

Five-Year Review Report

First Five-Year Review Report

for the

San Gabriel Valley Area 2 Superfund Site

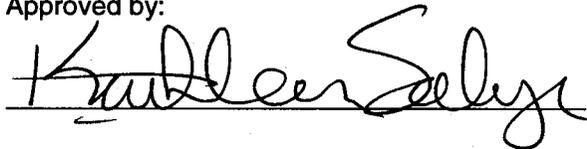
**La Puente Valley County Water District Operable Unit (OU 02)
San Gabriel Valley Water Company B6 Operable Unit (OU 03)
Valley County Water District Operable Unit (OU 04)
San Gabriel Valley Water Company B5 Operable Unit (OU 05)
(collectively known as the Baldwin Park Operable Unit)**

Los Angeles County, California

PREPARED BY:

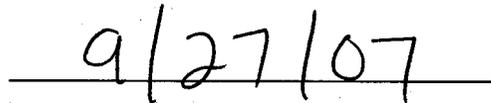
**United States Environmental Protection Agency
Region 9
San Francisco, California**

Approved by:



Kathleen Salyer, Chief
Site Cleanup Branch
U.S. EPA Region 9 Superfund Division

Date:



Five-Year Review Report

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
DTSC	California Department of Toxic Substances Control
CADPH	California Department of Public Health
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
RWQCB	Regional Water Quality Control Board
gpm	gallons per minute
IC	Institutional Control
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NDMA	n-Nitrosodimethylamine
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCE	perchloroethylene
ng/L	nanograms per liter
µg/L	micrograms per liter
RPM	Remedial Project Manager
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
FS	Feasibility Study
IROD	Interim Record of Decision
TCE	Trichloroethylene
TBC	To Be Considered
VOC	Volatile Organic Compound

Executive Summary

The remedy for the San Gabriel Valley Area 2 Superfund Site in Los Angeles County, California consists of groundwater extraction, treatment, and conveyance systems needed to limit further spread of contaminated groundwater containing elevated levels of volatile organic compounds (VOCs), perchlorate, N-nitrosodimethylamine, and 1,4-dioxane. The trigger for this five-year review is the actual start of construction on September 26, 2002 of one of the four operable units constructed as part of the remedy.

The assessment conducted as part of this five-year review found that the remedy was constructed in accordance with the requirements of the March 1994 Interim Record of Decision (ROD) and May 1999 Explanation of Significant Differences. Various operational issues temporarily limited operation of the remedy during the review period, but all of the operational issues have been or are expected to be resolved, allowing the remedy to function as designed. The remedy is protective of human health and the environment because Institutional Controls are in place to prevent installation of wells in the contaminated areas without adding treatment, and therefore, there is no current or potential exposure.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: San Gabriel Valley (Area 2) – Baldwin Park OU		
EPA ID: CAD CAD980818512		
Region: 9	State: CA	City/County: multiple cities in Los Angeles County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final		
Remediation status: <input checked="" type="checkbox"/> Operating		
Multiple OUs? <input checked="" type="checkbox"/> YES	Construction completion date: N/A	
Has site been put into reuse? N/A		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA		
Author name: Wayne Praskins		
Author title: Remedial Project Manager	Author affiliation: U.S. EPA Region 9	
Review period: 5/2007 to 9/2007		
Date(s) of site inspection: August 14 and September 13, 2007		
Type of review: <div style="text-align: right;"><input checked="" type="checkbox"/> Post-SARA</div>		
Review number: <input checked="" type="checkbox"/> 1 (first)		
Triggering action: <input checked="" type="checkbox"/> Actual RA Onsite Construction at OU #2		
Triggering action date (from CERCLIS): 9/26/2002		
Due date (five years after triggering action date): 9/26/2007		

* ["OU" refers to operable unit.]

Five-Year Review Summary Form, cont'd.

Issues & Recommendations:

1 – The last extraction well at OU 05 has not been permitted by the California Department of Public Health for use. EPA shall monitor the permitting process to ensure operation of this well.

Protectiveness Statement: The remedy for the San Gabriel Valley Area 2 Superfund Site is protective of human health and the environment because Institutional Controls are in place to prevent installation of wells in the contaminated areas without adding treatment, and therefore, there is no current or potential exposure.

Five-Year Review Report

I. Introduction

The purpose of a “five-year review” is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of a review are documented in a Five-Year Review report. A Five-Year Review report also identifies issues found during the review, if any, and recommendations to address them.

The United States Environmental Protection Agency (EPA) Region 9 is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

EPA interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

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

The California Department of Toxic Substances Control reviewed a draft of this report.

This is the first five-year review for the San Gabriel Valley (Area 2) Superfund Site. The triggering action for this statutory review is September 26, 2002, the date of actual RA on-site construction of OU 02. The five-year review is required because the interim remedy results in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure.

The San Gabriel Valley Area 2 Superfund Site consists of four independent groundwater extraction and treatment systems. Each system is designated in EPA's "CERCLIS" database (an EPA database of information about Superfund sites) as a separate operable unit (OU 02, OU 03, OU 04, and OU 05), and has separate dates for the design, construction, and operation (referred to in the CERCLIS database as "remedial design," "remedial action," and "operations and maintenance"). The four operable units were implemented in accordance with a single cleanup plan (known as the "Record of Decision or ROD") and are collectively known as the Baldwin Park Operable Unit or BPOU. Dates for the ROD, the Proposed Plan preceding the ROD, and other actions that are applicable to all four groundwater extraction and treatment system are designated in CERCLIS as part of operable units 00 or 01 (OU 00 or OU 01).

The San Gabriel Valley Area 2 Superfund Site is one of four San Gabriel Valley groundwater sites listed on the National Priorities List. The other three San Gabriel Valley sites are San Gabriel Valley Area 1 (which includes the El Monte, South El Monte, and Whittier Narrows operable units), San Gabriel Valley Area 3 (which addresses contamination in the Alhambra area), and San Gabriel Valley Area 4 (that addresses the Puente Valley operable unit).

This five-year review will serve as a review for operable units 02, 03, 04, and 05 at the San Gabriel Valley Area 2 Superfund Site.

