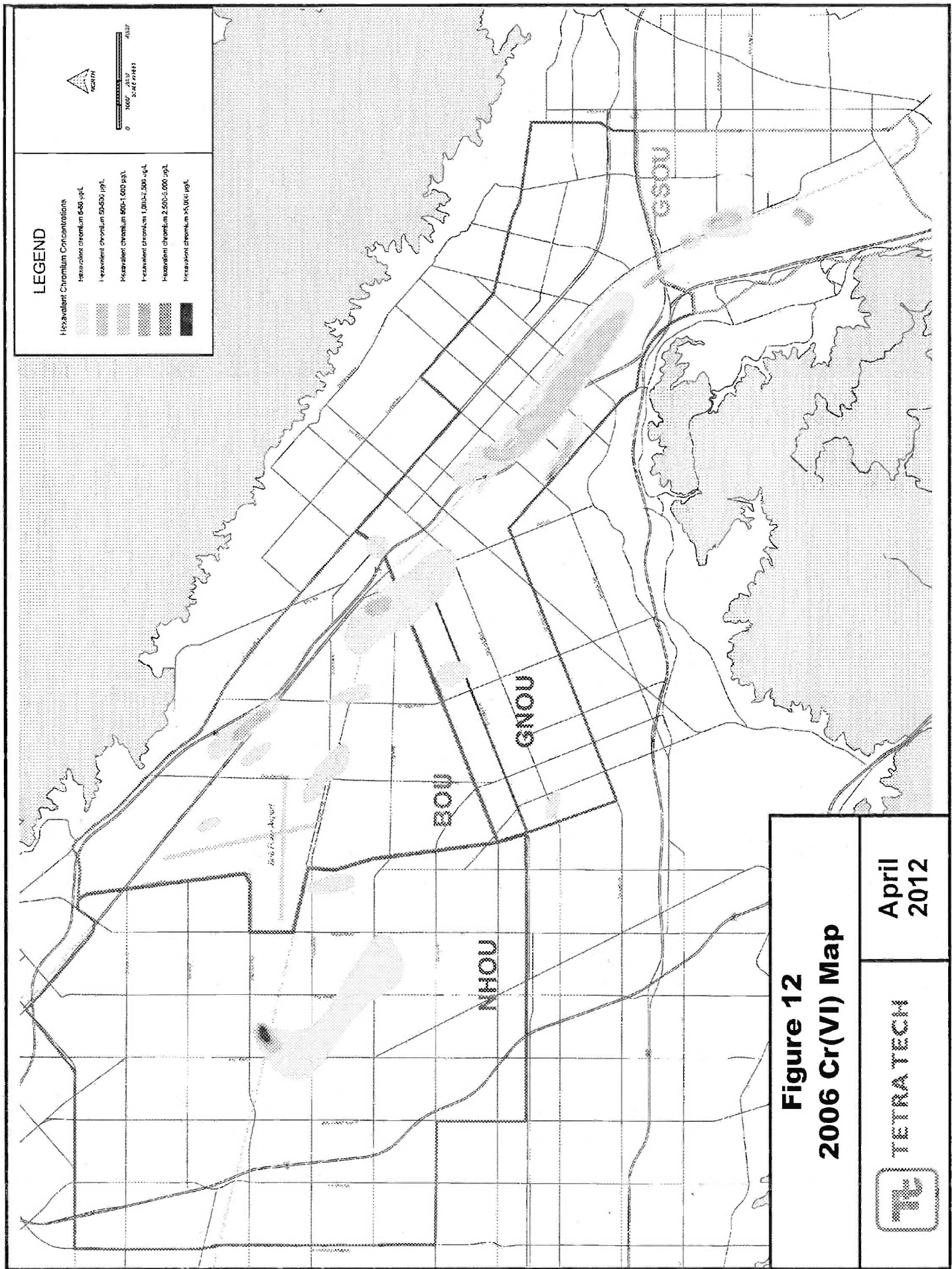




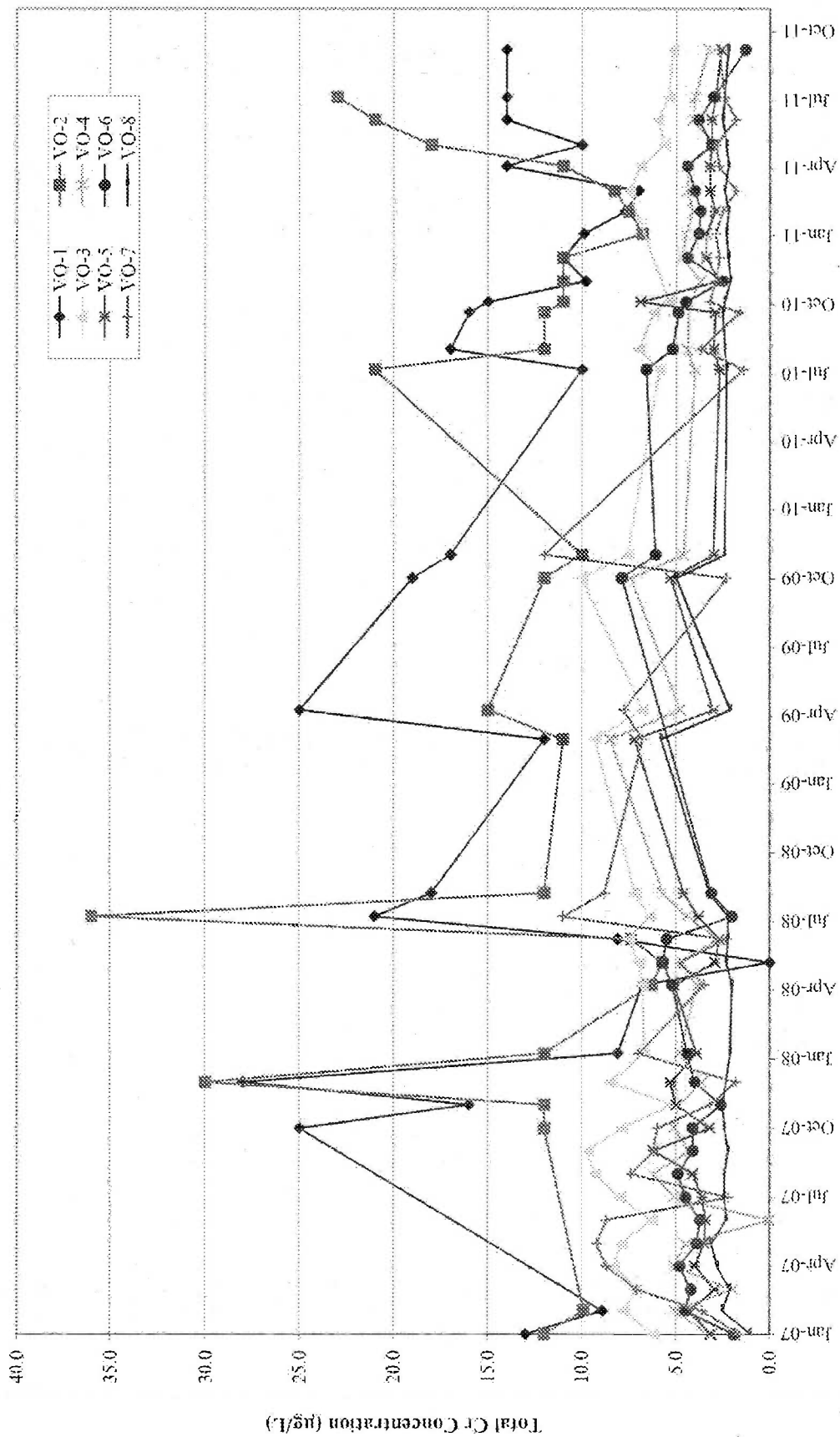


Figure 13
Total Chromium Concentrations
at BOU Extraction Wells

TETRA TECH

April 2012

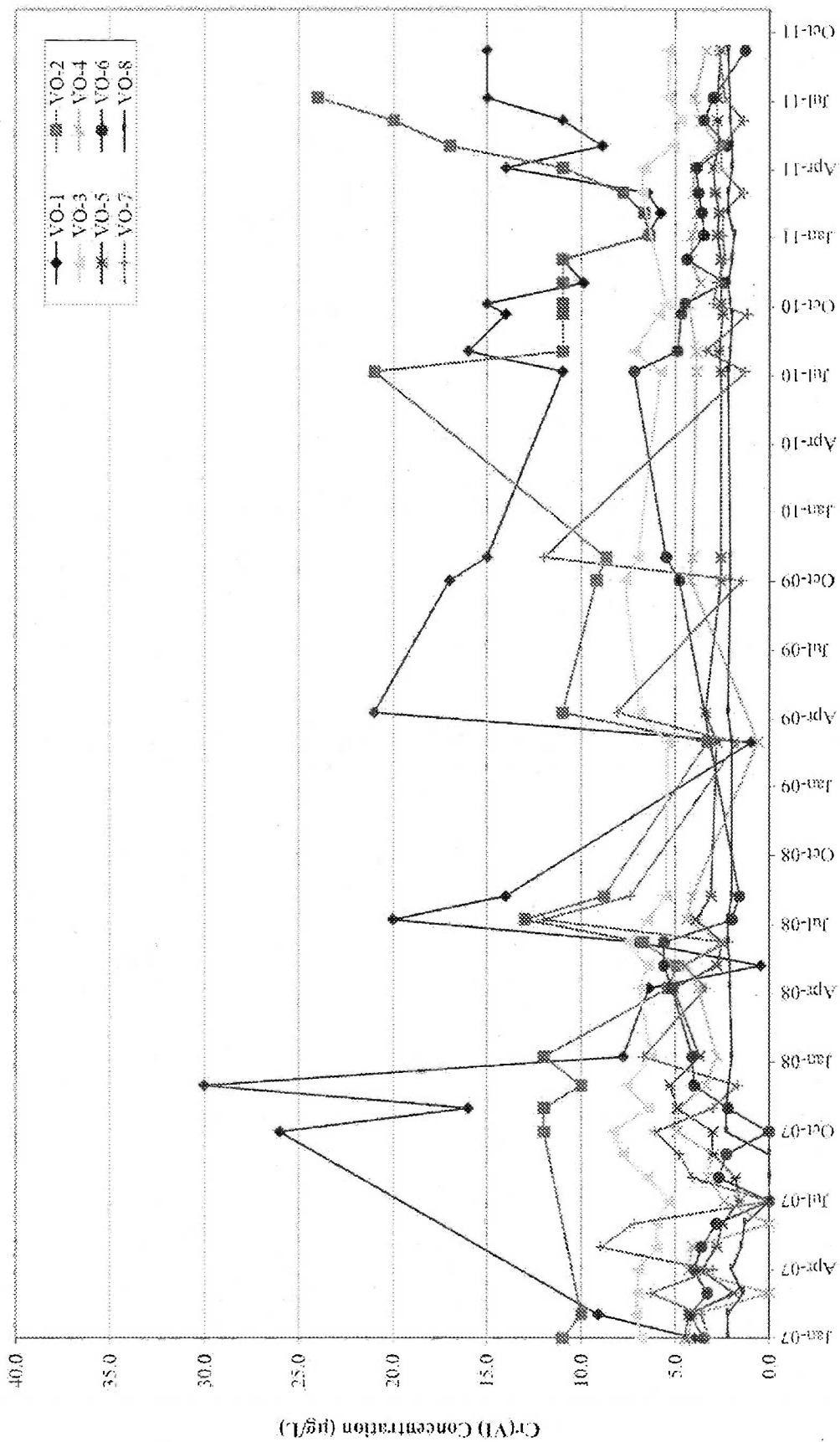


Figure 14
Hexavalent Chromium Concentrations
at BOU Extraction Wells

TETRA TECH

April
2012

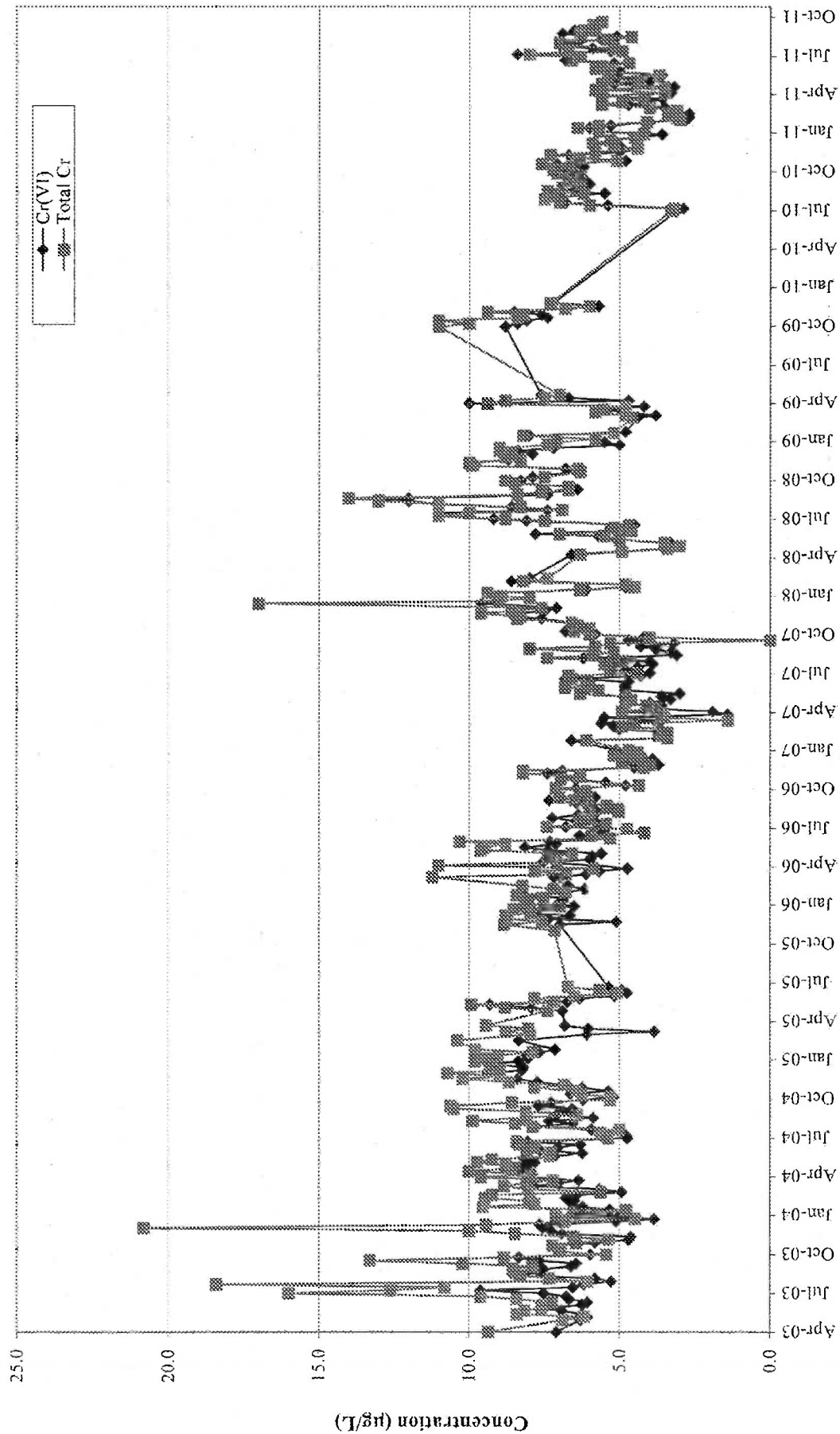


Figure 15
 Total and Hexavalent Chromium
 Concentrations in BOU Treatment
