to be addressed for the BPOU Project in 2009 include:

- Permit and activate well COI 5 as soon as possible;
- Optimize groundwater extraction from the Subarea 1 VCWD Lante Subproject extraction wells to increase mass removal and reduce ionic loading to the VCWD Lante Treatment Plant;
- Complete startup testing and begin operating full-time in early 2009 using single pass ion exchange at the LPVCWD Treatment Plant;
- Complete design, construction, startup testing and operation of single pass ion exchange systems at the VCWD Lante and SGVWC B6 Treatment Plants;
- Finalize carbon change-out criteria for air stripper off-gas VPGAC in order to maximize cost effectiveness and protection of human health and the environment;
- Update air portions of the SAP and QAPP and develop final monitoring program.
- Establish a competitive bidding process for O&M procurement;
- Optimize chemical amendment dosing at all treatment plants including peroxide (1,4-dioxane treatment), sodium hydroxide (pH adjustment), sodium hypochlorite (chlorination), ortho/poly phosphate (red water control), and acid (pH adjustment and calcium carbonate precipitation control); and
- Evaluate options for decommissioning ISEP® equipment.

As described in Section 3.0 of the Annual PE Report, the following recommendations were implemented beginning in October 2008 and will be continued in 2009:

- Potentiometric monitoring in the multiport wells will be reduced from quarterly to semi-annually.
- Water quality sampling in selected multiport wells will be reduced from semi-annual to annual. Semi-annual sampling will continue in MW5-03 (ports 5-10), MW5-19 (ports 3-5), MW5-24 (all ports), MW5-25 (all ports), MW5-26 (all ports), and MW 5-27 (all ports).
- Based on the distribution of 1,4-dioxane, the sampling frequency for 1,4-dioxane will be reduced to annual and the number of monitoring locations for 1,4-dioxane will also be reduced.

- Based on the limited detections of non-COC VOCs (including EDB) and VOC and SVOC TICs and also based on the redundancy between the PSEP and DPH sampling requirements, monitoring for these compounds will be eliminated from the PSEP monitoring program beginning in 2009. Results for non-COC VOCs (including EDB) and VOC and SVOC TICs will be reported by the WEs as part of their DPH monitoring requirements and the results will also be maintained the BPOU project database. In addition, the results for non-COC VOCs (including EDB) and VOC and SVOC TICs will be summarized in this and future Annual PE Reports.

- Continue to work with EPA to eliminate redundancies between DPH required monitoring and the PSEP monitoring program. Consistent with this objective, it is recommended that extraction well sampling under the PSEP program be eliminated since it is redundant with sampling conducted under each treatment plant's DPH drinking water permit.

9.0 REFERENCES

AMEC Geomatrix (AMEC), 2008, Memorandum, Proposed Modifications to PSEP Groundwater Monitoring Program, Baldwin Park Operable Unit, 9 September, 2008.

Camp Dresser and McKee (CDM), 1996, Draft, Pre-Remedial Design Report, Pre-Remedial Design Groundwater Monitoring Program, Baldwin Park Operable Unit, December 1996.

CDM, 1997, Final Draft, Pre-Remedial Design Report, Pre-Remedial Design Groundwater Monitoring Program, Baldwin Park Operable Unit, September 1997.

Earth Resources Management (ERM), 2006, Response to the Discovery of 1,2,3-Trichloropropane and Monitoring for Non-COCs, Baldwin Park Operable Unit, San Gabriel Valley Superfund Site, 29 September 2006.

ERM, 2007, Technical Memorandum-TIC Results, Spring 2007 PSEP Sampling, 17 December 2007.

Geomatrix 2004a, Revised Final Performance Standards Evaluation Plan, 30 January 2004.

Geomatrix, 2004b, Technical Memorandum—Response to Requested Modification #3 to the Revised Final Performance Standards Evaluation Plan, 17 February 2004.

Geomatrix, 2005, Comprehensive Groundwater Modeling Report, Baldwin Park Operable Unit of San Gabriel Valley Superfund Sites, 29 July 2005.