II. Site Chronology

Table 1: BPOU Remedy: Chronology of Site Events	
Event	Date
Initial discovery of problem or contamination (VOCs detected in drinking water supply well)	1979
NPL listing (final)	05/08/1984
Proposed Plan	May 1993
ROD signature	03/31/1994
Explanation of Significant Differences	May 1999
Third party agreement between PRPs and local water agencies ("BPOU Project Agreement")	Mar 2002
Remedial design (OU 02)	07/21/2000 to 09/26/2002
Remedial design (OU 03)	07/21/2000 to 03/31/2003
Remedial design (OU 04)	07/21/2000 to 08/08/2003
Remedial design (OU 05)	07/21/2000 to 09/29/2004
Remedial action start (OU 02)	09/26/2002
Remedial action start (OU 03)	03/31/2003
Remedial action start (OU 04)	08/08/2003
Remedial action start (OU 05)	09/29/2004
CADPH issues drinking water permit amendments to allow treated water to be used as drinking water supply (OU 02)	Feb 2001 (for operation of ion exchange and advanced oxidation), May 2002 (for operation of replacement advanced oxidation system)
CADPH issues drinking water permit amendments (OU 03)	June 2005 (for operation with backup wells), Feb 2006 (for operation with new wells),
CADPH issues drinking water permit amendment (OU 04)	Nov 2005 (for operation of air stripping, ion exchange, and advance oxidation), July 2007 (for addition of LGAC)
CADPH issues drinking water permit amendment (OU 05)	Late 2007 or early 2008 [planned]

III. Background

Physical Characteristics

The San Gabriel Valley Area 2 Superfund Site addresses a large area of groundwater contamination in eastern Los Angeles County (See Figure 1). The contamination originates at current and former industrial facilities in and near Azusa, California. The site, as defined by the extent of groundwater contamination, covers approximately 10 square miles.

Land and Resource Use

Land use at the site is largely suburban, with a mix of residential, commercial, and industrial development. Much of the development occurred in the 1950s and 1960s. Groundwater at the site is the primary source of drinking water to hundreds of thousands of residents and businesses overlying the site and in adjacent areas. Groundwater pumped from the site is replenished with precipitation in the Valley and adjacent San Gabriel Mountains, and with water imported from Northern California and the Colorado River.

History of Contamination

Volatile organic compounds (VOCs) were first detected in groundwater in the San Gabriel Valley in 1979. By 1984, high levels of VOCs had been found in 59 wells. As of August 2004, 196 out of 275 water supply wells in the Valley had detectable levels of one or more of the following contaminants: VOCs, perchlorate, N-nitrosodimethylamine (NDMA), and 1,4-dioxane. The groundwater contamination is believed to result from the cumulative impact of decades of improper chemical handling and disposal practices at hundreds of industrial operations in the Valley. Although many of the laws regulating the handling and disposal of hazardous chemicals went into effect after 1970, historical documents demonstrate that local officials were concerned about the potential for groundwater contamination by industrial activity in the San Gabriel Valley as early as the 1950s. Despite the widespread areas of contamination, the San Gabriel Basin aquifer continues to provide approximately 90 percent of the domestic water supply for the Valley's more than one million residents.

The San Gabriel Valley Area 2 Superfund Site addresses multiple, commingled plumes of groundwater contamination, which have resulted in an area of contamination over a mile wide and eight miles long. The contamination originates in and near the City of Azusa and extends to the southwest through portions of the cities of Irwindale, Baldwin Park, West Covina, and Industry. The depth to the groundwater varies from about 150 to 350 feet, and the groundwater contamination extends in various areas from the water table to more than 1,000 feet below ground surface. The most prevalent contaminants in the groundwater are trichloroethylene (TCE), perchloroethylene (PCE), carbon tetrachloride (CTC), perchlorate, and N-nitrosodimethylamine (NDMA). Other VOCs, including 1,1-dichloroethene, cis-1,2-dichloroethene, trans 1,2-dichloroethene, 1,2-dichloroethane, chloroform, and 1,2,3-trichloropropane are also present. TCE, PCE, and CTC are solvents that were commonly used for degreasing and cleaning; perchlorate is used in solid-fuel rockets; and NDMA is associated with liquid-fuel rockets. The chemical 1,4-dioxane is also present in the groundwater. It has been used as a stabilizer in chlorinated solvents. Table 2 lists contaminants detected in groundwater monitoring wells at the site between 2000 and 2005, and notes whether they have been detected at levels above a State or Federal Maximum Contaminant Level (MCL) or State Notification Level (NL).

Contaminant levels vary throughout the area of contamination. The highest contaminant concentration measured in groundwater at the site is 38,000 micrograms per liter (ug/l) PCE. Contaminant levels throughout much of the area are in the tens or hundreds of ug/L

Table 2. BPOU Remedy: Contaminants Detected in Groundwater (between 2000 and 2005)			
	Is There an MCL or NL?	Detected Above MCL or NL?	NOTES
1,1,1-TRICHLOROETHANE	YES	YES	
1,1,2-TRICHLOROETHANE	YES	NO	
1,1-DICHLOROETHANE	YES	YES	
1,1-DICHLOROETHENE	YES	YES	
1,2,3-TRICHLOROPROPANE	YES	YES	
1,2,4-TRIMETHYLBENZENE	YES	NO	Detected in only 1 of 1271 samples
1,2-DICHLOROBENZENE	YES	NO	
1,2-DICHLOROETHANE	YES	YES	
1,4-DICHLOROBENZENE	YES	YES	
1,4-DIOXANE	YES	YES	
4-CHLOROTOLUENE	YES	NO	Detected in only 1 of 1271 samples
ACETONE	NO		
ACRYLONITRILE	NO		Detected in only 1 of 572 samples
BENZENE	YES	YES	
BROMOCHLOROMETHANE	NO		Detected in only 1 of 1263 samples
BROMODICHLOROMETHANE	YES, FOR TOTAL THM	NO	
BROMOFORM	YES, FOR TOTAL THM	NO	
BROMOMETHANE	NO		
CARBON DISULFIDE	YES	NO	
CARBON TETRACHLORIDE	YES	YES	
CHLOROBENZENE	YES	NO	
CHLOROFORM	YES, FOR TOTAL THM	NO	
CIS-1,2-DICHLOROETHENE	YES	YES	
DIBROMOCHLOROMETHANE	YES, FOR TOTAL THM	NO	
DICHLORODIFLUOROMETHANE	YES	NO	
ISOPROPYLBENZENE	YES	NO	Detected in only 1 of 1267 wells
METHYLENE CHLORIDE	YES	YES	

N-NITROSODIMETHYLAMINE	YES	YES	
PERCHLORATE	YES	YES	
STYRENE	YES	NO	
TETRACHLOROETHENE	YES	YES	
TOLUENE	YES	NO	
TRANS-1,2-DICHLOROETHENE	YES	NO	
TRICHLOROETHENE	YES	YES	
TRICHLOROFLUOROMETHANE	YES	NO	
VINYL CHLORIDE	YES	YES	
XYLENES	YES	NO	

Initial Response

No removals have occurred at the site.

Basis for Taking Action

The concentrations of multiple contaminants in the groundwater exceed Federal and State Maximum Contaminant Levels (MCLs) or State of California “Notification Levels” (NLs). There is no known exposure to unacceptable levels of contamination, since frequent monitoring occurs and contaminated groundwater is not used if levels exceed MCLs or NLs. The primary route of potential exposure for the public would be through domestic use of untreated groundwater.

IV. Remedial Actions

The Baldwin Park Remedy

Remedy Selection

EPA adopted a Record of Decision (ROD) for an interim remedy for the BPOU in 1994 and updated the ROD in May 1999 with an Explanation of Significant Differences (ESD). The remedial objectives expressed in the ROD and ESD are to prevent future increases in, and begin to reduce, concentrations of groundwater contaminants 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 contamination from the aquifer. The ROD specifies extraction of contaminated groundwater at the downgradient end of two broad subareas of contamination, at locations and rates sufficient to limit the movement of contaminated groundwater through each subarea during all anticipated groundwater flow conditions. A secondary objective is to provide data necessary to determine final clean up standards for the aquifer.