 System Effluent Before Blending

April 2012

TETRA TECH

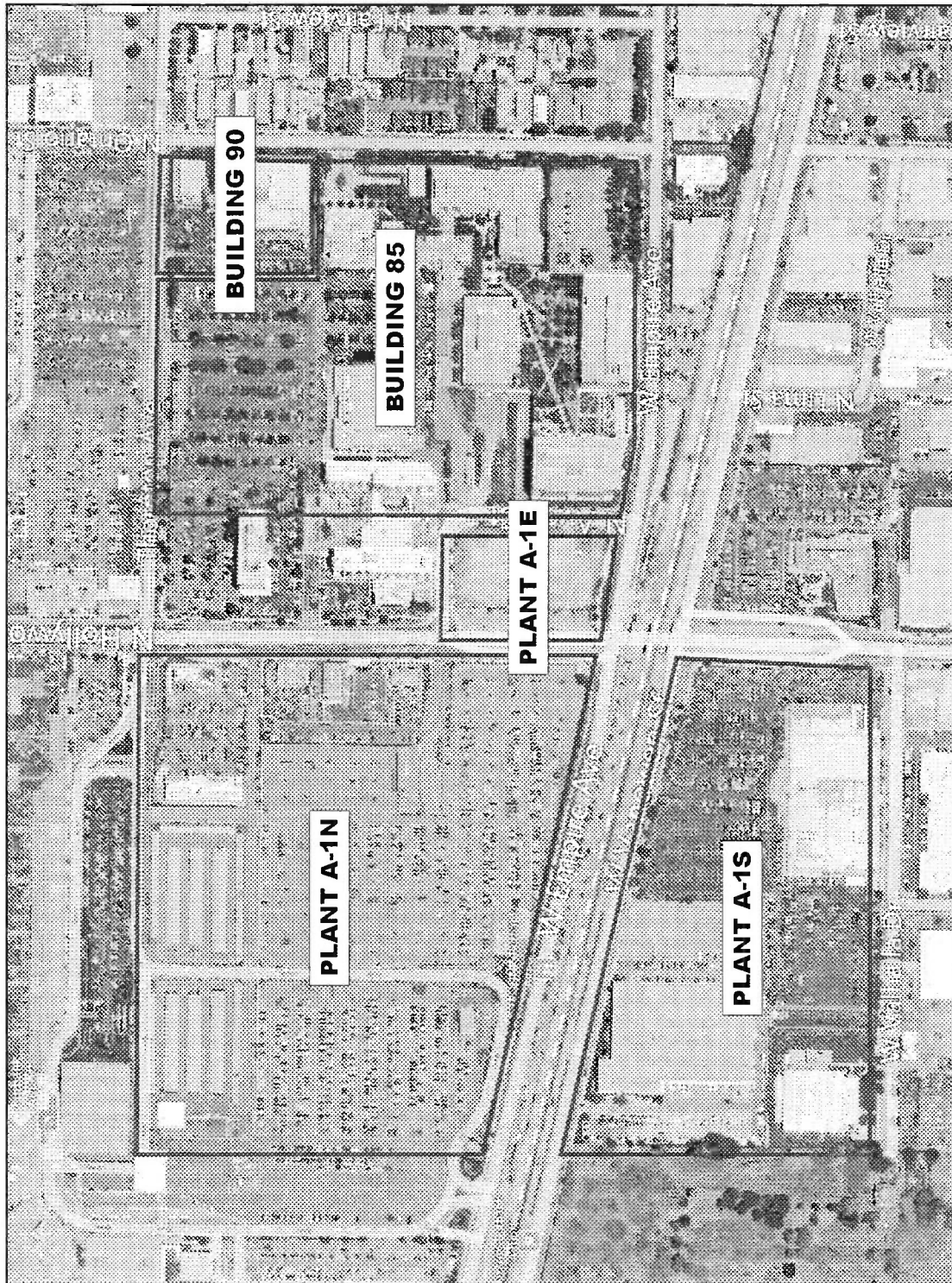


Figure 16
Current Land Use
Plant A-1



TETRA TECH

**April
 2012**

Site		Current Site Usage
Plant A-1	A-1 North	Airport parking lot with some commercial usage (restaurants)
	A-1 South	Commercial usage
	A-1 East	Open lot
	Building 85	Office space, convention center, and parking lot usage
	Building 90	Office Space.



