SECOND FIVE-YEAR REVIEW REPORT

FOR

SAN FERNANDO VALLEY (AREA 1) SUPERFUND SITE

NORTH HOLLYWOOD AND BURBANK, LOS ANGELES COUNTY

CALIFORNIA

PREPARED BY

United States Army Corps of Engineers

Seattle District

Seattle, Washington

Approved by:

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U.S. Environmental Protection Agency Region IX

Date: 9/30/13

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Executive Summary

The purpose of this Five-Year Review is to determine if the remedies at the San Fernando Valley (SFV) Area 1 Superfund Site (Site) in North Hollywood and Burbank, Los Angeles County, California are protective of human health and the environment. The triggering action for this Five-Year Review (FYR) was the signing of the previous FYR on September 30, 2008. The SFV Area 1 Site consists of two operable units (OUs): the North Hollywood Operable Unit (NHOU) and the Burbank Operable Unit (BOU). There have been three five-year review reports for the NHOU, one five-year review report for the BOU, and one combined five year report in 2008. The SFV Area 1 Site encompasses approximately 13 square miles beneath the Cities of North Hollywood and Burbank in the eastern SFV within the Upper Los Angeles River Area (ULARA).

In 1979, as a result of the passage of Assembly Bill 1803, the California Department of Public Health (CDPH), formerly Department of Health Services (DHS) requested that all major water providers sample and analyze groundwater for contamination as part of a statewide groundwater quality surveillance effort. Trichloroethene (TCE) and perchloroethene (PCE) were consistently detected in a larger number of production wells in the SFV at concentrations greater than the maximum contaminant level (MCL). The source of PCE, TCE, and other solvents was from decades of improper disposal of industrial chemicals from local aerospace and manufacturing facilities. Chromium levels above the MCL were first observed in NHOU groundwater in 1999 in NHOU well NHE-2 and in BOU groundwater in 1997. Chromium was used in the metal-plating and aerospace industries (metal fabrication) from the 1940s through the 1980s. The SFV Area 1 Site was listed on the National Priorities List (NPL) in July 1986.

North Hollywood OU

The Record of Decision (ROD) for the NHOU was signed in September 1987. The selected interim remedy addressed volatile organic compound (VOC)-contaminated groundwater in the North Hollywood area. The remedial action objective (RAO) for the NHOU presented in the 1987 ROD is to "slow down or arrest the migration of the contamination plume at the North Hollywood-Burbank Well Field…" The ROD selected groundwater extraction, treatment of VOCs by air stripping, disinfection with chlorine, and conveyance to the North Hollywood Pumping Station Complex, where it is blended with water from the Los Angeles Aqueduct Filtration Plant, water purchased from the Metropolitan Water District (MWD), and groundwater from other pumping fields in the vicinity of the NHOU that are operated by the Los Angeles Department of Water and Power, prior to being served to consumers. The VOCs in air emissions from the air stripper are treated with vapor-phase granular activated carbon (VPGAC) prior to discharge to the atmosphere. Construction of the original treatment system was completed March 1989, and operation commenced December 1989.

The NHOU extraction and treatment system is currently not functioning as intended by the decision documents. The NHOU treatment facility has suffered frequent and sometimes long duration shutdowns that have limited its ability to slow down migration of contaminated groundwater.

The Second Interim ROD for the NHOU was signed in September 2009, which selected a remedy that improves plume capture and addresses newly identified contaminants in the aquifer, including hexavalent chromium and 1,4 dioxane. The containment remedy will address contaminated groundwater using an expanded extraction well network and a newly designed treatment facility. This latest remedy is intended to capture VOCs and chromium in the Shallow and Deep Zone groundwater.

The Remedial Action Objectives for the remedy presented in the 2009 ROD were as follows: 1) Prevent exposure to contaminated groundwater with contaminant concentrations above acceptable risk levels; 2) contain areas of contaminated groundwater with concentrations that exceed the MCLs and notification levels to the maximum extent practicable; 3) prevent further degradation of water quality at the Rinaldi-Toluca and North Hollywood West production wells by preventing the migration toward these well fields of the more highly contaminated areas of the VOC plume located to the east/southeast; 4) achieve improved hydraulic containment to inhibit horizontal and vertical contaminant migration in groundwater from the more highly contaminated areas and depths of the aquifer to the less contaminated areas and depths of the aquifer, including the southeast portion of the NHOU in the vicinity of the Erwin and Whitnall production well fields; and, 5) remove contaminant mass from the aquifer.

The remedy selected 2009 ROD is in the remedial design phase and has not yet been constructed.

Burbank OU

The ROD for the BOU was signed in June 1989. 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: 1) 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; and, 2) 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 from groundwater by air stripping followed by a polishing step using liquid-phase granular activated carbon (LPGAC). The treated water is conveyed to the City of Burbank for municipal supply.

In addition to the ROD, the BOU is operated according to two Explanation of Significant Differences (ESDs). The first ESD for the BOU was signed in November 1990. This ESD allows for extracted groundwater with nitrate levels above the MCL to be blended with imported water in order to meet drinking water standards. A second ESD for the BOU was signed in February 1997. This ESD allows for an extraction rate of 9,000 gpm in place of the 12,000 gpm called for in the 1989 BOU ROD. The 2nd ESD also gives the City of Burbank the flexibility to pump at variable rates to achieve an annual average pumping rate of 9,000 gpm. Groundwater modeling studies and a recently conducted multi-well aquifer test suggest that containment might occur at rates less than 9,000 gpm. If an average annual pumping rate less than 9,000 gpm is to be used, BOU parties need to demonstrate such a rate achieves containment, and seek formal approval from EPA.

Phase I of BOU treatment system construction occurred from 1993 to 1994, and 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 constructed additional infrastructure to allow for an increase in the groundwater extraction rate from 6,000 gpm to 9,000 gpm. In December 1997, construction of Phase II of the BOU was completed and operation commenced in 1998.

Protectiveness Statement

The remedy at the NHOU is currently 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 and there are governmental controls in place that prevent exposure to untreated groundwater. However, to be protective in the long term, the existing treatment facility needs to be modified consistent with the remedy selected in the 2009 ROD, and chromium and 1,4 dioxane impacts to the remedy need to be addressed. The implementation of the selected remedy is in the design phase.

The remedy at the BOU is currently protective of human health and the environment because there is no exposure to untreated groundwater. There treatment system effluent contaminant concentrations are less than their regulatory cleanup goals and there are governmental controls in place that prevent exposure to untreated groundwater. There is uncertainty as to whether containment capture is being achieved since the BOU pumps at rates less than those prescribed in the 1997 ESD. In order to make a containment determination the facility must operate at an average annual rate of 9,000 gpm, or BOU parties must demonstrate that containment can be achieved at lower pumping rates.

Governmental controls in place at the Area 1 Site are effective in preventing exposure to contaminated groundwater. These controls include frequent sampling of treatment facility effluent, oversight of facility operations by both CDPH and EPA, and a court order that prevents any entity except the Cities of Los Angeles, Glendale, and Burbank from drilling wells in impacted area.

The California Department of Public Health (CDPH) released a draft MCL for hexavalent chromium of 10 ppb in August 2013. A new MCL for hexavalent chromium may affect the duration and effectiveness of the NHOU and BOU remedies and/or require additional treatment technology. The impacts of a California draft MCL are being evaluated by EPA, LADWP, Burbank, and other regulatory agencies.

There have been no changes in ARARs that would affect the protectiveness of either Area 1 remedies.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: San Fernando Valley (Area 1) Superfund Site		
EPA ID: CAD980894893		
Region: 9	**State:** CA	**City/County:** North Hollywood/Burbank/Los Angeles County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** No

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:**
Author name (Federal or State Project Manager): ZiZi Searles
Author affiliation: EPA
Review period: January 2013 – September 2013
Date of site inspection: February 26-27, 2013
Type of review: Statutory
Review number: 2 (Combined): 3 (Burbank OU), 5 (North Hollywood OU)
Triggering action date: 09/30/2008
Due date *(five years after triggering action date)*: 09/30/2013

Issues/Recommendations				
Issues and Recommendations Identified in the Five-Year Review:				
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA/State	06/2016
OU(s): BOU	**Issue Category: Remedy Performance**			
	Issue: According to the 1997 ESD the City of Burbank is committed to accepting an annual average of 9,000 gpm of water from treatment facility, yet the annual extraction for the BOU is consistently less than 9,000 gpm, at average annual rates at or near 6,500 gpm.			
	Recommendation: A formal evaluation of pumping rates and contaminant capture should be conducted and presented to EPA if pumping rates less than 9,000 gpm is to be used to meet BOU ROD and ESD objectives.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA/State	06/2016
OU(s): NHOU	**Issue Category: Changed Site Conditions**			
	Issue: The Second Interim Remedy (2009) for the NHOU does not explicitly address treatment of chromium in well NHE-3. Well NHE-3 remains off-line pending an evaluation on how to best address chromium as part of the remedial design.			
	Recommendation: Address chromium contamination in well NH-3 and additional wells as needed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	10/2015
OU(s): NHOU	**Issue Category: Changed Site Conditions**			
	Issue: The notification level for 1, 4-dioxane has been exceeded at least once in all of the operating NHOU wells.			
	Recommendation: Sample the influent and effluent of the NHOU plant for 1, 4-dioxane and take appropriate actions to keep concentrations below the notification level.			

Protectiveness Statement(s)		
Operable Unit: **North Hollywood**	***Protectiveness Determination:*** **Short-term Protective**	***Addendum Due Date (if applicable):***
Protectiveness Statement: The remedy at the NHOU is currently 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 and there are governmental controls in place that prevent exposure to untreated groundwater. However, to be protective in the long term, the existing treatment facility needs to be modified consistent with the remedy selected in the 2009 ROD, and chromium and 1,4 dioxane impacts to the remedy need to be addressed. The implementation of the selected remedy is in the design phase.		
Operable Unit: **Burbank**	***Protectiveness Determination:*** **Short-term Protective**	***Addendum Due Date (if applicable):***
Protectiveness Statement: The remedy at the BOU is currently protective of human health and the environment because there is no exposure to untreated groundwater. There treatment system effluent contaminant concentrations are less than their regulatory cleanup goals and there are governmental controls in place that prevent exposure to untreated groundwater. There is uncertainty as to whether containment capture is being achieved since the BOU pumps at rates less than those prescribed in the 1997 ESD. In order to make a containment determination the facility must operate at an average annual rate of 9,000 gpm, or it must be demonstrated that containment can be achieved at lower pumping rates.		

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List of Abbreviations

AOC	Administrative Settlement Agreement and Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
BOU	Burbank Operable Unit
CDPH	California Department of Public Health (formerly DHS)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of concern
DCA	Dichloroethane
DCE	Dichloroethene
DHS	Department of Health Services
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
FFS	Focused feasibility study
FYR	Five-year Review
GAC	Granular activated carbon
GMP	groundwater management plan
gpm	gallons per minute
HQ	Hazard Quotient
IC	Institutional controls
LADWP	Los Angeles Department of Water and Power
LPGAC	Liquid phase granular activated carbon
MCL	Maximum Contaminant Level
µg/L	micrograms per liter
MWD	Metropolitan Water District
NCP	National Contingency Plan
NHOU	North Hollywood Operable Unit
NPL	National Priorities List
O&M	Operations and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
OU	Operable Unit
PCE	Perchloroethene
ppb	parts per billion
PHG	public health goal
PRG	preliminary remediation goal
RAO	Remedial Action Objective
RD	Remedial Design
RI	Remedial Investigation
RME	Reasonable maximum exposure
ROD	Record of Decision
RPM	Remedial Program Manager
RSL	Regional Screening Level
RWQCB	Regional Water Quality Control Board
SAL	State Action Level
SCAQMD	South Coast Air Quality Management District
SFB	San Fernando Basin
SFV	San Fernando Valley
TBC	to-be-considered

TCA	Trichloroethane
TCE	Trichloroethene
TCP	Trichloropropane
ULARA	Upper Los Angeles River Area
USACE	United States Army Corps of Engineers
VOC	volatile organic compound
VPGAC	Vapor phase granular activated carbon

Five-Year Review Report

for

San Fernando Valley - Area 1 Superfund Site

1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 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 NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f) (4) (ii), which 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 actions no less often than every five years after the initiation of the selected remedial action*."

The United States Army Corps of Engineers (USACE) conducted the FYR and prepared this report regarding the remedy implemented at the San Fernando Valley (SFV) Area 1 Site in the Cities of North Hollywood and Burbank, Los Angeles County, California. EPA is the lead agency for developing and implementing the remedy for the Site.

The SFV Area 1 Site has two groundwater operable units (OUs), the North Hollywood OU (NHOU) and the Burbank OU (BOU), located within its boundaries (Figure 1). This is the 2nd FYR for the SFV Area 1 Site as a whole, but FYRs were conducted separately for each operable unit (OU) prior to the 2008 FYR. This FYR represents the fifth FYR for the North Hollywood operable unit (NHOU) and the third FYR for the Burbank operable unit (BOU). The triggering action for this statutory review is the previous FYR. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site at levels above those that would allow for unlimited use and unrestricted exposure.

Each OU has an operating groundwater extraction and treatment system for volatile organic compounds (VOCs). Both treatment systems utilize air stripping and vapor-phase granular activated carbon (VPGAC) for VOC treatment. The BOU treatment system has an additional liquid-phase GAC (LPGAC) polishing step.

This FYR addresses both OUs at the SFV Area 1 Site.

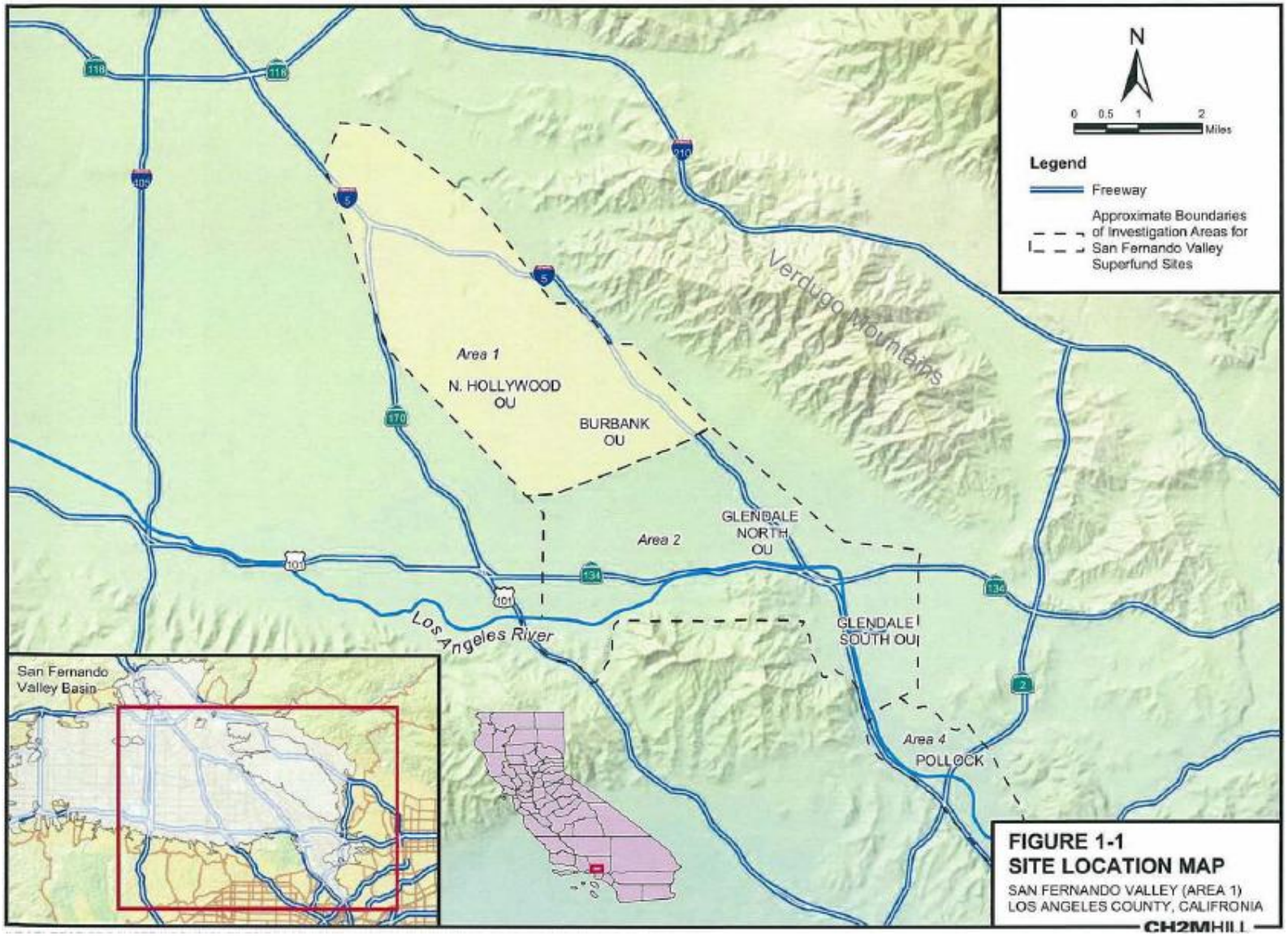

Figure 1. Location Map for the San Fernando Valley Area 1 Superfund Site

2. Site Chronology

Table 1 lists the dates of important events for the San Fernando Valley Area 1 Superfund Site.

Table 1. Chronology of Site Events

Event	Date
California Department of Public Health (CDPH; formerly Department of Health Services [DHS]) detected trichloroethene (TCE), perchloroethene (PCE), and other volatile organic compounds (VOCs) in a large number of production wells at levels that exceed respective maximum contaminant levels (MCLs) and/or state notification levels; those wells were removed from service. Alternative water supply was obtained from the Metropolitan Water District (MWD) where needed.	1980
The San Fernando (SFV) Area 1 Superfund Site was placed on the National Priorities List (NPL).	July 1986
A basin wide remedial investigation/feasibility study (RI/FS) was initiated under the lead of Los Angeles Department of Water and Power (LADWP) for all the SFV Superfund Sites. SFV Areas 1 and 2 were subdivided into operable units (OUs) to provide a discrete interim remedy for each.	1987
An interim Record of Decision (ROD) for NHOU was signed, selecting an interim groundwater remedy of extraction and treatment to inhibit migration of the groundwater plume and to remove TCE and PCE from extracted groundwater until remaining concentrations are below the maximum contaminant level (MCL).	September 1987
Construction of the NHOU facility was completed.	March 1989
An interim ROD for BOU was signed, selecting an interim groundwater remedy of extraction and treatment to partially control the groundwater plume and to remove TCE and PCE from extracted groundwater until remaining concentrations are below the MCL.	June 1989
NHOU treatment systems operations began.	December 1989
An Explanation of Significant Differences (ESD) for BOU was signed; the ESD clarified the following: blending could be used to reduce nitrate concentrations in treatment system effluent; reinjection of excess treated water would be required; and the remedy could be implemented in phases.	November 1990
The RI for all SFV Superfund Sites (including Area 1) was completed. A basin wide groundwater monitoring program for the SFV was established (sampling of 84 wells).	December 1992
The first NHOU five-year review (FYR) was completed.	July 1993
The Phase I BOU treatment plant was constructed.	Summer 1993 – Spring 1994
The Final Remedial Design Report for BOU was approved by EPA.	November 1993

Event	Date
The BOU Phase I remedy was determined operational (6,000 gallons per minute [gpm] capacity).	January 1996
A second ESD for BOU was signed. The second ESD eliminated 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
The Phase II BOU treatment plant was constructed.	October 1997 – December 1997
The second NHOU FYR was completed.	July 1998
The BOU Second Phase of Operation was initiated (9,000 gpm).	December 1998
The City of Burbank assumed responsibility for O&M of BOU.	December 2000
The Los Angeles Regional Water Quality Control Board (RWQCB) issued Cleanup and Abatement Order (CAO) 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
The third NHOU FYR was completed.	September 2003
RWQCB revised the February 2003 CAO issued to Honeywell to include VOCs as part of the CAO investigation and cleanup.	September 2004
The first BOU FYR was completed.	September 2004
EPA completed the NHOU Chromium Evaluation.	January 2006
A performance attainment study of the BOU groundwater extraction wells, delivery systems, and control processes was conducted.	May 2006
The chromium concentration at NHOU well NHE-2 reached 200 µg/L.	December 2006
Well NHE-2 was shut down due to high chromium concentrations.	February 2007
EPA completed a draft Focused Feasibility Study (FFS) at NHOU to determine how to improve plume containment, to evaluate certain emerging contaminants' impact on remedy performance, and to address data needs in the existing NHOU monitoring network.	February 2008
Well NHE-2 effluent is discharged to the LA sanitary sewer system due to high hexavalent chromium concentrations.	September 2008
The first SFV Area 1 FYR was completed, representing the fourth NHOU FYR and the second BOU FYR.	September 2008
EPA finalized the NHOU FFS for Second Interim Remedy.	July 2009
The second interim ROD for NHOU was signed; selecting a containment remedy for groundwater contaminated with VOCs and chromium in the Shallow and Deep Zones in the NHOU and is intended to prevent further migration of existing groundwater contamination.	September 2009

Event	Date
At the BOU EPA concluded a successful operational capacity test to demonstrate that 9,000 gpm of groundwater could be extracted and processed, as required by the 1991 Consent Decree, for a 60-day duration.	August 2010
An Administrative Settlement Agreement and Order on Consent for Remedial Design was executed among EPA, Honeywell, and Lockheed Martin to conduct pre-design data acquisition and remedial design activities at the NHOU associated with the 2009 ROD.	February 2011
LADWP shutdown NHOU well NHE-3 due to chromium concentrations exceeding the CA MCL of 50 µg/L	December 2012

3. Background

3.1. Physical Characteristics

The SFV Area 1 Superfund Site is defined by an area of VOC-contaminated groundwater that encompasses approximately 13 square miles beneath the Cities of North Hollywood and Burbank in the eastern SFV within the Upper Los Angeles River Area (ULARA).

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 northeast by the San Gabriel Mountains with the Verdugo Mountains to the southeast, on the north and northwest by the Santa Susana Mountains, on the west by the Simi Hills, and on the south by the Santa Monica Mountains. Average annual precipitation in the SFV 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 (Figure 2). The treatment facility for the NHOU is located west of Lankershim Blvd in North Hollywood. There are eight extraction wells associated with the treatment system. The NHOU treatment facility is approximately 3.8 miles north of the Los Angeles River.

The treatment facility for the BOU is located east of the airport in Burbank. There are eight extraction wells associated with the BOU treatment facility located approximately a half a mile north of the BOU. The BOU treatment facility is located approximately 3.5 miles north of the Los Angeles River.

SFV Area 1 contaminant sources include, but are not limited to, the former Bendix Aviation and Allied Signal-Aerospace Company facilities in North Hollywood (successor cooperation is now Honeywell International) the former Lockheed Martin Corporation facilities near the Burbank Airport, and many other facilities throughout Area 1. Trichloroethene (TCE) and perchloroethene (PCE) were widely used in the San Fernando Valley starting in the 1940s for dry cleaning and for degreasing

machinery. Disposal was not well regulated at that time, and releases from a large number of facilities throughout the eastern SFV have resulted in the large plume of VOC-contaminated groundwater that starts in the Area 1 site and extends southeast, down-gradient, through the Area 2 and Area 4 sites. Further investigation to define other sources is ongoing.

SFV Area 1 is in a populated urban area, and does not affect any environmentally sensitive areas.

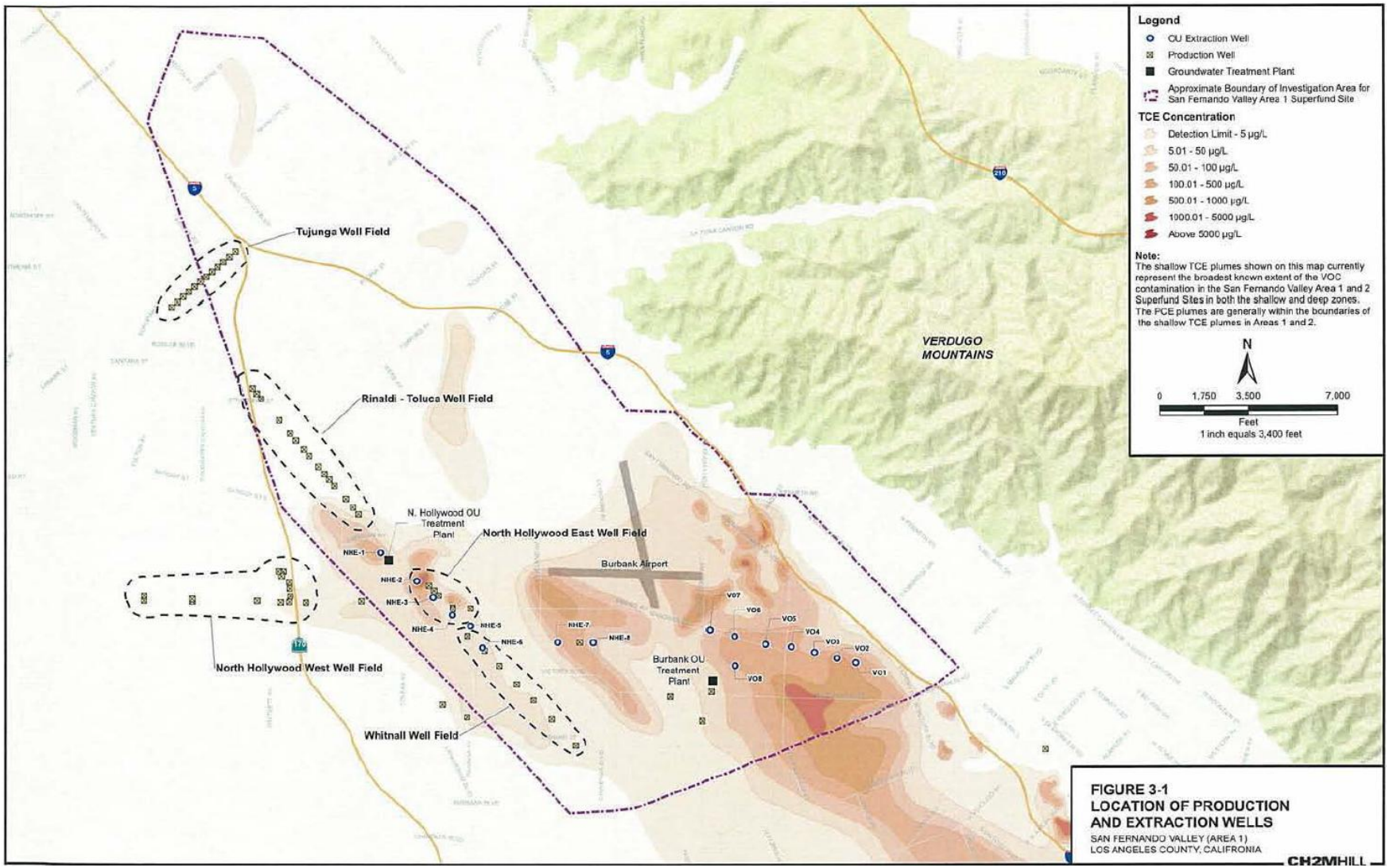

Figure 2. Relationship of Area 1 Treatment plants, extraction wells, and production wells (EPA 2008).

3.2. Hydrology

The depth to groundwater in non-pumping wells near the NHOU extraction well field is approximately 240 to 250 feet below ground surface (bgs). Groundwater levels measured at most NHOU monitoring wells declined approximately 20 to 50 feet from the mid-1990s to 2004, which corresponds to increases in groundwater production and declines in recharge in the SFV. Pumping groundwater levels at the NHOU extraction wells reportedly approached the depths of the pump intakes in 2003 to 2004, near the bottoms of the screened intervals, in the range of approximately 260 to 290 feet bgs. This condition limited extraction well pumping rates. Table 2 compares several subsurface stratigraphic and hydrostratigraphic classification schemes.

Table 2. Comparison of stratigraphic and hydrostratigraphic units in the SFV Area 1 (AMEC 2012)

<table>
<tr><th>Approx. Depth (feet)</th><th>Geologic Age</th><th>JMM (1992) Zone Designation</th><th>ULARA Watermaster Units</th><th>Oberlander, et al. (1993) units</th><th>Depth Region</th><th>NHOU Hydrostratigraphic Units[1]</th></tr>
<tr><td>100</td><td rowspan="2">Holocene</td><td rowspan="3">Upper</td><td rowspan="2">A - aluvial sand, gravel, and rocks</td><td rowspan="2"></td><td rowspan="3">1</td><td rowspan="3">A Zone</td></tr>
<tr><td>200</td><td rowspan="6">Pleistocene</td></tr>
<tr><td>300</td><td>L - gravel</td><td>A' - coarse sands, gravel, cobbles</td></tr>
<tr><td>400</td><td>K, J - fine grained</td><td rowspan="2">X - sand, silty sand, sandy silt, silty clay</td><td rowspan="2">2</td><td rowspan="2">B Zone</td></tr>
<tr><td>500</td><td rowspan="2">Middle</td><td>I - sand and brown clay</td></tr>
<tr><td>600</td><td>AA - sand and gravel</td><td>A - coarse sands, gravel, cobbles</td><td rowspan="3">3</td><td rowspan="5">Deeper Units</td></tr>
<tr><td>700</td><td rowspan="5">Lower</td><td>BB - sand, gravel, rocks</td><td>Y - sand, silty sand, sandy silt, silty clay</td></tr>
<tr><td>800</td><td>E - clay and gravel, very hard clay</td><td>B - coarse sand, gravel, cobbles</td></tr>
<tr><td>900</td><td>M - sand and gravel</td><td rowspan="3"></td></tr>
<tr><td>1000</td><td rowspan="2">Upper Pliocene</td><td>Blue Star - marker bed</td></tr>
<tr><td></td><td>Q - brown clay, gravel, rocks</td><td>4</td></tr>
<tr><td></td><td></td><td></td><td>Deeper Units</td><td></td><td></td><td></td></tr>
</table>

[1] NHOU Hydrostratigraphic units described in Section 4.0 of Data Gap Analysis (AMEC 2012)

Horizontal hydraulic gradients in the eastern SFV are generally south and east, toward the Los Angeles River Narrows, where essentially all groundwater and surface water outflow from the SFV occurs (Figure 3). Groundwater flow velocities in the NHOU were estimated during the RI to range from approximately 290 to 1,000 feet per year, depending on location.

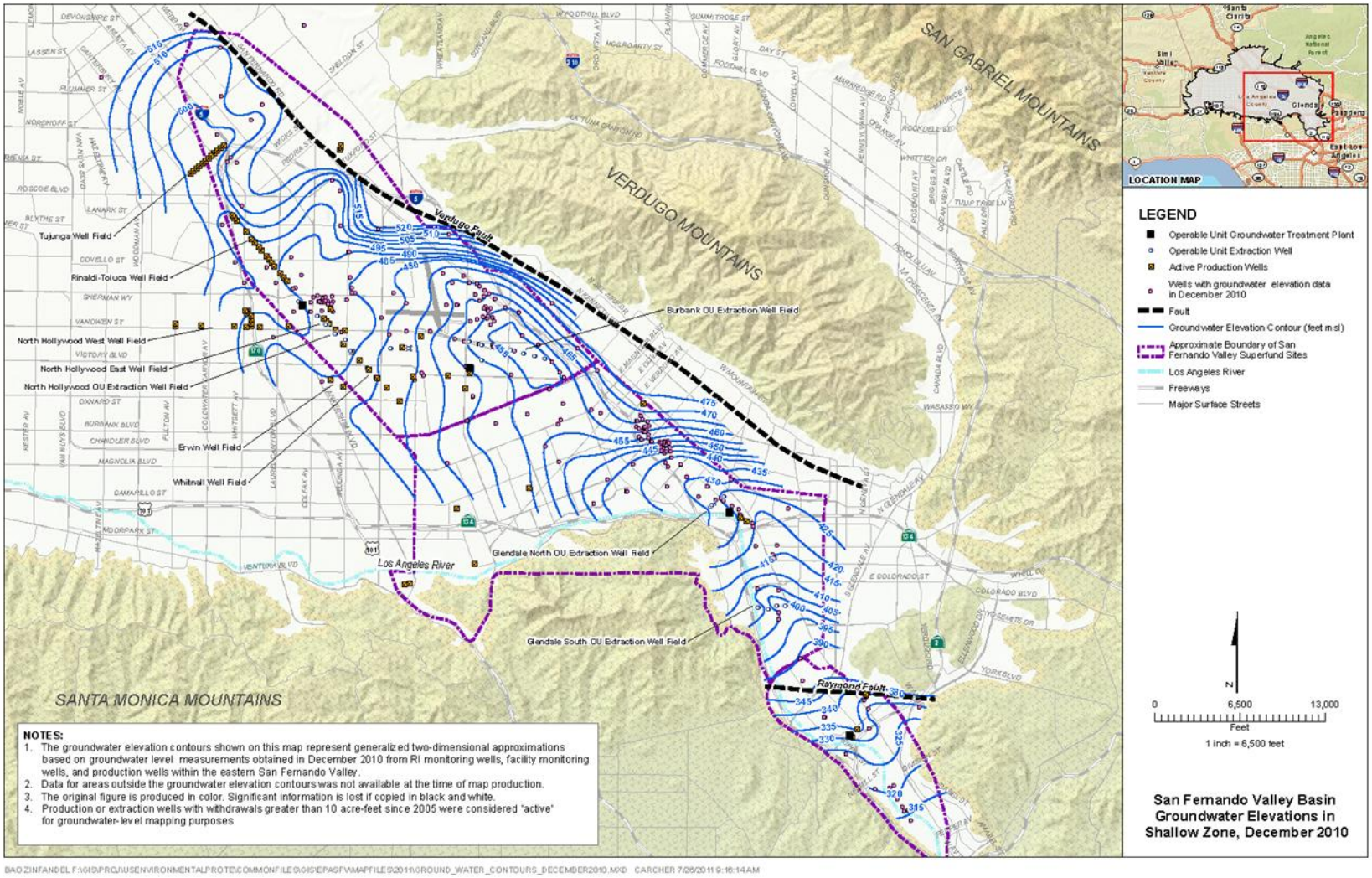

Figure 3. San Fernando Valley Basin Groundwater Elevations in Shallow Zone

Groundwater contamination within the NHOU is present from the water table to depths exceeding 500 feet bgs. Emerging contaminants such as hexavalent chromium are present primarily in the upper layer of the aquifer and/or only in localized areas, whereas VOCs and nitrate can be found in shallow and deep zones.

The four major hydrogeologic strata (Montgomery, Inc. 1992) are:

- The Upper Zone: comprising fine sand and gravel interbedded with silt; the top of this unit was defined by the water table (40 to 200 feet bgs) and was noted as unsaturated northwest of the North Hollywood area with saturated thickness increasing toward the Crystal Springs area (up to 210 feet). Hydraulic conductivity values for this zone were estimated to range from 32 to 306 feet per day (ft/d) in the North Hollywood area, and approximately 100 ft/d in Area 2.
- The Middle Zone: a less permeable unit representative of off-channel deposits consisting of clay, silt, and fine sand units, generally between 200 and 250 feet bgs throughout the San Fernando Basin (SFB). However, until more borehole data is collected, discontinuities are problematic in understanding local-scale geologic and hydraulic properties, and the thickness and lateral continuity of this zone. Hydraulic conductivity values for this zone were not estimated other than to estimate that they are lower than those of the Upper and Lower Zones.
- The Lower Zone: includes coarse sand, gravel, and cobble sediments immediately underlying the Middle Zone with a saturated thickness of 200 to 250 feet. Most production wells are screened at least in part within this zone. The full extent of the Lower Zone's saturated thickness has not been determined due to few wells installed to depths correlating with the underlying Deep Zone. Hydraulic conductivity in this zone was estimated to range from 237 to 627 ft/d in the North Hollywood area and from 189 to 864 ft/d in Area 2.
- The Deep Zone: includes portions of the Saugus Formation and has elevated calcium and sulfur concentrations, apparently resulting from poor groundwater circulation. Hydraulic conductivity values for this zone were not estimated due to insufficient data.

BOU-related groundwater investigations have defined Older and Younger Alluvium units, with the latter including sediments above approximately 300 feet above mean sea level (MSL); correlating to depths of up to 300 to 350 feet bgs.

- The Younger Alluvium includes the Upper and Middle Zones identified in the SFB RI. The Younger Alluvium is thus approximately equivalent to Depth Region 1 (see Table 2) and has been subdivided into five hydrostratigraphic units (Oberlander et al. 1993; see Table 2), including the A'-, X-, A-, Y-, and B-units (from shallower to deeper); the X- and Y-units include relatively fine-grained sediments that behave as aquitards and at least partially confine the aquifers that underlie them (A and B aquifers, respectively).
- These units uniformly dip to the southeast at a greater angle than the water table. Therefore, each unit becomes progressively less saturated in the northwest direction. The entire A'-unit lies above the water table in the NHOU and BOU areas and becomes saturated only in the southeast portion of the SFB. The A'-unit aquifer becomes less defined in the western portion of the BOU area, and its continuity into the NHOU area is unclear.

For the purposes of differentiating groundwater elevations and the distribution of chemicals of concern (COC) with respect to depth, USEPA designated wells screened within 50 feet of the water table as monitoring "Shallow Zone" groundwater and wells screened greater than 50 feet of the water table as monitoring "Deep Zone" or "Deeper Zone" groundwater. These hydrological designations should not be confused with the lithological designations of the Upper, Middle, Lower, and Deep Regional Zones (ERM 2011).

3.3. Land and Resource Use

Land use in the vicinity of the NHOU and the BOU is a mix of residential, commercial, and industrial. Land use has not changed since the last FYR.

The SFV is an important source of drinking water for the Los Angeles metropolitan area. The SFV is located in the Upper Los Angeles River Area (ULARA), which is under a judgment that adjudicates water rights in the basin, and is administered by the ULARA Watermaster pursuant to the authority of the Superior Court. Groundwater in the vicinity of the NHOU typically accounts for approximately 10-15 percent of the City of Los Angeles' drinking water supply, with the North Hollywood treatment system contributing 1 to 3 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% of the City of Burbank's public water supply with the remaining 50% purchased from the Metropolitan Water District (MWD).

Area 1 contains four types of wells; monitoring wells owned by facilities or the Cities, remedial investigation (monitoring) wells owned by EPA, municipal production wells; and extraction wells for the treatment plants. The locations of the SFV Area 1 Site treatment plants and a selection of the monitoring and remedial investigation wells are shown in Figure 2. All production well and the extraction wells are depicted in the figure (2).

3.4. 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 larger number of production wells in the SFV at concentrations greater than the maximum contaminant level (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 and other contaminants found in the groundwater today. Chromium levels above the state MCL were first observed in NHOU groundwater in 1999 in NHE-2 and in BOU groundwater in 1997. Chromium is 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.

1,4-dioxane, a stabilizing agent that can be added to chlorinated solvents (VOCs), was listed as an emerging contaminant in the 2009 NHOU ROD due to its presence in the groundwater in and around the NHOU wellfield.1,4-dioxane is also commonly found in some paint strippers, dyes, greases, varnishes, waxes, antifreeze, and aircraft deicing fluids.

1, 2, 3-TCP, a VOC of concern for the BOU, was first detected in treatment plant effluent above notification level (previously State Action Level or SAL) in June 2000.

EPA placed the Site on the National Priorities List on June 10, 1986.

3.5. Initial Response

A basin-wide remedial investigation/feasibility study (RI/FS) was initiated under the lead of Los Angeles Department of Water and Power (LADWP) for all the SFV Superfund Sites in 1989. SFV Areas 1 and 2 were subdivided into operable units (OUs) to provide a discrete interim remedy for each. The SFV RI was completed in 1992.

NHOU

In August 1985, samples from 27 of Los Angeles Department of Water and Power's (LADWP) 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. LAWDP obtained additional water from the 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 the future VOC treatment system known today as the NHOU, and it obtained an operating permit from CDPH to use the treated water as potable water supply.

BOU

The City of Burbank shut down its municipal production wells following the discovery of TCE and PCE groundwater contamination in excess of MCLs. In response to the discovery the City of Burbank was forced to purchase 100% of municipal drinking water from the MWD. In October 1988 the BOU feasibility study was completed, which reported a maximum of 1,800 micrograms per liter (µg/L) of TCE and 590 µg/L of PCE, both occurring in municipal well number 10 (currently inactive). Between 1989 and 1993, a BOU remedy was selected, the basinwide RI was completed, and construction of the BOU treatment system was initiated.