In March 2002, eight PRPs and seven local water agencies reached an agreement (the “BPOU Project Agreement”) that provided a means for implementing the remedy. The agreement commits the PRPs and water agencies to implement a joint cleanup and water supply project. The local water agencies agreed to construct, own, and operate the

groundwater extraction and treatment facilities called for in EPA's Record of Decision, and the PRPs agreed to fund most of the cost.

Major Components of the Remedy

The major components of the Baldwin Park remedy, as determined during the remedial design process, are four separate groundwater pump and treat systems, each ranging in capacity from 2,500 gallons per minute (gpm) to 7,800 gpm. Total treatment capacity is approximately 26,000 gpm of contaminated groundwater (37 million gallons per day [MGD]). EPA's expectation is that an average of approximately 22,000 gpm of contaminated groundwater will be extracted and treated to limit further spread of the contaminated groundwater (i.e., to provide "hydraulic containment" or "capture" of the contaminated areas). As depicted in Figure 2, each pump and treat system includes:

- one or more groundwater extraction wells whose rates and locations were determined during the remedial design process using a numeric model of groundwater flow and particle movement in the aquifer;
- water treatment equipment capable of removing VOCs from the contaminated groundwater (air stripping at OUs 02, 03, and 04; liquid phase granular activated carbon at OUs 04 and 05);
- water treatment equipment capable of removing perchlorate from the contaminated groundwater (ion exchange);
- water treatment equipment capable of removing NDMA and 1,4-dioxane from the contaminated groundwater (ultraviolet light with hydrogen peroxide); and
- Conveyance systems (i.e., pipelines, booster pumps) to transport contaminated groundwater from the wells to the treatment plant and treated water from the plant to the water distribution systems of one or more local water purveyors.
- Conveyance systems to transport waste brine from the treatment plant to the industrial sewer operated by LACSD (OUs 02, 03, and 04).

The remedy also includes piezometers and groundwater monitoring wells which are monitored to provide data to evaluate the performance of the remedy and provide early warning of upgradient conditions that could affect the remedy.

Remedy Implementation

Design and construction of the four pump and treat projects occurred between July 2000 and September 2006. One of the four systems (OU 02) was designed and constructed as a water supply project by local water agencies without significant EPA involvement. The system was incorporated into the remedy in 2002 after a decision was made during the remedial design process to include the system as part of the remedy and commitments

were made for its continued operation as part of the “BPOU Project Agreement.” Improvements were subsequently made to allow the system to operate at rates consistent with EPA’s remedial objectives and to meet ARARs.

Design and construction of OUs 03, 04, and 05 took much longer than originally estimated. The four OUs took, on average, 36 months to design and 19 months to construct. The four OUs have been permitted by the California Department of Public Health (DPH, formerly the Department of Health Services) for distribution of the treated water to residents and businesses in the area.

Design information on the four systems is summarized in Tables 3a, 3b, 3c, and 3d. Additional details are available in the remedial action reports prepared for each of the four OUs.

Table 3a. BPOU Remedy Design Information: La Puente Valley County Water District Subproject (OU 02)	
Owner/Operator	La Puente Valley County Water District
Treatment Capacity	2,500 gpm
Extraction Wells	Well No. 2 (has VFD allowing pumping rates up to approx 2,500 gpm.) Well No. 3 (has VFD allowing pumping rates up to approx 2,500 gpm.) New Well (scheduled for construction in late 2007 or early 2008)
Treatment	Air stripping, offgas carbon treatment, regenerable ion exchange, UV with hydrogen peroxide (advanced oxidation), pH adjustment, disinfection
Use of Treated Water	Drinking water supply
Users of Treated Water	La Puente Valley County Water District and Suburban Water Systems

Table 3b. BPOU Remedy Design Information: San Gabriel Valley Water Co. B6 Subproject (OU 03)	
Owner/Operator	San Gabriel Valley Water Co
Treatment Capacity	7,800 gpm
Extraction Wells	Well B25A (pumping capacity of approx 2,800 gpm) Well B25B (pumping capacity of approx 2,800 gpm) Well B26A (pumping capacity of approx 1,100 gpm) Well B25B (pumping capacity of approx 1,100 gpm)

Treatment	Air stripping, offgas carbon treatment, regenerable ion exchange, UV with hydrogen peroxide, pH adjustment, disinfection
Use of Treated Water	Drinking water supply
Users of Treated Water	San Gabriel Valley Water Co

Table 3c. BPOU Remedy Design Information: Valley County Water District Subproject (OU 04)	
Owner/Operator	Valley County Water District
Treatment Capacity	7,800 gpm
Extraction Wells	Well SA1-1 (has variable frequency drive (VFD) allowing variable pumping rates up to approx 3,400 gpm.) Well SA1-2 (pumping capacity of approx 2,400 gpm) Well SA 1-3 (has VFD allowing pumping rates up to approx 3,400 gpm.)
Treatment	Air stripping, offgas carbon treatment, liquid phase carbon, regenerable ion exchange, UV with hydrogen peroxide, pH adjustment, disinfection
Use of Treated Water	Drinking water supply
Users of Treated Water	Valley County Water District and Suburban Water Systems

Table 3d. BPOU Remedy Design Information: San Gabriel Valley Water Co. B5 Subproject(OU 05)	
Owner/Operator	San Gabriel Valley Water Co
Treatment Capacity	7,800 gpm
Extraction Wells	Well No. B5B (approx 3,000 gpm capacity) Well No. B5E (approx 3,000 gpm capacity) City of Industry No. 5 (approx 1,000 gpm capacity)
Treatment	Liquid phase carbon, single pass ion exchange, UV with peroxide, disinfection
Use of Treated Water	Drinking water supply
Users of Treated Water	San Gabriel Valley Water Co

Operation and Maintenance (O&M)

Routine maintenance activities have included or will in the future include regular cleaning and inspections, filter replacement, lubrication, equipment calibration, UV lamp replacement, the replacement of carbon in the offgas control units (OUs 02, 03, 04), and replacement of carbon in the water treatment unit (OUs 04, 05). Additional details on O&M procedures and requirements are outlined in Remedial Action reports prepared for each OU and in Operation, Maintenance, and Monitoring Plans available for each OU.

One-time efforts during the evaluation period included pilot-scale studies to optimize the operation of the regenerable ion exchange units (OUs 02, 03, 04) to reduce salt and acid usage and minimize water quality problems, well rehabilitation (OU 02), replacement of salt storage tanks (OU 02), and upgrades to computer controls (OU 02).