Current Site Usage	
Plant B-1	Mixed commercial /office space usage

Figure 17
Current Land Use
Plant B-1

April
2012

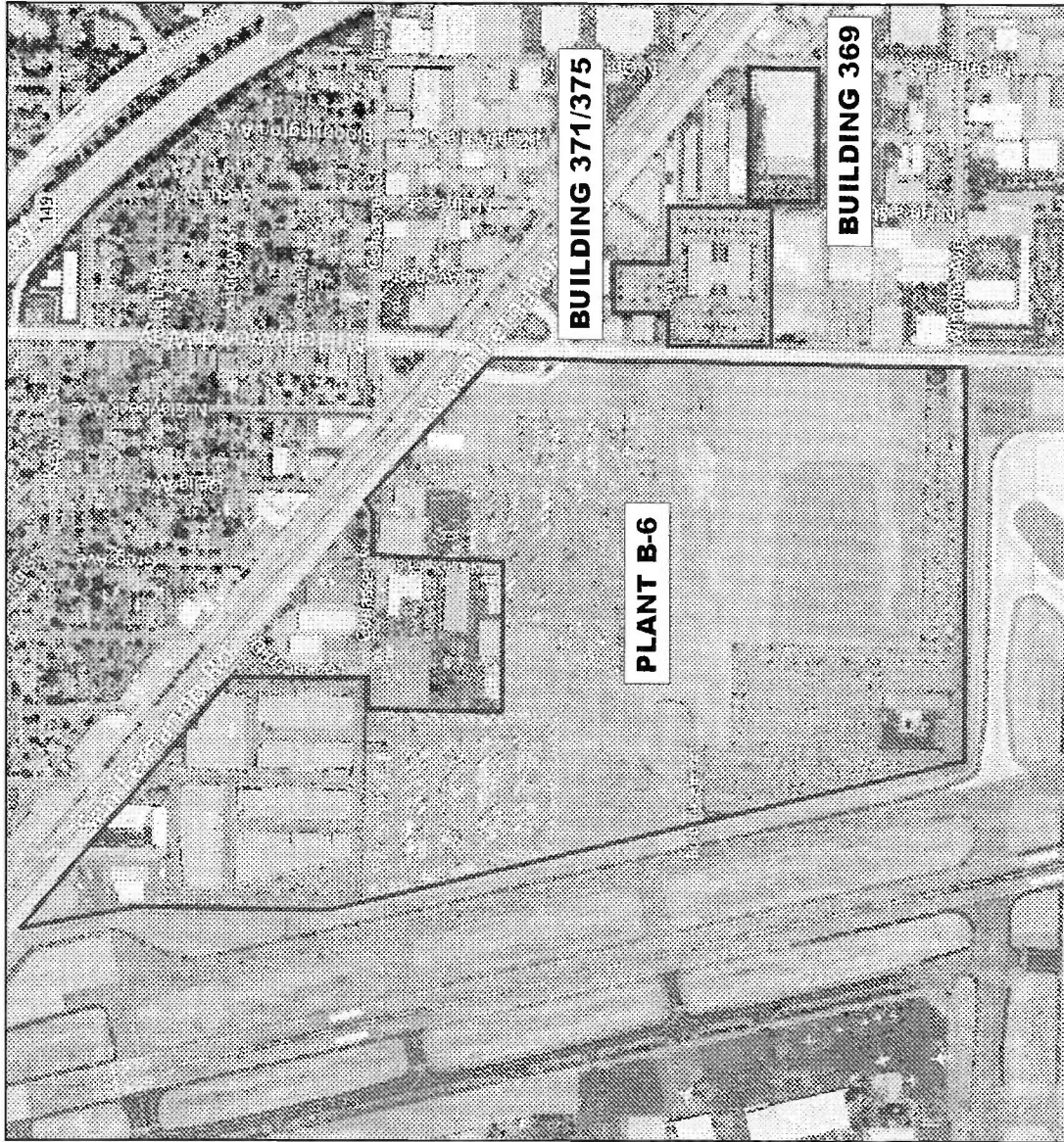
TETRA TECH





Current Site Usage	
Plant B-5	Aircraft hangars / office space

Figure 18 Current Land Use Plant B-5	
 TETRA TECH	April 2012

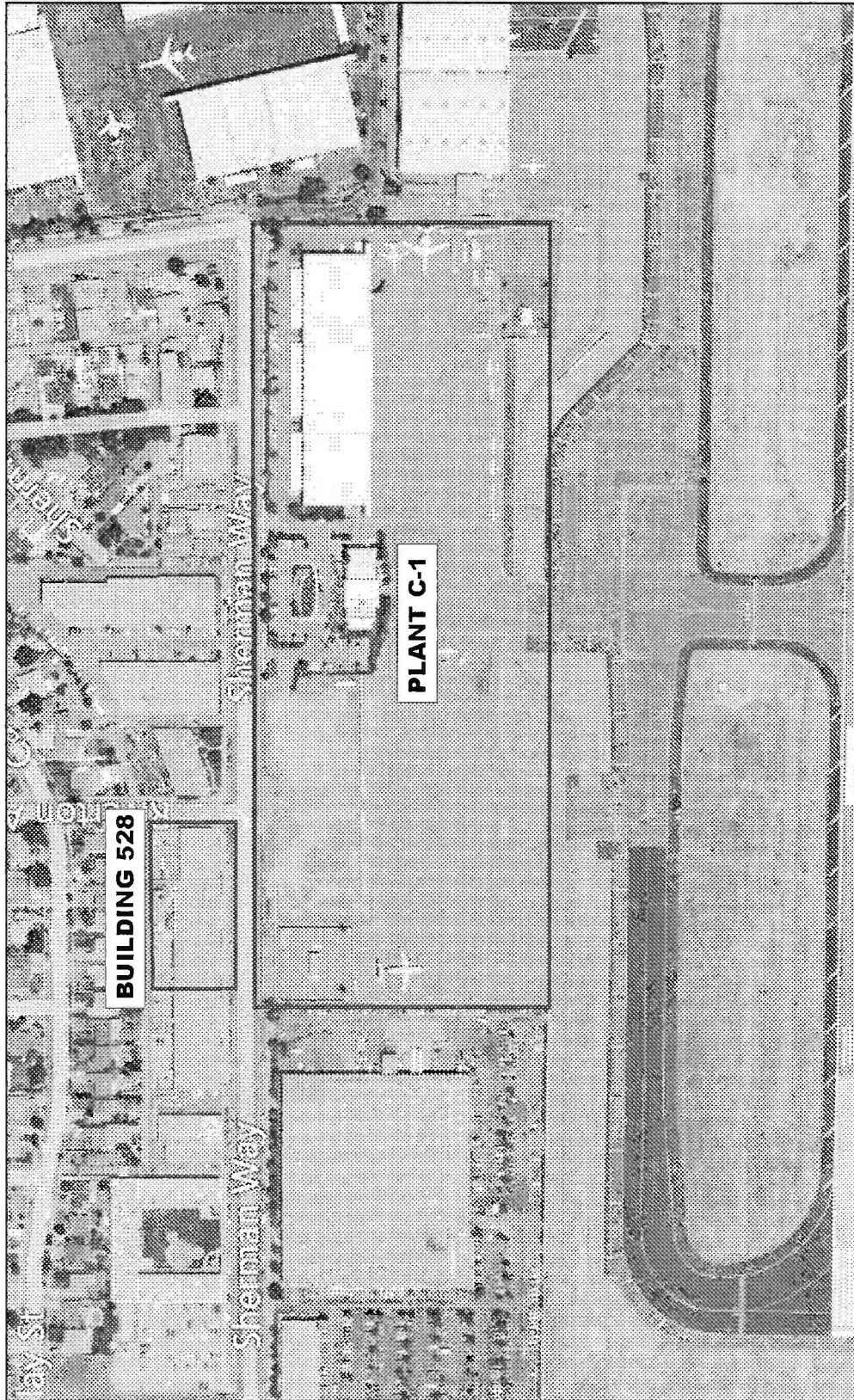


Site		Current Site Usage
Plant B-6	B-6	Storage units, studio equipment parking lot, airport parking, Burbank Police Department motorcycle training grounds
	Buildings 371/375	Commercial / office space usage
	Building 369	Commercial / office space usage