3.6. Basis for Taking Action

The primary contaminants of concern (COCs) addressed by the 1987 NHOU first interim ROD and the 1989 interim BOU ROD are TCE and PCE. The presence of these contaminants in groundwater at concentrations above their respective MCLs provided the basis for taking action under CERCLA. TCE and PCE are considered probable human carcinogens. The primary threat to human health was posed by ingestion (i.e. drinking the water).

4. Remedial Action

4.1. Remedy Selection

NHOU

The first interim Record of Decision (ROD) for the NHOU was signed in September 1987. The selected interim remedy addressed VOC-contaminated groundwater in the North Hollywood area. Due to the large area and complexity of the site, EPA and the state split responsibility for clean-up with EPA responsible for oversight of groundwater remediation and the State of California's Los Angeles Regional Water Quality Control Board (LARWQCB) responsible for source remediation and source investigation. This arrangement is formalized in a Co-operative Agreement that has been active since the 1980's.

The remedial action objective (RAO) for the NHOU presented in the 1987 ROD is to "slow down or arrest the migration of the contamination plume at the North Hollywood-Burbank Well Field…" The ROD selected groundwater extraction, treatment of VOCs by air stripping, disinfection with chlorine, and conveyance to the North Hollywood Pumping Station Complex, where it is blended with water from the Los Angeles Aqueduct Filtration Plant, water purchased from the Metropolitan Water District (MWD), and groundwater from other LADWP-operated pumping fields in the vicinity of the NHOU prior to being served to consumers. The VOCs in air emissions from the air stripper are treated with vapor-phase granular activated carbon (VPGAC) prior to discharge to the atmosphere.

The second interim ROD for the NHOU was signed in September 2009. The second interim remedy for the NHOU addresses contaminated groundwater by containing and remediating the groundwater using an extraction well network and above-ground treatment system. It is a containment remedy for groundwater contaminated with VOCs and chromium in the shallow and deep zones of the NHOU and is intended to prevent further migration of existing groundwater contamination. The RAOs for the remedy presented in the 2009 ROD were as follows:

- Prevent exposure to contaminated groundwater above acceptable risk levels.
- Contain areas of contaminated groundwater with contaminant concentrations that exceed the MCLs and notification levels to the maximum extent practicable.
- Prevent further degradation of water quality at the Rinaldi-Toluca and North Hollywood West production wells fields by preventing the migration toward these well fields of the more highly contaminated areas of the VOC plume located to the east/southeast.
- Achieve improved hydraulic containment to inhibit horizontal and vertical contaminant migration in groundwater from the more highly contaminated areas and depths of the aquifer to the less-contaminated areas and depths of the aquifer, including the southeast portion of the NHOU in the vicinity of the Erwin and Whitnall production well fields.
- Remove contaminant mass from the aquifer.

The performance criteria requires extraction and treatment of contaminated groundwater at certain locations within the plume, expanded treatment for VOCs, and additional treatment for chromium and 1,4-dioxane. It also includes an institutional/governmental control (in the form of a groundwater

management plan) to coordinate changes in groundwater pumping from nearby water supply well fields with remedy operations so production well pumping does not negatively impact NHOU remedy performance. Components include the following:

- Replacement of extraction well NHE-1 with a deeper well in approximately the same location;
- Two options:
    - Replacement of wells NHE-2, NHE-4, and NHE-5 with deeper wells with long screening interval;
    - OR pairing rehabilitated wells NHE-2, NHE-4 and NHE-5 with adjacent deep wells for purposes of having the flexibility to pump in deep and shallow zones;
- Rehabilitation of extraction wells NHE-3, NHE-6, NHE-7, and NHE-8;
- Construction of approximately three new extraction wells NEW-1, NEW-2, NEW-3 and associated piping;
- Expansion of VOC air stripper treatment capacity to treat up to 4,000 gpm of influent water; Installation of a second LPGAC vessel to meet CDPH requirement for a "barrier" VOC treatment ;
- Wellhead treatment at existing extraction well NHE-2 to remove chromium and 1,4-dioxane; for
- Ex-situ chromium treatment for the combined inflow from existing extraction well NHE-1 and two of the new groundwater extraction wells;
- Delivery of treated water to the LADWP drinking water system;
- Institutional controls (ICs) in the form of a groundwater management plan; and
- Installation of approximately 37 new groundwater monitoring wells.

BOU

The interim ROD for the BOU was signed in June 1989. 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 control the movement and spread of groundwater 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 from groundwater by air stripping followed by a LPGAC polishing step. The treated water is conveyed to the City of Burbank for municipal supply. The air stream is the treated through VPGAC vessels prior to discharge to the atmosphere.

An Explanation of Significant Differences (ESD) was signed in November 1990. The ESD concluded that, based on information suggesting high nitrate levels in the groundwater, additional measures were required to meet the MCLs for nitrate in the extracted and treated groundwater. EPA decided to require blending of the extracted and treated groundwater with a water supply lower in nitrate, such that the MCL would be achieved in water served to the public. Addition of the nitrate blending requirement raised the

possibility that the City of Burbank would not be able to accept the total quantity of water produced by the interim remedy. In the ESD, EPA decided to require reinjection of any excess water; that is, water that the City of Burbank could not use as a public water supply due to insufficient demand. Applicable or Relevant and Appropriate Requirements (ARARs) pertaining to the reinjection of extracted and treated groundwater were provided. Finally, the ESD clarified that the interim remedy could be designed, constructed, and operated in phases.

A second ESD was signed in February 1997. The ESD concluded that, based on additional study of the local groundwater system, an extraction rate of 9,000 gpm results in substantially the same level of groundwater containment as an extraction rate of 12,000 gpm, which is the rate called for in the ROD. Therefore, the interim remedy extraction rate was lowered to 9,000 gpm. EPA decided to eliminate the reinjection called for in the 1st ESD based on projections that no excess water would be generated at the revised extraction rate. In the 2nd ESD the City of Burbank also committed to accepting an annual average of 9,000 gpm from the interim remedy facilities contingent of water demand. Finally, EPA decided to suspend the 9,000-gpm extraction rate requirement during times when nitrate levels in the extracted groundwater exceed 50 mg/L as nitrate. This decision was made because it is possible that nitrate concentrations may reach a concentration where it is not possible to extract an average of 9,000 gpm and also meet the nitrate MCL through blending.

4.2. Remedy Implementation

NHOU

Construction of the original treatment system was completed March 1989, and operation commenced December 1989. The system consists of eight groundwater extraction wells (NHE-1 through NHE-8), one air stripping tower to remove VOCs from the extracted groundwater, two granular activated carbon (GAC) adsorbers to remove VOCs from the air stream, and ancillary equipment. The eight extraction wells associated with the treatment system are located in an existing electrical transmission line right of way in North Hollywood. Each well is approximately 300 ft deep (screened in NHOU Hydrostratigraphic Unit A-Zone, or the Shallow Zone; see Table 2) and has an approximate capacity of 300 gallons per minute (gpm). Extraction well NHE-1 was constructed but has never been operated because of insufficient groundwater yield. A schematic of the NHOU groundwater treatment facility is shown in Figure 4.

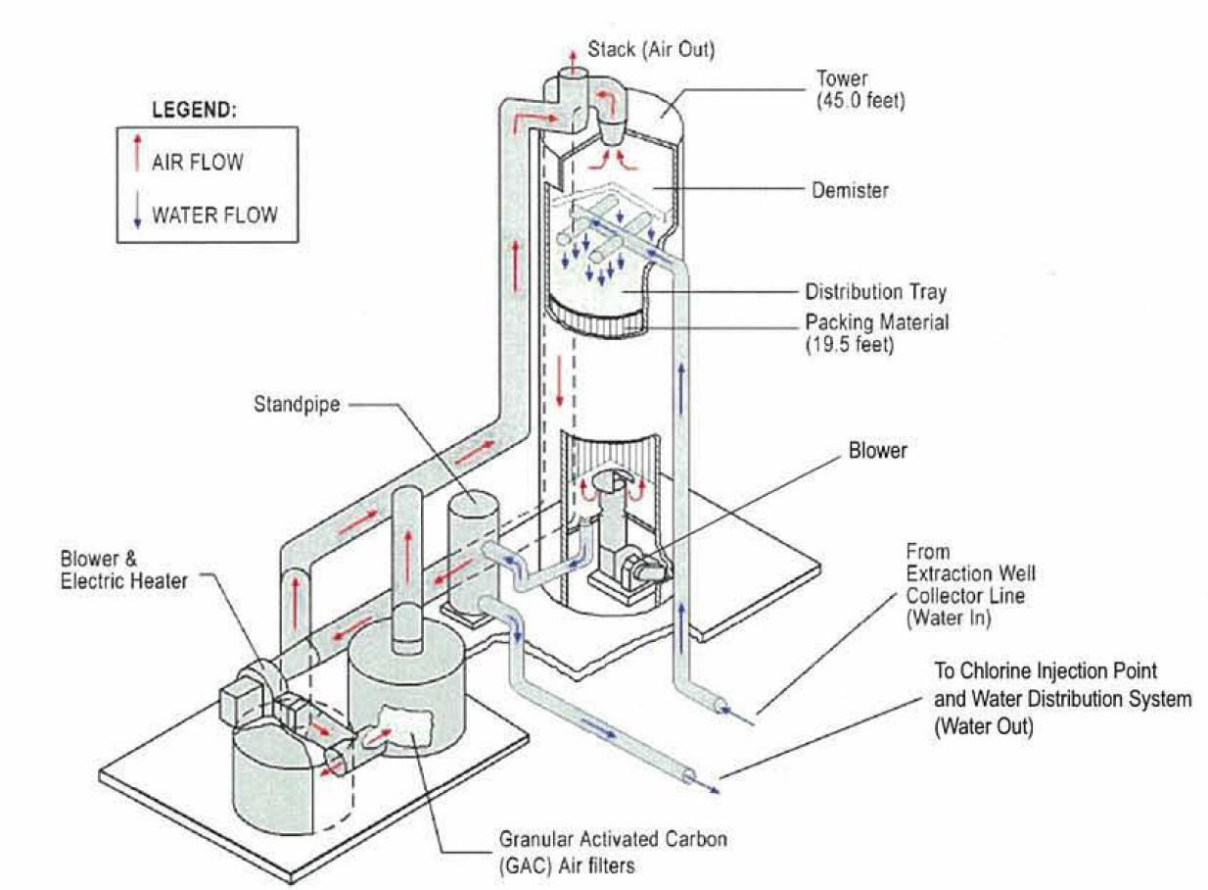

Figure 4. Schematic diagram of NHOU Groundwater Treatment Facility

The treatment facility for the NHOU is in North Hollywood and is approximately 3.8 miles north of the Los Angeles River. Extracted groundwater is fed through a 48-foot tall packed air stripper (packing height of 22 feet) with a capacity of 2,000 gpm. The treated groundwater is disinfected and then discharged into a LADWP blending facility where it is combined with water from other sources before entering the LADWP municipal supply system. This system remains in operation today. All water treated by this system is tested on a regular basis to ensure it meets all federal and state standards for drinking water. No water that enters the drinking water system exceeds these standards. Both EPA and CDPH oversee treatment facility operations to ensure these standards are met.

Due to a variety of factors, including emerging contaminants of concern, operations and maintenance (O&M) issues, and reduced groundwater levels that negatively impacted pumping capacity in several of the wells, the initial remedy has not performed as intended. A second interim remedy, detailed in the 2009 ROD is designed to better address NHOU groundwater contamination.

The second interim remedy has yet to be implemented, pending further design work, which is ongoing.

BOU

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.

The treatment facility for the BOU is located east of the airport. There are eight extraction wells within a half mile of the treatment facility. These extraction wells are called VO-1, VO-2, VO-3, VO-4, VO-5, VO-6, VO-7, and VO-8. Wells VO-1 –VO-7 are located north of the treatment plant in an east-west alignment. Well VO-8 is located between the treatment plant and the other wells. The BOU treatment facility is located approximately 3.5 miles north of the Los Angeles River.

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. Figure 5 shows a schematic diagram of the BOU groundwater treatment facility. Treated groundwater (effluent from the LPGAC vessels) is then conveyed to the City of Burbank Valley Forebay for distribution and storage, then to the blending facility. At the blending facility, the groundwater is blended with water from the MWD prior to distribution.

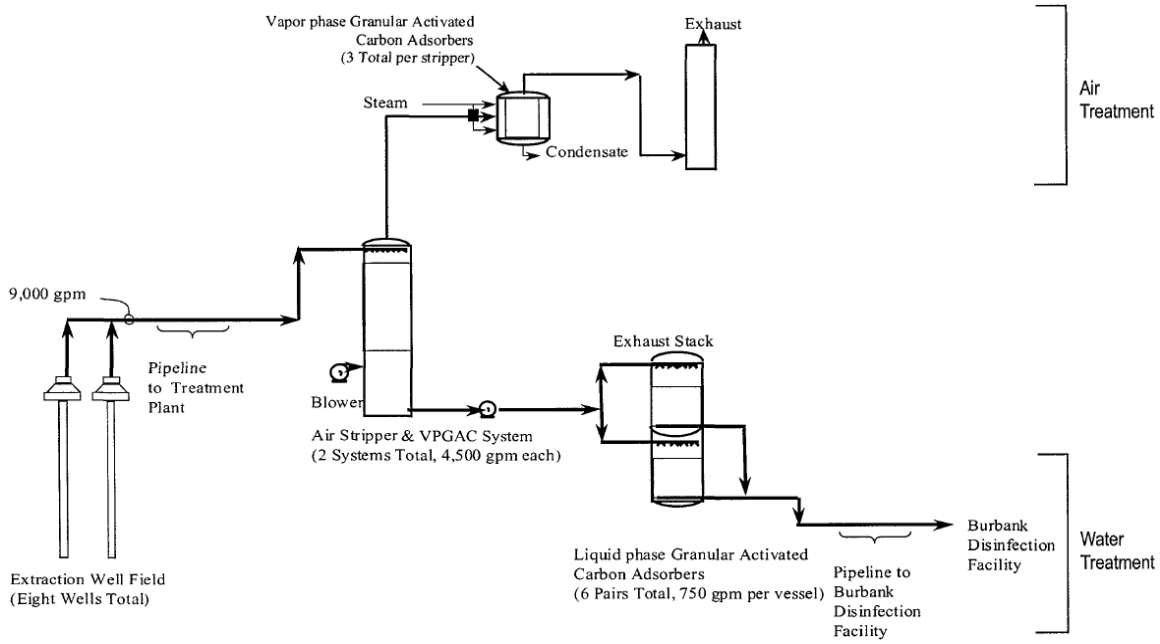

Figure 5. Schematic diagram of BOU Groundwater Treatment Facility

The BOU plant is designed to operate at 9,000 gpm, but has not often done so, primarily because consumer demand for water is less than that. Monthly pumping rates have ranged from 4,500 – 9,000 gpm in the past five years, although in the past two years the BOU has been pumping at an average rate of

6,500 gpm per month. In September 2010, a successful test was completed that verified the BOU system can operate at 9,000 gpm for an extended time. During this test the BOU operated for 60 days pumping at the 9,000 gpm capacity.

The pumping of groundwater at average rates of less than 9,000 gpm annually is not in compliance with the requirements specified in the 1997 ESD. As part of the ESD agreement the City of Burbank agreed to accept an average of 9,000 gpm annually from the facility. To give Burbank flexibility in meeting the terms of the ESD the 9,000 gpm rate is not a continuous rate, but an average annual rate. The annual average allows the City to accept the water contingent on utility demand.

4.3. Operation and Maintenance (O&M)

NHOU

LADWP is conducting long-term operations and maintenance of the NHOU extraction and treatment system in accordance with the EPA-approved 1988 O&M plan, and the 2003 preventative maintenance schedule. LADWP provides quarterly reports to EPA detailing the operations and maintenance of the NHOU, which include preventative maintenance activities, plant shutdown reports; an O&M cost breakdown, and a summary of the treated volumes and contaminant concentrations.

The NHOU extraction and treatment system was designed to treat 2,000 gpm, but averaged approximately 830 gpm from 2003 to 2008 and less than 960 gpm from January 2010 through September 2012. O&M-related issues were common during this FYR period, causing temporary stoppages in operations (e.g., Figure 6) and decreases in the volume of groundwater treated by the treatment plant (e.g., Figure 7). Other persistent O&M issues include the fact that extraction well NHE-1has never operated since the plant became operational and extraction well NHE-5 shut down during the last five year period due to declining groundwater elevation and insufficient yield. Honeywell lnc. has been operating well NHE-2 since 9/16/08, per Los Angeles Regional Water Quality Control Board CAO order R4-2003-0037. Water extracted from NHE-2 is currently being treated at the wellhead and diverted to a sanitary sewer, and therefore does not enter the NHOU treatment facility. Well NHE-3 was shutdown in December 2012 due to chromium concentrations exceeding the California MCL of 50 µg/L. NHE-3 remains offline pending the evaluation of options for addressing the chromium contamination.

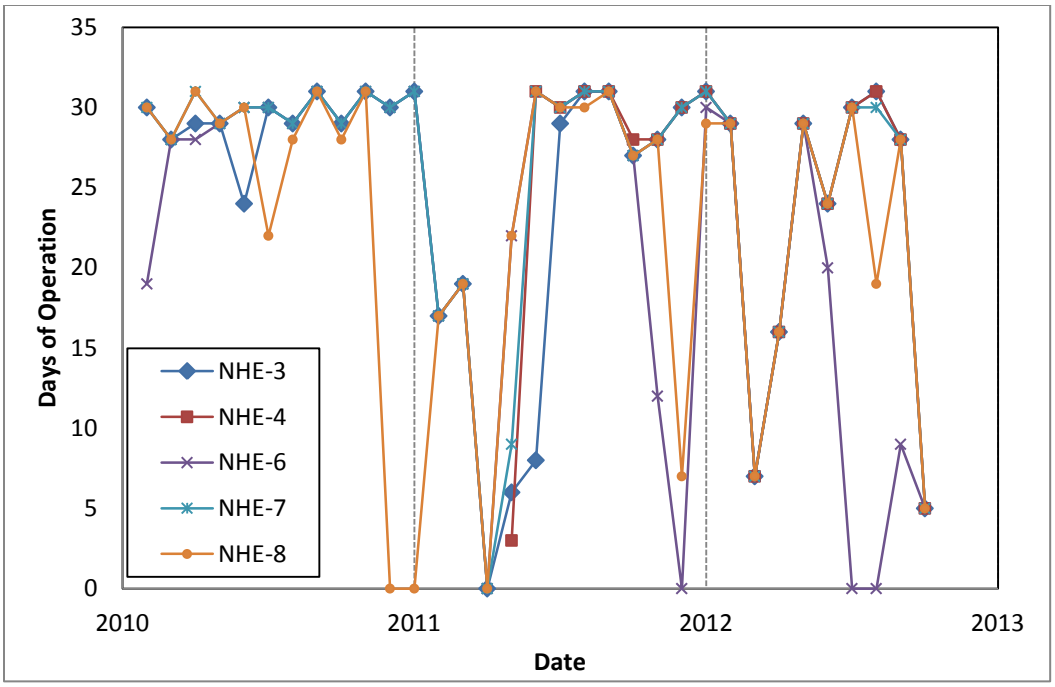

Figure 6. Monthly Days of Operation for the NHOU Wells from 2010 to 2012

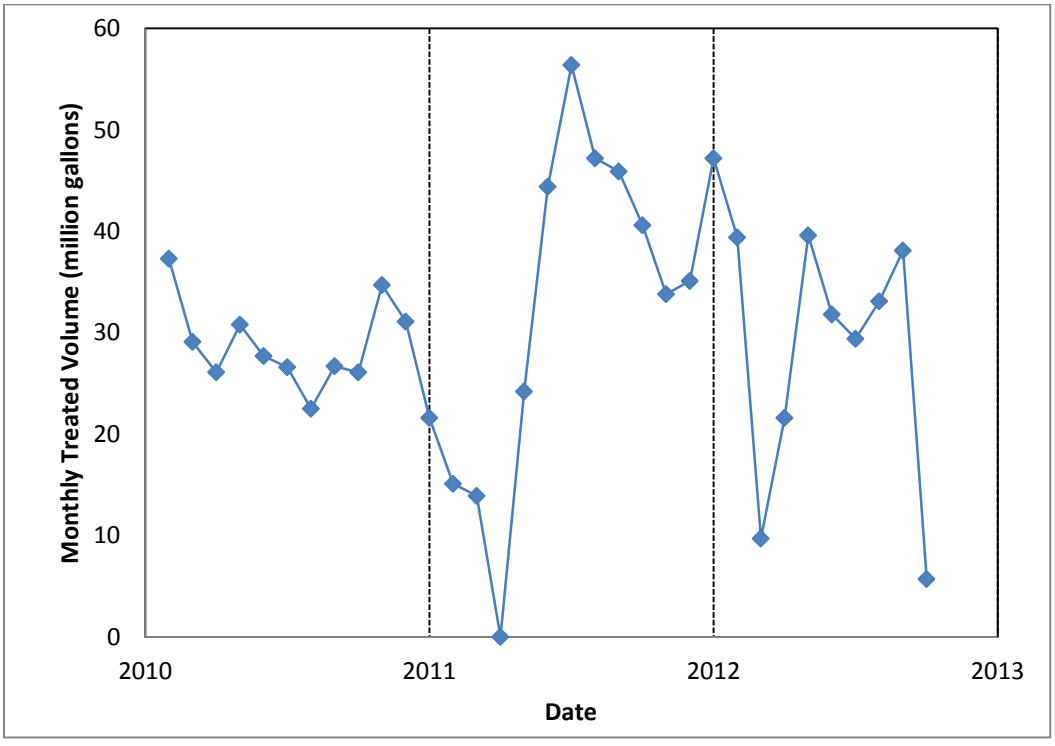

Figure 7. Monthly Treated Volumes for the NHOU Treatment Plant from 2010 to 2012

Plant outages totaled 80 days in 2011 and 171 days in 2012. From January 2010 through September 2012, the NHOU facility was shut down for varied durations due to a many operational issues including onsite

construction of a sodium hypochlorite facility, power loss, various leaks in effluent conveyance piping, and airstream heater failure.

From January 2010 through September 2012, some of the NHOU extraction wells were offline for varied durations and reasons. Well NHE-4 was restarted in April 2011, but had been down prior to that due to declining groundwater elevation and insufficient yield. Well NHE-6 was offline several times: a burned power meter was found in January 2010, a power loss occurred in April 2011, a burned motor was replaced and electrical controls were upgraded from October to December 2011, and a burned control panel to the power supply was replaced and upgraded from June through August 2012. Well NHE-7 was down briefly in January 2011 due to a power trip. Well NHE-8 was offline several times: shut down due to automatic shutdowns resulting from low flow from November to December 2010, shut down when a power loss occurred in April 2011, and automatic shutdowns related to a low setting on the pressure switch in March 2003.

Quarterly operations and maintenance costs for the NHOU from January 2010 through September 2012 are shown in Table 3.

Table 3. NHOU Quarterly O&M Costs

Date Range	Total Cost
January – March 2010	$126,000
April – June 2010	$63,000
July – September 2010	$52,000
October – December 2010	$84,000
January – March 2011	$124,000
April – June 2011	$170,000
July – September 2011	$156,000
October – December 2011	$115,000
January – March 2012	$114,000
April – June 2012	$131,000
July – September 2012	$117,000

BOU

The City of Burbank (via its contractor APT Water Services) is conducting long-term monitoring and maintenance activities for the BOU according to the O&M plan provided to EPA in 1998. The O&M plan is currently being revised, and is expected to be completed soon.

The City of Burbank provides monthly operations reports to EPA detailing the operations and maintenance activities, an air stripper efficiency analysis, VPGAC system monitoring results, a summary of the extracted water volumes from individual wells, and analytical results for the treatment system effluent and the solvent storage tank.

Influent and effluent samples from the air stripper, as well as plant effluent samples, are taken weekly. Samples of VPGAC stack effluent exhaust are taken quarterly. The solvent separator, used for treating investigation-derived wastewater, feeds into the solvent storage tank, which is sampled monthly. In order to predict their breakthrough, VOC and 1, 2, 3-tricholoropropane (1, 2, 3-TCP) concentrations are measured on a monthly basis at the 50% ports on the LPGAC vessels. If VOCs or 1, 2, 3-TCP are detected, then sampling occurs on a weekly basis at the 75% port. Generally, 1, 2, 3-TCP is the contaminant that drives GAC replacement. These results are not given in the monthly reports. Contaminant concentration data at individual extraction wells, which is collected quarterly, is not provided in monthly reports, but is provided in courtesy copies of CDPH monthly reports.

The BOU extraction and treatment system was designed to treat 9,000 gpm. From July 2010 through January 2012 (excluding March and April of 2011 because the monthly reports were unavailable), the BOU extraction and treatment system operated at an average pumping rate of about 6,500 gpm. An operational capacity test, or aquifer test, was completed from July 17 through September 17, 2010 to demonstrate that 9,000 gpm of groundwater could be extracted and processed as required by the 1991 Consent Decree (EPA 1991).

System shutdowns of the entire BOU treatment system for varying durations occurred on a number of occasions due to a variety of reasons including control panel power failure, valve replacement, static water level testing, VPGAC vessel inspection, repairs on the chlorine solution line, and MWD infrastructure maintenance. Shutdown durations lasted from half a day up to two weeks during the period of this FYR.

Short-duration normal shutdowns of one or both air strippers were performed fairly often, generally occurring a few times per month for a variety of reasons (scheduled maintenance, in response to alarms, for training purposes, etc.). These shutdowns generally lasted fewer than four hours, and often lasted less than one hour. Each monthly monitoring report provides detailed list of daily maintenance activities at the treatment facility and the extraction wells.

Detailed annual O&M costs for the BOU were unavailable at the time of this review. During the site inspection, the City of Burbank stated that annual O&M costs were estimated to be roughly $5,000,000.

5. Progress Since the Last Five-Year Review

5.1. Previous Five-Year Review Protectiveness Statement and Issues

Following is the protectiveness statement from the 2008 FYR for the SFV Area 1 Site:

> *"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 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."

The 2008 FYR included two issues and recommendations. Each recommendation and its current status are discussed below.

Table 4. Status of Recommendations from the 2008 FYR

Issues from previous FYR	Recommendations	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
In the NHOU, some groundwater migration from areas with high levels of COCs to areas of lower levels or with contamination has occurred.	Complete a focused feasibility study (FFS) for the NHOU and select remedy improvements that will achieve more effective plume containment.	EPA	2009	An FFS was completed and a ROD selecting remedy improvements was signed.	FFS: July 2009; Second Interim ROD signed: Sept 2009
The NHOU treatment facility cannot treat chromium, which has affected operation of at least one NHOU remedy extraction well.	Complete an FFS and select remedy improvements that include chromium treatment as needed to assure treated water meets drinking water requirements.	EPA	2009	An FFS was completed and a ROD selecting remedy improvements was signed.	FFS: July 2009; Second Interim ROD signed: Sept 2009

The issues and recommendations identified in the 2008 FYR were addressed by the completion of the FFS in July 2009 and the signing of the second interim ROD in September 2009 (described in Section 4.1).

5.2. Work Completed at the Site During this Five Year Review Period

NHOU

On September 22, 2008 LADWP to shut down treatment system operations due to airflow problems in the air stripper. LADWP's inspection of the air stripper subsequently revealed that the packing in the air stripper had become extensively calcified restricting airflow due to failure of the anti-scalent feed. To address issues with the air stripper, EPA recommended that LADWP remove the calcification scale from the interior of the air stripper and line the interior tower walls should be lined with a scale resistant coating. Recommendations and procedures for addressing mechanical issues with the air stripper tower are contained in a technical memorandum titled "North Hollywood OU – Air Stripper Packing Replacement" (CH2M Hill 2008b).

In January 2009, construction of the in-situ treatment system for chromium at the Honeywell facility was completed. The system consists of two components: 1) vadose zone treatment via percolation of a reductant solution from an infiltration basin located in the known source area and 2) hydraulic control via groundwater extraction.

On February 21, 2011, an Administrative Settlement Agreement and Order on Consent (AOC) for Remedial Design (RD) was executed among EPA, Honeywell International, Inc. and Lockheed Martin Corporation to conduct pre-design data acquisition and remedial design activities at the NHOU associated with the 2009 ROD. The Final RD Work Plan was submitted by AMEC (on behalf of Honeywell and Lockheed Martin) to EPA on October 5, 2011 (AMEC 2011). Per the Final RD Work Plan, AMEC completed a data gap analysis on March 14, 2012 (AMEC 2012a) that refined the conceptual site model (CSM) and identified several areas where additional data is needed to ensure that the RAOs in the ROD can be successfully accomplished. On April 11, 2012, AMEC submitted a health and safety plan for the RD work (AMEC 2012c). On April 13, 2012, AMEC submitted two documents relating to the Pre-Design Investigation to EPA: a draft work plan and a sampling and analysis plan (AMEC 2012b; 2012d). The purpose of the Pre-Design Investigation is to fill critical data gaps identified as necessary for the second interim remedy design to meet RAOs, as required by the second interim ROD.

In May 2013, EPA released for comment a proposed plan to amend the 2009 Second Interim Remedy by adding the option to re-inject groundwater extracted from NHOU extraction wells. The end use selected in the 2009 ROD calls for delivery of treated groundwater to the LADWP for use in its domestic water supply system. EPA concluded that re-injection might be necessary if LADWP and the NHOU PRPs are unable to reach agreement regarding the terms and criteria for delivery and acceptance of the treated water. Adding an option to the Second Interim Remedy to re-inject extracted groundwater back into the SFV groundwater aquifer ensures the flexibility to design the most effective remedy and implement that remedy without significant delay if LADWP and NHOU PRPs are unable to agree on the terms and criteria for delivery and acceptance of treated water.

BOU

In September 2010, EPA completed an operational capacity test, or aquifer test, to demonstrate that 9,000 gpm of groundwater could be extracted and processed, as required by the 1991 Consent Decree, for a 60-day duration. The pumping was maintained above 8,500 gpm with few exceptions.

On March 23, 2011, CH2M Hill (EPA's remedy oversight contractor) completed a technical memorandum (CH2M Hill 2011) analyzing the aquifer response during the operational capacity test. The analysis refined hydraulic transmissivities and conductivities for the area, as well as showing the amount of drawdown in the aquifer.

On September 23, 2011, Arcadis/Malcolm Pirnie completed a report (Arcadis 2011) for City of Burbank Water and Power that evaluated options for the removal of hexavalent chromium from the water at the treatment facilities, including an option for adding chromium removal at the Lake Street Granular Activated Carbon facility where VOCs were being removed. This was a voluntary study performed by the City of Burbank in order to document potential options for hexavalent chromium treatment ahead of the publication of a draft California MCL.

6. Five-Year Review Process

6.1. Administrative Components

EPA Region 9 initiated the FYR in January 2013 and scheduled its completion for September 2013. The review team was led by ZiZi Searles of EPA, Remedial Project Manager (RPM) for the SFV Area 1 Site, and contractor support provided by USACE (David Sullivan, geologist and Aaron King, environmental engineer). On January 9, 2013, EPA held a scoping call with the review team to discuss the Site and items of interest as they related to the protectiveness of the remedy currently in place. A schedule was established that consisted of the following:

- Community notification;
- Document review;
- Data collection and review;
- Site inspection;
- Local interviews; and
- Five-Year Review Report development and review.

6.2. Community Involvement

On January 30, 2013, a public notice was published in the *Los Angeles Daily News* announcing the commencement of the Five-Year Review process for the SFV Area 1 Site, providing Jackie Lane's contact information, and inviting community participation. The press notice is available in Appendix B.

The Five-Year Review report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated public repositories: Burbank Public Library, 110 North Glen Oaks Blvd, Burbank, CA or call (818) 238-5580 and Los Angeles Public Library, 630 W. Fifth St., Los Angeles, CA 90071 or call (213) 228-7000. Upon completion of the FYR, a public notice will be placed in the Los Angeles Daily News to announce the availability of the final FYR report in the Site document repositories.

6.3. Document Review

This FYR included a review of relevant, site-related documents including the ROD, remedial action reports, and recent monitoring data. A complete list of documents reviewed can be found in Appendix A.

6.3.1. ARARs Review

Section 121 (d)(2)(A) of CERCLA specifies that Superfund remedial actions (RAs) must meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site.

Changes (if any) in ARARs are evaluated to determine if the changes affect the protectiveness of the remedy. All the following decision documents: 1987 NHOU interim ROD, 2009 NHOU second interim ROD, 1989 BOU interim ROD, 1990 BOU ESD, and 1997 BOU second ESD identified only chemical- and action-specific ARARs for the site; no location-specific ARARs were identified for the Site. Each ARAR and any change to the applicable standard or criterion are discussed below. The selected interim remedies are expected to comply with all federal and state ARARs except for 40 CFR § 300.430(e) (2) (i) (A), which requires that the contaminant levels in the groundwater remaining in the aquifer be reduced below MCLs.

Because these were interim actions for containment of groundwater contamination, EPA has not established chemical-specific ARARs for restoration of groundwater remaining on-Site. EPA is waiving this ARAR pursuant to CERCLA Section 121(d) (4) (A), 42 U.S.C. § 9621(d) (4) (A), and 40 CFR § 300.430(f) (1) (ii) (C), which allows EPA to select a remedy that does not achieve an ARAR when the remedial alternative selected is an interim measure that will become part of a total remedial action that will attain ARARs. EPA's waiver of the aquifer cleanup standard does not apply to water extracted from the aquifer and delivered to municipalities for use as drinking water; all extracted and treated water is expected to comply with MCL ARARs.

Performance standards for treated groundwater are summarized in Table 5. The current regulatory standards for TCE, PCE, and the other VOC COCs are the state and federal MCLs. The current regulatory standard for total chromium is the state MCL of 50 µg/L, yet due to heightened public concern over hexavalent chromium in the drinking water the City of Burbank has a self-imposed limit of 5 µg/L for total chromium and hexavalent chromium in the distribution system. The BOU meets this standard by blending groundwater with chromium exceeding 5 µg/L with MWD water. Hexavalent chromium is not

regulated by itself, but addressed by both federal and state MCLs for total chromium. Recently, CDPH has proposed a draft MCL specific for hexavalent chromium at a value of 10 µg/L (August 2013). US EPA is currently revising the hexavalent chromium toxicity assessment and plans to revisit the MCL upon its completion. A final MCL for hexavalent chromium is expected to be announced during the period of the next FYR.

LADWP has also stated they will not accept NHOU water for use in its drinking water supply system with hexavalent chromium levels exceeding a voluntary limit of 5 µg/L. Therefore, EPA has chosen to use LADWP's 5 µg/L voluntary limit for hexavalent chromium as a performance standard in the remedy. With the draft MCL for hexavalent chromium is issued, EPA, the City of Burbank, LADWP will be reviewing potential future modification of the remedy to treat chromium in order to ensure that the treated water continues to meet requirements for drinking water.

No final or state or federal MCLs has yet been promulgated for 1, 2, 3-TCP, or 1, 4-dioxane. For these emerging chemicals that lack MCLs, EPA is requiring treatment to the CDPH notification levels, which are health-based advisory levels for drinking water use, as criteria to-be-considered (TBC; these criteria are commonly known as TBCs) in setting alternative performance standards for extracted groundwater. Notification levels are established as precautionary measures for contaminants that may be considered candidates for establishment of MCLs, but are not considered ARARs.

In 2010, EPA revised its 1, 4-dioxane risk evaluation such that a 10^{-6} risk level corresponds to 0.35 µg/L. In response to EPA's revision, CDPH revised its notification level from 3 to 1 µg/L in November 2010. None of the other MCLs or notification levels has changed since the previous FYR.

Table 5. Performance Standards for Treated Groundwater

Contaminant of Concern	Federal MCL (µg/L)	California MCL (µg/L)	CDPH Notification Level (µg/L)	Basis for Performance Standard	Performance Standard (µg/L)[a]
TCE	5	5	None	Federal MCL	5
PCE	5	5	None	Federal MCL	5
1,1-DCA	None	5	None	California MCL	5
1,2-DCA	5	0.5	None	California MCL	0.5
1,1-DCE	7	6	None	California MCL	6
cis-1,2-DCE	70	6	None	California MCL	6
1,1,2-TCA	5	5	None	Federal MCL	5
Carbon tetrachloride	5	0.5	None	California MCL	0.5
Chloroform	80[b]	None	None	Federal MCL	80
Methylene chloride	5	5	None	Federal MCL	5
Nitrate (as nitrogen)	10,000	10,000[c]	None	California MCL	10,000
Total chromium[e]	100	50[i]	None	NHOU: California MCL; BOU: California MCL	NHOU: 50; BOU: 50
Hexavalent chromium[d]	None	None	None	NHOU: See note g; BOU: See note f	NHOU: 5[g]; BOU: 5[f]

Contaminant of Concern	Federal MCL (µg/L)	California MCL (µg/L)	CDPH Notification Level (µg/L)	Basis for Performance Standard	Performance Standard (µg/L)[a]
Perchlorate	None	6	None	California MCL	6
1,2,3-TCP[i]	None	None	0.005	CDPH Notification Level	0.005
1,4-dioxane	None	None	1[h]	CDPH Notification Level	1
NDMA	None	None	0.01	CDPH Notification Level	0.01

Notes

a. The CDPH permitting process may require lower concentrations in the treated effluent.

b. Value shown is for total trihalomethanes (TTHMs).

c. MCL is listed as 45 mg/L nitrate as nitrate, which is equivalent to 10 mg/L nitrate as nitrogen

d. Federal and state MCLs specific to hexavalent chromium have not been established. In August 2013 CDPH announced a draft hexavalent chromium MCL of 10 µg/L for public comment

e. When speciation data is unavailable the State of California uses 50 micrograms per liter and for risk evaluation reasons, assumes all total chromium is hexavalent chromium.

f. During the time period covered by this FYR the City of Burbank had a self-imposed limit for hexavalent chromium of 5 µg/L in the distribution system. The BOU is operated in a way that treated groundwater is blended with imported MWD water to maintain hexavalent chromium levels below 5 µg/L. The self-imposed limit used by the City of Burbank is under review since the August 2013 announcement of the draft hexavalent chromium MCL of 10 µg/L.

g. During the time period covered by this FYR LADWP has a self-imposed limit for hexavalent chromium of 10 µg/L in the distribution system. This self-imposed limit used by the LADWP is under review since the August 2013 announcement of the draft hexavalent chromium MCL of 10 µg/L.

h. In 1998, CDPH established its initial notification level at 3 µg/L, based on an EPA drinking water concentration that corresponded to a 10^{-6} theoretical lifetime cancer risk. In 2010, EPA revised its 1, 4-dioxane risk evaluation such that a 10^{-6} risk level corresponds to 0.35 µg/L. In turn CDPH revised its notification level to 1 µg/L in November 2010.

i. The CDPH Notification Level for 1, 2, 3 TCP is the same as the detection limit. The detection limit for 1,2,3 TCP in water is 0.005µg/L.

Federal and state laws and regulations other than chemical-specific ARARs that have changed over the past five years are described in Table 6. These ARARs are pre-construction requirements; therefore all applicable requirements were fulfilled before the units went on-line. However, if the systems are modified significantly, these ARARs would still apply. There have been no other revisions to laws and regulations that affect the protectiveness of the remedy. A full summary of ARARs listed in the1987 NHOU Interim ROD, 2009 NHOU Second Interim ROD, 1989 BOU Interim ROD, 1990 BOU ESD, and 1997 BOU second ESD is given in Appendix F.

Table 6. Changes in Applicable or Relevant and Appropriate Requirements in the last five years

Source	Citation	Description	Effect on Protectiveness	Comments	Amendment Date
Clean Air Act SCAQMD	Regulation XIII	Regulation XIII requires that stationary sources of air emissions meet best available technology standards.	Rules 1309 (Emission Reduction Credits and Short Term Credits), 1315 (Federal New Source Tracking System), and 1325 (Federal $PM_{2.5}$ New Source Review Program) of Regulation XIII have been amended or adopted since the previous FYR, but none of the changes affect protectiveness.	For air strippers, SCAQMD requires 90-99% removal efficiency for vapor phase GAC devices to be BACT. These pre-construction requirements, and all applicable requirements, were obtained before treatment units went on-line.	Latest amendment was on June 3, 2011.
Clean Air Act SCAQMD	Rule 1401	Rule 1401 specifies limits for individual cancer risk and excess cancer cases from new or modified stationary sources which emit carcinogenic air contaminants. The rule requires BACT for toxic air discharge for new stationary sources where a lifetime maximum individual cancer risk of one in one million or greater is estimated to occur.	The list of chronic and acute toxic air contaminants was expanded, but this does not affect protectiveness.	As Rule 1401 is a pre-construction regulation, therefore all applicable requirements were attained before the treatment units went on-line. If the air stripping treatment system is modified significantly, substantive provisions of Rule 1401 will still apply.	Latest amendment was on September 10, 2010.