Geomatrix, 2006a, Proposal for Non-COC Groundwater Analysis and Reporting, Performance Standards Evaluation Plan Monitoring Program, Baldwin Park Operable Unit, 24 August 2006.

Geomatrix, 2006b, Quality Assurance Project Plan, Revision 2, Baldwin Park Operable Unit of San Gabriel Valley Superfund Sites, 6 November 2006.

Geomatrix, 2006c, Proposed Modifications to the PSEP Groundwater Monitoring Program, 2 November 2006.

Geomatrix, 2006d, Addendum to the Comprehensive Groundwater Modeling Report, Baldwin Park Operable Unit of San Gabriel Valley Superfund Sites, 8 September 2006.

Geomatrix, 2007a, Quality Assurance Project Plan for Air, Brine, and Treated Water, Baldwin Park Operable Unit of San Gabriel Valley Superfund Sites, 16 March 2007.

Geomatrix, 2007b, Technical Memorandum—Update to BPOU Groundwater Flow Model, 14 December 2007.

Geomatrix and ERM, 2008, 2007 Annual Performance Evaluation Report, Volumes 1 and 2, Baldwin Park Operable Unit of the San Gabriel Valley Superfund Sites, Los Angeles County, California, 18 April 2008.

Harding Lawson Associates (HLA), 1999, Draft Addendum to the Pre-Remedial Design Report, Pre-Remedial Design Groundwater Monitoring Program, Baldwin Park Operable Unit, 14 January 1999.

HLA, 2000a, Final Remedial Design/Remedial Action Work Plan, Baldwin Park Operable Unit, San Gabriel Basin, California, 10 February 2000.

HLA, 2000b, Draft Final Conceptual Design Report, Baldwin Park Operable Unit, San Gabriel Basin, California, 4 August 2000.

LDC, 2007, Data Management Plan for the Baldwin Park Operable Unit Performance Standards Evaluation Plan Monitoring Program, May 17, 2007.

LDC, 2008, BPOU Tier 3 Data Validation, 18 July 2008.

LDC, 2009, BPOU Tier 3 Data Validation, 12 January 2009.

Stetson Engineers, Inc., 2004, San Gabriel Valley Water Company Plant B6, Interim Remedial Action Report, 29 September 2004.

Stetson Engineers, Inc., 2005, Revised Draft Interim Remedial Action Report, San Gabriel Valley Area 2 Superfund Site (commonly known as the Baldwin Park Operable Unit) Valley County Water District Subproject, Operable Unit 04, March 2005.

Stetson Engineers, Inc., 2006a, Field Sampling Plan, Groundwater, Revision 4, Baldwin Park Operable Unit of the San Gabriel Valley Superfund Sites, Los Angeles, California, 6 November 2006.

Stetson Engineers, Inc., 2006b, Field Sampling Plan, Off-gas, Air, Waste Brine, and Treated Water, Revision Draft 4, Baldwin Park Operable Unit of the San Gabriel Valley Superfund Sites, Los Angeles, California, 14 August 2006.

Stetson, 2006c, Interim Remedial Action Report, San Gabriel Valley Water Company Area 2 Superfund Site, San Gabriel Valley Water Company B5 Subproject, Operable Unit 05, Part of the Baldwin Park Operable Unit, Los Angeles County, California, September 2006.

Stetson Engineers, Inc., 2007a, Technical Performance Report for the La Puente Valley County Water District, 30 June 2007.

Stetson, 2007b, Technical Performance Report for the San Gabriel Valley Water Company Plant B6 Water Treatment Facility, 2007.

Stetson Engineers, Inc., 2008a, 2007 Annual Technical Performance Report for Lante Plant, 21 June 2008.

Stetson Engineers, Inc., 2008b, Well No. 5 Well Completion Report, 2 June 2008.

Stetson Engineers, Inc., 2008c, Technical Performance Report (2007-2008) for the La Puente Valley County Water District, 2 July 2008.

Stetson, 2008d, Technical Performance Report for the San Gabriel Valley Water Company Plant B6 Water Treatment Facility, 18 September 2008.

Watermaster, 2001, Preliminary Design Report, Watermaster Plan for the Baldwin Park Operable Unit, 23 April 2001.