TETRA TECH

Figure 19
Current Land Use
Plant B-6

April 2012



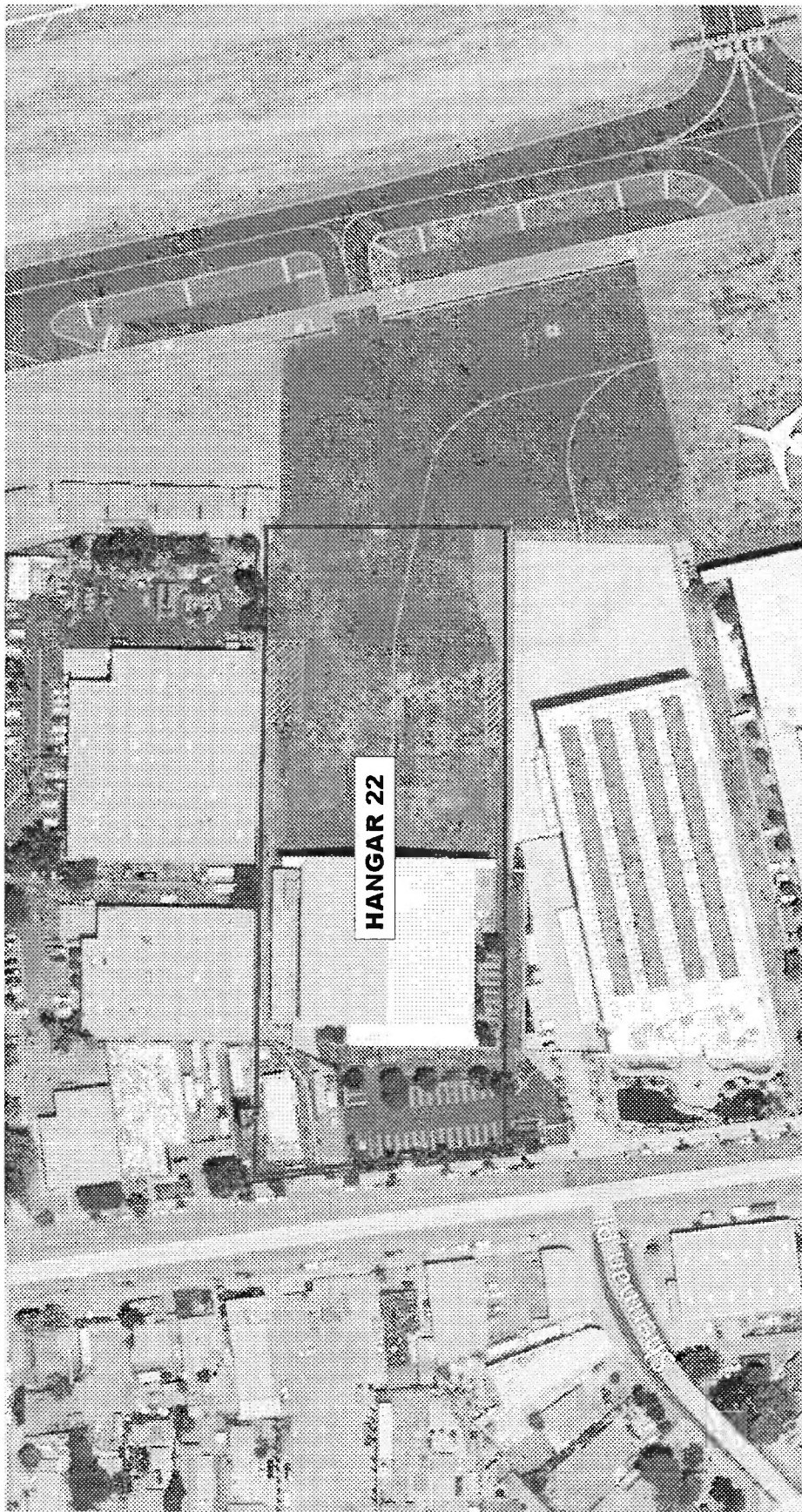
Site		Current Site Usage
Plant C-1	Plant C-1 Proper	Private aircraft terminal and hangar
	Building 528	Commercial usage

Figure 20
Current Land Use
Plant C-1

April
 2012

TETRA TECH

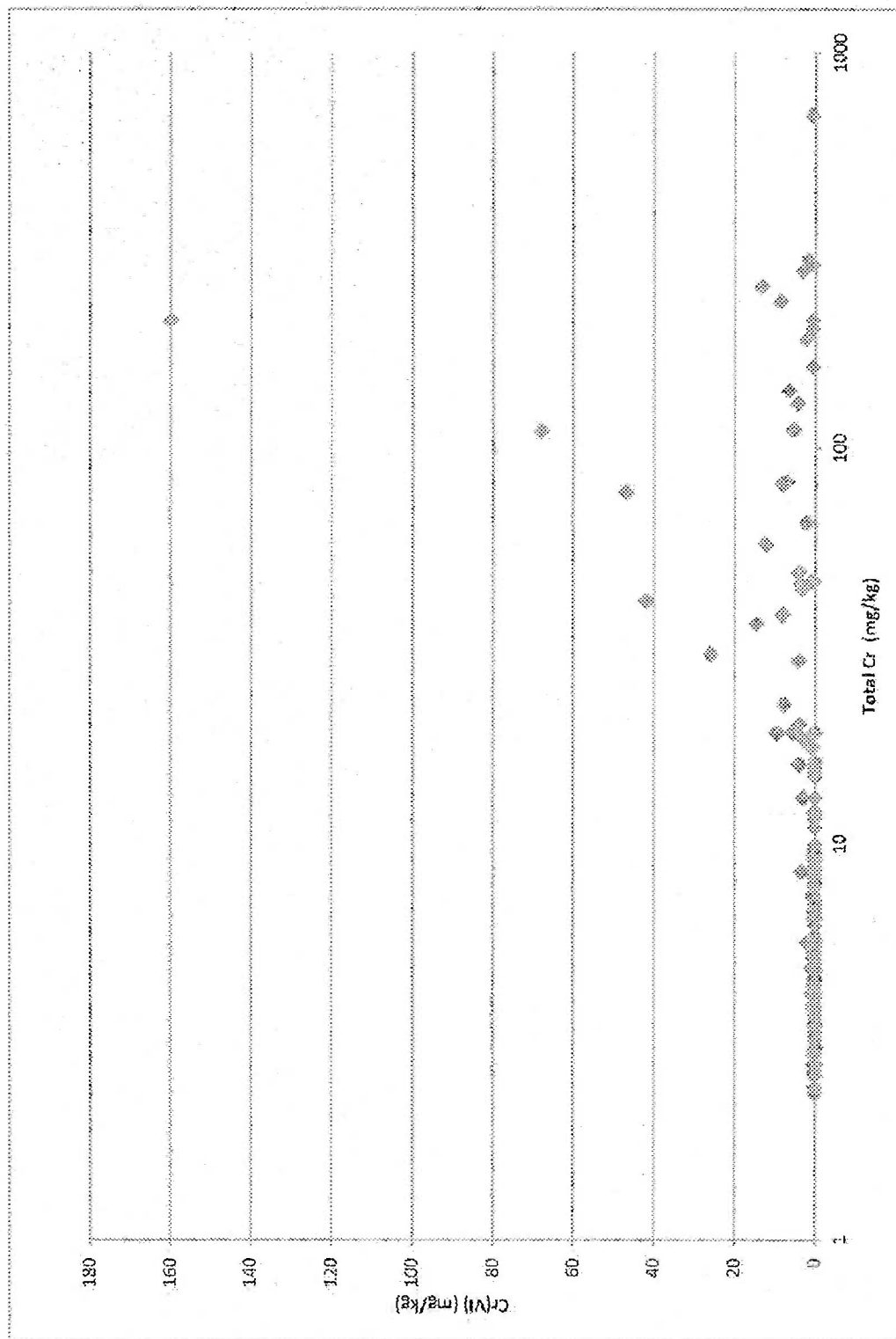




Current Site Usage	
Site	Private aircraft hangar
Hangar 22	

Figure 21 Current Land Use Hangar 22	
 TETRA TECH	April 2012

P:\CAD\0211 GC0U\0211 GC0U_Fig 22 Chromium Chart.dwg 4/06/12 17:05



NOTE:
Includes all data from all plants where total chromium was detected, both total and hexavalent chromium were measured and hexavalent chromium detection limit was below 4 mg/kg.

Hexavalent Vs Total Chromium Concentration in Soils

FORMER LOCKHEED BURBANK PLANTS



April 2012

Figure 22

STRATEGIC ENGINEERING & SCIENCE



PLATES

Exhibit 12
Five-Year Review Report

FIVE-YEAR REVIEW REPORT

Five-Year Review Report
For
San Fernando Valley (Area 1) Superfund Site
Los Angeles County, California

September 2008

Approved by:

Date:



Kathleen Salyer, Assistant Director
California Site Cleanup Branch
Superfund Division
USEPA, Region 9

9/30/08

Contents

Section	Page
List of Acronyms	vii
Five-year Review Summary Form	ix
Executive Summary	ES-1
1.0 Introduction	1-1
2.0 Site Chronology	2-1
3.0 Site Background	3-1
3.1 Physical Characteristics	3-1
3.2 Land and Resource Use	3-1
3.3 History of Contamination	3-2
3.4 Initial Response	3-2
3.4.1 NHOU Initial Response	3-2
3.4.2 BOU Initial Response	3-2
3.5 Basis for Taking Action	3-3
4.0 Remedial Actions	4-1
4.1 Remedy Selection	4-1
4.1.1 North Hollywood Operable Unit	4-1
4.1.2 Burbank Operable Unit	4-1
4.2 Remedy Implementation	4-2
4.2.1 North Hollywood Operable Unit	4-2
4.2.2 Burbank Operable Unit	4-2
4.3 Operation and Maintenance	4-2
4.3.1 System Operation and Maintenance	4-2
5.0 Progress Since the Last Review	5-1
5.1 Previous Protectiveness Statements	5-1
5.1.1 North Hollywood	5-1
5.1.2 Burbank Operable Unit	5-1
5.2 Status of Issues and Recommendations	5-2
5.2.1 Burbank Operable Unit	5-3
6.0 Five-year Review Findings	6-1
6.1 Five-year Review Process	6-1
6.2 Community Notification and Involvement	6-1
6.3 Document Review	6-1
6.4 Data Review	6-1
6.4.1 Area 1 Groundwater Quality	6-1
6.4.2 Groundwater Extraction and Treatment Systems	6-3
6.4.3 Containment of Contaminated Groundwater	6-4
6.5 Site Inspection	6-6
6.6 Interviews	6-7
6.6.1 Technical Interviews	6-7