Water samples are collected and analyzed at least monthly at each operating groundwater well (untreated water), weekly after treatment (fully treated water), and at varying frequencies at one or more locations within the treatment system (partially treated water). Table 8 summarizes contaminant concentrations in the untreated groundwater entering each of treatment plants. In May 2007, 25 samples were collected and analyzed for VOCs, perchlorate, NDMA, and 1,4-dioxane at OU 02, and 19 samples were collected and analyzed at OU 03. Reduced sampling occurred at OU 04 and OU 05 since water was discharged in May 2007 from both subprojects to surface water channels rather than used as potable supply. Results are reported monthly to EPA and entered into an electronic database available for further review and analysis. Treated water samples have been below Maximum Contaminant Levels and Notification Levels except in several occasions noted in the section below on problems in the implementation of system operations/O&M.

Air samples are collected and analyzed at frequencies that vary from weekly to monthly. Results are reported monthly to EPA and entered into an electronic database available for further review and analysis.

Problems in the implementation of system operations/O&M

During the start-up and initial operation of the remedial actions, several problems arose including higher than expected levels of nitrate and sulfate in the untreated water at OU 04, secondary water quality issues in OU 02, OU 03 and OU 04, exceedences of design concentrations at OU 02 and OU 04, and inconsistent or poor operation of the offgas treatment systems at OU 02, OU 03, OU 04. These problems have been resolved and currently do not affect the operation of the treatment plants. In addition, various staffing, supply delivery and other miscellaneous operational issues have been identified and addressed.

Several issues temporarily affected the ability of the remedy to extract groundwater at targeted rates, and required modifications to plant facilities after start-up. In February 2006, two months after the system began delivering potable water, the chemical 1,2,3-TCP was discovered in the extraction wells supplying OU 04 at levels

above the CDPH Notification Level (“NL”) of 0.005 ug/L. The operator stopped supplying water from the treatment plant for potable use, and the well with the highest 1,2,3-TCP levels was shut down. From February 2006 through May 2007, the plant was operated with water from the two wells with lower concentrations of 1,2,3-TCP and the treated water was discharged to a nearby surface water channel. During this period, a Liquid-Phase GAC (“LGAC”) treatment LGAC treatment system was designed, constructed, and permitted, allowing the plant to resume operation with all three wells in May 2007. Treated water was again used as drinking water beginning in July 2007 after CDPH amended Valley County Water District’s water supply permit.

At OU 02, operation was temporarily limited by problems with the groundwater extraction wells. The two available wells produced excessive amounts of sand, limiting their rate of operation. This problem was temporarily addressed by rehabilitating the wells, alternating use of the two available wells (#2 and #3), installing variable frequency drives (VFDs) to allow the two wells to operate simultaneously at lower rates. At present, the OU has operated with roughly half the water supplied by well #2 and half by well #3. A new well will be constructed in 2007 to be used as the primary extraction well for the OU, eliminating any operational issues from excessive sand production.

At OU 05, the smallest of the three extraction wells has not yet been permitted for use as a source of drinking water and is therefore not yet in continuous use. (The well has been used during start-up, at which time the treated water has been discharged to a surface water channel rather than used as a source of drinking water.) Permitting is expected to be complete in early 2008.

Annual O&M costs

Table 4 summarizes current and recent estimates of O&M costs for the remedy. O&M costs are substantially higher than estimated in 2002. Major contributors to the increased costs are higher rates for electricity and materials (especially salt used to regenerate the ion exchange resin).

Table 4. BPOU Remedy Estimated O&M Costs		
	Mar 2002 estimate (millions per year)	Nov 2006 estimate (millions per year)
Materials/Supplies	3.5	5.5
Power	0.6	2.5
Labor	0.7	1.4
Water Testing	0.7	0.8
Repair/Replacement	1.1	0.8
Contractor Labor	0.3	0.6
Direct Engineering/Legal	0.3	0.6
Carbon Purchase	0.3	0.5
Taxes	0.5	0.4
Other	0.4	0.9
TOTAL:	8.3	14.0

V. Progress Since the Last Review

This was the first five-year review for the site.

VI. Five-Year Review Process

Administrative Components

The Baldwin Park OU Five-Year Review team was led by Wayne Praskins of EPA, Remedial Project Manager (RPM) for the Baldwin Park OU Site. Cynthia Wetmore of the Regional Technical Support Program assisted with the review.

The report was reviewed by the California Department of Toxic Substances Control (DTSC).

Community Notification and Involvement

The community was notified of the five-year review in a fact sheet distributed in August 2007 and made available on EPA's website.

Document Review

The following documents were reviewed or cited as part of this five-year review:

1994 Baldwin Park Operable Unit Record of Decision, US EPA Region 9.

1999, Baldwin Park Operable Unit Explanation of Significant Differences (ESD), USEPA Region 9.

2000, Administrative Order for Remedial Design and Remedial Action, Docket No.2000-13, USEPA Region 9, June 2000.

2003, Interim Remedial Action Report, San Gabriel Valley Area 2 Superfund Site (commonly known as the Baldwin Park Operable Unit), La Puente Valley County Water District Subproject, Operable Unit 02, September 2003.

February 2004 through July 2007, "Monthly Progress Reports for the Baldwin Park Operable Unit (BPOU)," prepared by Stetson Engineers, submitted to EPA monthly pursuant to paragraph 85 of EPA's June 2000 Order (as amended).

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

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

2004 Annual Performance Evaluation Report, Baldwin Park Operable Unit of the San Gabriel Valley Superfund Sites, prepared by Geomatrix Consultants and Locus Technologies, March 31, 2005.

2005 Annual Performance Evaluation Report, Baldwin Park Operable Unit of the San Gabriel Valley Superfund Sites, prepared by Geomatrix Consultants and ERM, April 7, 2006.

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

2006 Proposed Modifications to PSEP Groundwater Monitoring Program, Baldwin Park Operable Unit, Geomatrix, November 2, 2006.

2006 Annual Performance Evaluation Report, Baldwin Park Operable Unit of the San Gabriel Valley Superfund Sites, prepared by Geomatrix Consultants and ERM, May 18, 2007.

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

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, Stetson Engineers, Inc., January 2005.

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

Operation, Maintenance, and Monitoring Plans (OMMPs) for OUs 02, 03, 04, and 05.

Data Review

Performance Evaluation

The remedy was designed to hydraulically contain (i.e., “capture”) the area of groundwater contamination and start to reduce contaminant concentrations within the groundwater. A site-specific groundwater flow model was developed to determine the target extraction rates to achieve plume containment. During this five-year review

period, extraction rates have increased and are now at or near the target rates for OU 02, OU 03, and OU 04. OU 05 is operating at approximately one-half of the targeted rate during start-up and is expected to meet its target rate after the last well begins continuous operation in early 2008. Table 5 summarizes the operation of the four OUs over the last five years.