6.3.2. Human Health Risk Assessment Review

A human health risk assessment was completed for the Site as part of the Remedial Investigation (RI) of Groundwater in the San Fernando Valley (James M. Montgomery, Inc., 1992). The risk assessment was reviewed to identify any changes in exposure or toxicity that would impact protectiveness.

The 1992 risk assessment identified the two exposure pathways at SFV Area 1 Site: ingestion of drinking water and inhalation of vapors during showering. The dermal absorption pathway was considered, but it was determined that its potential contribution to overall risk would not be significant. There have been no changes in exposure pathways, but the vapor intrusion pathway has not been fully evaluated.

In the RI, cancer risks and non-cancer hazard quotients (HQs) were calculated for the ingestion and inhalation pathways for the upper and lower aquifer zones (now called "Shallow" and "Deep") under three different exposure scenarios: average, reasonable maximum exposure (RME), and maximum. The different scenarios essentially represent exposures to different contaminant concentrations found during the RI. The average scenario represents an exposure to average contaminant concentrations, the RME scenario represents an exposure to contaminant concentrations corresponding to the upper bound 95% confidence interval, and the maximum scenario represents an exposure to the maximum observed contaminant concentrations. Table 7 shows the cancer risks and hazard indexes calculated for the ingestion and inhalation during showering exposure pathways in the 1992 RI.

Table 7. Site Risks Identified in the San Fernando Valley RI

Exposure Scenario and Pathway	Non-cancer Hazard Index	Cancer Risk
Shallow Zone – San Fernando Valley Groundwater		
Average - Ingestion	1.7	4.0E-04
RME - Ingestion	3.1	8.0E-04
Maximum - Ingestion	20	6.0E-03
Average - Inhalation	1.2	6.0E-04
RME - Inhalation	2.2	1.0E-03
Maximum - Inhalation	14	1.0E-02
Deeper Zone – San Fernando Valley Groundwater		
Average - Ingestion	0.26	4.0E-05
RME - Ingestion	0.42	6.0E-05
Maximum - Ingestion	1.7	2.0E-04
Average - Inhalation	0.17	1.0E-05
RME - Inhalation	0.32	2.0E-05
Maximum - Inhalation	1.6	1.0E-04

6.3.2.1 Vapor Intrusion

EPA's understanding of contaminant migration from soil gas and/or groundwater into buildings has evolved over the past few years leading to the conclusion that vapor intrusion may have a greater potential for posing risk to human health than assumed when the ROD was prepared. In April 2013, the EPA released an external review draft version of its vapor intrusion guidance titled "*OSWER Final Guidance* for *Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air (External Review Draft*, EPA 2013).

A soil gas investigation was performed during SFV RI activities to gather information on the extent of VOC contamination in the basin, but the vapor intrusion pathway has not been evaluated for the Area 1 site. The potential for vapor intrusion is evaluated following a "multiple lines of evidence" approach. PCE, TCE, and other VOCs are present at the site and are considered sufficiently toxic and volatile. Groundwater PCE and TCE concentrations over large areas of Area 1 are greater than the generic groundwater screening levels for a vapor intrusion hazard quotient equal to 1 for a residential exposure scenario (58 µg/L for PCE, 5.2 µg/L for TCE) as shown in EPA's Vapor Intrusion Screening Level Calculator (EPA 2012). The area is heavily populated and contains numerous buildings. At the time of the RI, depth to groundwater in Area 1 was generally greater than 150 feet, although today the depth to groundwater is much deeper at 200 feet or more. Based on depth to groundwater it is not expected that vapor intrusion pathway would be a significant exposure risk in Area 1.

6.3.2.2 Toxicity values

EPA's Integrated Risk Information System (IRIS) has a program to update toxicity values used by the Agency in risk assessment when newer scientific information becomes available. In the past five years, there have been a number of changes to the toxicity values for certain COCs at the Site. Revisions to the toxicity values for PCE, TCE, 1-4,dioxane, methylene chloride, carbon tetrachloride, cis-1,2-DCE, and 1,2,3-TCP indicate changes in risk from exposure to these chemicals compared to the risks previously

considered. Table 8 shows the changes in toxicity values for these contaminants based on available previous toxicity values. TCE, PCE, 1, 4-dioxane, and hexavalent chromium are discussed further.

Table 8. Changes in Toxicity Values in the Last Five Years

Contaminant	Toxicity Value	RI Value[a]	May 2013 RSL Table Value	Change
PCE	SFO[c] (kg-day/mg)	5.10E-02	2.10E-03	Less stringent
	RfD_o[d] (mg/kg-day)	1.00E-02	6.00E-03	More stringent
TCE	SFO (kg-day/mg)	1.10E-02	4.60E-02	More stringent
	RfD_o (mg/kg-day)	1.00E-02	5.00E-04	More stringent
1,4-dioxane	SFO (kg-day/mg)	1.10E-02[b]	1.00E-01	More stringent
	RfD_o (mg/kg-day)	--	3.00E-02	More stringent
cis-1,2-DCE	SFO (kg-day/mg)	--	--	No change
	RfD_o (mg/kg-day)	1.00E-02[b]	2.00E-03	More stringent
Carbon tetrachloride	SFO (kg-day/mg)	1.30E-01	7.00E-02	Less stringent
	RfD_o (mg/kg-day)	7.00E-04	4.00E-03	Less stringent
Methylene chloride	SFO (kg-day/mg)	7.50E-03[b]	2.00E-03	Less stringent
	RfD_o (mg/kg-day)	6.00E-02[b]	6.00E-03	More stringent
1,2,3-TCP	SFO (kg-day/mg)	2.00E+00[b]	3.00E+01	More stringent
	RfD_o (mg/kg-day)	6.00E-03[b]	4.00E-03	More stringent

Notes

[a] As listed in SFV RI

[b] Because toxicity values from the original risk assessment were not provided, these values are as listed in the EPA Region 9 2004 Preliminary Remediation Goals (PRGs) Table.

[c] SFO = oral slope factor

[d] RfD_o = oral reference dose

TCE and PCE: Groundwater results are compared to EPA regional screening levels (RSLs; previously called preliminary remediation goals [PRGs]) as a first step in determining whether response actions may be needed to address potential human health exposures. The RSLs are chemical-specific concentrations that correspond to an excess lifetime cancer risk level of $1x10^{-6}$ (or HQ of 1 for non-carcinogens) developed for standard exposure scenarios (e.g., residential and commercial/industrial). RSLs are not de facto cleanup standards for a Superfund site, but they do provide a good indication of whether actions may be needed. In September 2011, EPA completed a review of the TCE toxicity literature and posted on IRIS both cancer and non-cancer toxicity values which resulted in lower RSLs for TCE. The screening level for chronic exposure for cancer excess risk level of $1x10^{-6}$ is 0.44 µg/L TCE. EPA uses an excess cancer risk range between 10^{-4} and 10^{-6} for assessing potential exposures, which means a TCE concentration between 0.44 and 44 µg/L. The current MCL for TCE of 5 µg/L is within the revised protective carcinogenic risk range. EPA's 2011 Toxicological Review for TCE also developed safe levels that include at least a 10-fold margin of safety for health effects other than cancer. Any concentration below the non-cancer RSL indicates that no adverse health effect from exposure is expected. Concentrations significantly above the RSL may indicate an increased potential of non-cancer effects.

The non-cancer screening level for TCE is 2.6 µg/L. EPA considers the TCE MCL of 5 µg/L protective for both cancer and non-cancer effects.

EPA also recently reassessed PCE toxicity literature for both cancer and non-cancer affects and released the toxicological review in February 2012, posted on IRIS. The reassessment determined that excess cancer risk of $1x10^{-6}$ is a less stringent risk criterion than previously assumed, and has raised the cancer RSL for PCE to 9.7 µg/L. The non-cancer RSL was also revised based on adverse neurological effects and resulted in a non-cancer risk RSL of 35 µg/L. The PCE MCL of 5 µg/L remains protective for both carcinogenic and non-cancer effects. Table 9 summarizes the RSLs for TCE and PCE.

Table 9. Summary of Drinking Water RSLs for TCE and PCE

Contaminant of Concern	RSL for cancer excess risk level of $1x10^{-6}$ (µg/L)	RSL for non-cancer hazard (µg/L)
TCE	0.44	2.6
PCE	9.7	35

1, 4-Dioxane: There are currently no federal or state MCLs for 1, 4-dioxane. The current RSL is 0.67 µg/L (or equivalent units: parts per billion [ppb]). CDPH previously established a Notification Level (formerly "action level") for 1, 4-dioxane was 3 µg/L. Notification to the CDPH is required when treatment plant effluent delivered to a municipal water purveyor exceeds the notification level. In 2010, EPA revised its 1, 4-dioxane risk evaluation such that a 10^{-6} risk level corresponds to 0.35 µg/L, as noted in IRIS, though the RSL table has not yet been updated. In response to EPA's revision, CDPH revised its notification level from 3 to 1 µg/L in November 2010.

Hexavalent Chromium: There is currently no MCL specific for hexavalent chromium; however, there is a federal MCL for total chromium at 100 µg/L (ppb) and a California MCL for total chromium at 50 µg/L (ppb). These total chromium MCLs assume that the majority of chromium in drinking water is in the hexavalent state.

In 2010, EPA updated its RSLs for hexavalent chromium. The RSL update was based on a revised toxicity assessment by the New Jersey Department of Environmental Protection following new toxicity information from the National Toxicology Program. The current hexavalent chromium RSL for tap water ingestion is 0.031 µg/L (ppb). The EPA IRIS program is conducting its own reassessment of the toxicity of hexavalent chromium and EPA has committed to revise the chromium MCL upon completion of the IRIS reassessment. Any potential change to these chemicals will need to be addressed in subsequent five-year reviews.

In addition, the California Office of Environmental Health Hazard Assessment (OEHHA) released a new Public Health Goal (PHG) for hexavalent chromium at 0.02 µg/L (ppb) in 2010. The California Department of Public Health (CDPH) released a proposed MCL for hexavalent chromium of 10 ppb in August 2013. Once new federal and/or state MCLs for hexavalent chromium ~~is~~ are adopted, further evaluation regarding the protectiveness of the remedy will be completed.

6.3. Ecological Review

A brief ecological risk assessment was performed in the SFV RI. No threatened or endangered species were found to use the area. There is limited habitat use of the Los Angeles River by water fowl. However, because groundwater is the primary contaminated medium, and groundwater/surface water interactions do not occur within the NHOU or BOU, the ecological risk posed by contaminants in groundwater is negligible.

6.4. Data Review

Data that were reviewed include plume maps generated by CH2M Hill (EPA's oversight contractor), data used to generate those plume maps, available quarterly reports on the NHOU by LADWP (July 2010 – September 2012), available monthly reports on the BOU by the City of Burbank's contractor APT Water (July 2010 – January 2012, except for March and April 2011), graphs presented during the most recent quarterly BOU review call, and the Final Data Gaps Analysis report. A complete list of documents reviewed, with their sources, is shown in Appendix A.

6.4.1. Groundwater Quality

The contaminants of primary concern in Area 1 are TCE and PCE. Chromium, 1, 4-dioxane, 1, 2, 3-TCP, and perchlorate are considered emerging contaminants. Nitrate is also present in groundwater. Plume maps for these contaminants in Area 1 for the period from January 2006 to July 2011 are shown in Figure 8 through Figure 17. Each plume map uses the most recent data available from a well within that plume area during that period. Approximate locations of relevant LADWP well fields are also shown.

PCE and TCE: The PCE and TCE plumes in Area 1 have fluctuated in extent and concentration since the completion of the previous FYR. The fluctuations may have resulted from changing groundwater levels, migration of plumes, or changes in geochemical conditions in the aquifer; alternatively, they may reflect the incorporation of additional (or more recent) water quality data. Figure 8 through Figure 11 show the PCE and TCE plume maps for the Shallow and Deeper Zones of Area 1. PCE and TCE appear in wells at the Rinaldi-Toluca, North Hollywood West, North Hollywood East, and Whitnall Well fields, all of which are LADWP water supply well fields located near the NHOU remedy. It was noted in the previous FYR that the TCE and PCE concentrations had increased in LADWP's Rinaldi-Toluca and North Hollywood West well fields during 2007 and 2008; TCE and PCE are still present in these well fields.

Chromium: Chromium occurs naturally in groundwater throughout Area 1 at low concentrations; typically less than 5 µg/L. Chromium and hexavalent chromium at concentrations above 5 µg/L originate from source areas. Due to reducing geochemical conditions at depth in Area 1 groundwater, chromium concentrations decrease rapidly with increasing depth and are infrequently detected at levels above the MCL at depths greater than 100 feet below the water table. Generally, the chromium plumes (which are dominated by hexavalent chromium) have fluctuated in extent and concentrations. Figure 12 and Figure 13 show the total chromium and hexavalent chromium plume maps for the Shallow Zone of Area 1.

Total and hexavalent chromium has been detected in LADWP's Whitnall production wells. NHOU Extraction well data shows chromium concentrations have been decreasing in extraction well NHE-2, a

well with historically high in hexavalent chromium concentrations, but increasing in NHE-3. The current NHOU facility does not treat for chromium, but the 2009 Second Interim Remedy calls for wellhead treatment for chromium at NHE-2 and ex-situ treatment for chromium for the combined flows from NHE-1 and two of the proposed new extraction wells. Chromium treatment for NHE-3 is not a part of the second interim remedy. In 2013 elevated concentrations of total and hexavalent chromium resulted in the permanent shutdown of well NHE-3. With the August 2013 release of a CA draft hexavalent chromium MCL of 10 µg/L (publication of FYR is September 2013), a comprehensive evaluation of how to address chromium and hexavalent chromium as part of the treatment process has yet to take place. The impact of the draft is being evaluated by EPA, the state, and regulated parties. The BOU treatment facility does not treat for chromium, but is operated in a way that treated groundwater is blended with imported MWD water to maintain total chromium levels below 5 µg/L. EPA will address adding hexavalent chromium treatment to the BOU and a final CDPH MCL is announced.

Emerging contaminants: Of the emerging contaminants 1,4-dioxane and 1,2,3-TCP are the contaminants most frequently detected at concentrations exceeding the CDPH notification levels in Area 1 (Figure 14 and Figure 15); the notification levels for 1,4-dioxane and 1,2,3-TCP are 1 µg/L and 0.005 µg/L, respectively. Groundwater extracted by well NHE-2, where 1, 4-dioxane concentrations have exceeded the notification level, is currently discharged to the Los Angeles sewer system. 1, 4-dioxane concentrations in extraction wells NHE-3, NHE-4, NHE-7, and NHE-8 also exceeded the CDPH notification level. Wellhead treatment for 1, 4-dioxane at NHE-2 is expected to be implemented, as outlined in the second interim remedy for the NHOU. At the request of the EPA LADWP began monthly monitoring of 1, 4, dioxane concentrations in wells in 2010. EPA is evaluating the impacts of increasing concentrations of 1, 4, dioxane to the existing and future remedy.

1, 2, 3-TCP, a VOC, is treated using LPGAC which effectively removes the contaminant to non-detect levels but shortens the bedlife of the activated carbon. In the BOU, 1, 2, 3-TCP is also effectively treated with LPGAC, with the side effect being a shortened carbon bedlife. From 2006 – 2011, 1, 4-dioxane and 1, 2, 3-TCP have not been sampled in any of LADWP's sampled production wells in the well fields indicated in the figures. Perchlorate has not been detected in Area 1 above the state MCL of 6 µg/L (Figure 16). From 2006 – 2011, perchlorate has not been detected in any of LADWP's sampled production wells.

Nitrate: Nitrates in the Shallow Zone groundwater is at levels in excess of the MCL (Figure 17). It has been speculated that nitrate is present as a result of past agricultural, sewage release to the subsurface, or natural occurrence. Nitrate is not targeted for treatment as part of the NHOU or BOU interim remedies, although the 1990 BOU ESD allows Burbank to blend to keep nitrate effluent below MCL's . Other cities in the SFV, including the City of Los Angeles, follow this practice of blending when elevated nitrate concentrations are present in groundwater. Nitrate has been detected above its MCL of 45 mg/L as Nitrate in two of LADWP's Rinaldi-Toluca production wells. Nitrate was not detected above the MCL in the Deeper Zone.

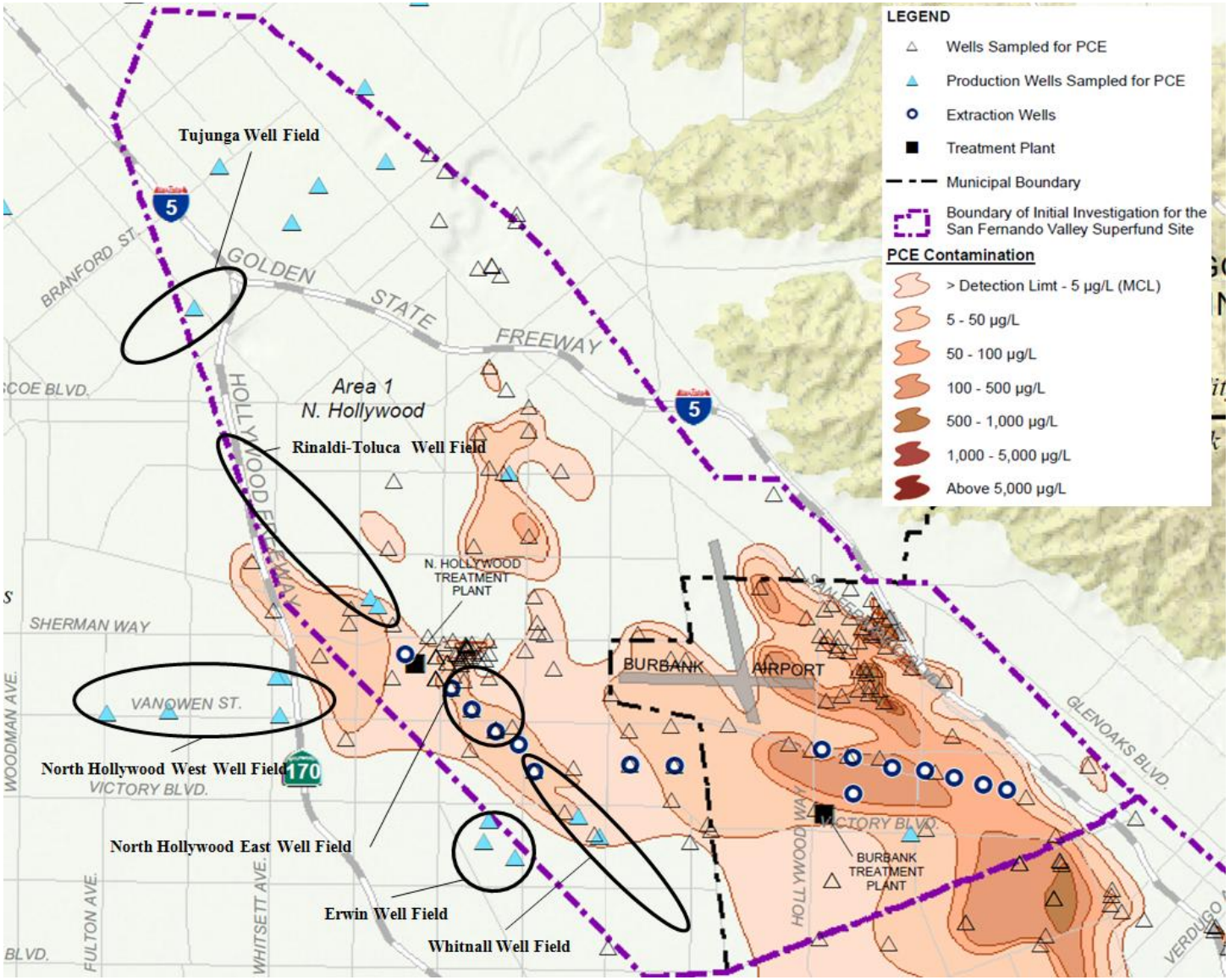

Figure 8. PCE in the Shallow Zone (Most Recent Concentration January 2006-2011)

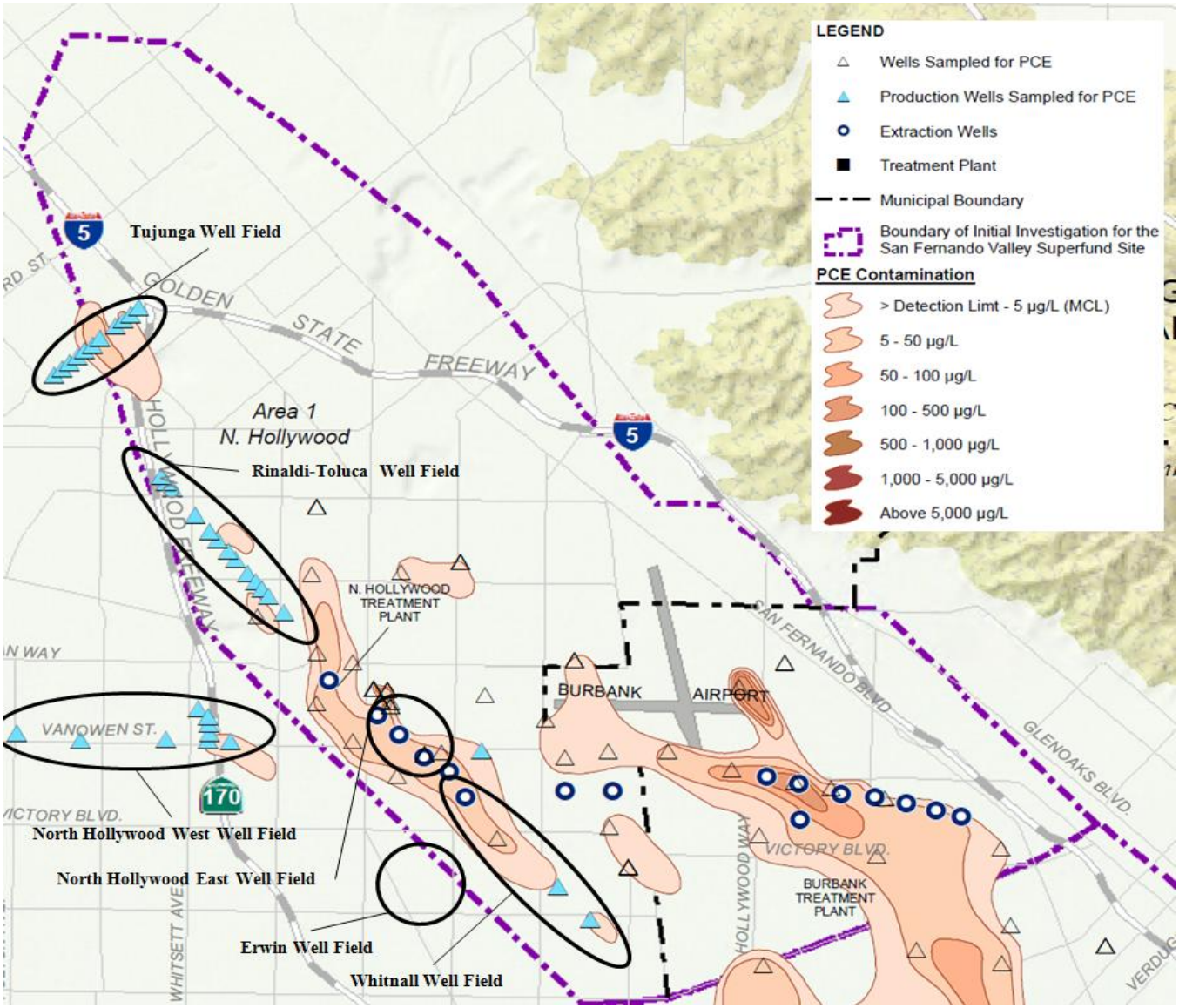

Figure 9. PCE in the Deeper Zone (Most Recent Concentration January 2006-2011)

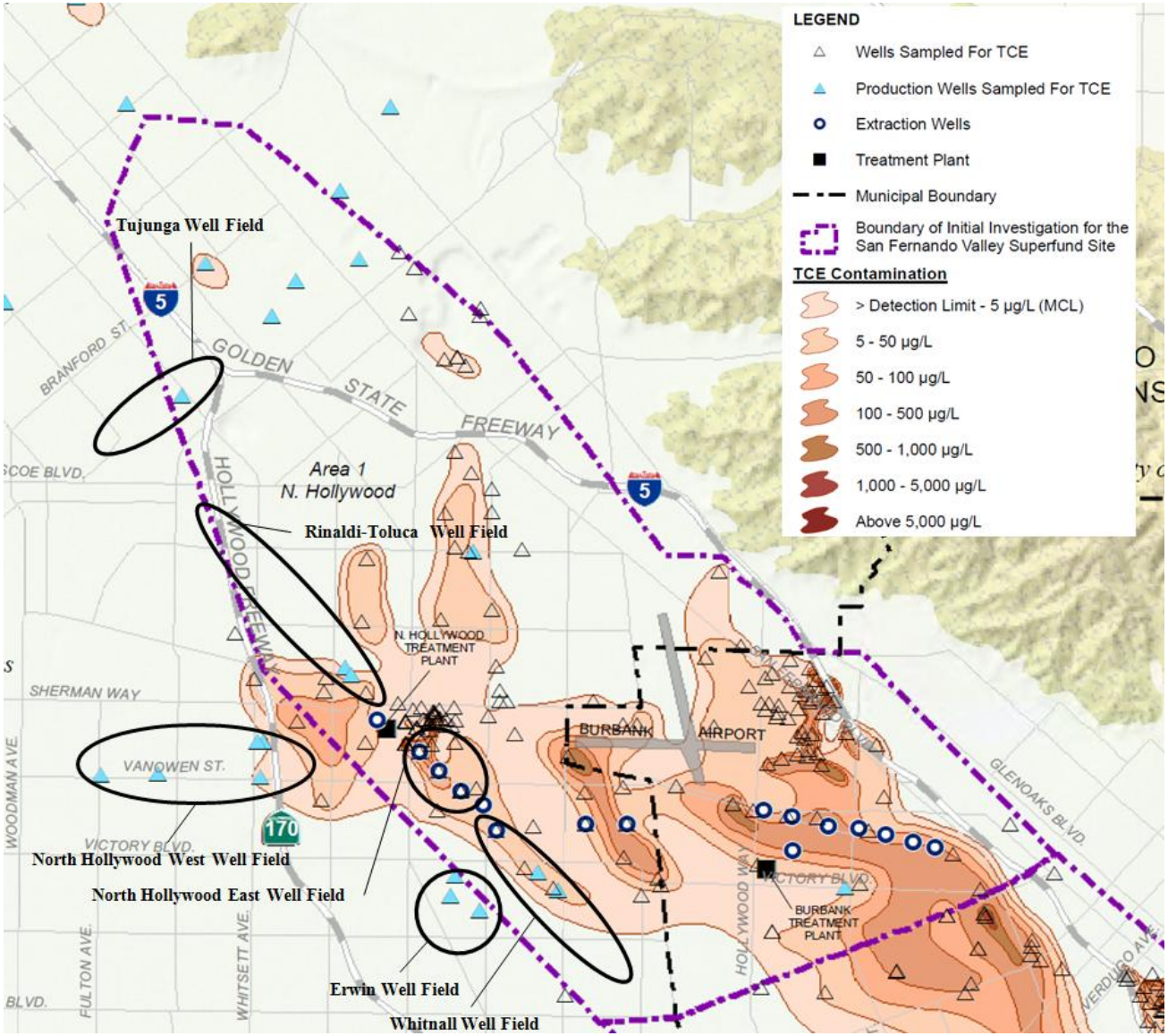

Figure 10. TCE in the Shallow Zone (Most Recent Concentration January 2006-2011)

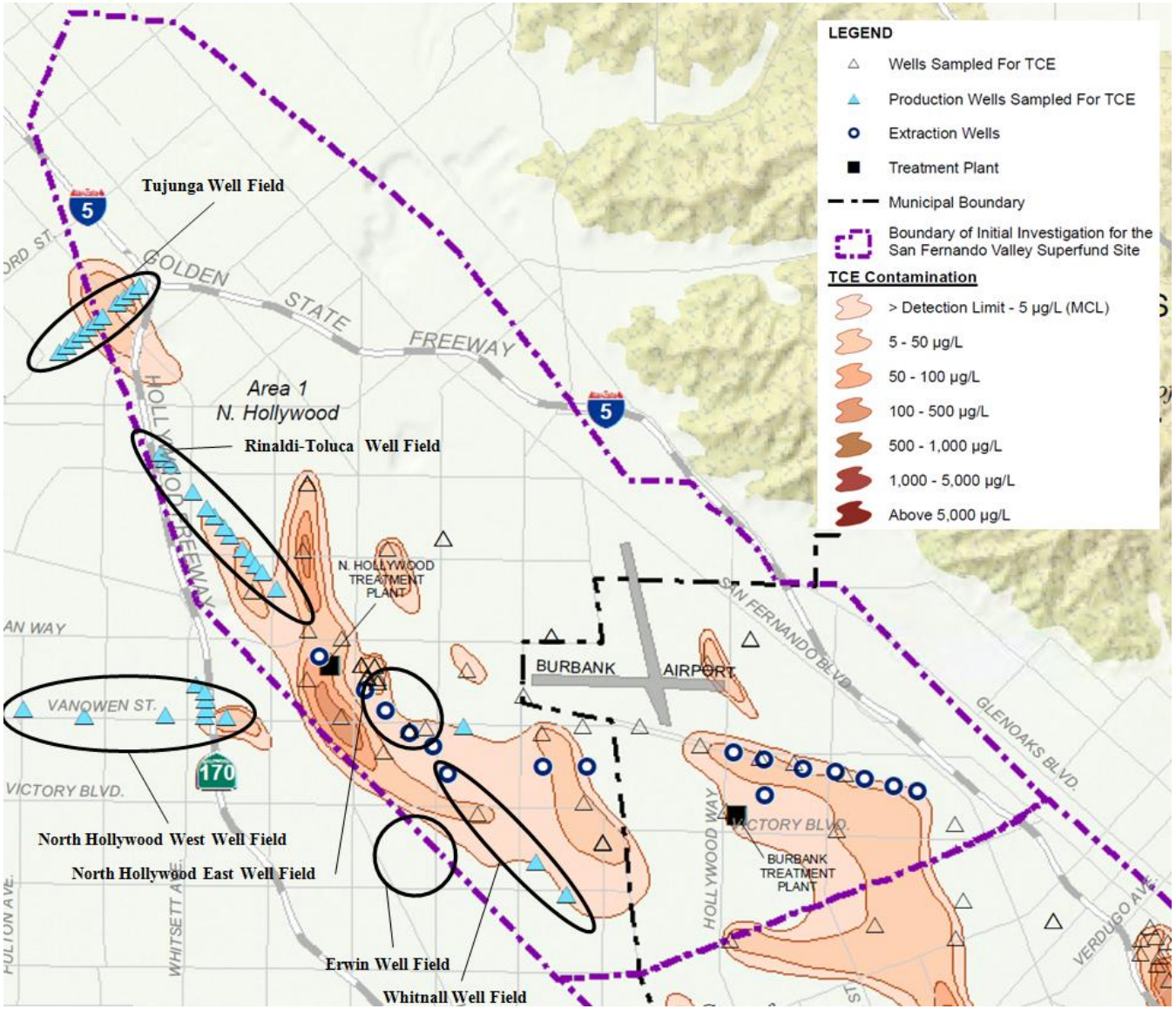

Figure 11. TCE in the Deeper Zone (Most Recent Concentration January 2006-2011)

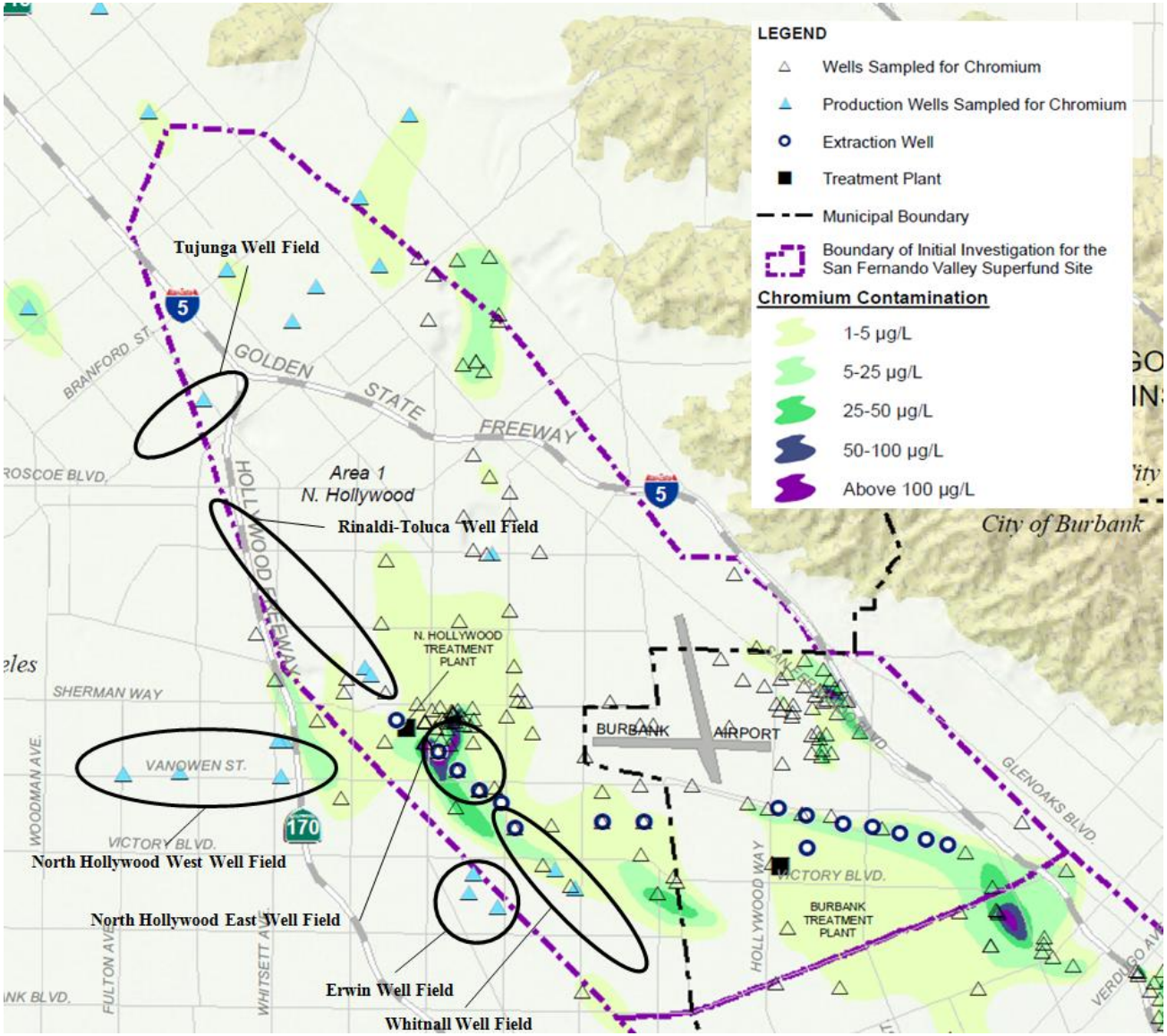

Figure 12. Total Chromium in the Shallow Zone (Most Recent Concentration January 2006-2011)

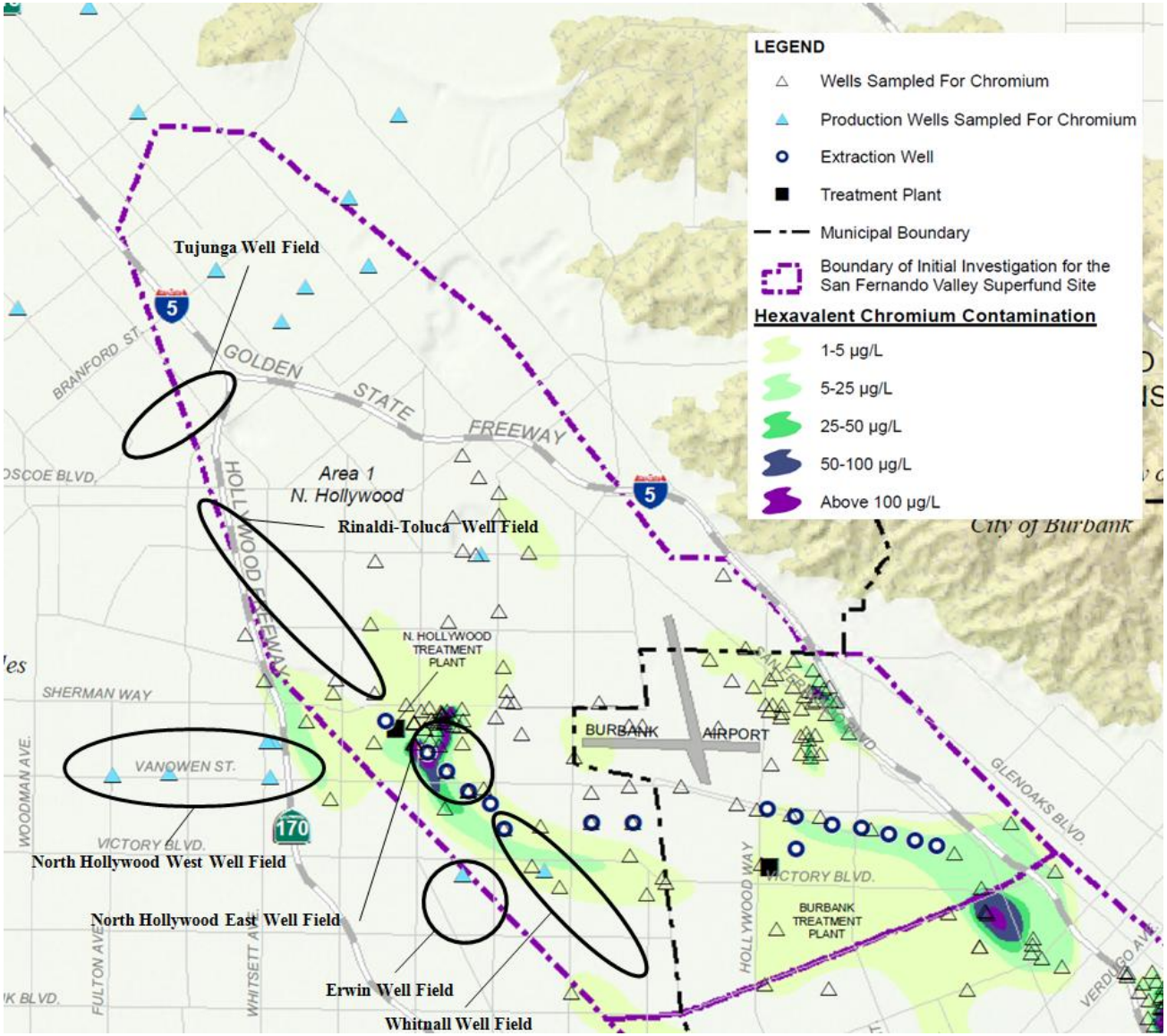

Figure 13. Hexavalent Chromium in the Shallow Zone (Most Recent Concentration January 2006-2011)