Contents, Continued

	Page
7.1 Question A: Is the remedy functioning as intended by the decision documents?	7-1
7.1.2 North Hollywood Operable Unit	7-1
7.1.3 Burbank Operable Unit	7-1
7.1.4 Institutional Controls for BHOU and NHOU	7-2
7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy selection still valid?	7-3
7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?	7-4
7.3.1 North Hollywood Operable Unit	7-4
7.3.2 Burbank Operable Unit	7-4
7.4 Technical Assessment Summary	7-4
8.0 Issues and Recommendations	8-1
9.0 Protectiveness Statement	9-1
10.0 Next Review	10-1

Tables

2-1 Chronology of SFV (Area 1) Site Events	2-1
4-1 Operation and Maintenance Costs 2004 -- 2007	4-4
4-2 Operation and Maintenance Costs 2004 -- 2008	4-5
8-1 Issues and Recommendations for Area 1	8-1

Figures

1-1 Site Location Map	1-3
3-1 Location of Production and Extraction Wells	3-5
3-2 Location of Facility and Remedial Investigation Monitoring Wells	3-7
3-3 Chromium Concentration in Shallow Zone Groundwater	3-9
4-1 Schematic Diagram of NHOU and BOU Groundwater Treatment Facility	4-7
4-2 Photograph of NHOU and BOU Groundwater Treatment Facilities	4-9

Appendices

A Interim Technical Memorandums	
A-1 North Hollywood Operable Unit Status of Past Recommendations Technical Memorandum	
A-2 Burbank Operable Unit Status of Past Recommendations Technical Memorandum	
A-3 North Hollywood Operable Unit Applicable or Relevant and Appropriate Requirements Technical Memorandum	
A-4 Burbank Operable Unit Applicable or Relevant and Appropriate Requirements Technical Memorandum	

Contents, Continued

	Page
A-5	North Hollywood Operable Unit Data Review Technical Memorandum
A-6	Burbank Operable Unit Data Review Technical Memorandum
B	Documents Reviewed
C	Five-year Review Site Inspection Checklist and Interview Summary Forms
D	Site Inspection Photographs

2400000000

List of Acronyms

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BOU	Burbank Operable Unit
CAO	Cleanup and Abatement Order
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	constituent of concern
ESD	Explanation of Significant Differences
FFS	focused feasibility study
GAC	granular activated carbon
gpm	gallons per minute
Honeywell	Honeywell International Inc.
IC	institutional control
LADWP	Los Angeles Department of Water and Power
LPGAC	liquid-phase granular-activated carbon
MCL	maximum contaminant level
MWD	Metropolitan Water District
µg/L	micrograms per liter
mg/L	milligrams per liter
NDMA	N-nitrosodimethylamine
NHOU	North Hollywood Operable Unit
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	operation and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
OU	Operable Unit

PCE	perchloroethene
PHG	public health goal
QA/QC	quality assurance / quality control
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
SFV	San Fernando Valley
TCE	trichloroethene
TCP	trichloropropane
ULARA	Upper Los Angeles River Area
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
VPAC	vapor-phase granular-activated carbon

Five-year Review Summary Form

SITE IDENTIFICATION

Site name : San Fernando Valley (Area 1) Superfund Site

EPA ID: CAD980894593

CERCLIS ID : 09N1 (North Hollywood Operable Unit (OU)) and 09L6 (Burbank OU)

Region: 9 State: CA City/County: Los Angeles / Los Angeles

SITE STATUS

NPL status: ☒ Final ☐ Deleted ☐ Other (specify) _____

Remediation status (choose all that apply): ☒ Operating ☐ Complete

Multiple OUs? ☒ YES ☐ NO Construction completion date: N/A

North Hollywood OU, Burbank OU

Has site been put into reuse? ☐ YES ☐ NO ☒ N/A This is a groundwater only site.

REVIEW STATUS

Reviewing agency: ☒ USEPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: Rachel Loftin

Author title: Remedial Project Manager

Author affiliation: USEPA Region 9

Review period: March through September 2008

Date(s) of site inspection: April 24, 2008 (Burbank OU) and April 25, 2008 (North Hollywood OU)

Type of review: ☒ Statutory

☐ Policy

☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only

☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐ Regional Discretion)

Review number: ☐ 1 (first) ☒ 2 (Burbank OU) ☐ 3 (third) ☒ 4 (North Hollywood OU) ☐ Other (specify)

Triggering action:

- ☐ Actual RA Onsite Construction at OU ____
☐ Actual RA
☒ Previous Five-year Review Reports
☐ Construction Completion
☐ Other (specify)

Triggering action date: Previous Five-Year Reviews: September 2003 (North Hollywood OU) and September 2004 (Burbank OU)

Due date (five years after triggering action date): September 2008 (Area-wide FYR).

Issues and Recommendations:

Issue

1. Some groundwater migration from areas with high levels of COCs to areas of lower levels or no contamination has occurred.
2. The treatment facility at NHOU cannot treat chromium, which has affected operation of at least one NHOU remedy extraction well

Recommendations

EPA should complete the NHOU Focused Feasibility Study and select remedy improvements in a new decision document.

Protectiveness Statement:

The remedy for the NHOU is protective of human health and the environment in the short-term because there is no exposure to untreated groundwater. The treatment system effluent contaminant concentrations are less than their regulatory cleanup goals. There are governmental controls in place that prevent exposure to untreated groundwater. However, to be protective in the long term, the treatment facility needs to be modified to treat chromium and the extraction system needs modifications to improve plume containment. EPA is completing a focused feasibility study to evaluate options for expanding and improving the performance of the NHOU remedy and expects to propose and later select a second interim remedy in 2009 that will enhance plume capture and add chromium treatment.

The remedy at the BOU is protective of human health and the environment because there is no exposure to untreated groundwater. The treatment system effluent contaminant concentrations are less than their regulatory cleanup goals. There are governmental controls in place that prevent exposure to untreated groundwater. The current extraction system is achieving the remedial action objective of partial containment.

Executive Summary

The U.S. Environmental Protection Agency Region 9 has conducted the second five-year review (FYR or "five-year review") of San Fernando Valley (SFV) Area 1 Superfund Site, in Los Angeles County, California. The purpose of this FYR is to determine whether the interim remedial actions implemented at the site are protective of human health and the environment. This FYR is required because hazardous substances remain on-site above the risk-based levels determined in the Records of Decision (RODs) that would allow for unlimited use and unrestricted exposure. The methods, findings, and conclusions of the review are documented in this report. In addition, this report summarizes issues identified during the review and includes recommendations and follow-up actions to address them.

The SFV Area 1 Site includes two operable units (OUs): North Hollywood and Burbank. This is the fourth five-year review report for the NHOU and the second five-year review report for the BOU (prior five-year reviews were conducted separately for each OU). The triggering actions for the SFV Area 1 Site five-year review are the dates of the previous NHOU and BOU five-year reviews (September 2003 and September 2004, respectively).

The Remedial Action Objective (RAO) presented in the North Hollywood OU interim Record of Decision was to "slow down or arrest" the migration of the groundwater contamination plume. The selected interim remedy at the Burbank OU was designed to achieve two objectives:

- To partially control the movement and spread of ground water contaminants in the Burbank OU area, while contributing to aquifer restoration at the SFV Area 1 Site.
- To address the public health threat posed by contamination of the City of Burbank's public water supply wells by providing residents in the area with a water supply that meets state and federal drinking water standards.

To address the above RAOs, pump and treat systems were selected as the interim remedies for both OUs. The groundwater treatment system started operations at North Hollywood OU in 1989 and at Burbank OU in 1996.

This five-year review found that the interim remedies were constructed in accordance with the requirements of the interim Records of Decision. Two Explanation of Significant Differences (ESDs) were issued at the Burbank OU to modify the treatment to allow blending in order to meet the nitrate standards, reduce the proposed capacity of the groundwater system from 12,000 gpm to 9,000 gpm, and to modify the end use of the treated groundwater. There are governmental controls in place that prevent exposure to untreated groundwater. The remedy at Burbank OU is operating as intended. However, the treatment facility at North Hollywood needs to be modified to treat chromium and the extraction system needs modifications to improve plume containment. EPA expects a decision document for a new remedy in 2009 that will enhance plume capture and add chromium treatment.

1.0 Introduction

The United States Environmental Protection Agency (USEPA) is conducting this five-year review of the remedial actions implemented at the San Fernando Valley (SFV) Area 1 Superfund Site (referred to hereafter as SFV Area 1 Site), in Los Angeles County, California.

The five-year review process in this case evaluates whether the interim remedies for the North Hollywood Operable Unit (NHOU) and the Burbank Operable Unit (BOU) of the SFV Area 1 Site remain protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review and provide recommendations and proposed follow up actions.