Table 5. BPOU Remedy Operational History									
	Capacity	EPA Targeted Rate	2002 (ave)	2003 (ave)	2004 (ave)	2005 (ave)	2006 (ave)	2007 (ave, thru Jul)	NOTES
LPVCWD (OU 02)	2,500 gpm	2,250 gpm	1,131 gpm	1,279 gpm	1,725 gpm	2,283 gpm	1,887 gpm	2,471 gpm	see note ¹
SGVWC B6 (OU 03)	7,800 gpm	6,750 gpm	0	0	NA	2,106 gpm	6,174 gpm	7,375 gpm	see note ²
VCWD (OU 04)	7,800 gpm	6,000 gpm	0	0	NA	403 gpm	2,659 gpm	5,191 gpm	see note ³
SGVWC B5 (OU 05)	7,800 gpm	7,000 gpm	0	0	0	0	0	3,530 gpm	see note ⁴
TOTAL	25,900 gpm	22,000 gpm	1,131 gpm	1,279 gpm	1,725 gpm	4,792 gpm	10,720 gpm	18,567 gpm	

Note 1: The LPVCWD subproject was incorporated into the remedy in 2002.

Note 2: The SGVWC B6 subproject began “start-up” operations in April 2004 with groundwater pumped from two backup wells. In March 2006, the primary source of water to the plant was changed from the backup wells to the new extraction wells. The plant first operated above 90% of the targeted extraction rate in June 2006.

Note 3: The VCWD subproject began “start-up” operations in October 2004 with groundwater pumped from the three extraction wells. Between February 2006 and February 2007, one of the three wells was shut down while additional treatment was installed and the plant operated above 90% of the targeted extraction rate in only one month (July 2006). The plant resumed operation with all three wells and operated above 80% of the targeted extraction rate beginning in April 2007.

Note 4: The SGVWC B5 subproject began “start-up” operations in January 2007 with groundwater pumped from two of the three planned extraction wells (and a backup well). Start-up operations continued through July. The third extraction well is expected to go online in early 2008.

A comprehensive monitoring program is in place to monitor water levels and water quality in the groundwater to provide data needed to verify the performance of the remedy. The monitoring program, described in the Performance Standards Evaluation Plan (as subsequently modified), includes 11 groundwater extraction wells, 18 multi-level monitoring wells, 8 other monitoring wells, 33 piezometers, and 30 production wells. See Figure 3 for well locations.

Annual performance evaluations were completed for 2004, 2005, and 2006 and summarized in reports submitted to EPA . The reports provide potentiometric surface maps and evaluations of 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; regional and local-scale vertical hydraulic gradients and flow directions, and estimates of contaminant mass removed from the aquifer. Table 6 summarizes the contaminant mass estimates.

Table 6: BPOU Remedy: Estimated Contaminant Mass Removed from Groundwater						
OU	2002	2003	2004	2005	2006	Primary Compounds Contributing Mass
02	705 lbs	732 lbs	680 lbs	1,135 lbs	587 lbs	Perchlorate, TCE, CTC, PCE
03	Not Operating (D)	Not Operating (C)	188 lbs	686 lbs	1593 lbs	Perchlorate, TCE, PCE, CTC
04	Not Operating (D)	Not Operating (C)	24 lbs	351 lbs	2117 lbs	1,1-DCE, PCE, TCE, perchlorate
05	Not Operating (D)	Not Operating (D)	Not Operating (C)	Not Operating (C)	Not Operating (C)	TCE, PCE
	705 lbs	732 lbs	892 lbs	2172 lbs	4297 lbs	

D= In design
C= In construction

The reports also provide plume maps and chemical cross sections for seven COCs, and evaluate temporal trends in chemical concentrations. The seven parameters are 1,2-dichloroethane (1,2-DCA); 1,4-dioxane; carbon tetrachloride; NDMA; perchlorate; PCE; and TCE.

In future five year evaluations, potentiometric surface maps will be evaluated for changes in groundwater flow patterns, and measured water levels will be compared with water levels simulated in the BPOU groundwater flow model to verify that the remedy is limiting further migration of groundwater contamination into clean and less contaminated areas. EPA will also evaluate trends in groundwater quality.

System Operation

From January 2005, the treated water from each of the operating OUs met drinking State and Federal Maximum Contaminant Levels, and State of California Notification Levels (NLs, previously known as Action Levels) more than 99% of the time. The only exceedences were as follows:

- perchlorate at OU 02 at 7.7 µg/L on May 16, 2005 (In a subsequent retest, the perchlorate concentration was less than the NL of 6.0 µg/L.)

- perchlorate at OU 02 at 6.9 µg/L on February 13, 2006 (In a subsequent retest, the perchlorate concentration was less than the NL of 6.0 µg/L.)
- 1,2,3-TCP at OU 04 at 0.012 µg/L on March 1, 2006 (The well contributing most of the 1,2,3-TCP was subsequently shut down while additional treatment was installed to reduce concentrations below the NL of 0.005 ug/L, as summarized below.)

These exceedences did not affect the protectiveness of the remedy because they did not reoccur (in the two perchlorate exceedences) or resulted in the treated water no longer being served as drinking water (in the 1,2,3-TCP exceedence).

Site Inspection

Site inspections were conducted on August 14 and September 13, 2007 by Wayne Praskins. The purpose of the inspections was to confirm that conditions are as reported in the monthly progress reports and annual performance evaluation reports. The inspections found the remedy to be as reported.

Interviews

Formal interviews were not conducted as part of the review.

VII. Technical Assessment

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

The review of documents and the results of the site inspections indicate that the remedy was constructed in accordance with the ROD and ESD. Groundwater extraction wells were designed and constructed to satisfy remedial action objectives based on information available during design, treatment systems were designed and constructed with sufficient capacity to achieve ARARs, conveyance systems were designed and constructed to transport untreated and treated water from wells to treatment plants and from treatment plants to discharge or end use locations, and the piezometers and groundwater monitoring wells were designed and constructed to satisfy the performance standards evaluation plan. Initial operations were occasionally limited by various operational issues, and the smallest of the three extraction wells planned as part of OU 05 has not yet been permitted and is therefore not yet in continuous use, limiting attainment of EPA's remedial objectives.

Construction delays and operational issues have been or are in the process of being addressed. None of the operational issues are expected to limit long-term operation of the system or achievement of remedial action objectives.

During the next five-year review, EPA expects that the remedy will have operated long enough that EPA can verify attainment of remedial action objectives and make recommendations on how to optimize the remedy. EPA will also review data collected and analyzed in accordance with the EPA-approved performance standards evaluation

plan to determine when sufficient information is available to develop remedial alternatives for the final remedy for the site.