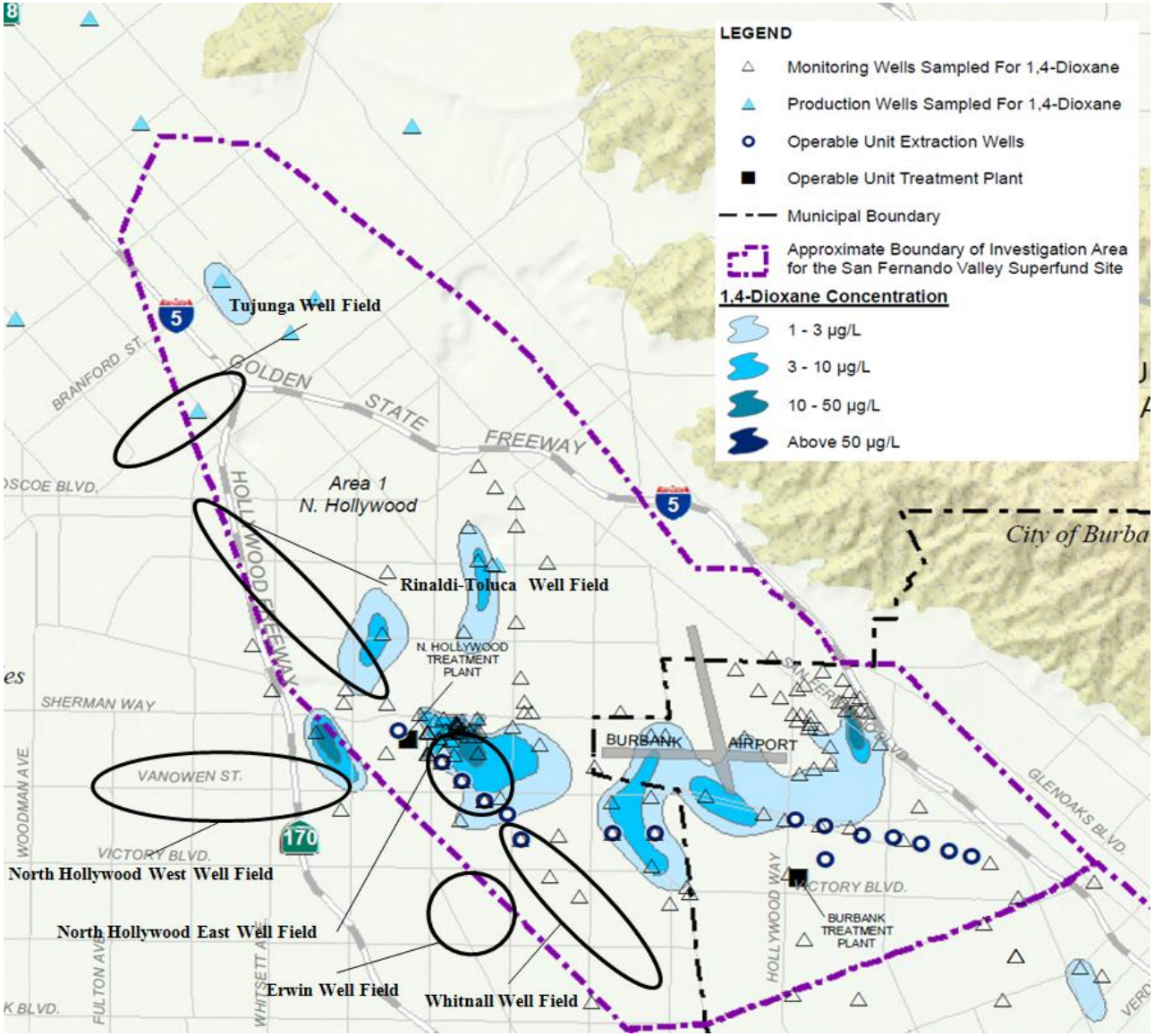

Figure 14. 1,4-Dioxane in the Shallow Zone (Most Recent Concentration January 2006-2011)

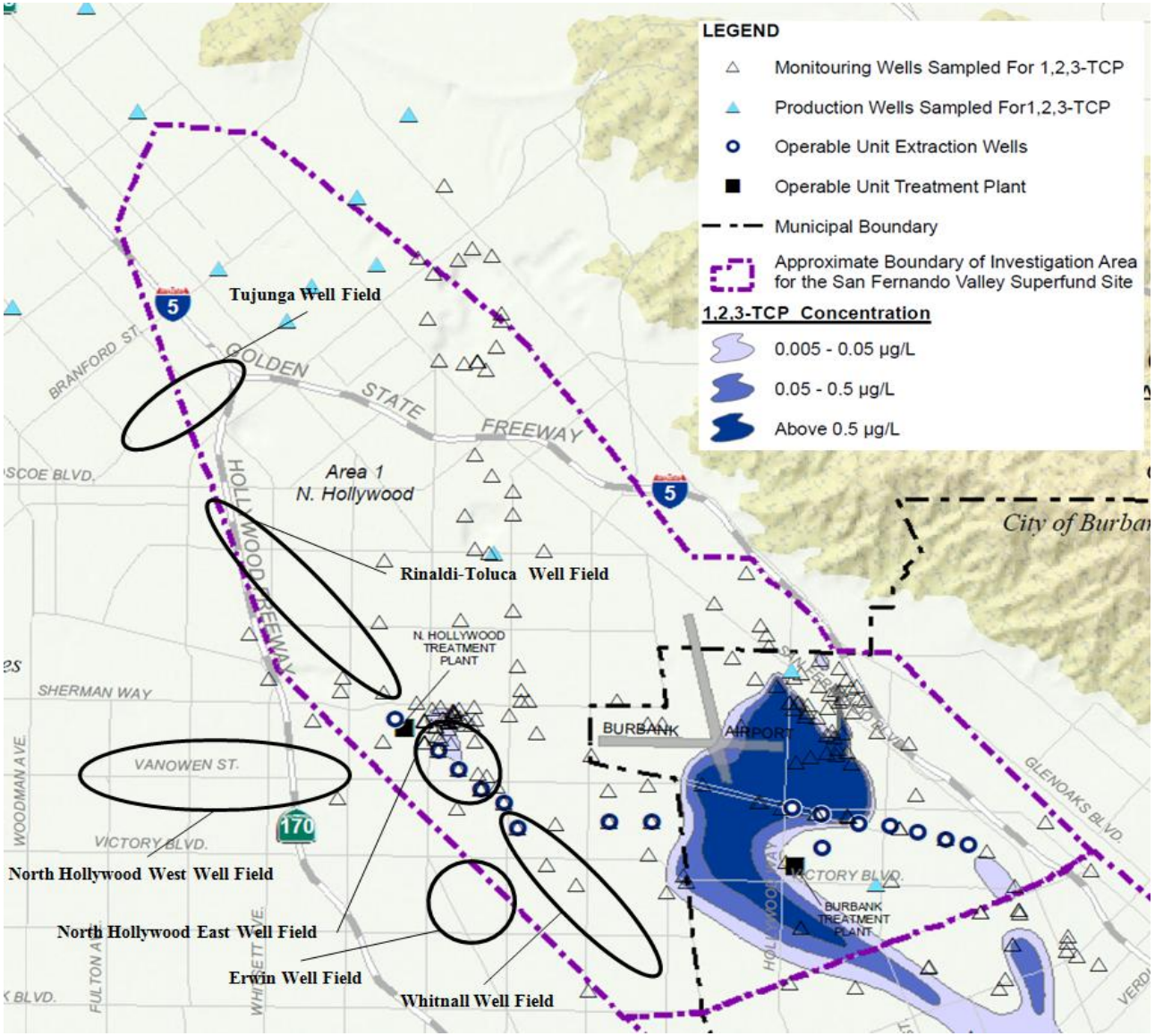

Figure 15. 1,2,3-TCP in the Shallow Zone (Most Recent Concentration January 2006-2011)

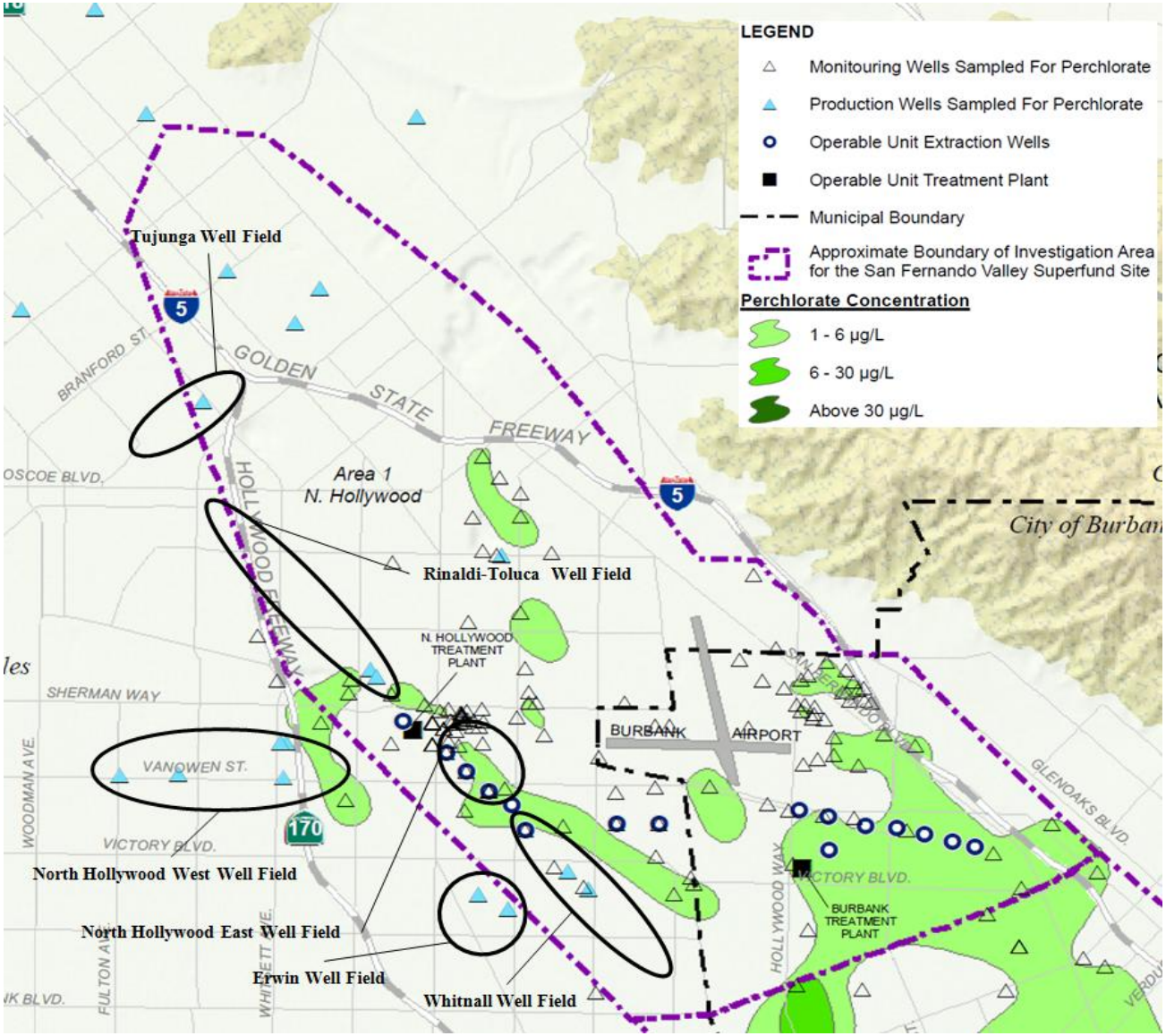

Figure 16. Perchlorate in the Shallow Zone (Most Recent Concentration January 2006-2011)

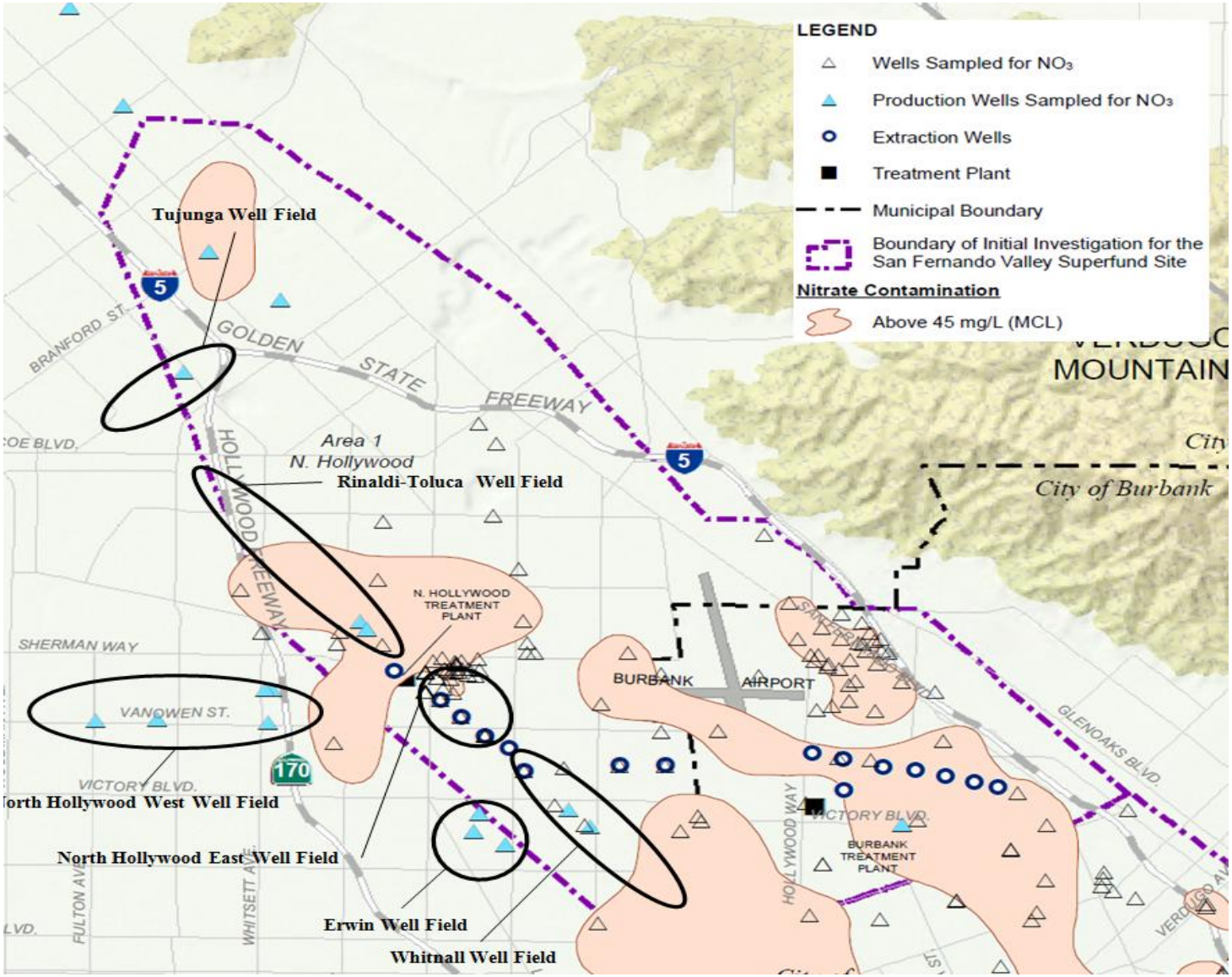

Figure 17. Nitrate in the Shallow Zone (Most Recent Concentration January 2006-2011)

6.4.2. Groundwater Extraction and Treatment Systems

NHOU

From January 2010 through September 2012, the NHOU extraction and treatment system operated at a pumping rate of less than 960 gpm, and treated approximately 993 million gallons of water. Average influent TCE and PCE concentrations were 27 and 7.2 µg/L, respectively, and neither TCE nor PCE was detected in the plant effluent. Approximately 279 pounds of VOCs were removed from January 2010 through September 2012. For comparison, approximately 300 pounds of VOCs were removed annually as of September 2009; the frequent unexpected shutdowns since January 2010 have limited the ability of the treatment facility to remove VOCs.

TCE concentrations in extraction well NHE-2 have shown a decreasing trend (Figure 18) and PCE concentrations have increased (Figure 19), though NHE-2 is currently discharging to the sanitary sewer after wellhead treatment. TCE and PCE concentrations in all other extraction wells have remained relatively stable. Refer to Figure 2 for locations of the extraction wells listed in the following Figures.

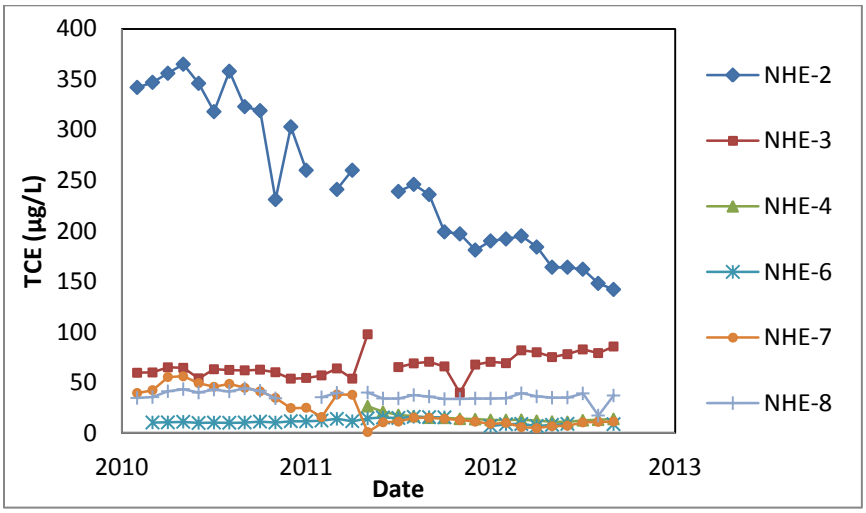

Figure 18. TCE Concentrations in NHOU Extraction Wells

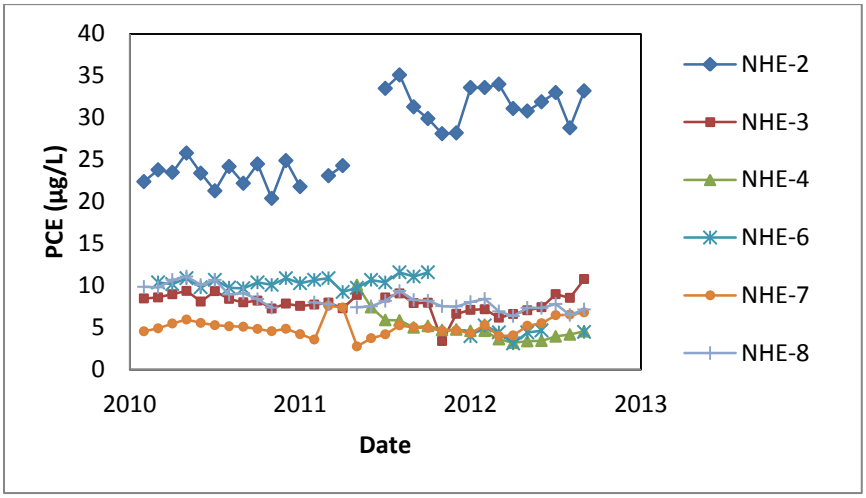

Figure 19. PCE Concentrations in NHOU Extraction Wells

Chromium is not removed by the VOC treatment process in place at the NHOU. Extraction well NHE-2 was producing the highest concentrations of chromium, but has shown a decreasing trend since the beginning of 2010 (Figure 20). The decreasing trend may be related to in-situ source remediation activities occurring at the former Honeywell facility. In December 2012, an increasing chromium trend in well NHE-3 above the California MCL of 50 µg/L resulted in LADWP shutting down the well (Figure 21). The well will remain offline pending a solution for treating chromium levels. When in operation the increasing concentrations of chromium in NHE-3 increased the concentration of chromium in the NHOU effluent resulting in the exceedence of the voluntary clean-up level of 5µg/L in July and August 2012 (Figure 22).

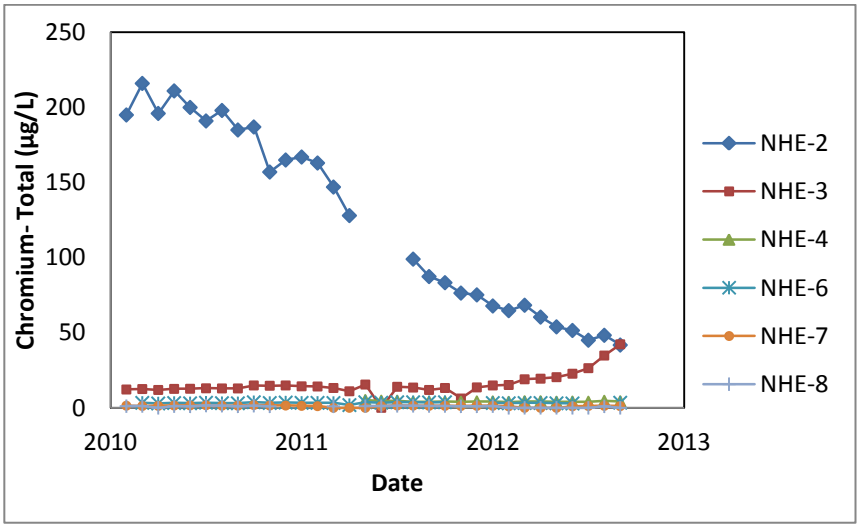

Figure 20. Total Chromium Concentrations in NHOU Extraction Wells

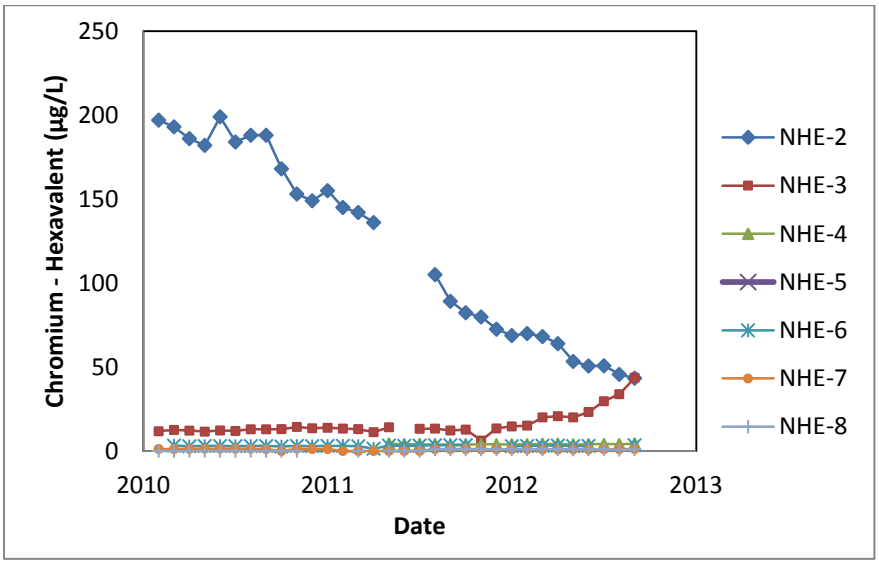

Figure 21. Hexavalent Chromium Concentrations in NHOU Extraction Wells

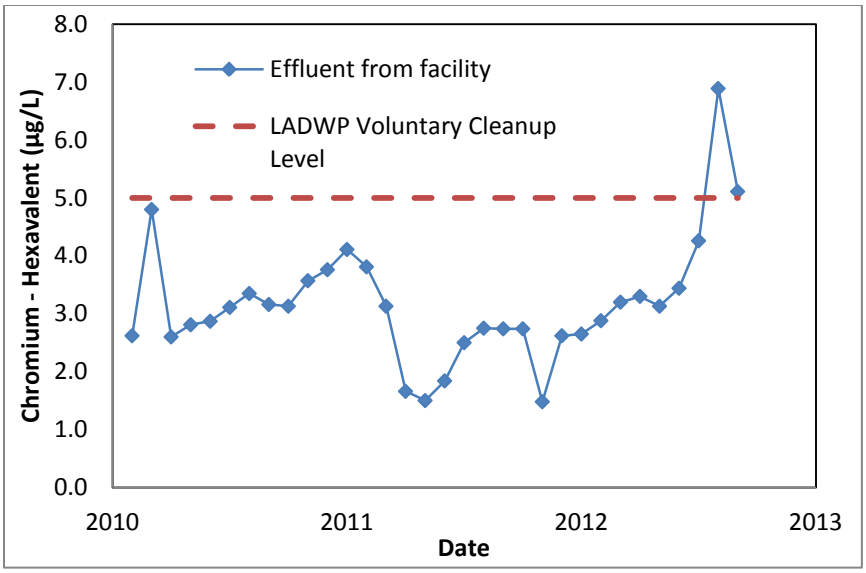

Figure 22. Hexavalent Chromium Concentration in NHOU Plant Effluent

Of the emerging contaminants of concern, 1,4-dioxane was frequently detected at extraction wells NHE-2, NHE-3, NHE-4, NHE-7, and NHE-8 at levels above the CDPH notification level of 1 µg/L (Figure 23); values on the x-axis are non-detects. Neither the combined plant influent nor effluent was sampled for 1,4-dioxane from January 2010 through September 2012. 1,2,3-TCP, on the other hand, has not been detected in any of the extraction wells over the same period. Perchlorate was only detected in the August 2012 sample from well NHE-2, though the concentration (2.28 µg/L) was below the California MCL of 6 µg/L; perchlorate was not detected in any other NHOU extraction wells during this period.

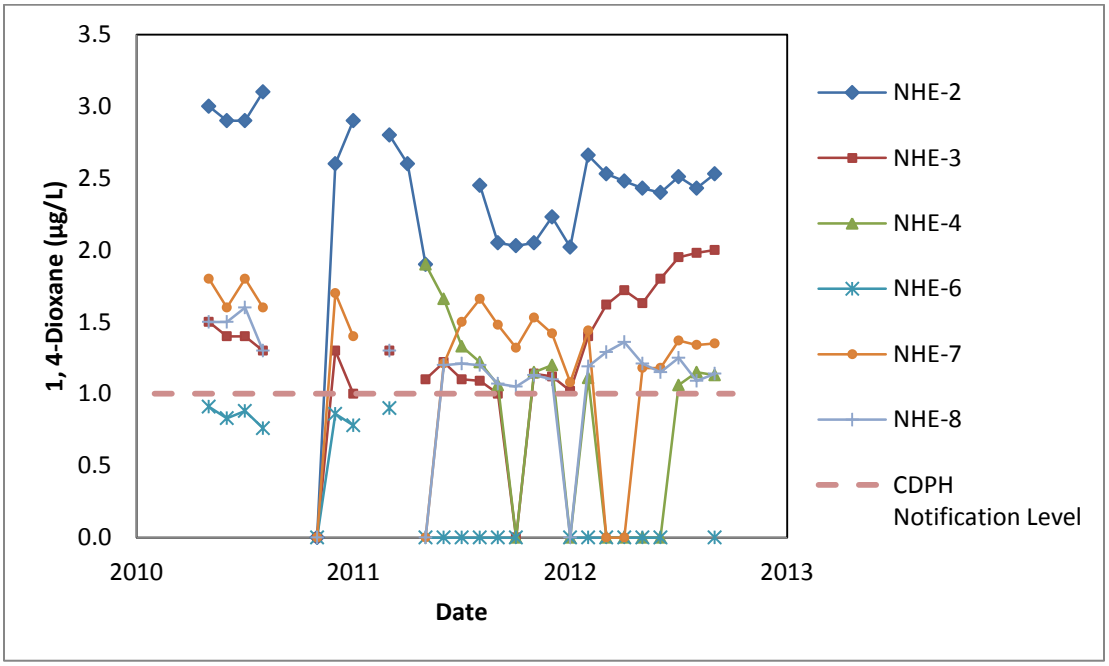

Figure 23. 1,4-Dioxane Concentrations in NHOU Extraction Wells

BOU

From July 2010 through January 2012 (excluding March and April of 2011 because the monthly reports were unavailable), the BOU extraction and treatment system operated at an average pumping rate of about 6,500 gpm, and treated approximately 4,847 million gallons of water. Excluding months when the 9,000 gpm capacity was occurring (July through September 2010), the average pumping rate was about 6,200 gpm. In more recent months, though, flow rates have generally been higher than 7,000 gpm (e.g., Figure 24).

Average influent PCE and TCE concentrations were 134 and 75 µg/L, respectively. In the 75 air stripper effluent samples that were taken from July 2010 through January 2012, PCE was detected in only five, and only one of those had a concentration above 0.77 µg/L (3.2 µg/L on 6 July 2010). TCE was only detected in the air stripper effluent once (3.4 µg/L on 6 July 2010). Excluding March and April 2011 because the data were unavailable, an estimated 8,430 pounds of VOCs were removed from July 2010 through January 2012. Influent PCE and TCE concentrations from January 2012 through February 2013, along with other VOCs, are shown in Appendix G. There is no apparent trend in influent PCE or TCE concentrations. PCE and TCE concentrations in individual extraction wells are shown in Appendix H. Trends are well and contaminant-specific. For example, PCE concentrations appear to be increasing in wells VO-1 and VO-5, but decreasing in wells VO-4, VO-7, and VO-8. TCE concentrations appear to be decreasing, if only slightly, in wells VO-4, VO-5, VO-6, VO-7, and VO-8.

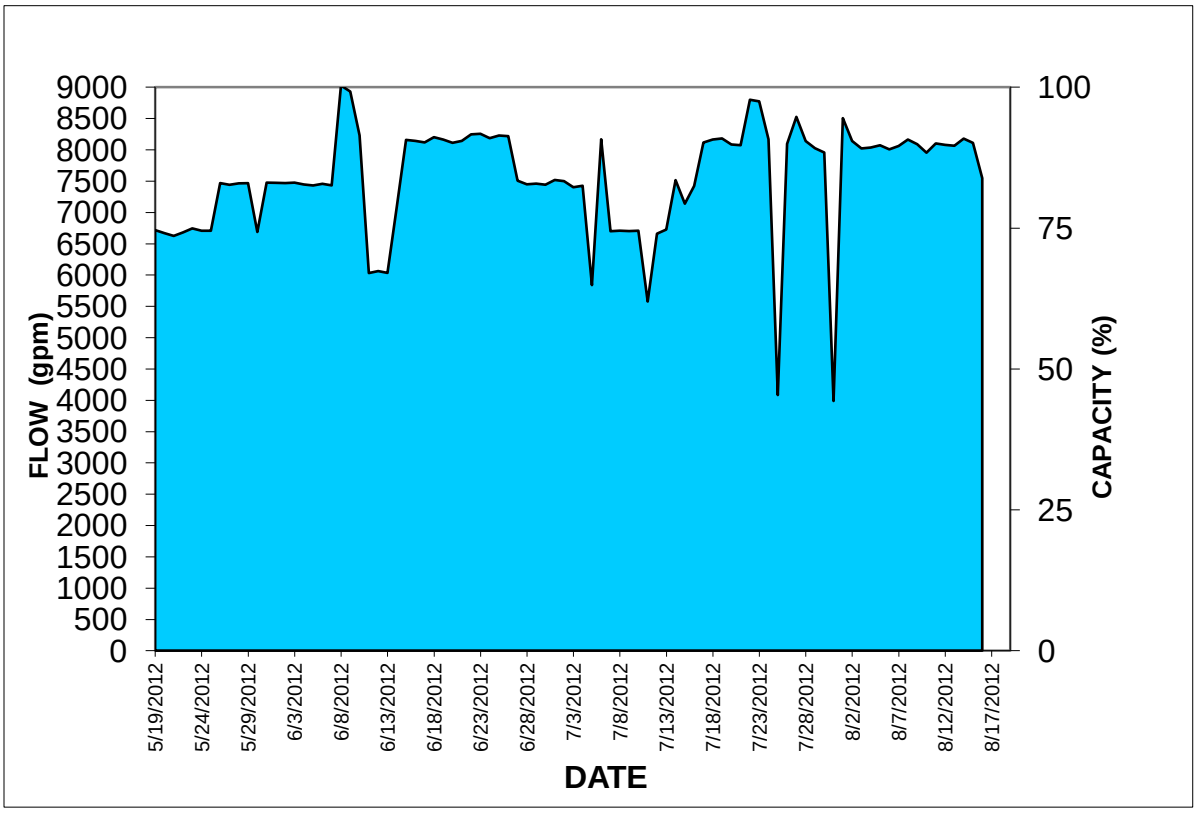

Figure 24. Daily Average BOU Flow Rate (May 2012 – August 2012)

Chromium is not removed by the treatment process in place at the BOU. Total chromium was detected in all 75 BOU treatment system effluent samples from July 2010 through January 2012 (excluding March and April of 2011), 50 of which were at concentrations above the City of Burbank distribution system voluntary limit of 5 µg/L. However, BOU treatment system effluent is blended with water from MWD so that the voluntary chromium limit in the Burbank distribution system is less than 5 µg/L.

City of Burbank Annual Water Quality Reports show the average chromium concentration of blended water ranged from 2.8 to 4.1 µg/L from 2008 to 2011. Over the same period, hexavalent chromium concentrations in the system effluent ranged from 2.7 to 8.4 µg/L and averaged 5.3 µg/L. Effluent total and hexavalent chromium concentrations from January 2012 through February 2013 are shown in Figure 25. Total and hexavalent chromium concentrations in individual extraction wells are shown in Appendix H. Hexavalent chromium appears to be decreasing in well VO-5.

1,4-dioxane is also not removed by the BOU treatment process. Figure 26 shows influent and effluent concentrations of 1, 4-dioxane from October 2007 through January 2013. There appears to be an increasing trend, with the most recent sampling exceeding the CDPH notification limit. Burbank blends treatment plant effluent to reduce 1, 4 dioxane concentrations below the notification level. Concentration data for 1,4-dioxane in individual extraction wells was unavailable at the time of this review.

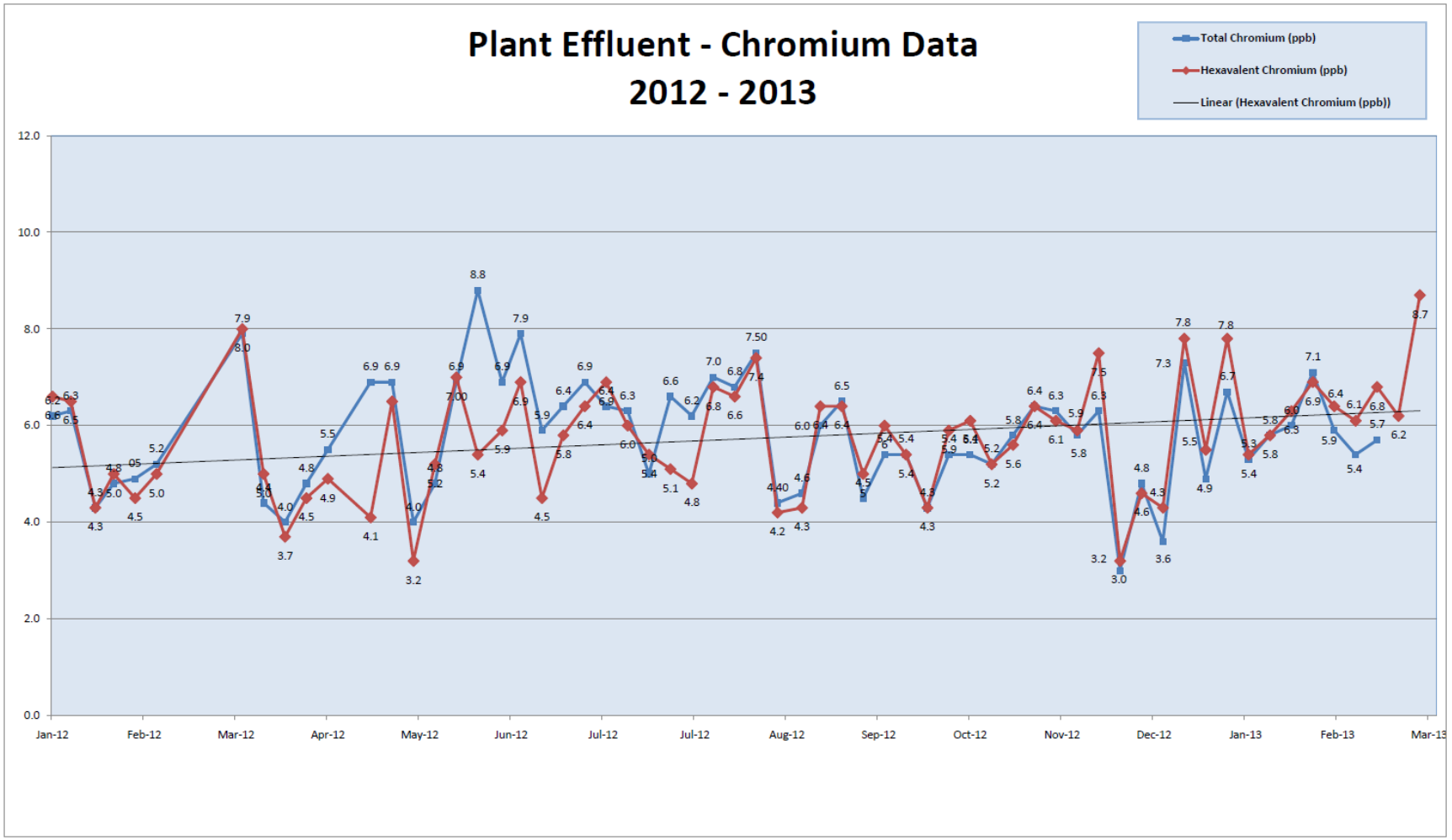

Figure 25. Total and Hexavalent Chromium Concentrations in BOU Treatment System Effluent

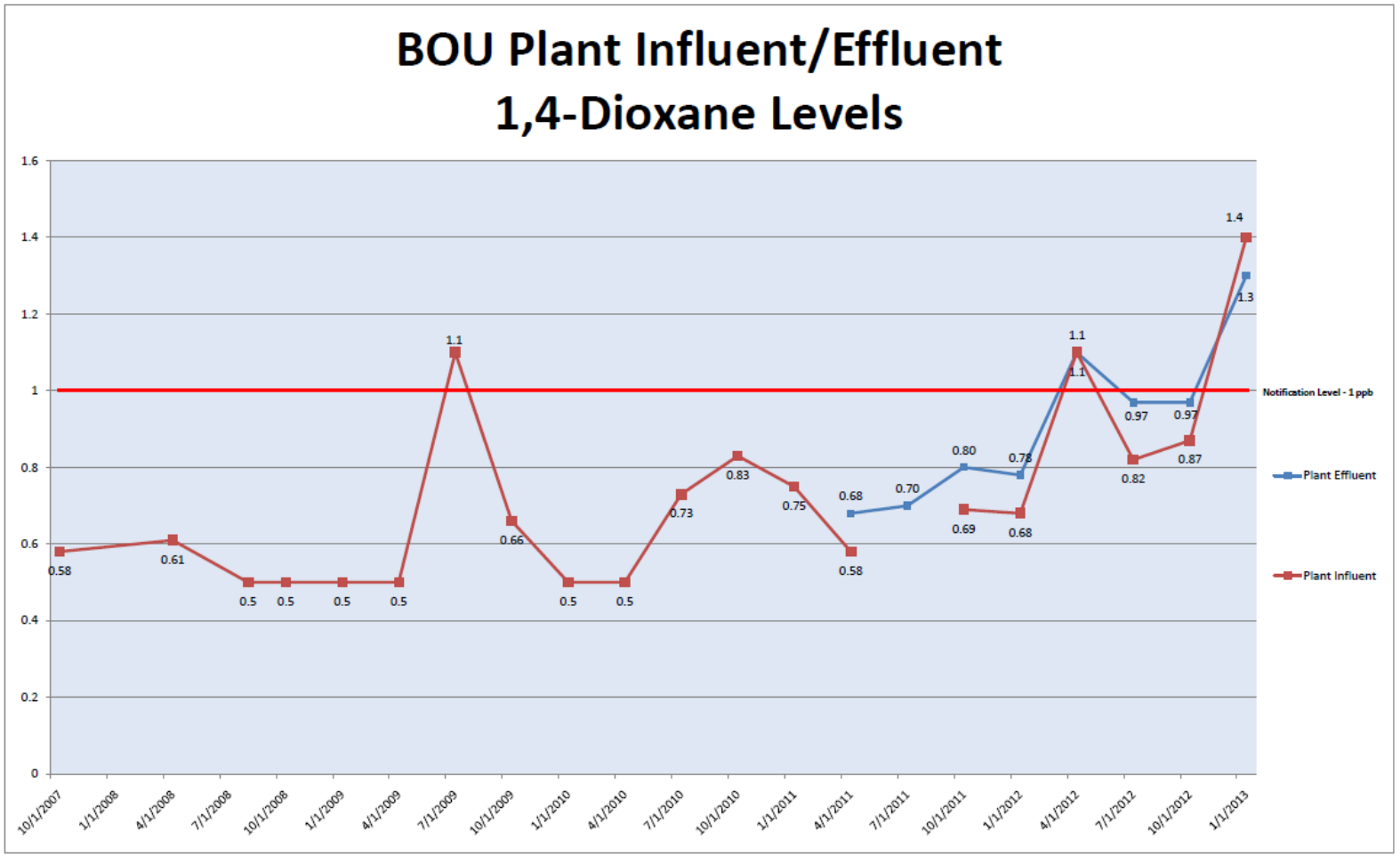

Figure 26. 1,4-dioxane Concentrations in BOU Treatment System Influent and Effluent

Influent 1,2,3-TCP concentrations are generally greater than the CDPH notification level, and appear to be increasing (Appendix G). The LPGAC units successfully treat 1, 2, 3-TCP. To prevent breakthrough of the contaminant at higher concentrations in the effluent, samples are taken from the LPGAC vessels, as described in Section 4.3, to ensure that 1,2,3-TCP does not exceed the notification level. 1, 2, 3-TCP concentrations in individual extraction wells are shown in Appendix H; 1, 2, 3-TCP appears to be decreasing in well VO-2 and increasing in wells VO-1, VO-4, VO-5, and VO-7. The LPGAC vessels are sufficient to treat 1, 2, 3 TCP to concentrations below the notification level.