This review is required by federal statute. USEPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the National Contingency Plan. CERCLA Section 121(c), as amended, states:

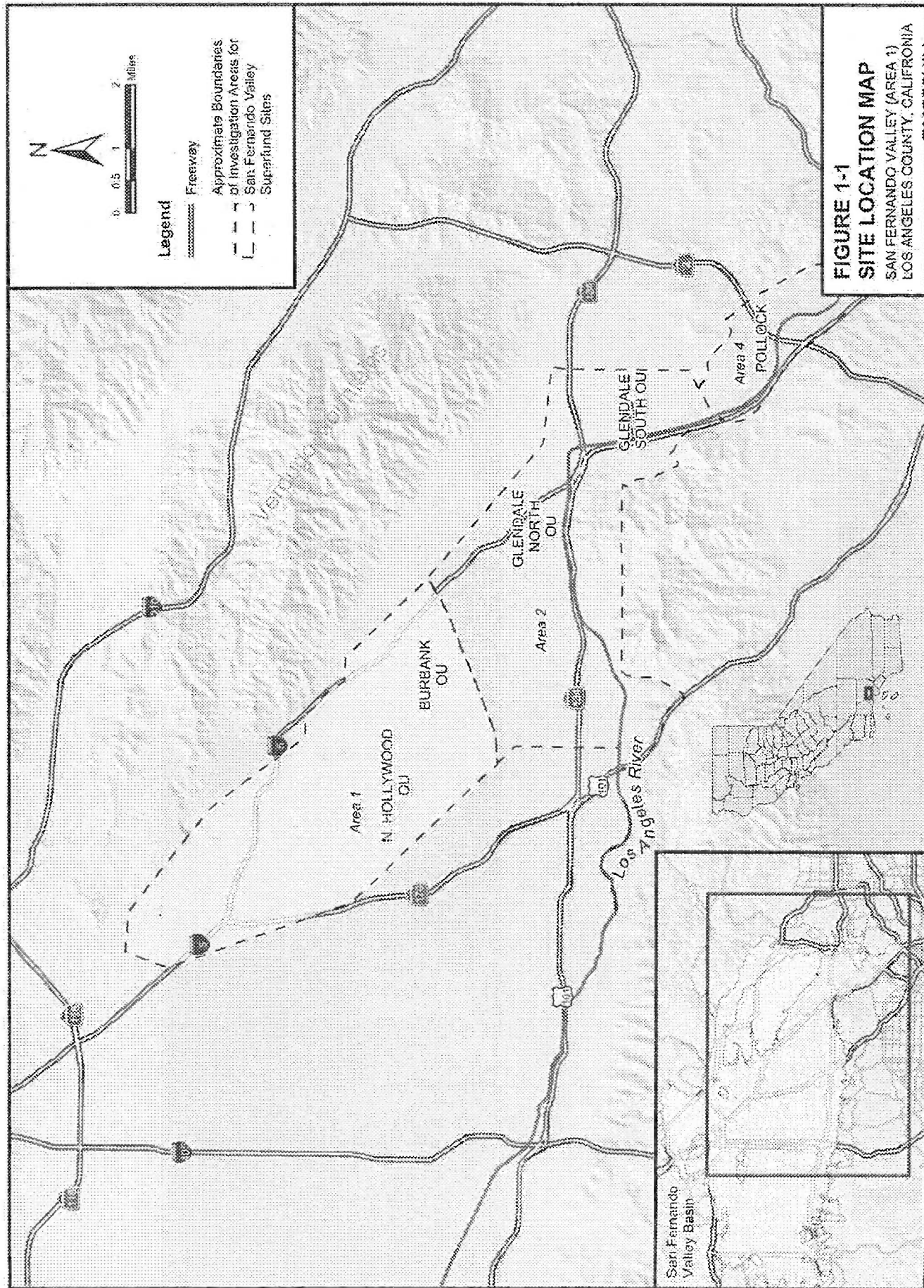
If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment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

The Agency interpreted this requirement further in the National Contingency Plan; 40 Code of Federal Regulations §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.

Consequently, this five-year review report has been completed because hazardous substances, pollutants, or contaminants remain at the NHOU and the BOU above levels that allow for unrestricted use and unlimited exposure.

The SFV Area 1 Site includes two operable units (OUs): North Hollywood and Burbank. This is the fourth five-year review report for the NHOU and the second five-year review report for the BOU (prior five-year reviews were conducted separately for each OU). The triggering actions for the SFV Area 1 Site five-year review are the dates of the previous NHOU and BOU five-year reviews (September 2003 and September 2004, respectively).



2.0 Site Chronology

Table 2-1 provides a chronology of events at the SFV (Area 1) Site.

TABLE 2-1
CHRONOLOGY OF SFV (AREA 1) SITE EVENTS
San Fernando Valley (Area 1) Superfund Site, Los Angeles County, California

Event	Date
CDPH (formerly DHS) detected trichloroethene (TCE), perchloroethene (PCE), and other volatile organic compounds (VOCs) in a large number of production wells exceeding respective maximum contaminant level (MCL) and/or state notification level; those wells removed from service. Alternative water supply obtained from the Metropolitan Water District (MWD) where needed.	1980
SFV Area 1 Superfund Site placed on the NPL.	July 1986
Initiated basinwide remedial investigation/feasibility study (RI/FS) under LADWP lead for all the SFV Superfund Sites. SFV Areas 1 and 2 subdivided into OUs to provide a discrete interim remedy for each.	1987
ROD signed for NHOU, selecting an interim groundwater remedy of extraction and treatment to inhibit migration of the groundwater plume and remove TCE and PCE from extracted groundwater to concentrations below the MCL.	September 1987
Construction of the NHOU treatment facility completed.	March 1989
ROD signed for BOU, selecting an interim groundwater remedy of extraction and treatment to partially control the groundwater plume and remove TCE and PCE from extracted groundwater to concentrations below the MCL.	June 1989
NHOU treatment system began operations.	December 1989
ESD #1 signed for BOU to clarify the following: blending could be used to reduce nitrate concentrations in treatment system effluent; reinjection of excess treated water would be required; the remedy could be implemented in phases; and the BOU ROD did not set clean up goals for the aquifer.	November 1990
RI for all SFV Superfund Sites completed (including Area 1). A basinwide groundwater monitoring program for the SFV established (sampling of 84 wells).	December 1992
First NHOU five-year review (USEPA, 1993) completed.	July 1993
Phase I BOU treatment plant constructed.	Summer 1993 – Spring 1994
Final Remedial Design Report for BOU submitted and approved by USEPA.	November 1993
BOU Phase I operational (6,000 gallons per minute [gpm] capacity).	January 1996
ESD #2 signed for the BOU. Eliminates the need for Phase III (additional 3,000 gpm) and reinjection of treated water. The new extraction rate would be calculated as average flow.	February 1997
Phase II BOU treatment plant constructed.	October 1997 – December 1997
Second NHOU five-year review (USEPA, 1998) completed.	July 1999

TABLE 2-1
CHRONOLOGY OF SFV (AREA 1) SITE EVENTS
San Fernando Valley (Area 1) Superfund Site, Los Angeles County, California

Event	Date
Second phase of Operation of BOU initiated (9,000 gpm).	December 1998
City of Burbank assumes responsibility of O&M of BOU.	December 2000
The RWQCB issued CAO No. R4-2003-0037 to Honeywell International Inc. (in the NHOU) for chromium, requiring that Honeywell "assess, cleanup, and abate the effects of contaminant discharged to soil and groundwater."	February 2003
Third NHOU five-year review (USEPA, 2003) completed.	September 2003
RWQCB revises the February 2003 CAO issued to Honeywell to include VOCs as part of the CAO investigation and cleanup.	September 2004
First BOU five-year review (USEPA, 2004) completed.	September 2004
USEPA completes NHOU Chromium Evaluation.	January 2006
Performance attainment study of the BOU groundwater extraction wells, delivery systems, and control processes.	May 2006
Chromium concentration at NHOU well NHE-2 reaches 200 µg/L.	December 2006
Well NHE-2 is shut down due to high chromium concentrations.	February 2007
USEPA completes a draft Focused Feasibility Study (FFS) at NHOU to improve plume containment, evaluate certain emerging chemicals, and address data needs in the existing NHOU monitoring network.	February 2008
Well NHE-2 resumes operating with effluent discharged to the LA sewer system.	September 2008

3.0 Site Background

The SFV Area 1 Superfund Site is defined by an area of VOC-contaminated groundwater that encompasses approximately 6 square miles beneath the Cities of Los Angeles and Burbank in the eastern SFV within the Upper Los Angeles River Area (ULARA).

3.1 Physical Characteristics

The SFV Area 1 Site lies within the SFV, which is a 122,800-acre alluvial basin in the south-central portion of the Transverse Ranges. The SFV is bordered on the east by the Verdugo Mountains, on the west by the Simi Hills, on the north by the Santa Susana and San Gabriel Mountains, and on the south by the Santa Monica Mountains. Average annual precipitation in the SFV (valley floor) is 16.48 inches; however, during Water Year 2006-2007 (October 1 to September 30) the total was 4.39 inches, well below average.

The SFV Area 1 Site has two OUs—NHOU and BOU—located within its boundaries, each having a groundwater extraction and treatment system for VOCs. The treatment facility for the NHOU is located at 11845 Vose Street, North Hollywood. The eight extraction wells associated with the treatment system are located in an existing electrical transmission line right of way and on LADWP property along Kittridge Avenue in North Hollywood as shown in Figure 3-1. The NHOU treatment facility is approximately 3.8 miles north of the Los Angeles River.

The treatment facility for the BOU is located at 3200 Monterey Avenue in Burbank. There are eight extraction wells associated with the BOU treatment facility, as shown in Figure 3-1. Three of these (VO-5, VO-6, and VO-7) are located along Vanowen Street. Four extraction wells (VO-1, VO-2, VO-3, and VO-4) are located along the former southern fence line of Lockheed Martin's Plant B-1 area. This area was redeveloped for commercial use around 2002. Extraction well VO-8 is located adjacent to the treatment facility in the parking lot of the Fire Department Training Center. The BOU treatment facility is located approximately 3.5 miles north of the Los Angeles River.

3.2 Land and Resource Use

Land use in the vicinity of the NHOU and the BOU is a mix of residential, commercial, and industrial¹.