The March 1994 ROD for the Baldwin Park OU discusses governmental controls that affect the extraction and use of groundwater. There are no specifically tailored institutional control (IC) instruments in place at the site and due to the size of the affected area, it would not be feasible to restrict each individual parcel with land use controls. However, the governmental controls in place at the site act as effective institutional controls. The primary governmental control is the Amended Judgment of August 24, 1989 (including Amendments through February 24, 1992) in the matter of Upper San Gabriel Valley Municipal Water District v. City of Alhambra, et. al., amending the original judgment entered on January 4, 1973 by the Superior Court of California, County of Los Angeles, establishing the entity known as the Main San Gabriel Basin Watermaster with authority to regulate groundwater pumping in the San Gabriel Valley. In conjunction, governmental controls on the use of groundwater as drinking water include EPA and California promulgated maximum contaminant levels ("MCLs") and California NLs that require drinking water standards be met prior to serving the water. These drinking water controls and the Watermaster's authority to regulate water resources and eliminate unregulated use of area groundwater serve as institutional controls that prohibit unauthorized use of or exposure to groundwater. Therefore, the remedy is currently protective.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

Changes in Standards and To Be Considereds (TBCs)

The 1994 Record of Decision only addressed volatile organic contaminants in the groundwater. The ROD adopted an interim remedy, which set treatment levels for groundwater leaving the treatment plants but did not set (in-situ) cleanup levels in the aquifer.

The 1999 ESD addressed three additional contaminants (perchlorate, N-nitrosodimethylamine, and 1,4-dioxane). Because there were no promulgated ARARs for these contaminants, EPA used California Notification Levels as "TBCs" to specify the required level of treatment.

There has been one change to the standards identified as ARARs in the ROD. In September 2007, the State of California promulgated an MCL for perchlorate at 6 ppb. The effective date of the new MCL is October 18, 2007. The treated groundwater continues to meet NLs and other State requirements, including the newly promulgated California perchlorate MCL, and remains protective of human health and the environment.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The previous risk assessments identified the exposure pathways at Baldwin Park as domestic use of groundwater including ingestion, inhalation, and dermal exposure. Recently, EPA's understanding of contaminant migration from groundwater into buildings has indicated that vapor intrusion may have a greater potential for posing risk to human health than originally assumed at the time the IROD was prepared. In September 2002, EPA released an external review draft version of its vapor intrusion guidance titled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (EPA 2002). One factor in considering whether there is a potential for vapor intrusion is the depth to contamination source. Any source less than 100 feet should be screened for potential vapor intrusion. At Baldwin Park, the depth of groundwater is between 100 and 350 feet below the surface. Therefore, vapor intrusion is not a potential issue for this FYR.

In the past five years, there have been a number of changes to the toxicity values for certain contaminants of concern at the Site. Revisions to the toxicity values for 1,1-DCE indicate a lower risk from exposure to these chemicals than previously considered. In addition, PCE, 1,4-dioxane and 1,2-dichloroethene are currently under review, as part of EPA's IRIS reassessment program. Any potential change to these chemicals will need to be addressed in subsequent Five Year Reviews

The greatest uncertainty with toxicological changes for the Site is associated with TCE. In August 2001, U.S. EPA's Office of Research and Development (ORD) released the draft "Trichloroethylene Health Risk Assessment: Synthesis and Characterization" ("TCE Health Risk Assessment") for external peer review. According to the draft TCE Health Risk Assessment, for those who have increased susceptibility and/or higher background exposures, TCE could pose a higher risk through inhalation than previously considered. The Science Advisory Board, a team of outside experts convened by U.S. EPA, reviewed the draft TCE Health Risk Assessment in 2002. In July 2006, the National Academy of Sciences completed additional peer review of scientific issues that were the basis for the draft TCE Health Risk Assessment. In response to this review, EPA will revise the draft TCE Health Risk Assessment. Consequently, review of the toxicity value for TCE may continue for a number of years. This issue will need to be updated in subsequent Five-Year Reviews.

In 2005, EPA added toxicological information about perchlorate into its IRIS database which was consistent with the toxicological information included in the National Academy of Science's January 2005 report "Health Implications of Perchlorate Ingestion". EPA is currently assessing the impact of this toxicological information and the need to regulate perchlorate in drinking water. However, in January 2006, EPA issued "The Assessment Guidance for Perchlorate." Using the toxicological information from the IRIS, the guidance suggested that, in certain circumstances, a protective concentration in drinking water would be as high as 24.5 ppb. Currently, Baldwin Park treatment systems treat perchlorate to the proposed California Standard of 6 ppb which EPA considers protective.

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

There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. The remedy is meeting all ARARs in the ROD, and there have been no changes in ARARs affecting the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the previous risk assessments or the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

There are no issues that affect protectiveness; however, it is not yet possible to verify whether the remedy is fully achieving EPA’s remedial objectives, primarily because construction on the last portion of the remedy was only recently completed and permitting of the last of the extraction wells by DPH was not yet complete.

IX. Recommendations and Follow-up Actions

EPA will continue to review and evaluate information provided in monthly progress reports, annual performance evaluation reports, through periodic meetings and communication with Potentially Responsible Parties, water agency staff, and consultants, and through use of the BPOU database to ensure that the remedy is satisfying EPA’s remedial objectives. Table 7 summarizes the most important follow-up action.

Table 7: BPOU Remedy: Recommendations and Follow-up Actions				
Issue	Recommendations and Follow-up Actions	Milestone Date	Affects Protectiveness	
			Current	Future
Ensure permitting and operation of the last extraction well planned as part of OU 05	Monitor progress	early 2008	No	No

X. Protectiveness Statement

The remedy for the San Gabriel Valley Area 2 Superfund Site is protective of human health and the environment because Institutional Controls are in place to prevent installation of wells in the contaminated areas without adding treatment, and therefore, there is no current or potential exposure.

XI. Next Review

The next five-year review for the Baldwin Park OU, San Gabriel Valley (Area 2) Superfund Site is required by September 2012, five years from the date of this review.

Table 8: BPOU Remedy: Raw (Untreated) Water Quality Data (ug/L)														
OU	No of Wells	TCE	PCE	CTC	1,1-DCA	1,2-DCA	1,1-DCE	cis 1,2-DCE	1,1,1-TCA	chloroform	CLO4	1,4-D	NDMA	Notes
02	2	40.4 (15-78)	2.9 (2.6-3.0)	2.1 (0.6-4.4)	ND	1.5 (0.8-2.8)	ND	ND	ND	ND	34.7 (10.4-62)	0.8 (nd-0.8)	0.104 (0.058-0.175)	calculated average (range) ¹
03	4	28.4 (8.7-46)	10.1 (nd-22)	7.1 (2.2-13)	ND	1.0 (nd-3.2)	2.4 (nd-5.2)	9.1 (nd-4.5)	ND	ND	24.0 (2.9-59)	1.0 (nd-2.0)	0.152 (0.006-0.52)	measured in combined flow (range)
04	3	74.3 (30-161)	173 (45-415)	0.9 (nd-2.7)	2.6 (1.4-3.6)	0.6 (nd-0.9)	52.3 (17-84)	9.9 2.1-25)	2.0 (0.8-3.6)	1.3 (0.6-2.4)	15.3 (10-22)	1.9 (1.3-2.4)	0.054 (0.003-0.152)	calculated average (range)
05	3	NA (up to 2.9)	NA (up to 1.0)	ND	ND	ND	ND	ND	ND	ND	NA (up to 0.6.6)	ND	NA (up to 0.043)	measured maximum
	MCL/ NL	5	5	0.5	5	0.5	6	6	200	80	6	3	0.01	

Note: The MCL listed for chloroform is for total trihalomethanes (the sum of the concentrations of chloroform, bromoform, bromodichloromethane, and dibromochloromethane).