From January 2012 through March of 2013, nitrate in the plant effluent did not exceed 38 mg/L, and, therefore, did not exceed its MCL. Since October 2007, nitrate has been detected above its MCL at least once each in wells VO-1, VO2, and VO-4 (Appendix H).

6.4.3. Containment of Contaminated Groundwater

6.4.3.1 Groundwater Modeling

A MODFLOW groundwater model for the San Fernando Valley basin was originally developed in 1992 for use in the 1994 San Fernando Basin Feasibility Study. This model was updated in 2007 for use in the FFS. The model's vertical discretization was based on the concept of Depth Regions, where Depth Region 1 correlated to the Upper Zone and upper Middle Zone, Depth Region 2 correlated to the lower Middle Zone and Lower Zone, and Depth Regions 3 and 4 correlated to the Deep Zone. The FFS model was used to evaluate impacts from projected future increases in production well field pumping. Final predictions indicated that long-term increases in pumping rates would cause significant dewatering of Depth Region 1 and that NHOU extraction wells would need to be deepened and additional extraction wells would be needed to protect the Rinaldi-Toluca production wells. Since the FFS modeling was completed, the ULARA Watermaster has revised the projected pumping and artificial recharge rates. The 2012 Data Gaps Analysis concluded that pumping and recharge volumes that would result from these new projections would increase groundwater levels rather than decrease. An updated groundwater model will be prepared during the RD to be consistent with the revised Conceptual Site Model. The final RD will be based on this updated model.

NHOU

As discussed in Section 4.3 Operation and Maintenance, NHOU plant shutdowns, including almost 6 months of 2012, as well as other significant plant non-operation time periods including 80 days in 2011, indicate that only partial containment may be achievable until/unless O&M issues are resolved and the 2009 NHOU remedy is in place.

BOU

There is uncertainty surrounding the achievement of containment in the BOU because the treatment facility has never operated in accordance with 9,000 gpm average annual pumping requirements outlined in the 1997 ESD. The BOU extraction rate has achieved an average monthly extraction rate of 6,500 gpm during this five-year-review period.

2010 drawdown data collected from monitoring wells during the 60-day 9,000 gpm demonstration test show that the treatment facility is capable of creating a large and robust zone of drawdown at 9,000 gpm (2011, CH2M Hill). The presence of drawdown does not imply hydraulic capture although there is

usually a correlation between the drawdown and capture zone. This pump-test analysis revealed that the some hydrogeologic parameters assumed at the time of the selection of the 9,000 gpm extraction rate were inaccurate. The original BOU conceptual site model (CSM) assumed two aquitards, whereas the pump-test analysis revealed that one of the aquitards is not an aquitard, but an unconfined unit. Transmissivity and hydraulic conductivity values were found to be significantly different that what was assumed in the original CSM. Tranmissivity values were assumed to be 1,800 ft^2/day for layer 1,500 ft^2/day and 8,200 ft^2/day for layer 2. Pump-test observations updated these values to 24,000 ft^2/day for layer 1 and 8,200 ft^2/day for layer 2. The principle reason for the much lower transmissivities used in the original CSM is the use of an incorrect hydraulic conductivity value of 15 ft/day. Analysis revealed hydraulic conductivity values of 153 ft/day, approximately 10 times higher than the original CSM.

A 2006 report by Tetra Tech, *Capture Zone Evaluation for the Burbank Operable Unit*, models different rates of capture at rates ranging from 4,000-9,000 gpm. The report concluded that hydraulic control, (i.e. containment), at 6,000 gpm is comparable to what was expected when the 9,000 gpm rate was originally selected. The model used to perform this evaluation was the subject of much comment from EPA; therefore model results would need to be revisited before any conclusions were accepted. A 2013 Arcadis report states that based on many lines of evidence including the evaluation of potentiometric surface maps, transducer data, an assessment of hydraulic gradients (horizontal and vertical), and analysis of long-term concentration trends, the BOU extraction system is controlling migration at average flow rates of 5,800 gpm or more.

Previous modeling studies, observations made during the 2010 pump-test, and other lines of evidence suggest that containment may be achieved a pumping rates lower than 9,000 gpm. However a formal vetting of this hypothesis with EPA has yet to occur. In order to make a containment determination the facility must operate at an average annual rate of 9,000 gpm, or it must be demonstrated that containment can be achieved at lower pumping rates. EPA considers the fact that the BOU pumps at rates less than 9,000 gpm an issue to be corrected pending a demonstration and the acceptance of alternative pumping rates.

6.5. Site Inspection

The NHOU and BOU site inspections were conducted on February 27, 2013 and February 26, 2013, respectively. A completed site inspection checklist for each OU is provided in Appendix D. Site photographs are given in Appendix E. Below are summaries of each site inspection.

NHOU

The NHOU site inspection was conducted by Vahe Dabbaghian (LADWP, Civil Engineering Associate III,) Roberto Ruiz (LADWP), Greg Tuttle (LADWP, Water Treatment Operator), Ernesto Ruiz (LADWP, Water Treatment Operator) , Greg Reed (LADWP), John Lindquist (CH2MHill, Senior Project Hydrogeologist), ZiZi Searles (EPA, RPM), David Sullivan (USACE, Geologist) and Aaron King (USACE, Environmental Engineer). The group met at the NHOU treatment facility. There, Mr. Tuttle, Mr. Roberto Ruiz, Mr. Ernesto Ruiz, Mr. Dabbaghian, and Mr. Reed described the operations of the NHOU treatment facility and answered questions. The NHOU treatment plant was not operating at the time of the site inspection due to a leak in the effluent pipeline, the third such incident in the last few years. Many system components are aging and/or antiquated and in need of replacement. The air stripper is showing signs of corrosion and needs to be repainted. The treatment plant is double-fenced, has security cameras on opposite sides of the air stripper, and is somewhat isolated; trespassing, theft, or vandalism has not been an issue.

Most site documentation is kept in LADWP's offsite filter building. Spare parts are also kept in the filter building. MSDS for chlorine were located in the treatment operator's vehicles, but the descalant MSDS sheets were not located. No MSDS were located in the site chlorination building at the time of the inspection. Mr. Dabbaghian showed several charts of contaminant concentrations at extraction wells, noting in particular that chromium is increasing in well NHE-3. He also noted that, because of the various design and operational problems that cause long facility shutdowns, the NHOU extraction and treatment system has failed to achieve its goals and needs to be replaced.

Mr. Roberto Ruiz and Mr. Lindquist then guided the tour of the extraction wells, some of which were inspected. All of the wells were fenced off, except for NHE-6, which is in an open lot. Vandalism has been reported on extraction well NHE-6. Extraction wells NHE-2 and NHE-3 were inspected. In general, the wells appeared to be in good condition. In CDPH's most recent sanitary survey of the NHOU, there were concerns about the vegetative overgrowth near NHE-2, but the issue appears to have been dealt with. Overall, the NHOU system is not operating as desired due to various design and operational problems.

BOU

The BOU site inspection was conducted by Albert Lopez (City of Burbank, EPA Project Coordinator), Charles Grace (APT Water, Plant Manager), Ms. Searles, Mr. Sullivan, and Mr. King. The group met at the BOU treatment facility. Mr. Lopez and Mr. Grace guided the tour of the BOU treatment facility, describing its operation and answering questions. The system appeared to be well-maintained and operating as desired. All site documentation is kept in the control room and is well-organized. Spare parts

are kept in storage containers on site. Theft of small system components has occurred on a few occasions in the past. The only complaint noted has been noise, but sound attenuation blankets were installed over the blowers. Still, a high-pitched noise can be heard by at least one off-site resident, and Mr. Lopez noted that the City is investigating the cause of the noise and possible remedies. Mr. Lopez and Mr. Grace then guided a brief tour of the extraction well locations; extraction well VO3 was inspected. Well VO3 is in an underground vault. It appeared to be well-maintained and in good operating condition. The sampling cabinet for VO3 also appeared to be in good condition. Overall, the BOU system appears to be well-maintained and operating as desired.

6.6. Interviews

During the FYR process, interviews were conducted with parties impacted by the Site, including the current facility operators, oversight contractors, and regulatory agencies involved in Site activities or aware of the Site. The purpose of the interviews was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy that have been implemented to date. Most of the interviews were conducted during the Site visit between February 26 and February 28, 2013. Interviews are summarized below and completed interview forms are included in Appendix C.

NHOU

Greg Tuttle and Ernesto Ruiz, Water Treatment Operators, LADWP; 27 February 2013; at the NHOU Treatment Facility. Mr. Tuttle and Mr. Ruiz felt that the NHOU facility is a great facility that is easily operated, but that it has become less reliable over the years. The treatment facility worked better when it was new, but it serves a good purpose by removing contaminants from drinking water from a local source. There is 24-hour monitoring from the LADWP Filter Plant control room (off-site), and the facility is visited at least once daily. Unexpected difficulties include the replacement of packing material that some sort of scale had built up on, several repairs to the effluent pipe downstream of the plant, and failure and difficult recalibration of the humidity/temperature probes downstream of the heater.

Vahe Dabbaghian, Civil Engineering Associate III, LADWP; 3 March 2013; in writing. Mr. Dabbaghian felt that, despite the good collaboration between LADWP and the state and federal regulators to address the contaminant plumes with the implementation of the current remedy, the NHOU has not operated as expected. High concentrations of contamination escape the containment areas and continue to spread to other LADWP water supply wells. Most recently, a sudden rise in hexavalent chromium in NHE-3 to nearly 52 ppb, just above the state mandated MCL of 50 ppb for total chromium, has been observed. Mr. Dabbaghian noted that urgent action is needed to respond and correct the operational deficiencies of the remedy. LADWP supports every effort that can be made by EPA to accelerate the implementation of the Second Interim Remedy and provide the protectiveness needed in the NHOU. Please note that Mr. Dabbaghian official response to the interview on behalf of LADWP was provided in writing to EPA. Please reference the LADWP interview form in Appendix C for LADWP's official response to FYR interview questions.

John Lindquist, Senior Project Hydrogeologist, CH2M Hill; 27 February 2013; in Mr. Lindquist's personal vehicle. Mr. Lindquist stated that the system is containing much of the contamination, but there

are doubts as to whether complete containment is occurring due to site downtime and the remedy not functioning at design flow rates. Some wells have shown increasing contaminant trends while others show decreasing trends; for example, NHE-2 has shown decreases in chromium while NHE-3 has shown increases in chromium. Mr. Lindquist noted that it may be possible to improve system uptime and changes to system maintenance for this purpose should be considered, and that O&M procedures should be reviewed.

Susan Brownstein, Associate Sanitary Engineer, CDPH and Chi Diep, Senior Sanitary Engineer, CDPH; 27 February 2013; at the CDPH Office. Ms. Brownstein and Mr. Diep felt that progress has been very slow at the NHOU, noting that the facility needs attention and emergent contaminants need to be addressed. The most recent sanitary survey (report done Oct 2011) showed at least four deficiencies: 1) the air stripper needing maintenance in terms of painting and corrosion, 2) the calcification of the packing in the tower due to the unnoticed failure of the anti-scalant chemical feed, 3) the conditions at well NHE-6 that wasn't fenced in like the other wells, which resulted in graffiti and trespassing, and 4) the conditions at well NHE-2, which was completely overgrown with weeds and there was concern about pesticides because of its proximity to plant nurseries. In response to a question about opportunities to optimize the system, Ms. Brownstein stated that the plume is uncontrolled and the remedy is not working, so this isn't the time to optimize the system. From CDPH's perspective, either the development of the new remedy has been an extremely slow process. CDPH is happy with EPA's involvement, and supports ongoing efforts of EPA to facilitate co-operation between various entities (LADWP, PRPs, etc.).

BOU

Albert Lopez, EPA Project Coordinator, City of Burbank; and Charles Grace, Plant Manager, APT Water; 26 February 2013; at the BOU facility. Mr. Lopez and Mr. Grace feel that it is a worthy project because it has provided clean water to the City of Burbank. The remedy functions well from an operations standpoint; contaminant levels appear to be diminishing, but water levels are also declining so it is difficult to tell. However, the plume is being cleaned up with minimal effects to the community. There has been one noise complaint, and the City is working to correct the issue. Operators are on site 365 days a year, 24 hours a day. It is expected that the issuance of an MCL for hexavalent chromium will affect protectiveness because the facility is not set up to treat hexavalent chromium.

Paul Williams, District Engineer, CDPH; 27 February 2013; at the CDPH Office. Mr. Williams felt that the BOU remedy is a good project and a benefit to the area. He noted that there are lots of dedicated people involved with the project. The remedy appears to be functioning as expected, but CDPH is not focused on how the plume is managed. Mr. Williams suggested that the City look at regenerating carbon, but stated that the City of Burbank and their O&M contractor are ahead of the game in most other areas regarding optimization. CDPH has experienced significant delays in receiving monthly monitoring reports.

Karen Meade, Project Manager, CH2M Hill; and Ken Martins, Senior Process Technologist, CH2M Hill; 6 May 2013; via telephone. Ms. Meade and Mr. Martins stated that the BOU system has been well-maintained. Based on the RAOs, the remedy is functioning as expected. The system is capable of 9,000

gpm, but the extraction rate is dependent on the demands of drinking water consumers. Pumping volumes of about 6,000 gpm appears to cut off the plume at the line of wells in an approximate quarter to half mile radius around the BOU extraction wells. Because of the lower pumping rates, though, mass removal has been less than what it could have been. VOC trends vary among wells; 1,4-dioxane has slightly increased in the plant influent. CH2M Hill would feel better informed if BOU monthly reports were submitted in a timely manner.

Sitewide

Larry Moore, Staff Environmental Scientist, Los Angeles RWQCB; and Alex Lapolstol, Technical Consultant, E2 Consulting Engineers; 26 February 2013; at the Los Angeles Regional Water Quality Control Board Office. The discussion covered SFV Areas 1 and 2. Mr. Moore and Mr. Lapolstol felt that, overall, the projects are a positive thing; that it takes long time to implement solutions. At the NHOU a lot of effort has been invested in attempting to make the original treatment system functional. Thus far the NHOU project has been unsuccessful at achieving plume capture. EPA continues to invest effort in facilitating co-operation between all NHOU stakeholders. It is the RWQCB's desire to see LADWP, EPA, and the PRPs come to an agreement regarding the appropriate pumping rates for LADWP production wells so the 2009 NHOU remedy is not adversely impacted.

Richard Slade, ULARA Watermaster; and Anthony Hicke, Assistant to the Watermaster; 28 February 2013; at the ULARA Watermaster Office. The discussion covered SFV Areas 1 and 2. Mr. Slade and Mr. Hicke noted that the plumes are still there and have spread more, and that it seems like the people involved never want to commit to anything without more data, delaying cleanup. The Watermaster noted several significant items: COCs are contaminating new wells, the groundwater model needs updating, the project has been frustrating because things in all OUs take too long, the remedy has not performed as expected, the plumes are as big or bigger than they were twenty years ago, production wells has impacted plume movement, the hydrogeology is not well defined or understood, and older wells in the NHOU and BOU lack sanitary seals. Progress at a faster pace is needed in all the aforementioned issues are needed sooner rather than later.

Tedd Yargeau, Senior Scientist, Department of Toxic Substances Control; 6 May 2013; via telephone. The discussion covered SFV Areas 1 and 2. Mr. Yargeau felt that the remedies were functioning as expected with the exception of the NHOU (regarding containment), but noted that all of the remedies appear to be headed in the right direction and that the projects are a positive for the SFV. Contaminant levels appear to be decreasing, except for chromium in some of the NHOU wells. DTSC does not deal directly with O&M, but is aware of EPA's O&M oversight activities. The only unexpected difficulty has been bringing more PRPs on board in the NHOU. DTSC feels that EPA has done a good job managing a complex site.

6.7. Institutional Controls

There are no specifically tailored institutional control (IC) instruments in place within Area 1. The NHOU RODs, BOU ROD, and BOU ESDs do not specify any institutional control program, however,

the governmental controls in place at the site are effective in preventing exposure to contaminated groundwater.

The primary governmental control is the 1979 Final Judgment in *Los Angeles v. San Fernando,* (Superior Court Case No. 650079) *(LA v. San Fernando).* The 1979 Final Judgment in *LA v. San Fernando* upheld the Pueblo Right of the City of Los Angeles to all groundwater in the ULARA Basin from precipitation within the ULARA and all surface and groundwater flows from the Sylmar and Verdugo Basins. 14 Cal. 3d 199 (1975). *LA v. San Fernando* also established the water rights of the cities of Los Angeles, Glendale, and Burbank to all water imported from outside the Basin and either spread or delivered within the Basin. With the exception of a few legacy entities including a few cemeteries and a hotel, only the Cities that are party to the Judgment have the authority to extract groundwater from the basin.

The Final Judgment created the entity known as "Watermaster" with full authority to administer the adjudication, under the auspices of the Superior Court. Under the final judgment in *LA v. San Fernando,* with the exception of certain minor historical water rights holders, only the cities of Los Angeles, Burbank, and Glendale are permitted to extract groundwater from the Basin. Each of these municipalities administers a public water system, which is regulated by the California Department of Public Health (CDPH). Governmental controls on the use of groundwater as drinking water include EPA- and State of California-promulgated MCLs and California State Action Levels that require drinking water standards to be met before delivery of the treated water to the potable water supply. These drinking water controls and the Watermaster's authority to regulate and allocate water resources eliminate unregulated use of area groundwater; therefore, the interim remedies are currently protective of human health.

EPA is working with the City of Los Angeles to augment the existing governmental controls with a Groundwater Resource Management Plan to ensure that groundwater extraction from municipal well fields does not interfere with the plume containment goals of the NHOU Second Remedy. A draft of this plan was completed in early 2012 and is still under development.

7. Technical Assessment

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

Remedial Action Performance

The NHOU treatment facility is not performing as to meet the RAO's stated in the 1987 interim ROD. The existing treatment plant has had numerous long shutdown periods over the past five years. As noted above, the current facility does not treat for chromium or 1,4-dioxane. The second interim remedy (2009), will address chromium at three wells, and 1, 4-dioxane at one well. The remedy, as proposed in the 2009 NHOU ROD, is in the Remedial Design phase.

The BOU interim remedy is not performing as intended by the 1997 ESD which requires that the BOU pump at an annual average rate of 9,000 gpm. The failure to achieve this rate translates into uncertainty

regarding the ability of the facility to achieve 100% containment. EPA is requiring that BOU parties meet ESD objectives or demonstrate that alternative pumping rates achieve 100% capture.

NHOU

The treatment system flow rate has never achieved its design flow rate of 2,000 gpm for a duration longer than a few months since it went into operation. Therefore, the system is not operating and functioning as designed. Some containment and treatment is being achieved, but, since extraction rates are less than 50% of design rates, the level of containment is not optimal.

Operating procedures, as implemented, are not expected to improve treatment facility performance. Increases in O&M costs in recent years reflect large repair efforts; particularly repair of the downstream effluent pipe.

Losses of power caused numerous temporary shutdowns in the last five years. The electrical systems for the wells and the treatment facility may be upgraded to prevent losses of power from shutting the system down. Otherwise, this is not a good time to optimize; a replacement facility is needed.

Equipment breakdowns and plant shutdowns have been frequent at the NHOU in the last five years. Electrical problems and leaks in the effluent pipelines have caused many plant shutdowns, some of very long duration; plant outages totaled 80 days in 2011 and 171 days in 2012. Total and hexavalent chromium concentrations in NHOU well NHE-3 have steadily increased and total chromium concentrations are approaching the state MCL, resulting in shutdown of this well until an alternative treatment and/or disposal method can be implemented.

BOU

The treatment system five year monthly average flow is to 6,500 gpm, contingent on the water demand needs of the City of Burbank (see 1997 ESD) Drawdown data collected from monitoring wells during the 2010 60-day 9,000 gpm demonstration test showed that horizontal hydraulic conductivity in the Burbank area is higher than estimated during the design phase of the treatment facility. The failure of the BOU to meet the 1997 ESD requirement to pump an annual average rate of 9,000 gpm means the extent of containment is uncertain.

Operating procedures as explained and demonstrated by the City of Burbank during the BOU site inspection are expected to maintain the operational effectiveness of BOU remedy, although the EPA has limited basis on which to make this statement given the lack of a final O&M plan yet to be submitted by Burbank. Due to lack of information at the time of the review, the variability of O&M costs for the BOU during the review period is unknown.

The BOU facility should consider regenerating carbon used in the LPGAC vessels as a way to optimize the system.

Implementation of Institutional Controls and Other Measures

The governmental controls in place at the site are effective in preventing exposure to contaminated groundwater.

7.2. Question B: Are the exposure assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?

RAOs used at the time of remedy selection are still valid. The exposure pathways evaluated in the RI have not changed. Although the toxicity data for some VOCs have changed, the remedy protectiveness of the remedy because VOC levels in treated water are non-detect. Cleanup levels for groundwater were not established at the time of remedy selection. No ARARs have changed in a way that would affect the protectiveness of the remedy. However issuance of a draft and final CDPH MCL for hexavalent chromium may require the addition of a treatment technology.

Changes in Standards and TBCs

The change in the 1,4-dioxane notification level, a TBC, from 3 to 1 µg/L affects the protectiveness of the remedies. Neither the NHOU nor BOU treatment system treats for 1,4-dioxane, and several NHOU extraction wells have concentrations above 1 µg/L. The BOU plant effluent for 1,4-dioxane concentrations tend to be around 1µg/L with some variance.

CDPH released a draft MCL for hexavalent chromium of 10 µg/L in August 2013. The final MCL may affect the current interim Area 1 remedies may require the addition of a treatment technology.

The September 2009 interim ROD for the NHOU added wellhead treatment for 1,4-dioxane at NHE-2 and hexavalent chromium treatment at NHE-2, and combined hexavalent chromium treatment for NHE-1 and two of the proposed new extraction wells.

Changes in Exposure Pathways

Land use on or near the site is not expected to change. The exposure pathways evaluated in the RI have not changed. The vapor intrusion pathway is not a significant in Area 1 because depths to groundwater exceed 150 ft. New ecological routes of exposure have not been identified. No new contaminants of concern have been identified. EPA has been monitoring emerging contaminants hexavalent chromium, 1, 4-dioxane, and 1, 2, 3-TCP throughout Area1. There were no unanticipated toxic byproducts not previously addressed by decision documents. Physical site conditions or the understanding of these conditions have not changed in a way that could affect the protectiveness of the remedy.

Changes in Toxicity and Other Contaminant Characteristics

Toxicity factors for TCE, PCE, 1-4,dioxane, methylene chloride, carbon tetrachloride, cis-1,2-DCE, and 1,2,3-TCP have changed in the last five years. VOCs, including 1,2,3 TCP, are treated to non-detect levels at both treatment systems. Other contaminant characteristics have not changed in a way that could

affect the protectiveness of the remedy. Also, cleanup levels for groundwater were not selected for this site.

Changes in Risk Assessment Methods

Standardized risk assessment methodologies have not changed in a way that could affect the protectiveness of the remedies.

Expected Progress Toward Meeting RAOs

NHOU

When operating, the NHOU treatment facility slows down the migration of the contamination plume at the North Hollywood-Burbank Well Field (as outlined in the 1987 ROD). However, several wells have been unable to pump, and the design flow rate of 2,000 gpm has not been achieved during this review period. Also, frequent shutdowns have severely limited the ability of the extraction and treatment system to achieve constant and meaningful migration inhibition. The new remedy, when implemented, will achieve the new RAOs.

BOU

There is uncertainty regarding the ability of the BOU interim remedy to control the movement and spread of groundwater contaminants since the BOU is not pumping at the 9,000 gpm rate prescribed in the ESD. In order to make a 100% containment determination the BOU parties must pump at 9,000 gpm annually or demonstrate that alternative rates are acceptable for achieving the same level of capture as expected with the 9,000 gpm rate.

7.3. Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?

No other information has come to light which could affect the protectiveness of the remedy. There are no newly identified ecological risks. There have been no impacts from natural disasters.

7.4. Technical Assessment Summary

The NHOU extraction and treatment system is not functioning as intended by the decision documents. The NHOU system has suffered frequent and sometimes long duration shutdowns that have severely limited its ability to slow down migration of contaminated groundwater. In December 2012 chromium concentrations in well NHE-3 exceeded the state MCL resulting in well shut down. The inoperability of well NHE-3 due to elevated chromium levels impairs the remedy's containment function. The second interim remedy does not explicitly address provisions for the treatment of chromium in well NHE-3. NHOU O&M practices are not expected to maintain the required level of remedy effectiveness.

The BOU extraction and treatment system is not functioning as intended by the 1997 ESD, which requires an average annual pumping rate of 9,000 gpm. It is uncertain to what extent containment is being

achieved. The BOU parties need to operate the treatment facility at an annual rate of 9,000 gpm or demonstrate that an alternative pumping rate can meet the requirement of 100% containment.

8. Issues

Table 10 summarizes the current issues for the SFV Area 1 Site.

Table 10. Current Issues for the SFV Area 1 Site

Issue	Affects Current Protectiveness (Yes or No)	Affects Future Protectiveness (Yes or No)
There is uncertainty regarding whether the BOU is achieving 100% containment since the BOU pumps at an annual average rate of 6,500 gpm instead of the 9,000 as required in the 1997 ESD.	No	Yes
Total and hexavalent chromium concentrations in NHOU well NHE-3 have steadily increased and total chromium concentrations recently exceeded the state MCL, resulting in shutdown of this well, and the second interim remedy (2009) for the NHOU does not include provisions for the treatment of chromium in well NHE-3.	No	Yes
The notification level for 1, 4-dioxane has been exceeded at least once in all of the operating NHOU wells.	No	Yes

9. Recommendations and Follow-up Actions

Table 11 provides recommendations to address the current issues at the SFV Area 1 Site.

Table 11. Recommendations to Address Current Issues at the San Fernando Valley Area 1 Site

Issue	Recommendations/ Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
1	The BOU facility must meet the ESD requirement to pump an annual average of 9,000 gpm or demonstrate that alternative pumping rates achieve 100% capture.	PRP	EPA	1/2015	No	Yes
1	Expand chromium treatment in the Second Interim Remedy to include well NHE-3, and other potentially impacted wells.	EPA	EPA	01/2018	No	Yes
2	Sample the influent and effluent of the NHOU plant for 1, 4-dioxane and take appropriate actions to keep concentrations below the notification level.	LADWP	EPA	06/2015	No	Yes

In addition, the following are recommendations that improve effectiveness, operations, or safety of the remedy but do not affect current protectiveness and were identified during the FYR:

NHOU

- The MSDS for the hexametaphosphate descalant was not located on-site or in the LADWP vehicles during the site visit. It is recommended that copies of the MSDS for hexametaphosphate be kept on-site and in the staff vehicles.
- An evaluation of conveyance piping from the treatment facility to the main drinking water distribution pipe will be done to assess impacts of the piping's age and integrity on the 2009 NHOU remedy.
- NHE-6 has exhibited vandalism due its exposed location. Consider measures to protect NHE-6 from further vandalism.

Sitewide

- Involvement of the ULARA Watermaster as often as practicable in evaluation of current remedies and future designs should be explored.
- CDPH released a draft MCL of 10 µg/L in August 2013. Relevant parties should continue to monitor the situation and continue reasonable preparations to achieve the new hexavalent chromium MCL.

10. Protectiveness Statements

NHOU

The remedy at the NHOU is currently 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 and there are governmental controls in place that prevent exposure to untreated groundwater. However, to be protective in the long term, the existing treatment facility needs to be modified consistent with the remedy selected in the 2009 ROD, and chromium and 1,4 dioxane impacts to the remedy need to be addressed. The implementation of the selected remedy is in the design phase.

BOU

The remedy at the BOU is protective of human health and the environment because there is no exposure to untreated groundwater. There treatment system effluent contaminant concentrations are less than their regulatory cleanup goals and there are governmental controls in place that prevent exposure to untreated groundwater. There is uncertainty as to whether containment capture is being achieved since the BOU pumps at rates less than those prescribed in the 1997 ESD. In order to make a containment determination the facility must operate at an average annual rate of 9,000 gpm, or it must be demonstrated that containment can be achieved at lower pumping rates.

11. Next Five Year Review

This is a statutory Site that requires ongoing FYRs as long as waste is left on site that does not allow for unlimited use and unrestricted exposure. The next FYR will be due within five years of the signature date of this FYR.

Appendix A: List of Documents Reviewed

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List of Documents Reviewed

AMEC. 2011. Final Remedial Design Work Plan North Hollywood Operable Unit Second Interim Remedy Groundwater Remediation System Design. Prepared by AMEC for Honeywell International, Inc. and Lockheed Martin Corporation. October 2011.

AMEC. 2012a. Final Data Gap Analysis North Hollywood Operable Unit Second Interim Remedy Groundwater Remediation System Design. Prepared by AMEC for Honeywell International, Inc. and Lockheed Martin Corporation. March 2012.

AMEC. 2012b. Draft Work Plan Phase I Pre-Design Investigation North Hollywood Operable Unit Second Interim Remedy Groundwater Remediation System Design. Prepared by AMEC for Honeywell International, Inc. and Lockheed Martin Corporation. April 2012.

AMEC. 2012c. Health and Safety Plan North Hollywood Operable Unit Second Interim Remedy Groundwater Remediation System Design. Prepared by AMEC for Honeywell International, Inc. and Lockheed Martin Corporation. April 2012.

AMEC. 2012d. Sampling and Analysis Plan Phase I Pre-Design Investigation North Hollywood Operable Unit Second Interim Remedy Groundwater Remediation System Design. Prepared by AMEC for Honeywell International, Inc. and Lockheed Martin Corporation. April 2012.

Arcadis/Malcolm Pirnie. 2011. Removal of Hexavalent Chromium at Burbank Water Treatment Facilities, September 2011.

Arcadis. 2013. Groundwater Monitoring and Emerging Compound Report, Second Quarter, 2013, Burbank Operable Unit. Prepared by Arcadis for Lockheed Martin Corporation. August 2013.

Burbank Water and Power. 2009-2012. City of Burbank Annual Water Quality Reports (2008-2011). June 2009 – June 2012.

CH2M Hill. 2008. 2007 San Fernando Valley Groundwater Model Update Technical Memorandum. Prepared by CH2M Hill for EPA. September 2008.

CH2M Hill. 2008b. North Hollywood OU – Air Stripper Packing Replacement. Prepared by CH2M Hill for EPA. December 2008.

CH2M Hill. 2010. San Fernando Valley Basin Groundwater Elevations in Shallow Zone, December 2010. July 2011

CH2M Hill. 2011. Analysis of Aquifer Response during the Operational Capacity Test for Burbank Operable Unit, Technical Memorandum. Prepared by CH2M Hill for EPA. March 2011.

CH2M Hill. 2012. Potential Impacts of Los Angeles Department of Water and Power's Proposed Groundwater Pumping Plan on Selected Areas of North Hollywood and Glendale North Operable Units. Technical Memorandum. Prepared by CH2M Hill for EPA. October 2012.

City of Burbank. 2007-2012. Burbank Operable Unit EPA Monthly Operations Reports. Prepared by APT Water Services, LLC for the City of Burbank. July 2007 through January 2012.

EPA. 1987. Record of Decision for a Remedial Action for Area 1 of the San Fernando Valley Superfund sites. EPA Region 9. September 1987.

EPA. 1989. Superfund Record of Decision, San Fernando Valley (Area 1), USEPA. June 1989.

EPA. 1991. Consent Decree – Area 1 Burbank Well Field Operable Unit, USEPA. March 1991.

EPA. 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), USEPA. November 2002.

EPA. 2004. Five-Year Review Report For Burbank Operable Unit, San Fernando Valley (Area 1) Superfund Site, Los Angeles County, California. EPA Region 9. September 2004.

EPA. 2008. Five-Year Review Report for San Fernando Valley (Area 1) Superfund Site, Los Angeles County, California. EPA Region 9. September 2008.

EPA. 2009. Focused Feasibility Study North Hollywood Operable Unit San Fernando Valley Area 1 Superfund Site, Los Angeles County, California. EPA Region 9. July 2009.

EPA. 2009. Interim Action Record of Decision for the North Hollywood Operable Unit San Fernando Valley (Area 1) Superfund Site, Los Angeles County, California. EPA Region 9. September 2009.

EPA. 2012. Vapor Intrusion Screening Level Calculator. Updated November 2012.

EPA. 2013 OSWER Final Guidance for Assessing and Mitigating the Vapor Intrusion Pathwa from Subsurface Sources to Indoor Air (External Review Draft). April 2013. http://www.epa.gov/epawaste/hazard/correctiveaction/eis/vapor/complete.pdf

ERM (Environmental Resources Management). 2011. Fourth Quarter 2010 Remedial Investigation Well Sampling Report San Fernando Valley Superfund Sites Area 2 – Crystal Springs Glendale North and Glendale South Operable Units. Prepared by ERM for the Glendale Respondents Group February 2011.

James M. Montgomery, Inc. 1992. Remedial Investigation of Groundwater Contamination in the San Fernando Valley. Prepared by for the City of Los Angeles Department of Water and Power. December 1992.

Tertra Tech. Capture Zone Evaluation for the Burbank Operable Unit. Prepared for Lockheed Martin. July 2006.

LADWP. 1988. North Hollywood-Burbank Aeration Emissions Control Facility Operation and Maintenance Manual. Prepared by James M. Montgomery Consulting Engineers, Inc. for the City of Los Angeles Department of Water and Power. September 1988.

LADWP. 2010-2012. North Hollywood Operable Unit Quarterly Reports. January 2010 through September 2012.

ULARA Watermaster. 2012. Annual Report Watermaster Service in the Upper Los Angeles River Area (ULARA) Los Angeles County, California, 2010-2011 Water Year. May 2012.

Appendix B: Press Notices

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Press Notices

Public Notice
The United States Environmental Protection Agency (EPA)
Start of Five-Year Review of Groundwater Cleanup
San Fernando Valley Superfund Sites (Areas 1 and 2)

The EPA has begun the Second Five-Year Review (FYR) process for cleanup actions undertaken at the San Fernando Valley Superfund Sites (SFV Sites) for Areas 1 and 2. Area 1 includes North Hollywood and Burbank Operable Units (OUs). Area 2 includes Glendale North and South OUs, and the Glendale Chromium OU. EPA often addresses clean-up at a large site by breaking the site into small operable units (OUs) to manage cleanup actions. This notice addresses the FYRs for Areas 1(North Hollywood and Burbank OUs) and 2 (Glendale North and South OUs). Upon completion of the review EPA will issue two separate reports that evaluate whether the cleanup actions for Areas 1 and 2 remain protective of human health and the environment.

The Review Process: When EPA's cleanup action leaves some waste in place or the action will take longer than five years to complete, the Superfund law requires an evaluation of the protectiveness of the cleanup systems every five years until the site has been cleaned up sufficiently to allow unrestricted use. The purpose of the FYR is to publically document the effectiveness of cleanup systems and to measure progress towards achieving cleanup goals. FYRs consist of evaluating the effectiveness of clean-up in both the short and long-term, facility inspections, and the analysis of 2008-2013 groundwater data. The FYR will report the amount of contaminant mass being removed by groundwater treatment facilities, evidence of natural processes that may assist with the breakdown of chemicals, cleanup progress within the Superfund sites, and treatment facility operations. This review also includes interviews with regulators, government officials, and community representatives. To date, previous FYR reviews conducted for Areas 1 and 2 have shown the clean-up systems to be protective of human health and the environment. The 2013 FYRs will comment on the status of 2008 recommendations and offer new recommendations if necessary. The 2008 FYR for Areas 1 and 2 are available on EPA's web page and at the information repositories listed below. Both 2013 FYR reports will be completed by September 30, 2013 and copies will be made available to the public via the websites.

Community Involvement: EPA invites the community to learn more about the Sites, the FYR review process and provide input to EPA. Interviewees can contact Jackie Lane, Community Involvement Coordinator **no later than July 31, 2013** at (415) 972-3236 or by email at lane.jackie@epa.gov to be interviewed.

Information and Repositories: Area 1: Burbank Public Library, 110 North Glen Oaks Blvd, Burbank, CA or call (818) 238-5580 and Los Angeles Public Library, 630 W. Fifth St., Los Angeles CA 90071 or call (213) 228-7000. **Area 2:** City of Glendale Public Library, 222 East Harvard St. Glendale, CA or call (818) 548-2021 and Los Angeles Public Library, 630 W. Fifth St., Los Angeles CA 90071 or call (213) 228-7000.
EPA Web Page: Area 1: www.epa.gov/region09/SanFernandoNorthHollywood
Area 2: www.epa.gov/region09/SanFernandoGlendale

Appendix C: Interview Forms

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Interview Forms

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 Superfund Site North Hollywood OU	**EPA ID No:**	CAD980894893
Interview Type:	Visit		
Location of Visit:	NHOU Treatment Facility		
Date:	2/27/2013 **Time:** 11:30 AM		

Interviewer:	ZiZi Searles David Sullivan Aaron King	**Title:**	RPM Geologist Environmental Engineer	**Organization:**	USEPA USACE USACE

Individuals Contacted

Name:	Greg Tuttle	**Title:**	Water Treatment Operator	**Organization:**	LADWP
Telephone:	(213) 798-5737	**Address:**	13101 Sepulveda Blvd Los Angeles CA 91344		
Name:	Ernesto Ruiz	**Title:**	Water Treatment Operator	**Organization:**	LADWP
Telephone:	(213) 792-4765	**Address:**	13101 Sepulveda Blvd Los Angeles CA 91344		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

The NHOU treatment facility is a great facility that is easily operated. However, it has become less reliable over the years.

2) What is your current role and your agency's role with respect to the site?

LADWP operates the facility. Any of ten water treatment operators visit the site to log data, monitor alarms, provide emergency response, or complete routine maintenance.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

The LA City Fire Department conducts annual site visits. At least one operator visits the site daily. A maintenance log is maintained and daily operation changes are recorded.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

There have been no violations or complaints. Operators respond when there is a leak, power outage, etc.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No. There are door alarms and cameras that alert the department in case of an intruder. The facility is double fenced and very secure.

6) Is the remedy functioning as expected? How well is the remedy performing?

The treatment facility worked better when it was new. It needs an upgraded control system and new piping. It serves a good purpose by removing contaminants from drinking water.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

N/A

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

There is 24-hr monitoring from the control room at the LADWP Filter Plant. The plant is visited at least once daily by operator(s).

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

No. LADWP has lots of experience operating the plant, and operations and maintenance have not changed since the beginning of operations.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

The media in the air stripper had to be replaced; significant scale formed even with the application of anti-scalant. The effluent pipe downstream of the treatment plant has leaked several times in the last few years. There are portions of the tower that need to be repainted and corrosion has been an issue. The relative humidity/temperature probes downstream of the heater are difficult to calibrate and fail every 3-4 months, though failure is becoming more frequent.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

O&M sampling efforts are as efficient as they are going to get.

13) What effects have site operations had on the surrounding community?

The groundwater is being cleaned, and drinking water is being provided from a local source. There have been no complaints from residents regarding the repair of the effluent pipe.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

No. The facility is isolated.

15) Do you feel well informed about the site's activities and progress?

Yes. There is a good training program. The Superintendent meets with and updates operators once a month.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

No.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

The facility needs a new control system, and the operators would like to be able to trend data on-site. The installation of the new sodium hypochlorite disinfection system is a positive.