The SFV (also referred to in this report as "the basin") is an important source of drinking water for the Los Angeles metropolitan area. The SFV is located in the ULARA, which is under a judgment that adjudicated water rights in the basin, and is administered by the ULARA Watermaster pursuant to the authority of the Superior Court. On average, groundwater in the vicinity of the NHOU accounts for approximately 11 percent of the City

¹ The outer boundary of a school is located less than 1,000 feet from the BOU treatment facility.

of Los Angeles' drinking water supply, with the North Hollywood treatment system contributing between 1-2 percent of this amount.

The BOU treatment facility and extraction wells are located down- and cross-gradient from the LADWP production well fields. Groundwater from the BOU treatment facility contributes approximately 50 percent of the City of Burbank's public water supply with the remaining 50% purchased from the Metropolitan Water District (MWD).

The locations of the SFV Area 1 Site wells, facility wells and remedial investigation wells are shown in Figure 3-3 and Figure 3-4.

3.3 History of Contamination

In 1979, as a result of the passage of Assembly Bill 1803, the California Department of Public Health (CDPH) (formerly Department of Health Services or DHS) requested that all major water providers sample and analyze groundwater for contamination as part of a statewide groundwater quality surveillance effort. TCE was consistently detected in a large number of production wells in the SFV at concentrations greater than the MCL. Solvents, including TCE and PCE, were widely used from 1940 to 1967 for dry cleaning and degreasing machinery, and disposal of these solvents was not well-regulated. Numerous parties owned and operated facilities in the SFV Area 1 Site that were known to have used and been the source of releases of solvents. Chromium was used in the metal plating and aerospace industry (metal fabrication), as well as for corrosion inhibition in industrial cooling towers, from the 1940s through the 1980s.

3.4 Initial Response

3.4.1 NHOU Initial Response

In August 1985, samples from 27 of LADWP's 38 most active production wells in the NHOU area contained TCE concentrations greater than the MCL. LADWP shut down several contaminated wells in the North Hollywood (east) well field. LADWP obtained additional water from MWD to augment the water supply.

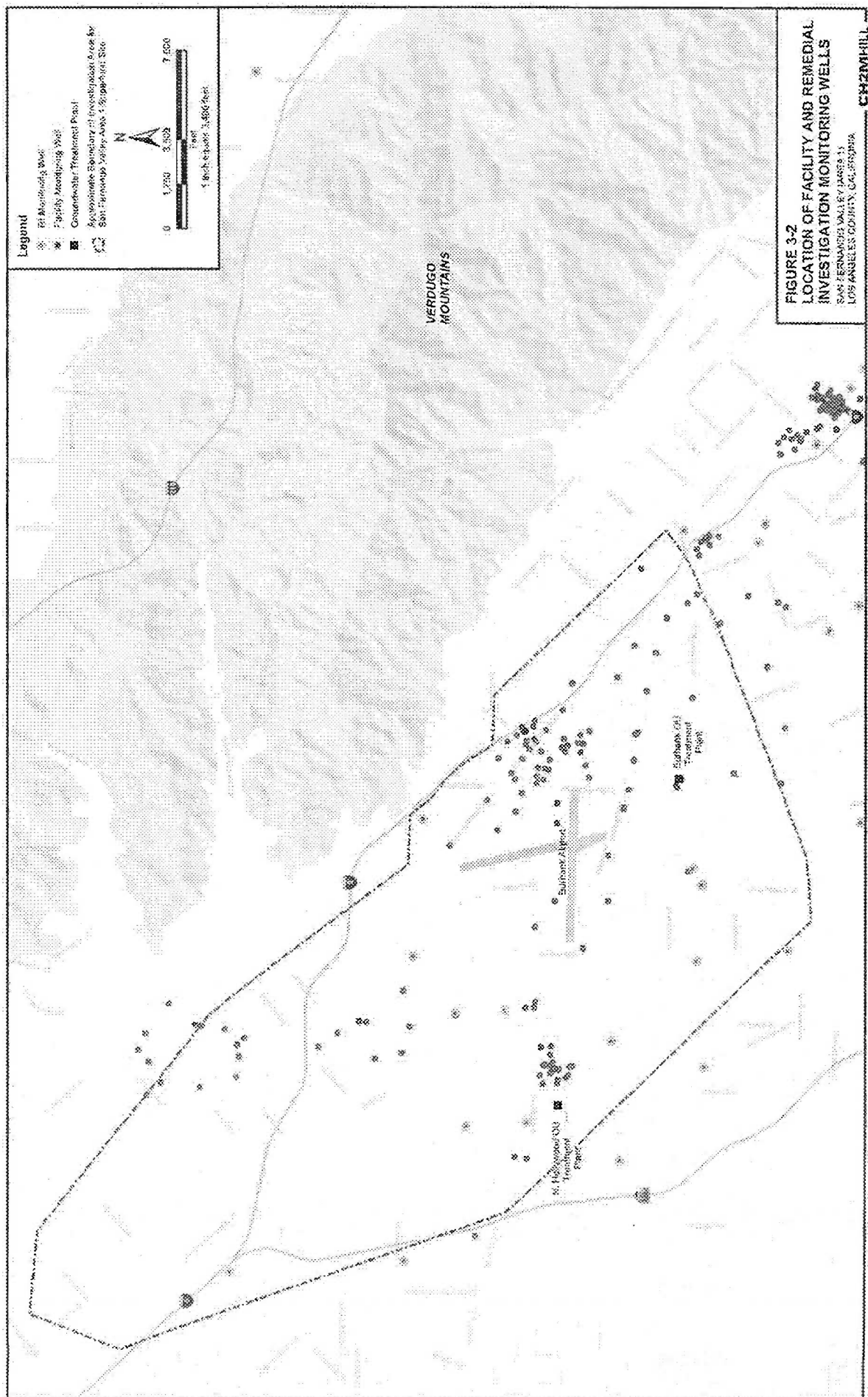
In 1986, LADWP obtained a permit from the South Coast Air Quality Management District (SCAQMD) to "construct and operate" a VOC treatment system in the NHOU, and it obtained an operating permit from CDPH to use the treated water as potable supply.

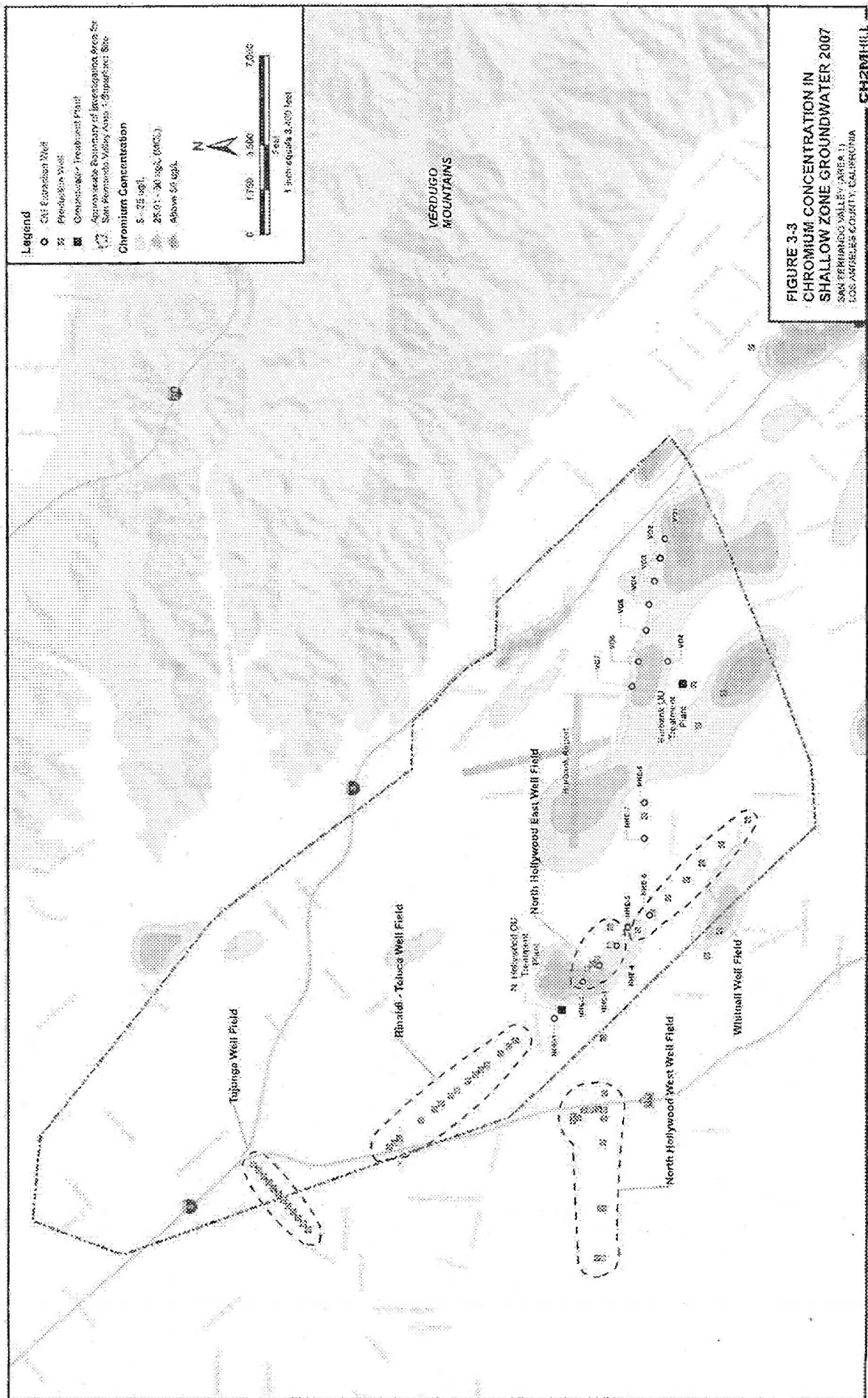
3.4.2 BOU Initial Response

The City of Burbank shut down its municipal production wells when the wells were found to contain TCE and PCE concentrations greater than respective MCLs. Water for the City of Burbank's municipal supply was purchased from MWD. In October 1988, the BOU feasibility study was completed, which reported a maximum concentration of 1,800 µg/L of TCE and 590 µg/L of PCE in municipal well number 10 (inactive). Between 1989 and 1993, a remedy was selected, a basinwide RI and Phase I of the BOU remedy design was completed, and construction of the BOU treatment system was initiated.