¹ Calculated averages assume that each well is pumped at the same rate.

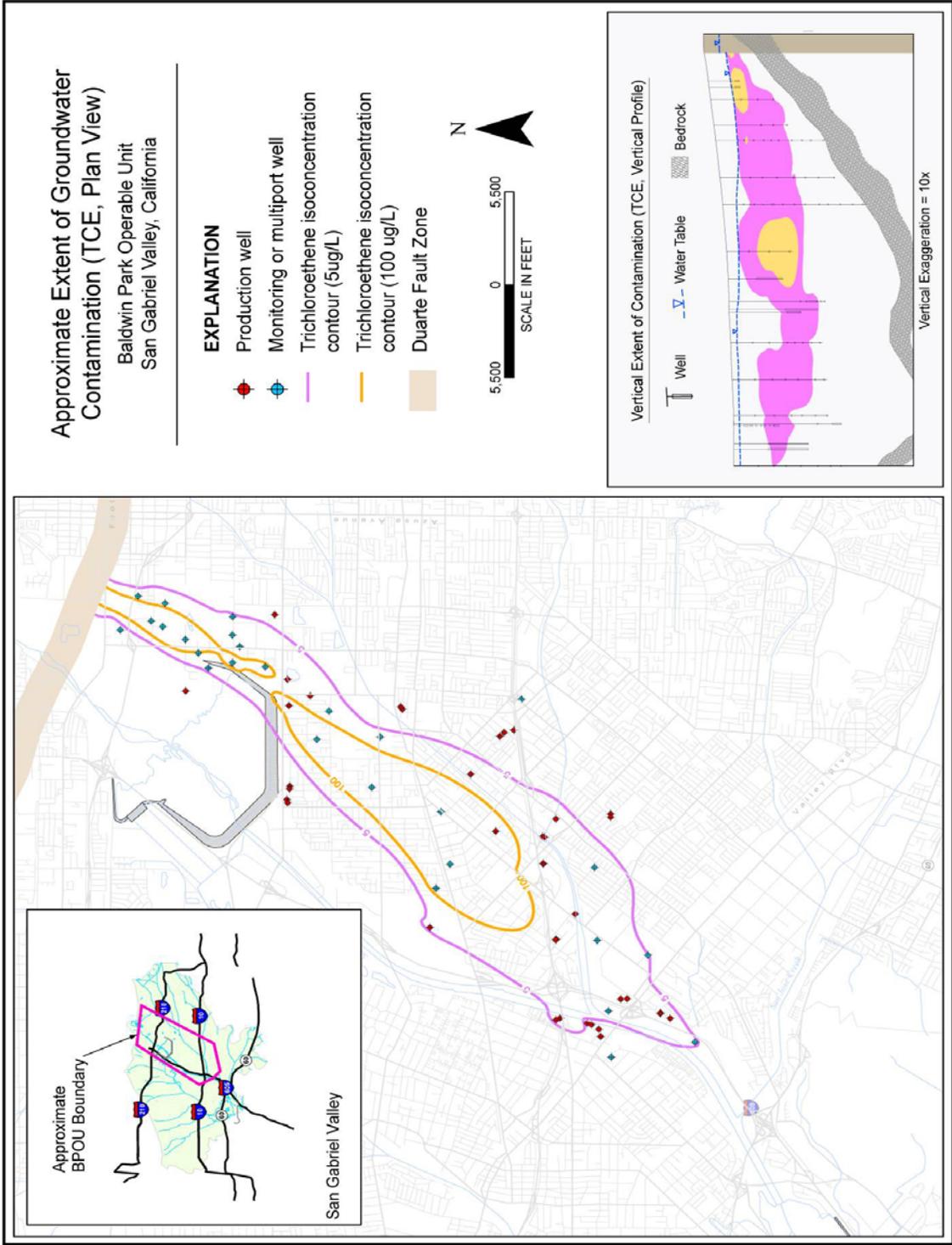


Figure 1 – Site Location Map and Approximate Extent of Groundwater Contamination

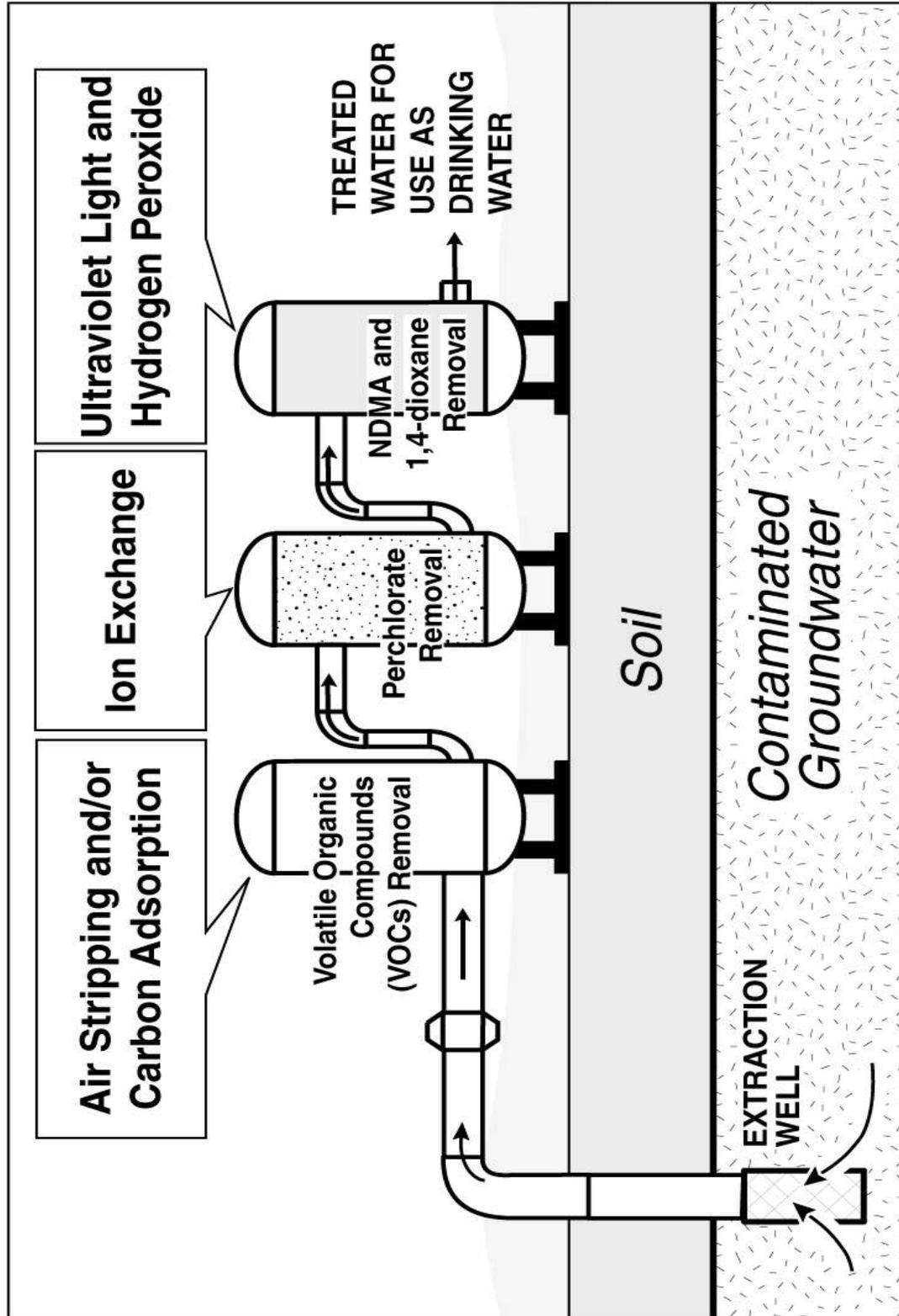
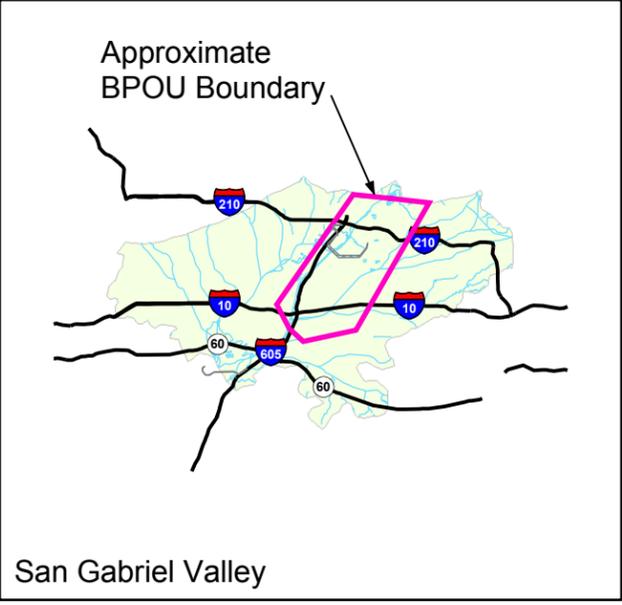
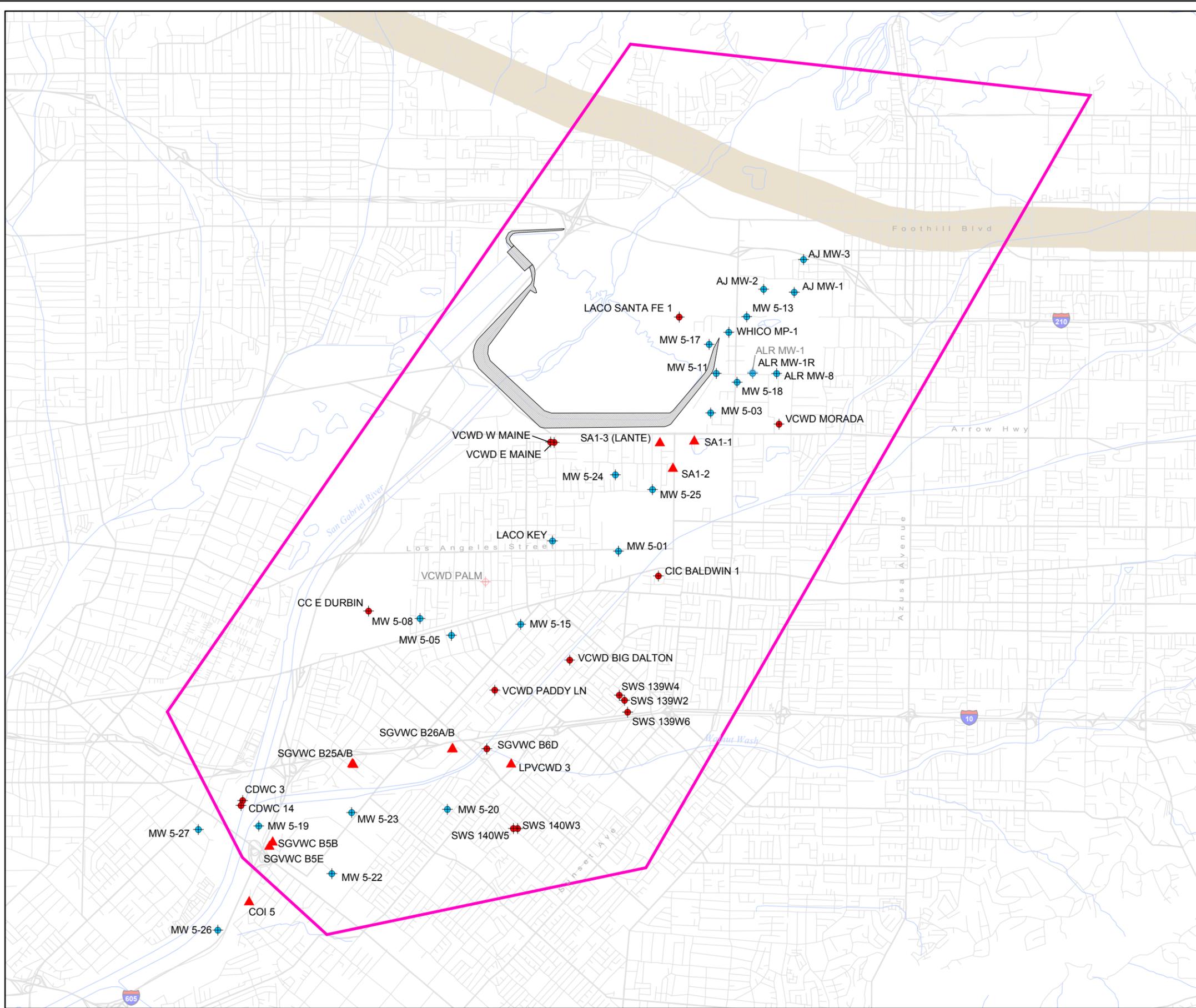
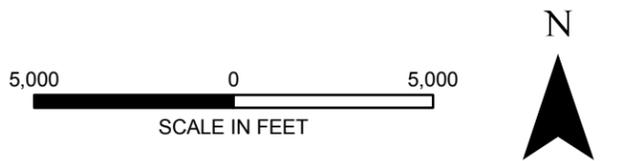


Figure 2 – Water Treatment Process

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- EXPLANATION**
- ◆ Multiport or monitoring well
 - ⊕ Monitoring well - destroyed
 - ▲ Extraction well
 - ◆ Production well
 - ⊕ Production well - removed from PSEP, 2006
 - Approximate BPOU boundary
 - Duarte Fault Zone



BPOU-WIDE GROUNDWATER QUALITY MONITORING NETWORK
 Baldwin Park Operable Unit
 San Gabriel Valley, California

	Project No.	Figure
	7190	3-2