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 Superfund Site North Hollywood OU	**EPA ID No:**	CAD980894893
Interview Type:	In writing		
Location of Visit:	N/A		
Date:	3/13/2013 **Time:** N/A		

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	David Sullivan		Geologist		USACE
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	Vahe Dabbaghian	**Title:**	Civil Engineering Associate III	**Organization:**	LADWP
Telephone:	(213) 367-3543	**Address:**	111 North Hope St, Room 1217 Los Angeles, CA 90012		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

The NHOU has been operated and maintained by LADWP under the direction of EPA in accordance with the Cooperative Agreement between the two agencies. The NHOU has failed to fully contain the contaminant plume, and the highly concentrated contaminants have escaped the containment area and spread to other nearby LADWP supply wells and forced their closure. In addition, the remedy was not designed to remove newly emerging contaminants such as hexavalent chromium and 1,4-dioxane. This problem has required the diversion of extraction well NHE-2, which is now discharged to the sanitary sewer due to high concentrations of hexavalent chromium. Moreover, hexavalent chromium concentrations in NHE-3 have elevated over the past six months to nearly 52 ppb, exceeding the CDPH limit of 50 ppb for total chromium. Urgent response is needed to contain the hexavalent chromium and prevent its continued spreading to the other extraction wells. Despite LADWP's best efforts to maintain the equipment and respond with repairs, the age and deterioration of this facility have resulted in numerous plant shutdowns, in particular over the last two years, with plant outages totaling 80 days in 2011 and 171 days 2012. The overall sentiment is that this remedy needs to be replaced, on an expedited basis, with the Second Interim Remedy now being planned by EPA.

2) What is your current role and your agency's role with respect to the site?

LADWP operates and maintains the NHOU on behalf of the EPA and under their direction pursuant to the Cooperative Agreement between the two agencies.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

Routine reporting activities for the NHOU include various reports prepared by LADWP and submitted to EPA, such as monthly reports, quarterly reports, plant shutdown reports, and copies of reports to other agencies about the performance of the NHOU (monthly water quality reports to CDPH and air emissions reports to the Air Quality Management District). LADWP participates with various other municipal, state, and federal agencies in quarterly meetings hosted by EPA. These meetings provide an opportunity for exchange of information and reporting on the activities of the Superfund Projects in the San Fernando Basin, including the NHOU.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

In March and September 2012, residents complained when a leak occurring on the NHOU effluent pipeline prevented access to their homes. LADWP responded by repairing the effluent pipeline on both occasions. As required by state mandate, CDPH conducts Sanitary Surveys (routine site inspections) on public water systems every three years. CDPH conducted a survey in 2011, which included inspection of the NHOU. Their findings cited plant deficiencies requiring the painting of the NHOU facility and abatement of corrosion affecting components of the treatment system. Having responsibility to EPA for compliance with state and federal mandates, LADWP has provided notice to EPA about the deficiencies and subsequently received approval to correct these problems.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

The only vandalism incident was graffiti at NHE-6 on several occasions.

6) Is the remedy functioning as expected? How well is the remedy performing?

The remedy is not functioning as expected and has failed. Since the 1980 discovery of VOCs in the San Fernando Valley, LADWP has worked with state and federal agencies to contain and remediate the high concentration contaminant plumes. However, there has been failure to accomplish this primary function of containing the high-concentration contaminant plumes, which have escaped the remedy containment area and forced the closure of many LADWP groundwater supply wells. The remedy was designed to only remove VOCs; it is not designed to remove hexavalent chromium or 1,4-dioxane. The inadequate containment has allowed the hexavalent chromium to spread from NHE-2 to NHE-3.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

The concentrations of TCE and PCE have fluctuated over this five year period and have not shown a clear trend of increasing or decreasing concentrations. Hexavalent chromium concentrations in NHE-2 have decreased from just over 300 ppb to nearly 50 ppb over the five years. However, hexavalent chromium concentrations in NHE-3 have increased in recent months to 52 ppb in October 2012, which exceeds the CDPH MCL for total chromium. In the four years prior to this recent spike, the hexavalent chromium level was persistent, but at concentrations below 20 ppb. An urgent response is needed to prevent the continued spread of the hexavalent chromium plume to other extraction wells and LADWP's nearby supply wells.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

The facility is continuously monitored remotely via electronic alarm systems and LADWP staff respond immediately when alarms are triggered. If it is determined that plant operations have been shut down, EPA is notified within 3 working days of such events via a Plant Shutdown Report. Licensed water treatment operators inspect the Aeration Tower and the on-site chlorination station daily. Pump operators inspect the active extraction wells approximately once a week. They also conduct maintenance and preventative maintenance as needed. Repairs beyond their responsibility are transferred to the maintenance staff. A laboratory technician collects air emission samples once every two months. A laboratory technician collects monthly water samples, unless the wells or plant are inoperable.

9) What are the annual O&M costs for your organization's involvement at the site?

LADWP operates and maintains the NHOU on behalf of the USEPA and under their direction pursuant to the Cooperative Agreement between the two agencies. The annual budget for these services is approximately $500,000. However, the costs are increasing due to aging of equipment (wells, power controls, air emission controls) and repair costs of deteriorating discharge pipeline where three leaks occurred recently within a 10-month period (March 2012 through January 2013).

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

The operational requirements and preventative/routine maintenance requirements have not changed over the past five years. Water sampling routines have also remained steady. However, the aging equipment and system components have resulted in repeated facility outages which further impair the protectiveness needed by this remedy. While the preventative maintenance schedule is followed per manufacturer's requirements and industry standards, the Aeration Tower had numerous failures; in particular, the facility was shut down 80 days in 2011, and 171 days in 2012 due to various causes, such as failures with the air emission unit, main blower, and power bumps.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

Unexpected O&M difficulties or costs are primarily attributed to the age of the facility. New power controls and upgrading the alarm systems at the Aeration Tower, extraction wells, and air emission unit may help the performance. Power controls were upgraded for extraction wells 6, 7 and 8. Well rehabilitation was performed on all operable extraction wells, including wire-brushing, swabbing, and bailing. Replacement of the air emission control unit is planned and should also help with the outages. As mentioned above, three leaks occurred on the plant's discharge pipe within a 10-month period. Corrosion and facility repainting were deficiencies noted by CDPH in the mid-2011 sanitary survey.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

Yes. LADWP has taken steps to optimize the operation of the NHOU facility, pursuant to its responsibilities to EPA for the O&M of the NHOU facility. These steps have included rehabilitating the extraction wells by periodically wire brushing and swabbing the well screens to remove encrustation, and airlifting to remove debris from the well casings. Power controls for extraction wells 6, 7 and 8 were upgraded. However, these optimizations have only provided temporary improvement and are not sufficient to overcome the failure of this remedy due to the numerous deficiencies which render this facility inadequate and the aging infrastructure which makes the facility increasingly unreliable. Essentially, there is an urgent need to replace this facility with the Second Interim Remedy, designed to contain and remove the highly concentrated plumes of contaminants and prevent their continued escape from the containment areas.

13) What effects have site operations had on the surrounding community?

Over the recent 10-month period, three leaks on the effluent discharge line have impacted the access of neighbors to their properties.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

Aside from the three leaks on the effluent discharge line, the surrounding community has not expressed any concerns in the past five years.

15) Do you feel well informed about the site's activities and progress?

Yes. Pursuant to the Cooperative Agreement, LADWP maintains continuous monitoring of the facility and gathers considerable amounts of performance data which are provided to EPA on a regular basis.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

New safe drinking water regulations, when enacted by EPA and/or CDPH, such as a new MCL for hexavalent chromium or new standards for regulating "families" of VOCs, may render the current remedy obsolete. Such changes are exemplified by the recent Notice of Intent released by EPA to regulate VOC families to 1 ppb total for those groupings of VOC contaminants and to regulate hexavalent chromium at 1 ppb.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

Despite the good collaboration between LADWP and the state and federal regulators to address the contaminant plumes with the implementation of the current remedy, the NHOU has been a failure. We have seen high concentrations of contamination escape the containment areas and continue to spread to other LADWP water supply wells. Most recently, we have seen a sudden rise in hexavalent chromium in NHE-3 to nearly 52 ppb, just above the state mandated MCL of 50 ppb for total chromium. Urgent action is needed to respond and correct the failure of this remedy. LADWP supports every effort that can be made by USEPA to accelerate the implementation of the Second Interim Remedy and provide the protectiveness needed in the NHOU project areas.

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 Superfund Site North Hollywood OU	**EPA ID No:**	CAD980894893
Interview Type:	Visit		
Location of Visit:	Mr. Lindquist's personal vehicle		
Date:	2/27/2013 **Time:** 1:40 PM		

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	David Sullivan		Geologist		USACE
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	John Lindquist	**Title:**	Senior Project Hydrogeologist	**Organization:**	CH2M Hill
Telephone:	(805) 371-7822	**Address:**	325 E. Hillcrest Dr Suite 125 Thousand Oaks, CA 91360		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

The system is containing much of the contamination, but there are doubts as to whether complete containment is occurring.

2) What is your current role and your agency's role with respect to the site?

CH2M Hill is a support contractor under EPA for remedial design oversight and negotiation.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

There have been routine communications regarding the remedial design aspects, but communication with respect to O&M has been irregular.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

No.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No.

6) Is the remedy functioning as expected? How well is the remedy performing?

The remedy is not functioning at design flow rates, but is functioning as expected since the last five-year review.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

Some wells show decreasing trends and other wells show increasing trends. For example, NHE-2 has shown decreases in chromium concentrations while NHE-3 has shown increases in chromium concentrations.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

N/A

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

Within the last 5 years, they had to do emergency change out of the packing. The pipeline (effluent) is prone to breaking downstream of the plant.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

The change out of the air stripper packing and the pipeline breaks were both unexpected.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

CH2M Hill occasionally sends suggestions to LADWP to help improve system O&M.

13) What effects have site operations had on the surrounding community?

There was little community attendance at the focused feasibility study meeting.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

No.

15) Do you feel well informed about the site's activities and progress?

Yes.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

There have been changes to CDPH notification levels.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

There has been lots of site downtime. It may be possible to improve uptime by considering changes to system maintenance. The O&M procedures should be reviewed.

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 Superfund Site North Hollywood OU	**EPA ID No:**	CAD980894893
Interview Type:	Visit		
Location of Visit:	CDPH Office		
Date:	2/27/2013 **Time:** 3:00 PM		

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	David Sullivan		Geologist		USACE
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	Susan Brownstein	**Title:**	Associate Sanitary Engineer	**Organization:**	CDPH
Telephone:	(818) 551-2016	**Address:**	500 N Central Ave, Suite 500 Glendale, CA 91203		
Name:	Chi Diep	**Title:**	Senior Sanitary Engineer	**Organization:**	CDPH
Telephone:	(818) 551-2039	**Address:**	500 N Central Ave, Suite 500 Glendale, CA 91203		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

Progress has been very slow at the NHOU. The original design allowed for VOC treatment, but the discovery of the chromium plume led the shutdown of NHE-2. The original remedy has worked relatively well except for the calcified packing. The facility needs attention. Emergent contaminants need to be addressed.

2) What is your current role and your agency's role with respect to the site?

CDPH ensures that potable water meets drinking water standards as well as internal policy requirements for impaired sources. We review monthly monitoring reports and would be involved with the design and oversight of a new facility.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

Timely monthly water quality monitoring reports have shown that treated water meets standards. The most recent sanitary survey (report done Oct 2011) showed at least four deficiencies: 1) the air stripper needed maintenance in terms of painting and corrosion, 2) the calcification of the packing in the tower due to the unnoticed failure of the anti-scalant chemical feed, 3) concern about the conditions of well NHE-6, which wasn't fenced in like the other wells, which resulted in graffiti and dog feces being found nearby, and 4) NHE-2 was completely overgrown with weeds and there was concern about pesticides because of its proximity to plant nurseries.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

Nothing that required a response.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

Some of the well sites have evidence of vandalism, particularly NHE-6 where people are easily able to trespass. Vandalism is mostly just graffiti.

6) Is the remedy functioning as expected? How well is the remedy performing?

For VOC removal, the remedy is performing as expected, but it is not removing other COCs like chromium or 1,4-dioxane, or TCP in the Tujunga production wells.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

NHE-2 was taken offline from the potable remedy. There are no trends showing contaminant levels are decreasing.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

There is not continuous on-site O&M. Treatment operators visit daily to weekly. Review of water quality sampling shows wells are visited once a month at best; this is not the responsibility of the treatment operators, and they don't communicate with each other.

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

The frequency of monitoring for hexavalent chromium and 1,4-dioxane has increased in the last five years; done monthly now.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

Unexpected difficulties include the calcification of the packing in the tower and the increasing hexavalent chromium concentrations in NHE-3.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

The plume is uncontrolled and the remedy is not working, so this isn't the time to optimize costs.

13) What effects have site operations had on the surrounding community?

Secondhand, CDPH has heard that the residential neighbors do not think the treatment facility is attractive and are not happy about it.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

There is surprisingly little concern about the fact that it is a Superfund Site.

15) Do you feel well informed about the site's activities and progress?

CDPH is pretty well informed about the NHOU and current on-site remedy. The development of the new remedy is either an extremely slow process or CDPH is not being kept in the loop.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

The 1,4-dioxane notification level decreased from 3 to 1 μg/L. CDPH is to release a draft MCL for hexavalent chromium in the summer.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

LADWP could be more proactive. The relationships between various entities (LADWP, PRPs, etc.) could be smoother, but CDPH is happy with EPA's involvement.

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 Superfund Site Burbank OU	**EPA ID No:**	CAD980894893
Interview Type:	Visit		
Location of Visit:	Burbank OU Treatment Facility		
Date:	2/26/2013 **Time:** 10:30 AM		

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	David Sullivan		Geologist		USACE
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	Albert Lopez	**Title:**	EPA Project Coordinator	**Organization:**	City of Burbank
Telephone:	(818) 238-3500	**Address:**	164 W Magnolia Blvd Burbank, CA 91502		
Name:	Charles Grace	**Title:**	General Manager/Plant Manager	**Organization:**	APT Water
Telephone:	(818) 736-5101	**Address:**	1875 North Ontario Burbank, CA 91505		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

It's a worthy project as it has provided clean water to the City of Burbank. The project is well organized; the system is well-run, well-documented, and well-maintained. The system has done exactly what it was designed to do with a few tweaks. The current operating consultants are a strong group.

2) What is your current role and your agency's role with respect to the site?

The City of Burbank is responsible for O&M. APT water is the contractor hired by the City to operate the treatment facility. Mr. Lopez is the EPA Project Coordinator, and Mr. Grace is the Project Manager for APT Water.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

Monthly reports are provided to EPA, CDPH, and the Watermaster. The City of Burbank and APT Water meet at least weekly. The City reviews maintenance logs and often inspects maintenance activities.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

One or two samples where high for arsenic in the effluent for tank 600; cleaning takes care of the problem, which is assumed to be a biological issue. The plant effluent is creeping up toward the 1,4-dioxane notification level. There was one complaint of an unusual piercing noise. The bearings for the blowers were replaced. The sound is generated near a heat generation source. A sound test is being planned for later in the spring. The City is considering installing a sound blanket to block the noise.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

There is occasional graffiti on sample cabinets, which is painted over when observed. Trespassing and theft of spare parts has occurred near the treatment facility.

6) Is the remedy functioning as expected? How well is the remedy performing?

The remedy functions very well from an operations standpoint. Otherwise, it is difficult to tell. Contaminant levels appear to be diminishing, but water levels are also declining. Removal efficiency has not been looked at too much.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

Contaminant levels have been consistent, though the hot spot shifted from VO6 to VO5.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

Yes. There are three shifts that conduct the daily monitoring, collect field data, update appropriate logs, and complete preventative maintenance. The City of Burbank would like APT to develop a supervisor's monthly inspection form in order to verify that work is getting done appropriately.

9) What are the annual O&M costs for your organization's involvement at the site?

Roughly $5,000,000 per year, though more accurate numbers are to be provided later.

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

The regeneration schedule has changed to be more frequent. Additional proactive sampling has occurred. Sampling locations have been changed as appropriate. For example, the sampling location for 1,4-dioxane was changed to the plant effluent. The impetus for modifying the sampling in this way is to prevent breakthroughs or violations.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

No.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

The utility water pump is only started when needed, when previously is was run continuously. Plant inlet pressure was decreased to reduce backpressure that wells must fight against.

13) What effects have site operations had on the surrounding community?

The plume is being cleaned up with minimum effects from operations. The community is well aware that the water is being cleaned-up.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

Only the noise complaint described previously.

15) Do you feel well informed about the site's activities and progress?

Yes.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

Enactment of a hexavalent chromium MCL will affect the protectiveness because the site is not set up to treat hexavalent chromium.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

From operators to managers, APT and the City of Burbank are always looking at ways to improve. The City is happy with their current contractor (APT); previous site managers did not know the site documents or how the facility was designed to operate. The City of Burbank re-evaluated their contractor pay structure in order to prevent turnover of site employees.

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 Superfund Site Burbank OU	**EPA ID No:**	CAD980894893

Interview Type: Phone

Location of Visit: N/A

Date: 5/6/2013 **Time:** 10:00 AM

Interviewer:	ZiZi Searles Aaron King	**Title:**	RPM Environmental Engineer	**Organization:**	USEPA USACE

Individuals Contacted

Name:	Karen Meade	**Title:**	Project Manager	**Organization:**	CH2MHill
Telephone:	(714) 429-2000	**Address:**	6 Hutton Centre Drive, Suite 700 Santa Ana, CA 92707		
Name:	Ken Martins	**Title:**	Senior Process Technologist	**Organization:**	CH2MHill
Telephone:	(714) 435-6284	**Address:**	6 Hutton Centre Drive, Suite 700 Santa Ana, CA 92707		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

The physical plant is in good shape and a number of improvements have been made since construction completion. The remedy can still pump 9,000 gpm if necessary. The system has been well-maintained, and significant improvements have been made to the VPGAC system. On a scale of 1 to 10, the BOU would score an 8 or 9.

2) What is your current role and your agency's role with respect to the site?

Oversight of remedial operations on behalf of EPA. Review of all documents and participation in quarterly calls and some visits.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

No. Site visits occur generally once per year. During construction activities, CH2M Hill was on site daily.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

No.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

Not in the last five years. There was the fire in Feb 2008, but that was noted in the last FYR.

6) Is the remedy functioning as expected? How well is the remedy performing?

Based on the RAOs, yes. The system is capable of 9,000 gpm, but the extraction rate is dependent on water demand. Pumping around 6,000 gpm appears to cut off the plume at the line of the wells. Because of the lower pumping rates, mass removal has been less than what it could have been.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

VOC trends vary with each well; some show increasing trends, some show decreasing trends, and some show steady trends. 1,4-dioxane has slightly increased in the plan influent (most recent value of 1.3 μg/L)

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

APT Water is the current O&M contractor, but there was another contractor prior to that. Someone is on-site at all times. There was some talk in the past about installing a system that would allow for unstaffed nights and weekends at the plants, but this has not been implemented.

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

CDPH asked the City of Burbank to increase monitoring frequency for 1,4-dioxane in the influent and at extraction wells. CH2M Hill has encouraged the City to monitor Tank 600 water more actively and rigorously.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

No.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

The heater load to the air stripper off-gas (VPGAC influent) has been reduced. Previously, towers might shut down soon after startup because the proper airflow wasn't yet provided by the blowers; the controls were adjusted to allow more time for the appropriate airflow to be achieved before a shutdown would occur.

13) What effects have site operations had on the surrounding community?

There has been a single noise complaint; otherwise, there have been no effects.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

Only the single noise complaint.

15) Do you feel well informed about the site's activities and progress?

Generally yes, but CH2M Hill would feel more well-informed if reports were submitted in a timely manner. CH2M Hill participates in the quarterly calls.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

There is pending chromium MCL, and a study has been done to see what technologies could treat chromium to expected limits.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

The plant is run very-well, but reporting is not very timely. Consistent operator would improve continuity and help with operation and documentation into the future. The LPGAC units are unusual in their size (40,000 lbs) and construction (stacked), but have worked well.

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 Superfund Site Burbank OU	**EPA ID No:**	CAD980894893
Interview Type:	Visit		
Location of Visit:	CDPH Office		
Date:	2/27/2013 **Time:** 2:40 PM		

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	David Sullivan		Geologist		USACE
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	Paul Williams	**Title:**	District Engineer	**Organization:**	CDPH
Telephone:	(818) 551-20	**Address:**	500 N Central Ave, Suite 500 Glendale, CA 91203		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

The BOU remedy is a good project and is providing a benefit to the groundwater, providing a lot of value to the area. There are lots of dedicated people on the project.

2) What is your current role and your agency's role with respect to the site?

CDPH's role is to ensure that the city is providing water that is safe for public consumption. We review monthly reports and participate in OU meetings.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

Yes. CDPH is required to conduct a sanitary survey every three years. CDPH also reviews monthly reports. The City of Burbank is doing a great job.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

No.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No. Not in the last five years.

6) Is the remedy functioning as expected? How well is the remedy performing?

The remedy appears to be functioning as expected, but CDPH is not focused on how the plume is managed.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

It depends on the well, but not sure.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

Yes. Daily logs are given in the monthly reports.

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

Not that CDPH is aware of.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

No.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

The BOU facility might look at regenerating carbon, but they are ahead of the game in most other areas.

13) What effects have site operations had on the surrounding community?

Safe water is being provided to the surrounding community.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

No.

15) Do you feel well informed about the site's activities and
progress?

At times, but CDPH is experiencing delays in receiving the monthly monitoring reports.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

No.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

No.

Five-Year Review Interview Record

Site:	San Fernando Valley Areas 1 and 2 Superfund Sites	**EPA ID No:**	CAD980894893

Interview Type: Visit

Location of Visit: Los Angeles Regional Water Quality Control Board Office

Date: 2/26/2013 **Time:** 3:00 PM

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	David Sullivan		Geologist		USACE
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	Larry Moore	**Title:**	Staff Environmental Scientist	**Organization:**	Los Angeles RWQCB
Telephone:	(213) 576-6730	**Address:**	320 W 4th Street Suite 200 Los Angeles, CA 90013		
Name:	Alex Lapolstol	**Title:**	Technical Consultant	**Organization:**	E2 Consulting Engineers Under Contract to EPA
Telephone:	(213) 576-6801	**Address:**	320 W 4th Street Suite 200 Los Angeles, CA 90013		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

It's a positive project; the only unfortunate thing being that it takes longer than they would like to do things. However, it is a slow process because of due process.

2) What is your current role and your agency's role with respect to the site?

RWQCB works to identify PRPs, and make sure PRPs are in compliance and responsible. Mr. Moore works as a state employee on site cleanup with an emphasis on chromium, but is still involved with VOCs. Mr. Lapolstol provides support on behalf of EPA to identify chromium PRPs (though in some cases VOCs and chromium overlap), fulfill EPA information needs, and assist the state in enforcing the water code.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

RWQCB conducts site inspections, reviews work plans, completes chemical use questionnaires from PRPs, and oversees the cleanup process. EPA provides concurrence with cleanup levels. Mr. Lapolstol is the "eyes and ears" of EPA so that EPA isn't surprised by what the RWQCB is doing.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

There have been no public complaints, and no PRP complaints that have required a response. Glendale, Burbank, and LADWP complain about the slow pace of investigations and response times of EPA and RWQCB. PRPs complain about paying for cleanup.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No, though residents near the former Excello plating facility admitted to trespassing and rolling around in the dirt when the facility was still operational, but that did not occur in the last five years.

6) Is the remedy functioning as expected? How well is the remedy performing?

For the NHOU, EPA has spent lots of money on the remedy, but unless LADWP uses appropriate pumping rates, it's a moot point; they're just spreading contamination around. It is difficult to contain plumes the way the remedy has been operated. For the GOU, PCE, TCE, total chromium, and hexavalent chromium have been found down gradient of GS-3. The characterization

of the GOU is insufficient. Part of the plume has gone off-site of the Excello facility.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

The BOU has not been completely assessed in regard to chromium. Honeywell (NHOU) has been remediating an on-site source by injecting calcium polysulfide, and has been seeing reductions in off-site wells. Decreasing chromium concentrations have not been observed in the GOU; the plume appears to be shifting, rather than decreasing in concentrations.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

RWQB has no day-to-day interactions with facilities, but receives monthly updates from the GOU.

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

N/A

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

N/A

12 Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

N/A

13) What effects have site operations had on the surrounding community?

For example, the BOU is pumping their own water, meaning they don't have to purchase all of their water from the Metropolitan Water District. The water is clean, and no one sees the plant; it's a great benefit. In general, the public is interested. If the site has a Cleanup and Abatement Order, the PRP must do community outreach before RWQCB will issue a closure.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

Nothing to add; refer to response to question 13.

15) Do you feel well informed about the site's activities and progress?

Yes. The updates and contact with EPA are sufficient.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

OEHHA developed a PHG for hexavalent chromium, which is the precursor for development of an MCL. This will result in higher costs for treatment facilities, which will be passed on to consumers.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

No.

Five-Year Review Interview Record

Site:	San Fernando Valley Areas 1 and 2 Superfund Sites	**EPA ID No:**	CAD980894893

Interview Type: Visit

Location of Visit: ULARA Watermaster Office

Date: 2/28/2013 **Time:** 4:00 PM

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	David Sullivan		Geologist		USACE
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	Richard Slade	**Title:**	ULARA Watermaster	**Organization:**	ULARA Watermaster
Telephone:	(818) 506-0418	**Address:**	12750 Ventura Blvd, Suite 202 Studio City, CA 91604		
Name:	Anthony Hicke	**Title:**	Assistant to the Watermaster	**Organization:**	ULARA Watermaster
Telephone:	(818) 506-0418	**Address:**	12750 Ventura Blvd, Suite 202 Studio City, CA 91604		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

The plumes are still there and have spread more. It seems like the people involved never want to commit to anything without more data, delaying cleanup. The project has been frustrating because things in all OUs take too long.

2) What is your current role and your agency's role with respect to the site?

Court-appointed Watermaster. The Watermaster accounts for extractions and protects the pumping rights and water quality in the Upper Los Angeles River Area per the 1979 judgment.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

There are Quarterly EPA meetings. GOU and BOU extraction reports are provided, though the Watermaster was unaware that 14 more wells had been installed at the GOU. There are Quarterly Administrative Committee meetings as part of the judgment.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

N/A

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

N/A

6) Is the remedy functioning as expected? How well is the remedy performing?

No. The remedy has not performed as expected. The plumes are as big or bigger than they were twenty years ago. Production has moved "stuff" around. But something is better than nothing. The Judge might be unhappy if the Watermaster were to give her an update on the Sites.

7) What does the monitoring data show? Are there any trends that show contaminant levels are

decreasing?

The Watermaster has only seen plume maps, but would like to see more depth-specific versions of the plume maps.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

N/A

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

N/A

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

N/A

12 Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

The wells should be pumped efficiently to capture the most contamination, through, for example, the use of packers.

13) What effects have site operations had on the surrounding community?

The wells cannot be pumped to safe yield or are forced to exceed safe yield, which ultimately means it costs more for customers to buy water.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

N/A

15) Do you feel well informed about the site's activities and progress?

The Watermaster receives a lot of PRP reports (not all of them), but trusts regulators to review these. The Watermaster likes to be kept informed.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

Yes.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

Older wells in the NHOU and BOU lack sanitary seals. Static surveys should be performed to ascertain the direction of groundwater flow within the wells. Also, it cannot be assumed that water removed from the same depth at different wells comes from the same aquifer system; the hydrogeology is not well defined or understood.

Five-Year Review Interview Record

Site:	San Fernando Valley Area 1 and Area 2 Superfund Sites	**EPA ID No:**	CAD980894893

Interview Type: Phone

Location of Visit: N/A

Date: 5/6/2013 **Time:** 11:00 AM

Interviewer:	ZiZi Searles	**Title:**	RPM	**Organization:**	USEPA
	Aaron King		Environmental Engineer		USACE

Individuals Contacted

Name:	Tedd Yargeau	**Title:**	Senior Scientist	**Organization:**	DTSC
Telephone:	(818) 212-5340	**Address:**	9211 Oakdale Avenue Chatsworth, CA 91311		

Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

Overall, the projects are very good. Things are moving forward with the GCOU and things are going well with the BOU. There have been some issues in the NHOU with bringing in other responsible parties.

2) What is your current role and your agency's role with respect to the site?

Peer-reviewing documents. DTSC ensures that the state's interests are represented.

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

There have been no recent site visits, though DTSC is well aware of what is going on due to communications from EPA and PRPs.

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

No.

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No.

6) Is the remedy functioning as expected? How well is the remedy performing?

The remedies are functioning for the most part with the exception of the NHOU (regarding containment). However, all of the remedies are headed in the right direction.

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

Contaminant levels are definitely decreasing, except for hexavalent chromium in some wells in the NHOU.

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

There is no oversight on behalf of the state but DTSC is aware of EPA's oversight.

9) What are the annual O&M costs for your organization's involvement at the site?

N/A

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

The only new thing is the new and emerging compounds, especially hexavalent chromium. The second remedy for the NHOU will treat for hexavalent chromium, and the GOU is actively working on a chromium remedy.

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

Bringing more PRPs on board has been a challenge in the NHOU.

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

EPA has been trying to be more efficient in sampling by reducing the number of mobilizations.

13) What effects have site operations had on the surrounding community?

DTSC has not heard any complaints; EPA has been running a great outreach program.

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

There was a recent inquiry regarding a real estate purchase in the San Fernando Valley and whether the presence of the contamination could affect the value of the property. DTSC responded that property values would not be affected.

15) Do you feel well informed about the site's activities and progress?

Yes. EPA has actively notified DTSC.

16) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

The MCL for hexavalent chromium may impact protectiveness, and the challenge has been how to address it. EPA has moved in the right direction, and technologies are being tested that could treat hexavalent chromium down to what the MCL might be.

17) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

No. EPA has done a very good job at managing a complex project, and DTSC certainly appreciates it.

Appendix D: Site Inspection Checklist

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Site Inspection Checklist (NHOU)

I. SITE INFORMATION	
Site name: San Fernando Valley (Area 1) Superfund Site- North Hollywood OU	**Date of inspection:** 27 February 2013
Location: Los Angeles/Los Angeles County/California	**EPA ID:** CAD980894893
Agency, office, or company leading the five-year review: USACE	**Weather/temperature** Sunny, light wind, 73 degrees F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other:
- ☐ Monitored natural attenuation
- ☒ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____

Name Title Date

Interviewed ☐ at site ☐ at office ☐ by phone

Problems, suggestions; ☐ Report attached N/A

2. **O&M staff** Greg Tuttle, Ernesto Ruiz Water Treatment Operators 27 February 2013

Name **Title** **Date**

Interviewed ☒ at site ☐at office ☐ by phone

Problems, suggestions; ☒ Report attached Faulty temperature probe, collapsing effluent line. See Appendix C for full interview record.

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: CDPH

Contact: Susan Brownstein Associate Sanitary Engineer 27 February 2013

Name Title Date

Problems; suggestions; ☒ Report attached See Appendix C

Agency: RWQCB

Contact : Larry Moore Staff Environmental Scientist 26 February 2013

Name Title Date

Problems; suggestions; ☒ Report attached See Appendix C

Agency: EPA Consultant

Contact: Alex Lapolstol Technical Consultant 26 February 2013

Name Title Date

Problems; suggestions; ☒ Report attached See Appendix C

Agency: Los Angeles Department of Water and Power

Contact: Vahe Dabbaghian Civil Engineering Associate III 3 March 2013

Name Title Date

Problems; suggestions; ☒ Report attached System needs replacement. See Appendix C

4. **Other interviews** (optional) ☒ Reports attached.

John Lindquist, CH2M Hill, 27 February 2013; Richard Slade and Anthony Hicke, ULARA Watermaster, 28 February 2013; See Appendix C

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks As-built drawings not maintained on site, but rather at LADWP filter building.

2. **Site-Specific Health and Safety Plan** ☐ Readily available ☐ Up to date ☐ N/A

Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks MSDS sheets not available on site. Chlorine MSDS carried in LADWP vehicles, but hexametaphosphate descalant MSDS was not located.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☐N/A

Remarks Training records not maintained on site, but rather at LADWP filter building.

4. **Permits and Service Agreements**

☐ Air discharge permit ☐ Readily available ☐ Up to date ☐ N/A

☐ Effluent discharge ☐ Readily available ☐Up to date ☐ N/A

☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A

☐ Other permits_____ ☐ Readily available ☐ Up to date ☐ N/A

Remarks Permits and Service Agreements not maintained on site, but rather at LADWP filter building.

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks None

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks None

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☐N/A

Remarks Groundwater is sampled by a different group than those present on the site inspection.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks None

9. **Discharge Compliance Records**

☐ Air ☐ Readily available ☐ Up to date ☐ N/A

☐ Water (effluent) ☐ Readily available ☐ Up to date ☐ N/A

Remarks Discharge Compliance Monitoring Records provided with Quarterly Reports

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A

Remarks Access and maintenance are recorded on paper and noted at LADWP filter building.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State

☐ PRP in-house ☐ Contractor for PRP

☐ Federal Facility in-house ☐ Contractor for Federal Facility

☒ Other Los Angeles Department of Water and Power (LADWP)

2. **O&M Cost Records**

☒ Readily available ☒ Up to date

☒ Funding mechanism/agreement in place

Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From Jan 2010 To Dec 2010 $325,000 ☒ Breakdown attached

Date Date Total cost

From Jan 2011 To Dec 2011 $565,000 ☒ Breakdown attached

Date Date Total cost

From Jan 2012 To Sept 2012 $362,000 ☒ Breakdown attached

Date Date Total cost

Quarterly reports show O&M cost records. Quarterly breakdowns attached.

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Replacement of air emissions control system; effluent piping leaks; tower repainting (yet to be completed); wells rehabilitated in 2012; power controls at NHE-6, -7, and -8 replaced.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: No Fencing Damage; treatment system is double fenced and fairly isolated.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks Security cameras on both sides of air stripper, alarms on doors that notify LADWP when door is opened.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) N/A

Frequency N/A

Responsible party/agency N/A

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

No problems or suggestions; See Section 6.7

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks None

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks Graffiti has previously been observed on well NHE-6, which is in an open lot and not protected by a security fence like the other extraction wells.

2.	**Land use changes on site** ☒ N/A Remarks None
3.	**Land use changes off site** ☒ N/A Remarks None
VI. GENERAL SITE CONDITIONS	
A. Roads	☒ Applicable ☐ N/A
1.	**Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A Remarks None
B. Other Site Conditions	
	Remarks None
VII. LANDFILL COVERS ☐ Applicable ☒ N/A	
VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A	
IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines	☒ Applicable ☐ N/A
1.	**Pumps, Wellhead Plumbing, and Electrical** ☒ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks For reasons other than plant shutdowns, 3-4 extraction wells are not operating from time to time for one reason or another (insufficient yield, high chromium concentrations). Generally, extraction system components seem to be in good condition, but could use some preventive maintenance and better vegetation control.
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☒ Good condition ☐ Needs Maintenance Remarks None
3.	**Spare Parts and Equipment** ☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks Parts are stored offsite in a nearby warehouse, which was not visited during the site inspection.
B. Surface Water Collection Structures, Pumps, and Pipelines	☐ Applicable ☒ N/A

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☒ Air stripping ☒ Carbon adsorbers

☐ Filters_____

☒ Additive (*e.g.*, chelation agent, flocculent) Hexametaphosphate descalant

☐ Others_____

☒ Good condition ☐ Needs Maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of groundwater treated annually_____

☐ Quantity of surface water treated annually None

Remarks The treatment system needs to be repainted; corrosion is visible.

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs Maintenance

Remarks The electrical system is antiquated and often requires the attention of technicians.

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs Maintenance

Remarks None

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☒ Needs Maintenance

Remarks Underground effluent piping has collapsed 3 times since March of 2012, and is currently undergoing repair for most recent collapse in January 2013.

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks Chlorine tanks are currently in enclosed space without noticeable ventilation or exhaust, but construction on a new building to house a new sodium hypochlorite disinfection system was underway at time of inspection.

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks Monitoring Wells were not visited on the site inspection.

D. Monitoring Data

1. Monitoring Data
☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks This is not an MNA remedy, it is a containment remedy.

X. OTHER REMEDIES

N/A

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy is not effective; it is a failure. The equipment is old, and the wells are not deep enough. A higher capacity is needed for containment.

B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. The system is old, but functions well when operating.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. There have been three leaks in the downstream effluent pipeline since March 2012, leading to long shutdowns. This pipe is dedicated for NHOU discharge, and is "paper thin".
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. The new remedial design will optimize the system. The existing extraction wells could be deepened or new extraction wells could be drilled.