3.5 Basis for Taking Action

TCE and PCE were discovered in groundwater in the NHOU and the BOU areas at concentrations greater than their respective MCLs. The groundwater contamination occurred in a known drinking-water supply aquifer. TCE and PCE are constituents of concern (COCs) due to the potential risk from ingestion, dermal contact, and inhalation of volatilization fractions during showering or bathing. TCE and PCE are classified as probable human carcinogens based on laboratory studies performed on animals.





4.0 Remedial Actions

4.1 Remedy Selection

4.1.1 North Hollywood Operable Unit

The ROD for the NHOU was signed in September 1987. The selected interim remedy addressed VOC-contaminated groundwater in the North Hollywood area. The objective of the selected remedy was to "slow down or arrest" the migration of the contamination plume at the North Hollywood-Burbank well field (i.e., in the area south of the Burbank airport). The 1987 ROD selected groundwater extraction and treatment by air stripping (referred to as "aeration" in historical documents).

Specifically, groundwater is pumped from extraction wells to the treatment plant where it enters the air stripper, which consists of a vertical column containing a packing medium (to increase surface area) over which a countercurrent flow of air is introduced to remove VOCs from the groundwater. The VOCs in the air emissions are filtered through vapor-phase granular activated carbon (VPGAC) prior to discharge to the atmosphere.

Construction of the NHOU treatment system was completed in March 1989, and operation commenced in December 1989. The treated water is conveyed to the City of Los Angeles for municipal supply.

4.1.2 Burbank Operable Unit

The ROD for the BOU was signed in June 1989. An ESD was signed in November 1990 and a second ESD was signed in February 1997. The selected interim remedy addressed the VOC-contaminated groundwater plume in the Burbank area. The remedial action selected for the BOU was designed to achieve two objectives:

- To partially control the movement and spread of ground water contaminants in the Burbank OU area, while contributing to aquifer restoration at the SFV Area 1 Site.
- To address the public health threat posed by contamination of the City of Burbank's public water supply wells by providing residents in the area with a water supply that meets state and federal drinking water standards.

Specifically, groundwater is pumped from extraction wells to the treatment plant where the VOCs are removed by air stripping and granulated activated carbon (GAC), followed by liquid phase GAC. The treated water is conveyed to the City of Burbank for municipal supply.

4.2 Remedy Implementation

4.2.1 North Hollywood Operable Unit

Construction of the treatment system was completed March 1989, and operation commenced December 1989.

Contaminated groundwater is pumped from seven active extraction wells, as shown in Figure 3-1, and conveyed to the NHOU treatment facility. An eighth extraction well [NHE-1] was constructed, but has never operated because of insufficient groundwater yield.

Contaminated water is treated by the air stripper and the air stream is passed through a GAC system to remove VOCs prior to release to the atmosphere. Treated groundwater is disinfected with chlorine and piped to the North Hollywood Pumping Station Complex (North Hollywood Sump). The groundwater is then blended with water from the Los Angeles Aqueduct Filtration Plant, water purchased from MWD, and groundwater from other LADWP-operated pumping fields located in the vicinity of the NHOU prior to being served to consumers.

4.2.2 Burbank Operable Unit

Phase I of BOU treatment system construction occurred from 1993 to 1994, which included the installation of seven extraction wells capable of producing a combined flow of 6,000 gpm. Phase I began operation in 1996. Phase II consisted of increasing the groundwater extraction rate from 6,000 gpm to 9,000 gpm. The City's municipal supply well W-10 (also known as WP-180) was modified and incorporated in the interim remedy as BOU extraction well VO-8. In December 1997, construction of Phase II of the BOU was completed and operation commenced in 1998.

A pipeline conveys the extracted groundwater to the BOU treatment system. Contaminated groundwater is treated by the BOU air stripper, and the air-stream is passed through a GAC system to remove VOCs prior to release to the atmosphere. Treated groundwater (effluent from the air stripper) is then conveyed to one of two LPGAC polishing trains. The treated groundwater is then conveyed to the City of Burbank Valley Forebay for disinfection and storage, then to the blending facility. At the blending facility, the groundwater is blended with water from MWD to decrease the nitrate concentration prior to distribution to consumers.

4.3 Operation and Maintenance

4.3.1 System Operation and Maintenance

North Hollywood Operable Unit

LADWP is conducting long-term operation, monitoring and maintenance of the NHOU extraction and treatment system in accordance with the EPA-approved Operations and Maintenance (O&M) plan dated 1988, and the revised preventative maintenance schedule implemented in 2003.

The NHOU extraction and treatment system was designed to treat 2,000 gpm of groundwater, but has averaged approximately 830 gpm since 2003. O&M-related issues were common during the previous five-year review period, causing a decrease in operational time and in the volume of groundwater treated by the treatment plant. During the 2003 to 2008 period, O&M delays have been less frequent as a result of the revised preventative maintenance plan, centralized coordination at LADWP, and more clearly defined roles/responsibilities at LADWP. The preventative maintenance schedule is being implemented, and EPA is working with LADWP to resolve O&M issues and implement recommendations.

During the current review period, the NHOU facility was shut down for varied durations due to following operational and maintenance issues:

- Operational shutdown of aeration tower and water supply wells due to air heater malfunction (existing system was replaced with new Chromalox MaxPac II power controller unit) for approximately 2 and half months from September 15, 2004 to November 29, 2004.
- NHOU was shut down for 20 days (April 26, 2005 to May 16, 2005) due to a water leak in the chlorinator injector water service line.
- NHOU aeration tower and all extraction wells were shut down due to unplanned outage of temperature probes in emissions control unit from October 13, 2006 to first week of November. Other issues identified were a burned motor in extraction well NHE-4 and a faulty circuit breaker in extraction well NHE-7.
- NHOU aeration tower and all extraction wells were shut down for approximately 2 months beginning on October 20, 2007 due to water quality issues (i.e., elevated bromate levels).

During the current review period, the NHOU extraction wells were offline for varied durations due to operational issues and routine maintenance. A majority of the issues were related to pump and/or motor failure due to low water levels in the wells. These individual well shutdowns caused a reduction in overall flow rate to the facility. High concentrations of chromium necessitated the shutdown of extraction well NHE-2 from February 2007 to September 2008, and water from this well is currently being discharged to the Los Angeles sewer system instead of the NHOU treatment system. This is a temporary measure implemented by Honeywell under a Cleanup and Abatement Order (CAO) from the RWQCB. Pursuant to the RWQCB's CAO, a chromium treatment system is expected be installed to ensure that the groundwater extracted by well NHE-2 meets drinking water standards and can be discharged to the influent pipeline of the existing NHOU remedy, for further treatment, blending, and use in LADWP's water supply system.

Operations and maintenance costs in Table 4-1 summarize the actual maintenance costs for years 2004 through 2007.

TABLE 4-1
North Hollywood Operable Unit
Operation and Maintenance Costs 2004 - 2007

Year	Total O&M Costs
2004	\$257,888
2005	\$399,130
2006	\$451,360
2007	\$480,163
Total for Years 2004 - 2007	\$1,588,541

Burbank Operable Unit

The City of Burbank (via contractor Southwest Water Company) is conducting long-term monitoring and maintenance activities according to the O&M plan provided to EPA in 1998. The O&M plan is currently being revised.

The BOU extraction and treatment system was designed to treat 9,000 gpm of groundwater, but has averaged approximately 5,700 gpm since 2004. EPA is working with the City of Burbank to resolve O&M issues and implement recommendations to improve the extraction rate and overall efficiency of the system.

During the current review period, the entire BOU facility or one of two of the VPGAC trains of the BOU was shut down for varied durations as follows:

- Fire damage to "A Train" due to overheating of the offgas heater. The A Train fire repairs resulted in the entire plant being out of service for approximately 6 weeks.
- Numerous screen failures in the VPGAC adsorbers often caused one of the treatment trains to be offline for a period of a few weeks.
- The VPGAC retrofit project, which was a planned outage, was planned with facility operations at half flow for a period up to 6 months. However, the A Train fire occurred at the beginning of the retrofit project resulting in the BOU operating at half capacity for approximately 5 months.
- The main influent pipeline was punctured during a fiber optic cable installation construction effort in November 2005. The entire system was down for a period of approximately 3 weeks until the pipeline was repaired.

The extraction wells had several short-term outages resulting from operational issues such as burned out motors and conductor insulation failure, for periods ranging from a few days to a few weeks.

Operations and maintenance costs in Table 4-2 summarize the actual maintenance costs for the City of Burbank Fiscal years 2003/2004 through 2007/2008.

TABLE 4-2
North Hollywood Operable Unit
Operation and Maintenance Costs 2004 – 2008

City of Burbank Fiscal Year	Total O&M Costs
2003/2004	\$4,100,926
2004/2005	\$4,880,316
2005/2006	\$4,910,312
2006/2007	\$5,457,761
2007/2008	\$3,579,869
Total for Fiscal Years 2003/2004 – 2007/2008	\$22,929,184