NHOU O&M Cost

ANALYSIS TIME FRAME – JANUARY 1, THROUGH MARCH 31, 2010

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
	LABOR – REGULAR	$18,943.43	
	LABOR – OVERTIME	1,481.66	
			20,425.09
2. FRINGE BENEFITS *			
	ALLOWED TIME @ 30%	5,683.03	
	RETIREMENT & DEATH BENEFITS @ 26.63%	5,044.64	
	HEALTH CARE COSTS @ 26.45%	5,010.54	
			15,738.20
3. OTHER INDIRECTS @ 27.80% *			5,266.27
4. TRAVEL			0.00
5. EQUIPMENT			
	DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	22.01	
	DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	1,110.49	
			1,132.50
6. SUPPLIES			
	TOOLS (S293), (S551),(S270)	16,788.69	
			16,788.69
7. CONTRACTUAL			
	COST FROM OUTSIDE CONTACTORS (S-515)	0.00	
			0.00
8. CONSTRUCTION			
	LAB SERVICES – WATER QUALITY (S-330,310. X)	4,090.50	
	CHEMISTRY SERVICES – (320)	1,150.00	
			5,240.50
9. OTHER			
	OTHER OUTSIDE SERVICES (S465,S466)	6,023.84	
	SUPER & ENGINE (S298,S296,S294,550,521,245)	6,209.33	
	PURCHASE FROM OTHER SYSTEMS(S-469)	278.20	
	LABOR REGULAR – CLEARING – 591	2,873.91	
	REPROGAPHICS	52.96	
	LABOR OVERTIME – CLEARING – 592,554	106.78	
	MEALS AND SUBSISTENCE (S921)	20.47	
	OTHER UTILITY SVCS (S464).	45,522.50	
			61,087.99
TOTAL BILLABLE CHARGES			125,679.25
BILLABLE TO USEPA (90%)			113,111.32
TOTAL BILLED QUARTER ENDED MARCH 31, 2010			$ 113,111

* APPLIED ON LABOR –REGULAR

NHOU O&M Cost

ANALYSIS TIME FRAME - APRIL 1, THROUGH JUNE(PRELIM), 2010

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
	LABOR - REGULAR	$9,302.68	
	LABOR - OVERTIME	2,516.17	
			11,818.85
2. FRINGE BENEFITS *			
	ALLOWED TIME @ 30%	2,790.81	
	RETIREMENT & DEATH BENEFITS @ 26.63%	2,477.30	
	HEALTH CARE COSTS @ 26.45%	2,460.56	
			7,728.67
3. OTHER INDIRECTS @ 27.80% *			2,586.15
4. TRAVEL			0.00
5. EQUIPMENT			
	DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	4.12	
	DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	58.20	
			62.32
6. SUPPLIES			
	TOOLS (S293), (S551), (S270)	1,019.55	
			1,019.55
7. CONTRACTUAL			
	COST FROM OUTSIDE CONTACTORS (S-515)	0.00	
			0.00
8. CONSTRUCTION			
	LAB SERVICES - WATER QUALITY (S-330,310. X)	6,068.43	
	CHEMISTRY SERVICES - (320)	1,610.00	
	SHOP SERVICES	395.80	
			8,074.23
9. OTHER			
	OTHER OUTSIDE SERVICES (S465,S466)	3,670.00	
	SUPER & ENGINE (S298,$296,S294,550,521,245)	5,433.49	
	PURCHASE FROM OTHER SYSTEMS(S-469)	(13.10)	
	LABOR REGULAR - CLEARING - 591	2,510.83	
	REPROGAPHICS	24.19	
	LABOR OVERTIME - CLEARING - 592,554	114.79	
	MEALS AND SUBSISTENCE (S921)	10.33	
	OTHER UTILITY SVCS (S464).	20,274.49	
			32,025.02
TOTAL BILLABLE CHARGES			63,314.79
BILLABLE TO USEPA (90%)			56,983.31
TOTAL BILLABLE QUARTER ENDED JUNE(PRELIM), 2010			$ 56,983

* APPLIED ON LABOR -REGULAR

NHOU O&M Cost

ANALYSIS TIME FRAME - JULY 1, 2010 THROUGH SEPTEMBER 30, 2010

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL		
LABOR - REGULAR	$7,020.40	
LABOR - OVERTIME	1,855.10	
		8,875.50
2. FRINGE BENEFITS *		
ALLOWED TIME @ 30%	2,106.12	
RETIREMENT & DEATH BENEFITS @ 14.37%	1,008.83	
HEALTH CARE COSTS @ 25.30%	1,776.16	
		4,891.11
3. OTHER INDIRECTS @ 24.83% *		1,743.17
4. TRAVEL		0.00
5. EQUIPMENT		
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	0.00	
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	82.64	
		82.64
6. SUPPLIES		
STORES - IN AND OUT	0.00	
MATERIAL ON VOUCHERS	0.00	
TOOLS (S293), (S551), (S270)	80.48	
		80.48
7. CONTRACTUAL		
COST FROM OUTSIDE CONTACTORS (S-515)	0.00	
		0.00
8. CONSTRUCTION		
LAB SERVICES - WATER QUALITY (S-330,310. X)	8,407.00	
CHEMISTRY SERVICES - (320)	805.00	
SHOP SERVICES	0.00	
		9,212.00
9. OTHER		
OTHER OUTSIDE SERVICES (S465,S466)	3,670.00	
SUPER & ENGINE (S298,S296,S294,550,521,245)	2,362.89	
PURCHASE FROM OTHER SYSTEMS(S-469)	0.00	
LABOR REGULAR - CLEARING - 591	(380.58)	
REPROGAPHICS	0.00	
LABOR OVERTIME - CLEARING - 592,554	(97.43)	
MEALS AND SUBSISTENCE (S921)	53.22	
OTHER UTILITY SVCS (S464).	21,866.89	
		27,474.99
TOTAL BILLABLE CHARGES		52,359.89
BILLABLE TO USEPA (90%)		47,123.90
TOTAL BILLED QUARTER ENDED SEPTEMBER 30, 2010		$ 47,124

* APPLIED ON LABOR -REGULAR

NHOU O&M Cost

ANALYSIS TIME FRAME - OCTOBER 1, 2010 THROUGH DECEMBER 31, 2010

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL		
LABOR - REGULAR	$10,082.87	
LABOR - OVERTIME	2,688.77	
		12,771.64
2. FRINGE BENEFITS *		
ALLOWED TIME @ 30%	3,024.86	
RETIREMENT & DEATH BENEFITS @ 14.37%	1,448.91	
HEALTH CARE COSTS @ 25.30%	2,550.97	
		7,024.73
3. OTHER INDIRECTS @ 24.83% *		2,503.58
4. TRAVEL		0.00
5. EQUIPMENT		
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	0.00	
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	94.90	
		94.90
6. SUPPLIES		
STORES - IN AND OUT	0.00	
MATERIAL ON VOUCHERS	2,784.20	
TOOLS (S293), (S551), (S270)	87.40	
		2,871.60
7. CONTRACTUAL		
COST FROM OUTSIDE CONTACTORS (S-515)	0.00	
		0.00
8. CONSTRUCTION		
LAB SERVICES - WATER QUALITY (S-330,310. X)	7,351.50	
CHEMISTRY SERVICES - (320)	1,955.00	
SHOP SERVICES	0.00	
		9,306.50
9. OTHER		
OTHER OUTSIDE SERVICES (S465,S466)	17,379.00	
SUPER & ENGINE (S298,S296,S294,550,521,245)	3,538.99	
PURCHASE FROM OTHER SYSTEMS (S-469)	4,345.00	
LABOR REGULAR - CLEARING - 591	(235.26)	
REPROGAPHICS	0.00	
LABOR OVERTIME - CLEARING - 592,554	(51.96)	
MEALS AND SUBSISTENCE (S921)	19.96	
OTHER UTILITY SVCS (S464).	24,408.33	
		49,404.06
TOTAL BILLABLE CHARGES		83,977.01
BILLABLE TO USEPA (90%)		75,579.31
TOTAL BILLED QUARTER ENDED DECEMBER 31, 2010		$ 75,579

* APPLIED ON LABOR -REGULAR

NHOU O&M Cost

ANALYSIS TIME FRAME - JANUARY 1, 2011 THROUGH MARCH 31, 2011

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
LABOR - REGULAR	$15,170.10		
LABOR - OVERTIME	3,311.60		
		$	18,481.70
2. FRINGE BENEFITS *			
ALLOWED TIME @ 30%	4,551.03		
RETIREMENT & DEATH BENEFITS @ 14.37%	2,179.94		
HEALTH CARE COSTS @ 25.30%	3,838.04		
			10,569.01
3. OTHER INDIRECTS @ 24.83% *			3,766.74
4. TRAVEL			0.00
5. EQUIPMENT			
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	0.00		
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	505.52		
			505.52
6. SUPPLIES			
STORES - IN AND OUT	0.00		
MATERIAL ON VOUCHERS	0.00		
TOOLS (S293), (S551), (S270)	109.19		
			109.19
7. CONTRACTUAL			
COST FROM OUTSIDE CONTACTORS (S-515)	0.00		
			0.00
8. CONSTRUCTION			
LAB SERVICES - WATER QUALITY (S-330,310. X)	5,398.00		
CHEMISTRY SERVICES - (320)	920.00		
SHOP SERVICES	595.95		
			6,913.95
9. OTHER			
OTHER OUTSIDE SERVICES (S465,S466)	6,199.59		
SUPER & ENGINE (S298,S296,S294,550,521,245)	5,925.46		
PURCHASE FROM OTHER SYSTEMS (S-469)	5,700.37		
LABOR REGULAR - CLEARING - 591	1,011.20		
REPROGAPHICS	0.00		
LABOR OVERTIME - CLEARING - 592,554	208.80		
MEALS AND SUBSISTENCE (S921)	74.87		
OTHER UTILITY SVCS (S464).	64,945.77		
			84,066.06
TOTAL BILLABLE CHARGES			124,412.16
BILLABLE TO USEPA (90%)			111,970.95
TOTAL BILLED QUARTER ENDED MARCH 31, 2011		$	111,971

* APPLIED ON LABOR -REGULAR

NHOU O&M Cost

ANALYSIS TIME FRAME - APRIL 1, 2011 THROUGH JUNE 30, 2011

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
LABOR - REGULAR	$29,441.06		
LABOR - OVERTIME	2,370.83		
		$	31,811.89
2. FRINGE BENEFITS *			
ALLOWED TIME @ 30%	8,832.32		
RETIREMENT & DEATH BENEFITS @ 14.37%	4,230.68		
HEALTH CARE COSTS @ 25.30%	7,448.59		
			20,511.59
3. OTHER INDIRECTS @ 24.83% *			7,310.22
4. TRAVEL			0.00
5. EQUIPMENT			
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	1,812.74		
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	2,513.48		
			4,326.22
6. SUPPLIES			
STORES - IN AND OUT	0.00		
MATERIAL ON VOUCHERS	5,459.32		
TOOLS (S293), (S551), (S270)	388.45		
			5,847.77
7. CONTRACTUAL			
COST FROM OUTSIDE CONTACTORS (S-515)	35,490.68		
			35,490.68
8. CONSTRUCTION			
LAB SERVICES - WATER QUALITY (S-330,310. X)	5,246.70		
CONSTRUCTION EQUIPMENT	812.65		
CHEMISTRY SERVICES - (320)	2,012.50		
SHOP SERVICES	635.45		
			8,707.30
9. OTHER			
OTHER OUTSIDE SERVICES (S465,S466)	1,885.00		
SUPER & ENGINE (S298,S296,S294,550,521,245)	11,239.53		
PURCHASE FROM OTHER SYSTEMS(S-469)	3,584.59		
RENTALS & LEASES	(3.45)		
REPROGAPHICS	0.00		
LABOR REGULAR - CLEARING - 591	(903.70)		
LABOR OVERTIME - CLEARING - 592,554	(149.46)		
MEALS AND SUBSISTENCE (S921)	0.00		
OTHER UTILITY SVCS (S464).	40,158.74		
			55,811.25
TOTAL BILLABLE CHARGES			169,816.91
BILLABLE TO USEPA (90%)			152,835.22
TOTAL BILLED QUARTER ENDED JUNE 31, 2011		$	152,835

NHOU O&M Cost

ANALYSIS TIME FRAME - JULY 1, 2011 THROUGH SEPTEMBER 30, 2011

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
LABOR - REGULAR	$10,978.57		
LABOR - OVERTIME	1,721.28		
		$	12,699.85
2. FRINGE BENEFITS *			
ALLOWED TIME @ 30%	3,293.57		
RETIREMENT & DEATH BENEFITS @ 52.23%	5,734.11		
HEALTH CARE COSTS @ 28.52%	3,131.09		
			12,158.77
3. OTHER INDIRECTS @ 7.86% *			862.92
4. TRAVEL			0.00
5. EQUIPMENT			
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	0.00		
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	154.08		
			154.08
6. SUPPLIES			
STORES - IN AND OUT	0.00		
MATERIAL ON VOUCHERS	823.21		
TOOLS (S293), (S551), (S270)	167.39		
			990.60
7. CONTRACTUAL			
COST FROM OUTSIDE CONTACTORS (S-515)	0.00		
			0.00
8. CONSTRUCTION			
LAB SERVICES - WATER QUALITY (S-330,310. X)	4,848.00		
CONSTRUCTION EQUIPMENT	0.00		
CHEMISTRY SERVICES - (320)	474.40		
SHOP SERVICES	0.00		
			5,322.40
9. OTHER			
OTHER OUTSIDE SERVICES (S465,S466)	81,147.38		
SUPER & ENGINE (S298,S296,S294,550,521,245)	4,638.53		
PURCHASE FROM OTHER SYSTEMS(S-469)	4,369.84		
RENTALS & LEASES	0.00		
REPROGAPHICS	0.00		
LABOR REGULAR - CLEARING - 591	(459.98)		
LABOR OVERTIME - CLEARING - 592,554	(18.59)		
MEALS AND SUBSISTENCE (S921)	11.85		
OTHER UTILITY SVCS (S464).	34,334.06		
			124,023.09
TOTAL BILLABLE CHARGES			156,211.70
BILLABLE TO USEPA (90%)			140,590.53
TOTAL BILLED QUARTER ENDED SEPTEMBER 30, 2011		$	140,591

NHOU O&M Cost

ANALYSIS TIME FRAME - OCTOBER 1, 2011 THROUGH DECEMBER 31, 2011

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
LABOR - REGULAR	$19,035.76		
LABOR - OVERTIME	2,911.12		
		$	21,946.88
2. FRINGE BENEFITS *			
ALLOWED TIME @ 30%	5,710.73		
RETIREMENT & DEATH BENEFITS @ 52.23%	9,942.38		
HEALTH CARE COSTS @ 28.52%	5,429.00		
			21,082.11
3. OTHER INDIRECTS @ 7.86% *			1,496.21
4. TRAVEL			0.00
5. EQUIPMENT			
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	0.00		
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	784.28		
			784.28
6. SUPPLIES			
STORES - IN AND OUT	164.19		
MATERIAL ON VOUCHERS	1,987.81		
MATERIAL HANDLING	52.08		
TOOLS (S293), (8551), (8270)	421.63		
			2,625.71
7. CONTRACTUAL			
COST FROM OUTSIDE CONTACTORS (S-515)	0.00		
			0.00
8. CONSTRUCTION			
LAB SERVICES - WATER QUALITY (S-330,310. X)	2,672.00		
CONSTRUCTION EQUIPMENT	0.00		
CHEMISTRY SERVICES - (320)	3,450.00		
SHOP SERVICES	0.00		
			6,122.00
9. OTHER			
OTHER OUTSIDE SERVICES (8465,8466)	4,009.50		
SUPER & ENGINE (8298,8296,8294,550,521,345)	4,954.93		
PURCHASE FROM OTHER SYSTEMS(S-469)	8,622.04		
RENTALS & LEASES	0.00		
REPROGAPHICS	0.00		
LABOR REGULAR - CLEARING - 591	(172.99)		
LABOR OVERTIME - CLEARING - 592,554	(21.32)		
MEALS AND SUBSISTENCE (8931)	4.67		
OTHER UTILITY SVCS (9464).	43,867.93		
			61,264.76
TOTAL BILLABLE CHARGES			115,321.95
BILLABLE TO USEPA (90%)			103,789.75
TOTAL BILLED QUARTER ENDED DECEMBER 31, 2011		$	103,790

NHOU O&M Cost

ANALYSIS TIME FRAME - JANUARY 1, 2012 THROUGH MARCH 31, 2012

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
LABOR - REGULAR	$22,550.78		
LABOR - OVERTIME	2,403.59		
		$	24,954.37
2. FRINGE BENEFITS *			
ALLOWED TIME @ 30%	6,765.23		
RETIREMENT & DEATH BENEFITS @ 52.23%	11,778.27		
HEALTH CARE COSTS @ 28.52%	6,431.48		
			24,974.99
3. OTHER INDIRECTS @ 7.86% *			1,772.49
4. TRAVEL			0.00
5. EQUIPMENT			
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	80.85		
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	739.53		
			820.38
6. SUPPLIES			
STORES - IN AND OUT	9.23		
MATERIAL ON VOUCHERS	1,625.81		
MATERIAL HANDLING	0.00		
TOOLS (S293), (S551), (S270)	272.39		
			1,907.43
7. CONTRACTUAL			
COST FROM OUTSIDE CONTACTORS (S-515)	0.00		
			0.00
8. CONSTRUCTION			
LAB SERVICES - WATER QUALITY (S-330,310. X)	2,195.28		
CONSTRUCTION EQUIPMENT	0.00		
CHEMISTRY SERVICES - (320)	1,200.00		
SHOP SERVICES	0.00		
			3,395.28
9. OTHER			
OTHER OUTSIDE SERVICES (S465,S466)	3,927.84		
SUPER & ENGINE (S298,S296,S294,550,521,245)	5,387.26		
PURCHASE FROM OTHER SYSTEMS(S-469)	10,424.63		
RENTALS & LEASES	0.00		
REPROGAPHICS	0.00		
LABOR REGULAR - CLEARING - 591	1,932.92		
LABOR OVERTIME - CLEARING - 592,554	213.92		
MEALS AND SUBSISTENCE (S921)	6.10		
OTHER UTILITY SVCS (S464).	34,076.86		
			55,969.53
TOTAL BILLABLE CHARGES			113,794.46
BILLABLE TO USEPA (90%)			102,415.02
TOTAL BILLED QUARTER ENDED MARCH 31, 2012		$	102,415

NHOU O&M Cost

ANALYSIS TIME FRAME - APRIL 1, 2012 THROUGH JUNE 30, 2012

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
LABOR - REGULAR	$16,520.70		
LABOR - OVERTIME	677.05		
		$	17,197.75
2. FRINGE BENEFITS *			
ALLOWED TIME @ 30%	4,956.21		
RETIREMENT & DEATH BENEFITS @ 52.23%	8,628.76		
HEALTH CARE COSTS @ 28.52%	4,711.70		
TOTAL BENEFITS			18,296.68
3. OTHER INDIRECTS @ 7.86% *			1,298.53
4. TRAVEL			0.00
5. EQUIPMENT			
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	69.53		
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	590.69		
			660.22
6. SUPPLIES			
STORES - IN AND OUT	0.90		
MATERIAL ON VOUCHERS	852.75		
MATERIAL HANDLING	100.96		
TOOLS (S293), (S551), (S270)	(302.35)		
			652.26
7. CONTRACTUAL			
COST FROM OUTSIDE CONTACTORS (S-515)	0.00		
			0.00
8. CONSTRUCTION			
LAB SERVICES - WATER QUALITY (S-330,310. X)	673.64		
CONSTRUCTION EQUIPMENT	0.00		
CHEMISTRY SERVICES - (320)	1,220.56		
SHOP SERVICES	(406.62)		
			1,487.58
9. OTHER			
OTHER OUTSIDE SERVICES (S465,S466)	31,989.45		
SUPER & ENGINE (S298,S296,S294,550,521,245)	(713.21)		
PURCHASE FROM OTHER SYSTEMS(S-469)	(863.53)		
RENTALS & LEASES	0.00		
REPROGAPHICS	0.00		
LABOR REGULAR - CLEARING - 591	(2,289.01)		
LABOR OVERTIME - CLEARING - 592,554	(215.97)		
MEALS AND SUBSISTENCE (S921)	0.00		
OTHER UTILITY SVCS (S464).	63,093.51		
			91,001.24
TOTAL BILLABLE CHARGES			130,594.25
BILLABLE TO USEPA (90%)			117,534.83

NHOU O&M Cost

ANALYSIS TIME FRAME - JULY 1, 2012 THROUGH SEPTEMBER 30, 2012

NARRATIVE SUMMARY/STATEMENT OF FACTS
COST FOR O & M AERATION FACILITY

INDIRECTS

DOCUMENTATION: Calculations for indirects, and letter from Department of Transportation approving the Cost Allocation Plan and Agreement.

1. PAYROLL			
LABOR - REGULAR	$29,703.71		
LABOR - OVERTIME	12,878.36		
		$	42,582.07
2. FRINGE BENEFITS *			
ALLOWED TIME @ 30%	8,911.11		
RETIREMENT & DEATH BENEFITS @ 56.32%	16,729.13		
HEALTH CARE COSTS @ 26.53%	7,880.39		
TOTAL BENEFITS			33,520.63
3. OTHER INDIRECTS @ 7.63% *			2,266.39
4. TRAVEL			0.00
5. EQUIPMENT			
DEPT-OWNED POOLED TRANS EQUIP (S-620/XXX)	120.45		
DEPT-OWNED ASSIGNED TRANS EQUIP (S-630X)	4,351.47		
			4,471.92
6. SUPPLIES			
STORES - IN AND OUT	10.73		
MATERIAL ON VOUCHERS	6,249.74		
MATERIAL HANDLING	30.93		
TOOLS (S293), (S551),(S270)	159.60		
			6,451.00
7. CONTRACTUAL			
COST FROM OUTSIDE CONTACTORS (S-515)	0.00		
			0.00
8. CONSTRUCTION			
LAB SERVICES - WATER QUALITY (S-330,310. X)	1,504.00		
CONSTRUCTION EQUIPMENT	1,726.32		
CHEMISTRY SERVICES - (320)	67.76		
SHOP SERVICES	0.00		
			3,298.08
9. OTHER			
OTHER OUTSIDE SERVICES (S465,S466)	0.00		
SUPER & ENGINE (S298,S296,S294,550,521,245)	12,757.99		
PURCHASE FROM OTHER SYSTEMS(S-469)	0.00		
RENTALS & LEASES	0.00		
REPROGAPHICS	0.00		
LABOR REGULAR - CLEARING - 591	(1,410.88)		
LABOR OVERTIME - CLEARING - 592,554	(195.77)		
MEALS AND SUBSISTENCE (S921)	0.00		
OTHER UTILITY SVCS (S464).	13,320.08		
			24,471.42
TOTAL BILLABLE CHARGES			117,061.51
BILLABLE TO USEPA (90%)			105,355.36

Site Inspection Checklist (BOU)

I. SITE INFORMATION	
Site name: San Fernando Valley (Area 1) Superfund Site- Burbank OU	**Date of inspection:** 26 February 2013
Location: Burbank/Los Angeles County/California	**EPA ID:** CAD980894893
Agency, office, or company leading the five-year review: USACE	**Weather/temperature** Clear, sunny, light breeze, 72 degrees F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Monitored natural attenuation
- ☒ Access controls
- ☒ Groundwater containment
- ☒ Institutional controls
- ☐ Vertical barrier walls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other:

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Charles Grace General Manager/Plant Manager 26 February 2013

Name Title Date

Interviewed ☒ at site ☐ at office ☐ by phone

Problems, suggestions; ☐ Report attached See Appendix C.

2. **O&M staff**

Name Title Date

Interviewed ☐ at site ☐ at office ☐ by phone

Problems, suggestions; ☐ Report attached

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: City of Burbank

Contact: Albert Lopez EPA Project Coordinator 26 February 2013

Name Title Date

Problems; suggestions; ☒ Report attached See Appendix C

Agency: RWQCB

Contact: Larry Moore Staff Environmental Scientist 26 February 2013

Name Title Date

Problems; suggestions; ☒ Report attached See Appendix C

Agency: EPA Consultant

Contact: Alex Lapolstol Technical Consultant 26 February 2013

Name Title Date

Problems; suggestions; ☒ Report attached See Appendix C

Agency: CDPH

Contact: Paul Williams District Engineer 27 February 2013

Name Title Date

Problems; suggestions; ☒ Report attached See Appendix C

4. **Other interviews** (optional) ☒ Report attached.

Karen Meade, CH2M Hill, 6 May 2013; Richard Slade and Anthony Hicke, ULARA Watermaster, 28 February 2013; See Appendix C

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☐ Readily available	☒ Up to date	☐ N/A

Remarks O&M manual in process of being updated, will have 3 chapters of 12 to go by end of March, complete NLT end of April.

2.	**Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A **Contingency plan/emergency response plan** ☒ Readily available ☒ Up to date ☐ N/A Remarks There's a trifold contingency/emergency response plan in every vehicle's glove box.
3.	**O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐N/A Remarks None
4.	**Permits and Service Agreements** ☐ Air discharge permit ☐ Readily available ☐ Up to date ☐ N/A ☐ Effluent discharge ☐ Readily available ☐Up to date ☐ N/A ☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A ☒ Other permits CDPH ☒ Readily available ☒ Up to date ☐ N/A Remarks None
5.	**Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A Remarks None
6.	**Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A Remarks Lockheed Martin Corp maintains
7.	**Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☐N/A Remarks Lockheed does monitoring. Tetra Tech does semi-annual reports
8.	**Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A Remarks None
9.	**Discharge Compliance Records** ☒ Air (quarterly) ☒ Readily available ☒ Up to date ☐ N/A ☒ Water (effluent) (monthly) ☒ Readily available ☒ Up to date ☐ N/A Remarks Provided in Monthly reports
10.	**Daily Access/Security Logs** ☒Readily available ☒ Up to date ☐ N/A Remarks None

IV. O&M COSTS	
1.	**O&M Organization** ☐ State in-house ☐ Contractor for State ☐ PRP in-house ☐ Contractor for PRP ☐ Federal Facility in-house ☐ Contractor for Federal Facility ☒ Other City of Burbank
2.	**O&M Cost Records** ☐ Readily available ☒ Up to date ☒ Funding mechanism/agreement in place Original O&M cost estimate_____ ☐ Breakdown attached
3.	**Unanticipated or Unusually High O&M Costs During Review Period** Describe costs and reasons: None. High cost to re-build/rehab wells, but this is anticipated.
V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A	
A. Fencing	
1.	**Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A Remarks No damage. Fencing and gates look good.
B. Other Access Restrictions	
1.	**Signs and other security measures** ☐ Location shown on site map ☐ N/A Remarks Security patrols at night, will have cameras up in next couple of months.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) N/A

Frequency N/A

Responsible party/agency N/A

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☒ No ☐ N/A

Other problems or suggestions: ☐ Report attached

No problems or suggestions; See Section 6.7

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks None

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident

Remarks Some minor theft of wire, parts, pumps from storage areas has occurred. Occasional graffiti on sample cabinets, though none was observed on the site inspection.

2. **Land use changes on site** ☒ N/A

Remarks None

3. **Land use changes off site** ☒ N/A

Remarks None

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks None

B. Other Site Conditions	
Remarks Site looks clean and well organized. High pitch noise had been heard off site by at least one resident; possible causes and remedies are being investigated.	
VII. LANDFILL COVERS ☐ Applicable ☒ N/A	
VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A	
IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A	
1. **Pumps, Wellhead Plumbing, and Electrical** ☒ Good condition ☒ All required wells properly operating G Needs Maintenance G N/A Remarks None	
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☒ Good condition ☐ Needs Maintenance Remarks None	
3. **Spare Parts and Equipment** ☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks Spare parts kept in storage areas of buildings or containers. Well organized. Planning to build another small building for spare parts.	
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A	
C. Treatment System ☒ Applicable ☐ N/A	

1. **Treatment Train** (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☒ Air stripping ☒ Carbon adsorbers

☐ Filters_____

☒ Additive (*e.g.*, chelation agent, flocculent) C150 proprietary antiscalant (NALCO)

☐ Others_____

☒ Good condition ☐ Needs Maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of groundwater treated annually_____

☐ Quantity of surface water treated annually N/A

Remarks Treatment system looks clean and well maintained

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐N/A ☒ Good condition ☐ Needs Maintenance

Remarks None

3. **Tanks, Vaults, Storage Vessels**

☐N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs Maintenance

Remarks None

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs Maintenance

Remarks None

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☒ Chemicals and equipment properly stored

Remarks None

6.	**Monitoring Wells** (pump and treatment remedy) ☐ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance ☐ N/A Remarks Monitoring Wells were not visited on the Site Inspection
D. Monitoring Data	
3.	Monitoring Data ☐ Is routinely submitted on time ☒ Is of acceptable quality
4.	Monitoring data suggests: ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining
D. Monitored Natural Attenuation	
1.	**Monitoring Wells** (natural attenuation remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance ☒ N/A Remarks This is a containment remedy, not an MNA remedy.
X. OTHER REMEDIES	
N/A	
XI. OVERALL OBSERVATIONS	
A.	**Implementation of the Remedy**
	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.). The remedy functions very well. Contaminants are being removed from the aquifer, but levels appear to be consistent. Haven't looked too hard at removal efficiency or containment, and are mostly focused on operations.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. The largest O&M issue had been finding the right contractor to manage the day to day operations of the BOU treatment facility, which the City of Burbank feels that they have done with APT Water. Together, the City of Burbank and APT Water are proactive in maintaining and optimizing the BOU treatment facility.
C.	**Early Indicators of Potential Remedy Problems**

	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Carbon regeneration for LPGAC carbon

Appendix E: Photographs from Site Inspection Visit

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Photographs from Site Inspection Visit

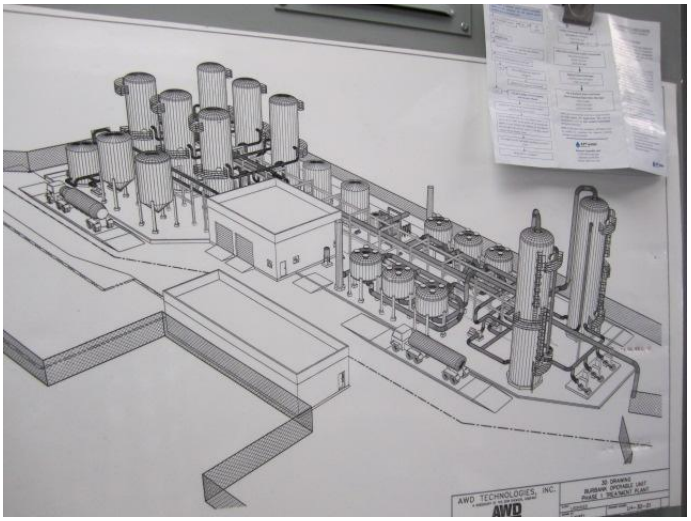

Photo 1. Original BOU Treatment Plant Schematic

Photo 2. BOU VPGAC and Air Strippers

Figure 3. BOU Air Strippers and Blowers (sound attenuation blankets on the blowers)


Photo 4. BOU Air Strippers and Blowers (sound attenuation blankets on the blowers)

Photo 5. Process stream labeling

Photo 6. Process stream label

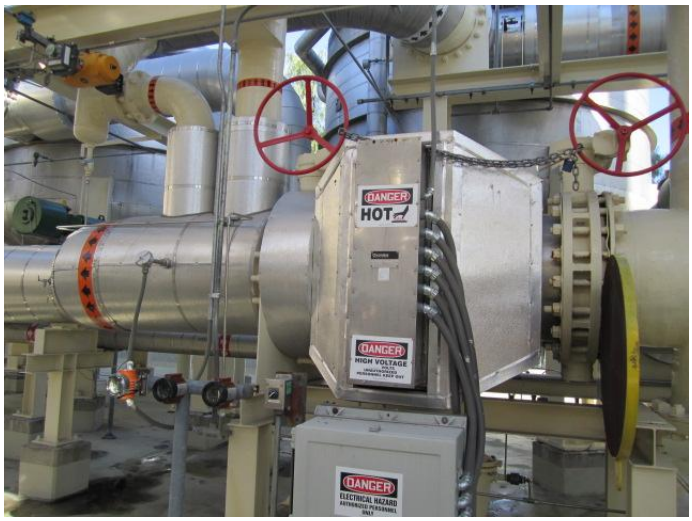

Photo 7. Dehumidifier (caught on fire on 2008)


Photo8. VPGAC Unit (from inside the bed galley)

Photo 9. Solvent Collection Tank (TK-610) and Solvent Separator (V-510)

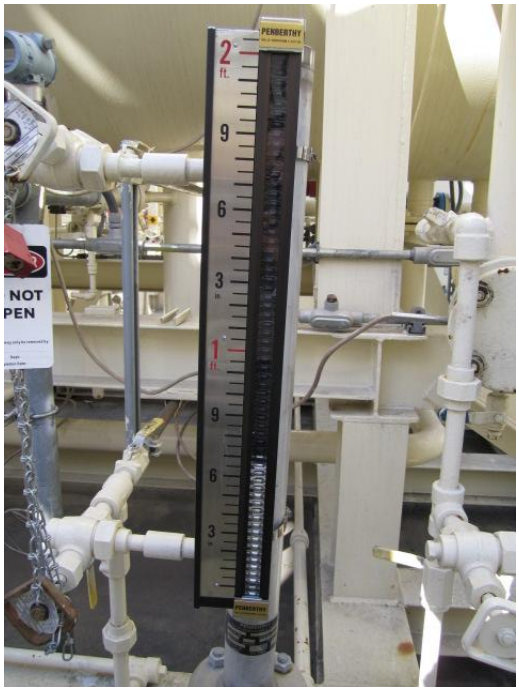

Photo 10. Solvent level indicator on solvent separator (V-510)

Photo 11. Solvent separator (V-510)

Photo 12. Solvent collection tank (TK-610)


Photo 13. LPGAC Vessels

Photo 14. Bed galleries

Photo 15. New flow meter control to the LPGAC vessels

Photo 16. New flow meter to an LPGAC vessel

Photo 17. LPGAC backwash units (not currently in use)

Photo 18. Forebay level indicator

Photo 19. BOU Treatment Facility from southwest


Photo 20. Ammonia storage room


Photo 21. Ammonia feed piping


Photo 22. Ammonia control panels

Photo 23. BOU blending facility with hydrogenerator (top pipeline)

Photo 24. BOU from west (above blending facility)

Photo 25. BOU blending facility

Photo 26. BOU pump room

Photo 27. On-site sump for discharge of purge water to solvent separator

Photo 28. Extraction well VO3


Photo 29. Extraction well VO3


Photo 30. Extraction well VO3


Photo 31. Extraction well VO3 vault openings and air circulation fan


Photo 32. VO3 Sample cabinet

Photo 33. NHOU Treatment Facility

Photo 34. Hexametaphosphate anti-scalant storage tank

Photo 35. VPGAC Unit

Photo 36. Blower upstream of heater and VPGAC units

Photo 37. Gasket on blower entrance

Photo 38. NHOU Air Stripper

Photo 39. NHOU Chlorination Room


Photo 40. Extraction well NHE-2


Photo 41. NHE-2 Wellhead treatment structure

Photo 42. Extraction Well NHE-3


Photo 43. San Fernando Valley (looking west)


Photo 44. San Fernando Valley (looking southwest)

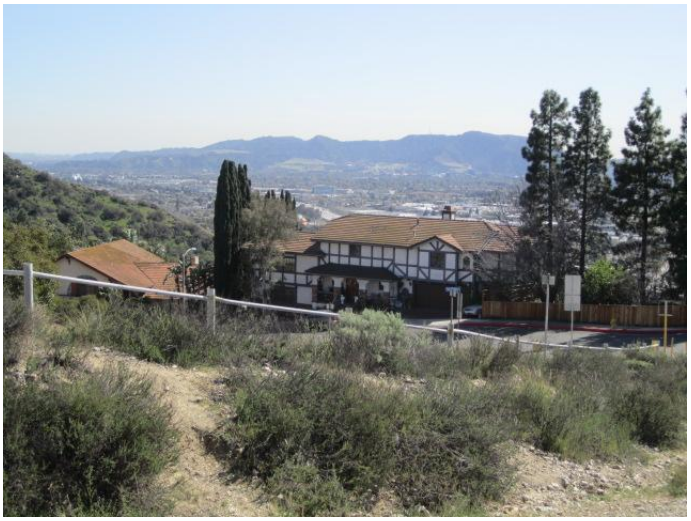

Photo 45. San Fernando Valley (looking south beyond the house)

Photo 46. BOU Treatment Facility from far north (air stripper and LPGAC towers visible)

Appendix F: ARARs Summary

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ARARs Summary

Chemical-specific ARARs

Chemical-specific ARARs are discussed in section **Error! Reference source not found.**. Table 1 summarizes the chemical-specific ARARs.

Action-specific ARARs

Action-specific ARARs identified include Air Quality Standards, Hazardous Waste Management Regulations, and Water Quality Standards for Reinjection. These are summarized in Table 2.

In California, the authority for enforcing the standards established under the Clean Air Act has been delegated to the State. The program is administered by the South Coast Air Quality Management District (SCAQMD).

The State of California has been authorized by the EPA to develop and enforce its own hazardous waste regulations in lieu of the Federal program. These requirements are found in 22 CCR Division 4.5. The source of the VOCs in groundwater was unknown and, therefore, could not be definitively classified as listed hazardous wastes. However, EPA determined in both RODs that the contaminants are sufficiently similar in nature to listed hazardous wastes that certain substantive requirements of California's hazardous waste regulations are relevant and appropriate at the site.

To-Be-Considered (TBC) Criteria

Two TBC Criteria were identified for the NHOU and BOU and are summarized in Table 3. As noted previously, the 1,4-dioxane notification level was revised from 3 to 1 µg/L in November 2010.

Table 1. Chemical-specific ARARs

Source	Citation	Description	Effect on Protectiveness	Comments	Amendment Date
SDWA (2 USC 300 et seq.)	National Primary Drinking Water Standards, including 40 CFR 141.61 and 40 CFR 141.62	Chemical-specific drinking water standards and MCLs have been promulgated under the SDWA; MCLGs above zero are considered chemical-specific ARARs under the NCP (40 CFR 300.430(e)(2)(i)(B)). When the MCLGs are equal to zero, which is generally the case for a chemical considered to be a carcinogen, the MCL is considered the chemical-specific ARAR instead of the MCLG (40 CFR 300.430(e)(2)(i)(C)). Established MCLs for COCs are listed in **Error! Reference source not found.**.	There have been no changes to the federal MCLs since the last FYR. Protectiveness is not affected.	The MCLs are ARARs for the purpose of establishing performance standards for the treated water from the NHOU and BOU treatment plants.	N/A
SDWA (2 USC 300 et seq.)	National Primary Drinking Water Standards, 40 CFR 141, including 40 CFR 141.23 and 40 CFR 141.24	Requires monitoring to determine compliance with MCLs.	No changes have been made to this requirement. Protectiveness is not affected.	Substantive monitoring requirements are relevant and appropriate to ensure that treated effluent is meeting performance standards.	N/A
State of California Domestic Water Quality and Monitoring Regulations	California Safe Drinking Water Regulations, including 22 CCR 64431 and 22 CCR 64444	Contains provision for California domestic water quality; establishes MCLs for primary drinking water chemicals. Established MCLs for COCs are listed in **Error! Reference source not found.**.	There have been no changes to the state MCLs since the last FYR. Protectiveness is not affected.	The MCLs are ARARs for the purpose of establishing performance standards for COCs in the water extracted from the basin and treated at the treatment plants.	N/A

Table 2. Action-specific ARARs

Source	Citation	Description	Effect on Protectiveness	Comments	Amendment Date
Clean Air Act SCAQMD	Regulation XIII	Regulation XIII requires that stationary sources of air emissions meet best available technology standards.	Rules 1309 (Emission Reduction Credits and Short Term Credits), 1315 (Federal New Source Tracking System), and 1325 (Federal $PM_{2.5}$ New Source Review Program) of Regulation XIII have been amended or adopted since the previous FYR, but none of the changes affect protectiveness.	For air strippers, SCAQMD considers vapor phase GAC (with 90-99% removal efficiency) devices to be BACT. These are pre-construction requirements, so all applicable requirements were obtained before treatment units went on-line.	Latest amendment was on June 3, 2011.
Clean Air Act SCAQMD	Rule 1401	Rule 1401 specifies limits for individual cancer risk and excess cancer cases from new or modified stationary sources which emit carcinogenic air contaminants. The rule requires BACT for toxic air discharge for new stationary sources where a lifetime maximum individual cancer risk of one in one million or greater is estimated to occur.	The list of chronic and acute toxic air contaminants was expanded, but this does not affect protectiveness.	As Rule 1401 is a pre-construction regulation, so all applicable requirements were attained before the treatment units went on-line. If the air stripping treatment system is modified significantly, substantive provisions of Rule 1401 will still apply.	Latest amendment was on September 10, 2010.
California Water Code and State Water Resources Control Board Model Well Standards Ordinance (1989)	Division 7, Chapter 10, Section 13700 et seq.	The California Water Code requires the State Water Resources Control Board to adopt a model well ordinance implementing the standards for well construction, maintenance, and abandonment contained in the construction requirements for wells, in conformance with DWR Bulletin 74-81. DWR Bulletin 74-90 (1990) updated DWR Bulletin 74-81.	No changes have been made to this requirement. Protectiveness is not affected.	Substantive provisions of this code are applicable in instances of well construction or maintenance.	N/A
California Hazardous Waste Regulations, Generator Requirements	22 CCR 66262.10	22 CCR 66262.10 lists the sections of California law with which a generator of hazardous waste must comply.	No changes have been made to this requirement since that last FYR. Protectiveness is not affected.	The remedies need only apply with the substantive provisions of the regulations listed in 22 CCR 66262.10. Spent GAC is an example of hazardous waste generated on-site.	N/A

Source	Citation	Description	Effect on Protectiveness	Comments	Amendment Date
California Hazardous Waste Regulations, Generator Requirements	22 CCR 66262.11	Requires waste generators to determine if wastes are hazardous, and establishes procedures for such determinations.	No changes have been made to this requirement since that last FYR. Protectiveness is not affected.	The substantive requirements are applicable to management of waste materials generated by a groundwater treatment plant and to any waste generated while installing new wells.	N/A
California Hazardous Waste Regulations, Generator Requirements	22 CCR 66262.34(a)(1)(A)	Waste stored on-site should be placed in containers or tanks that are in compliance with California Waste Regulations.	No changes have been made to this requirement since that last FYR. Protectiveness is not affected.	Storage of hazardous waste accumulated on-site must be in compliance with substantive requirements for interim status facilities.	N/A
California Hazardous Waste Regulations, Generator Requirements	22 CCR 66265.170 et seq. (Article 9); 22 CCR 66265.190 et seq. (Article 10)	Regulates use and management of containers, compatibility of wastes with containers, and special requirements of certain wastes.	No changes have been made Articles 9 or 10 since that last FYR. Protectiveness is not affected.	Substantive provisions of Articles 9 and 10 are applicable because hazardous waste is generated and accumulated on-site.	N/A
California Land Disposal Restrictions, Requirements for Generators	22 CCR 66268.3, 22 CCR 66268.7, 22 CCR 66268.9, and 22 CCR 66268.50	Compliance with land disposal regulation treatment standards is required if hazardous waste is placed on land.	No changes have been made to these requirements since that last FYR. Protectiveness is not affected.	Hazardous waste hauled off-site must meet "land-ban" requirements.	N/A
California Land Disposal Restrictions, Requirements for Generators	22 CCR 66268.1 et seq. (Article 1)	Prior to transporting for off-site disposal, hazardous waste must be characterized to determine whether land disposal restriction treatment standards apply and whether the waste meets these standards. This information must be provided to the off-site facility with the first waste shipment.	No changes have been made Article 1 since that last FYR. Protectiveness is not affected.	The substantive requirements are applicable to the management of waste materials generated by a groundwater treatment plant and to any waste generated while installing new wells.	N/A
Spent Carbon Disposal	40 CFR 268.40	Attain land disposal treatment standards before putting waste into landfill to comply with land disposal restriction.	No changes have been made to this requirement since that last FYR. Protectiveness is not affected.		N/A

Source	Citation	Description	Effect on Protectiveness	Comments	Amendment Date
Groundwater Reinjection	State Water Resources Control Board Resolution 68-16	Requires that reinjected water not unreasonably degrade existing water quality.	No changes have been made to this requirement since that last FYR. Protectiveness is not affected.	Resolution 68-16 (Statement of Policy with respect to Maintaining High Quality of Waters in California) does not contain substantive requirements in and of itself. This regulation is applicable to any treated water that is reinjected into the groundwater.	N/A
Groundwater Reinjection	RCRA Section 3020	Provides that the ban on the disposal of hazardous waste into a formation which contains an underground source of drinking water shall not apply to the injection of contaminated groundwater into the aquifer if: 1) such reinjection is part of a response action under CERCLA, 2) such contaminated groundwater is treated to substantially reduce hazardous constituents prior to such reinjection, and 3) such response action will, upon completion, be sufficient to protect human health and the environment.	No changes have been made to this requirement since that last FYR. Protectiveness is not affected.	This regulation is applicable to any treated water that is reinjected into the groundwater.	N/A

Table 3. To Be Considered Criteria

Source	Citation	Description	Effect on Protectiveness	Comments	Amendment Date
California PHGs, California Environmental Protection Agency, and OEHHA	California Calderon-Sher SDWA of 1996, California Health and Safety Code 116365	OEHHA has adopted PHGs for chemicals in drinking water. PHGs are levels of drinking water contaminants at which adverse health effects are not expected to occur from a lifetime of exposure.	No changes have been made to this requirement. Protectiveness is not affected.	In the absence of MCLs, the state PHGs adopted by OEHHA have been considered during selection of performance standards for extracted groundwater.	N/A
CDPH Drinking Water Notification Levels	California Health and Safety Code 116455	CDPH has established drinking water notification levels (formerly known as action levels) based on health effects, but in some cases they are based on taste and odor values for chemicals without MCLs.	CDPH revised its notification level for 1,4-dioxane from 3 to 1 µg/L. Protectiveness may be affected, but notification levels are not ARARs.	In the absence of MCLs, the drinking water notification levels established by CDPH have been considered during selection of performance standards for extracted groundwater.	December 14, 2010

Appendix G: VOC and 1,2,3-TCP Concentrations in BOU Plant Influent

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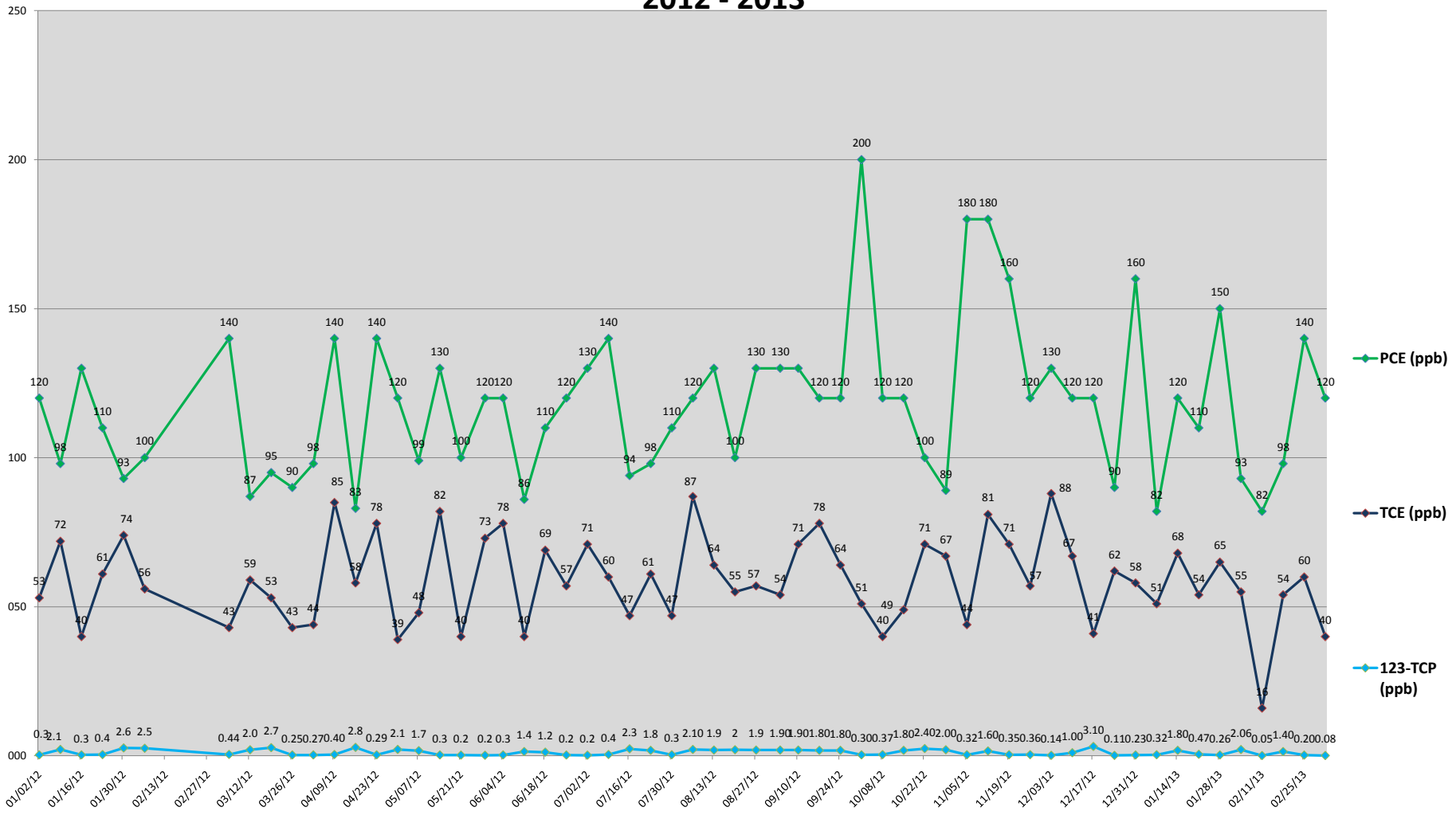
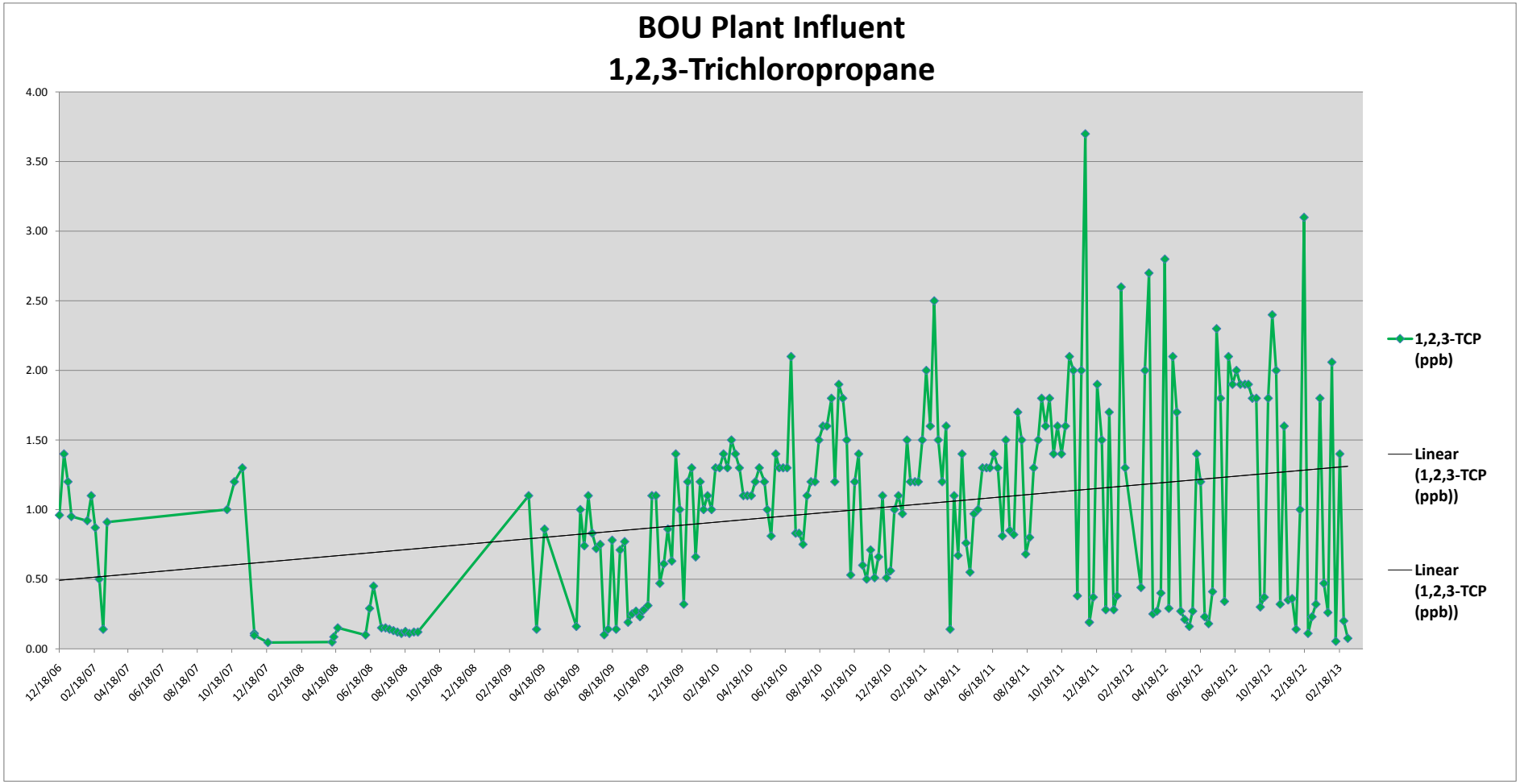
BOU Plant Influent
PCE/TCE/123-TCP
2012 - 2013




BOU Plant Influent
1,2,3-Trichloropropane
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
12/18/06
02/18/07
04/18/07
06/18/07
08/18/07
10/18/07
12/18/07
02/18/08
04/18/08
06/18/08
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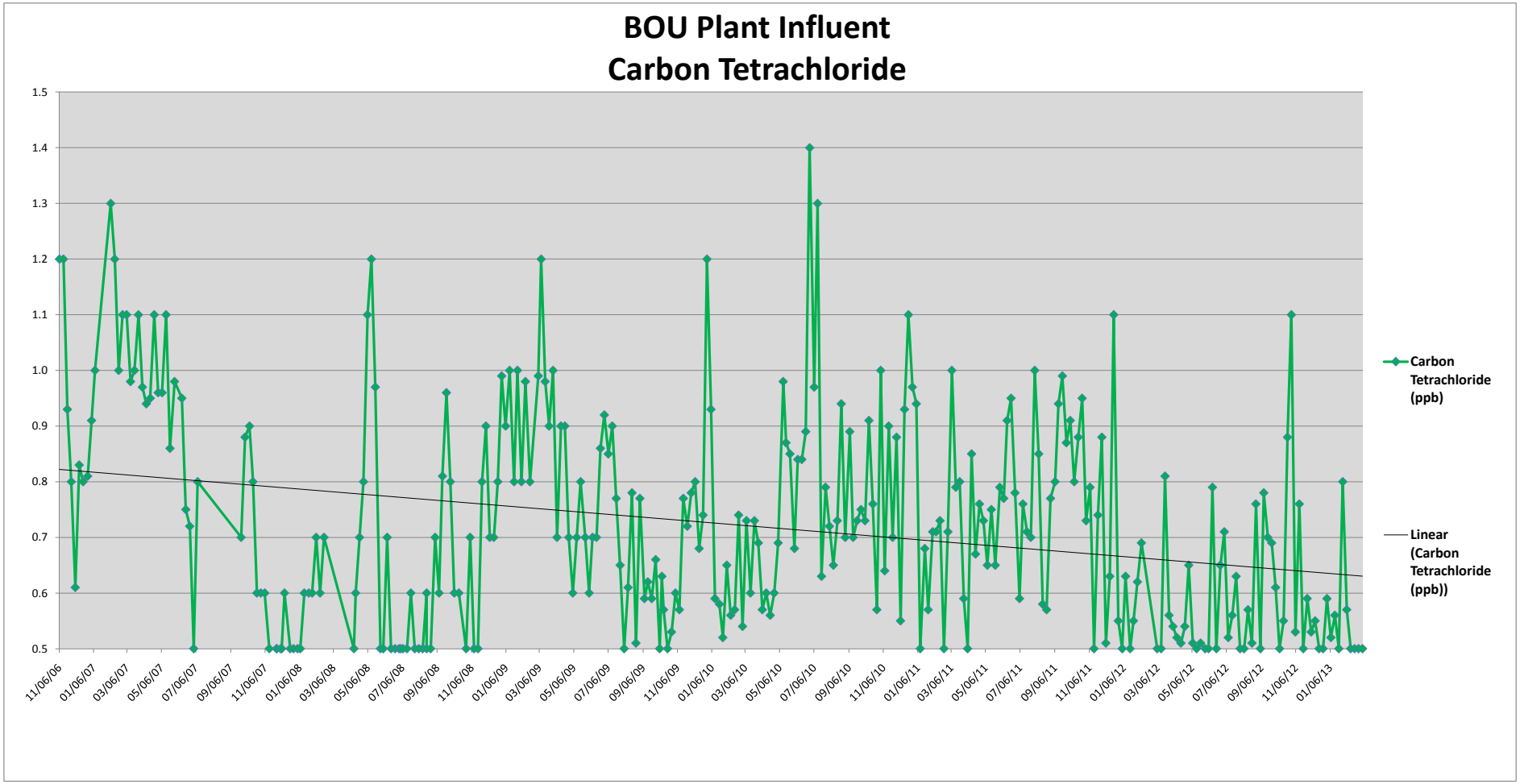
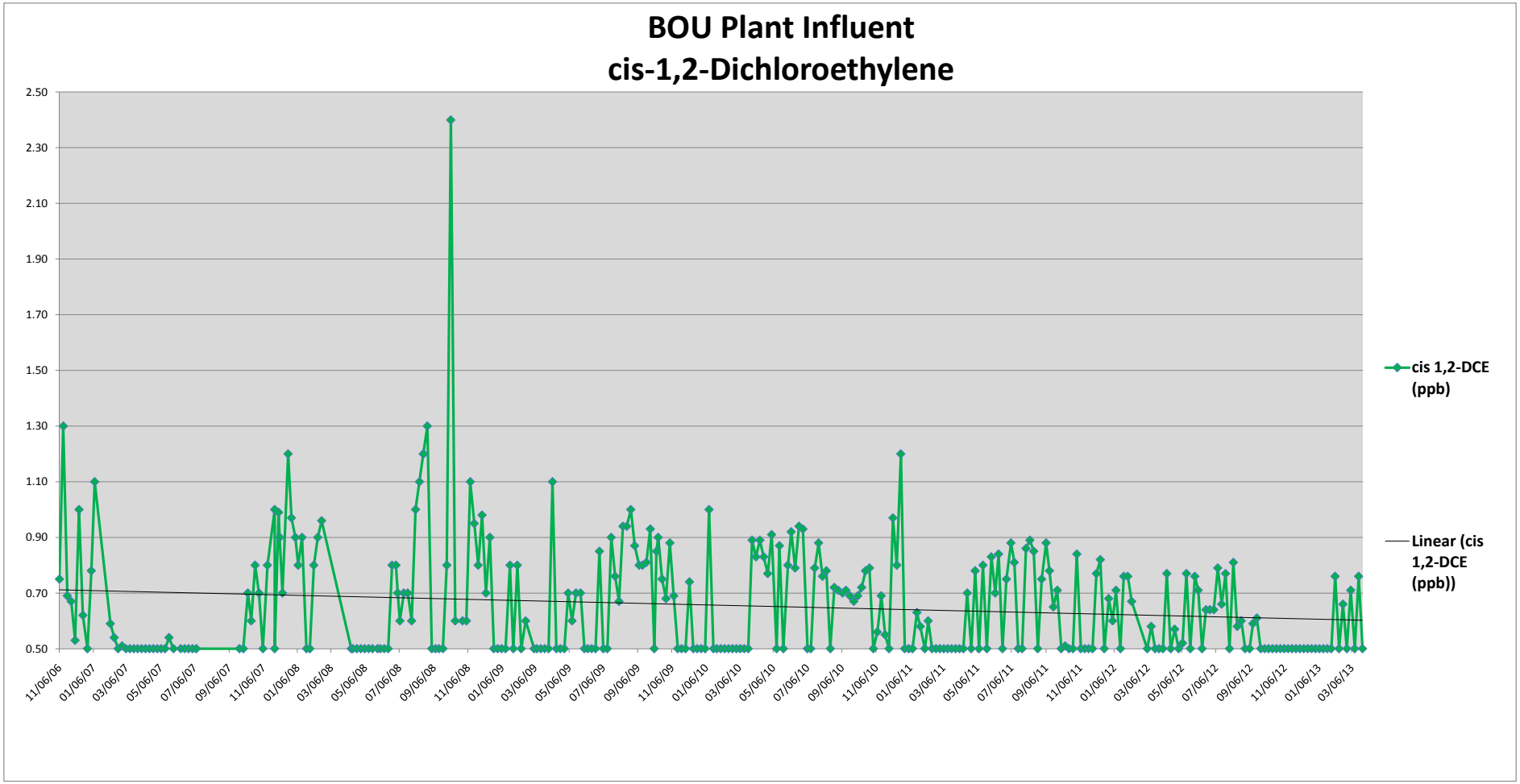
10/18/11
12/18/11
02/18/12
04/18/12
06/18/12
08/18/12
10/18/12
12/18/12
02/18/13
1,2,3-TCP (ppb)
Linear (1,2,3-TCP (ppb))
Linear (1,2,3-TCP (ppb))

BOU Plant Influent
Carbon Tetrachloride




BOU Plant Influent
cis-1,2-Dichloroethylene
2.50
2.30
2.10
1.90
1.70
1.50
1.30
1.10
0.90
0.70
0.50
11/06/06
01/06/07
03/06/07
05/06/07
07/06/07
09/06/07
11/06/07
01/06/08
03/06/08
05/06/08
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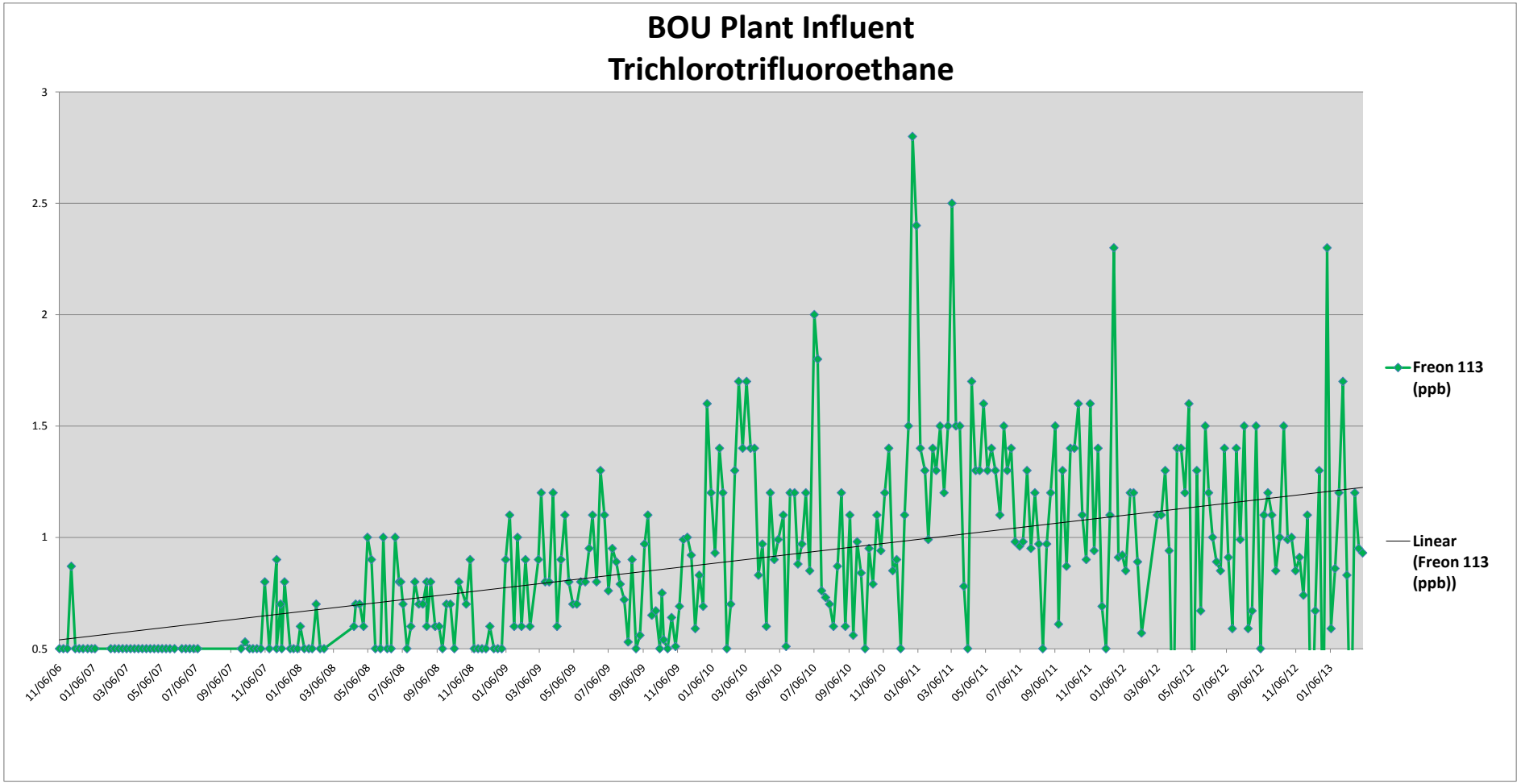
11/06/11
01/06/12
03/06/12
05/06/12
07/06/12
09/06/12
11/06/12
01/06/13
03/06/13
cis 1,2-DCE (ppb)
Linear (cis 1,2-DCE (ppb))


BOU Plant Influent
Trichlorotrifluoroethane
3
2.5
2
1.5
1
0.5
11/06/06
01/06/07
03/06/07
05/06/07
07/06/07
09/06/07
11/06/07
01/06/08
03/06/08
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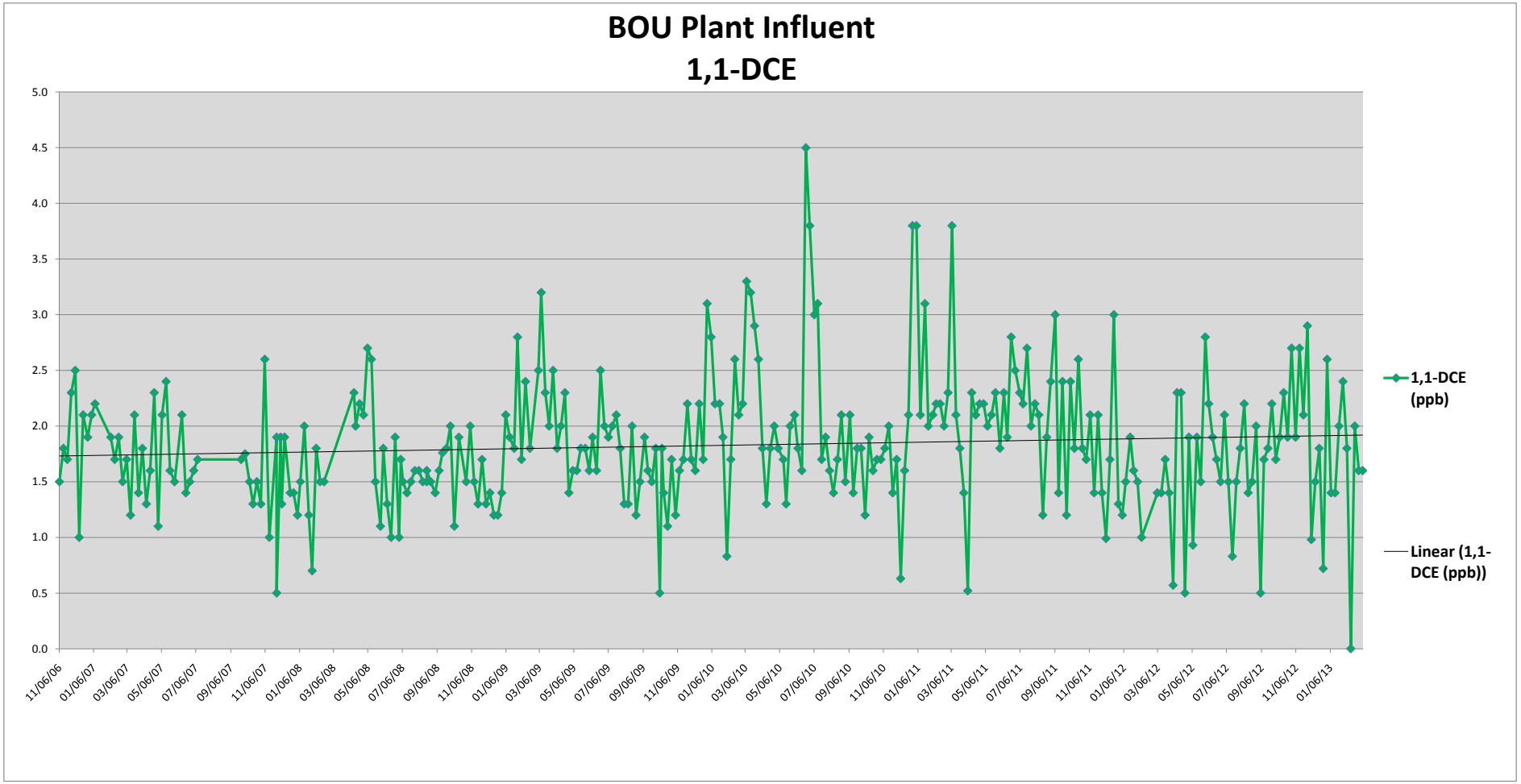
Linear (Freon 113 (ppb))


BOU Plant Influent
1,1-DCE
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
11/06/06
01/06/07
03/06/07
05/06/07
07/06/07
09/06/07
11/06/07
01/06/08
03/06/08
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07/06/11
09/06/11
11/06/11
01/06/12
03/06/12
05/06/12
07/06/12
09/06/12
11/06/12
01/06/13
1,1-DCE (ppb)
Linear (1,1-DCE (ppb))

Appendix H: Contaminant Concentrations in BOU Extraction Wells (October 2007 – February 2013)

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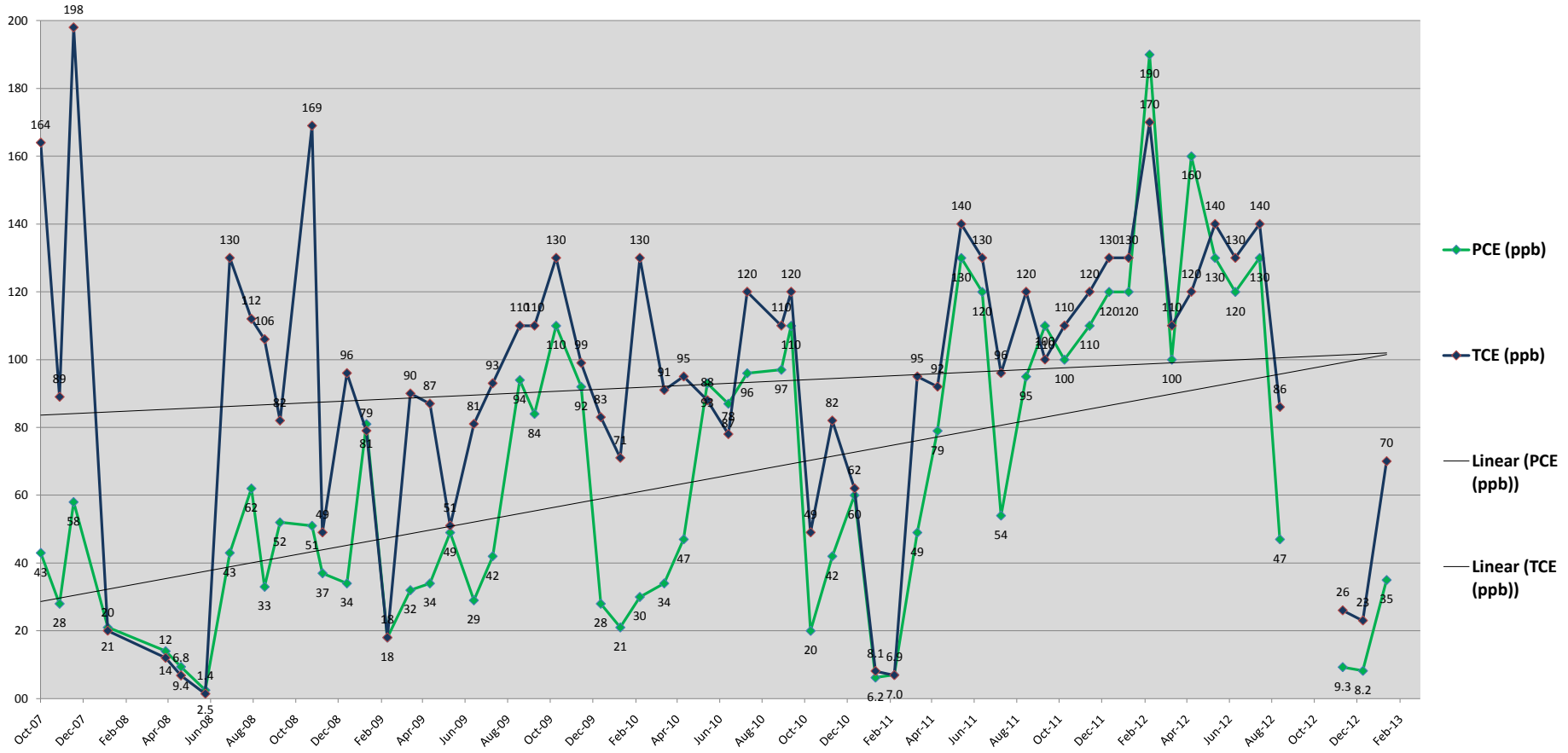
BOU Well VO-1


PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))
Oct-07
Dec-07
Feb-08
Apr-08
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Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
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Dec-10
Feb-11
Apr-11
Jun-11
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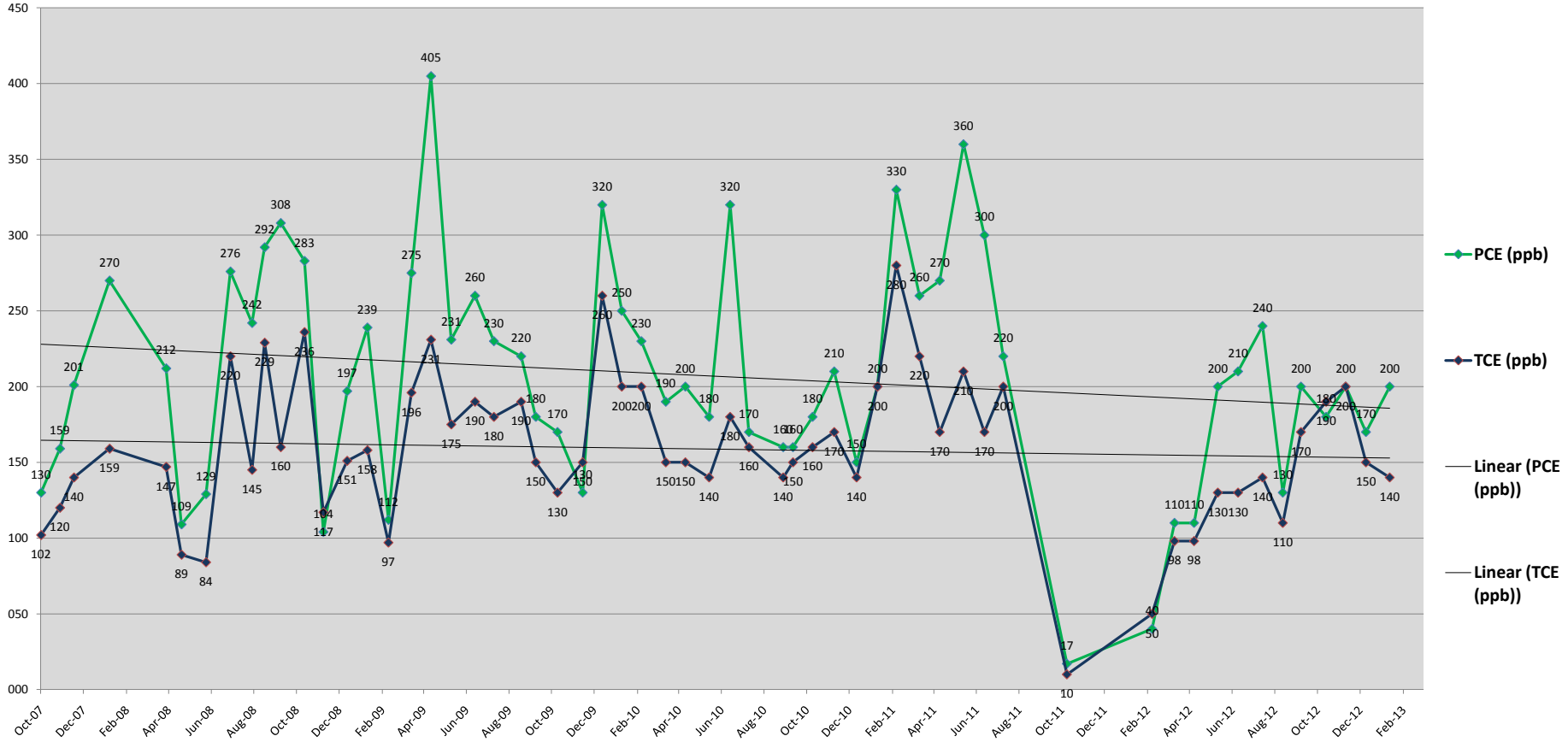
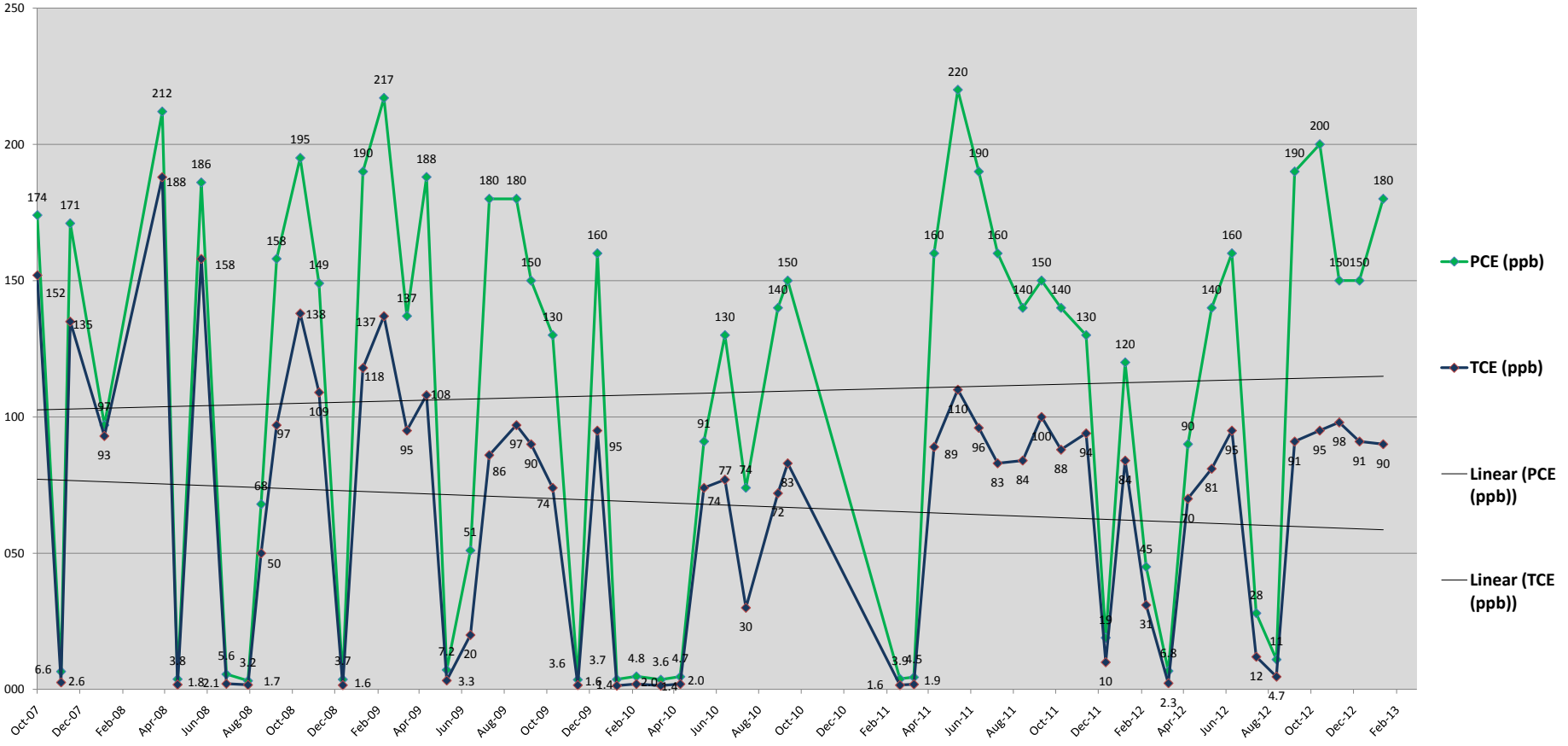
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13

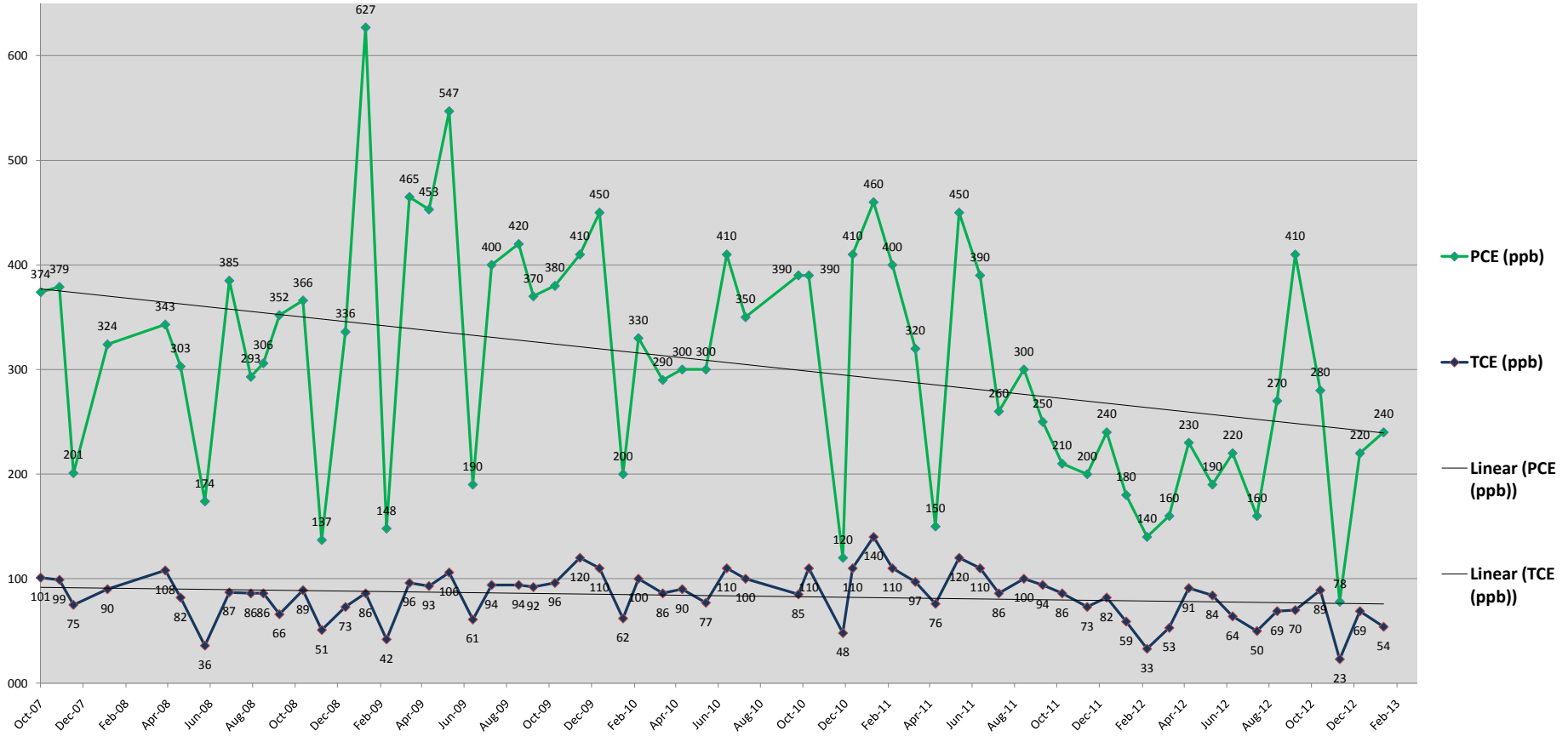
BOU Well VO-2


450
400
350
300
250
200
150
100
050
000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))

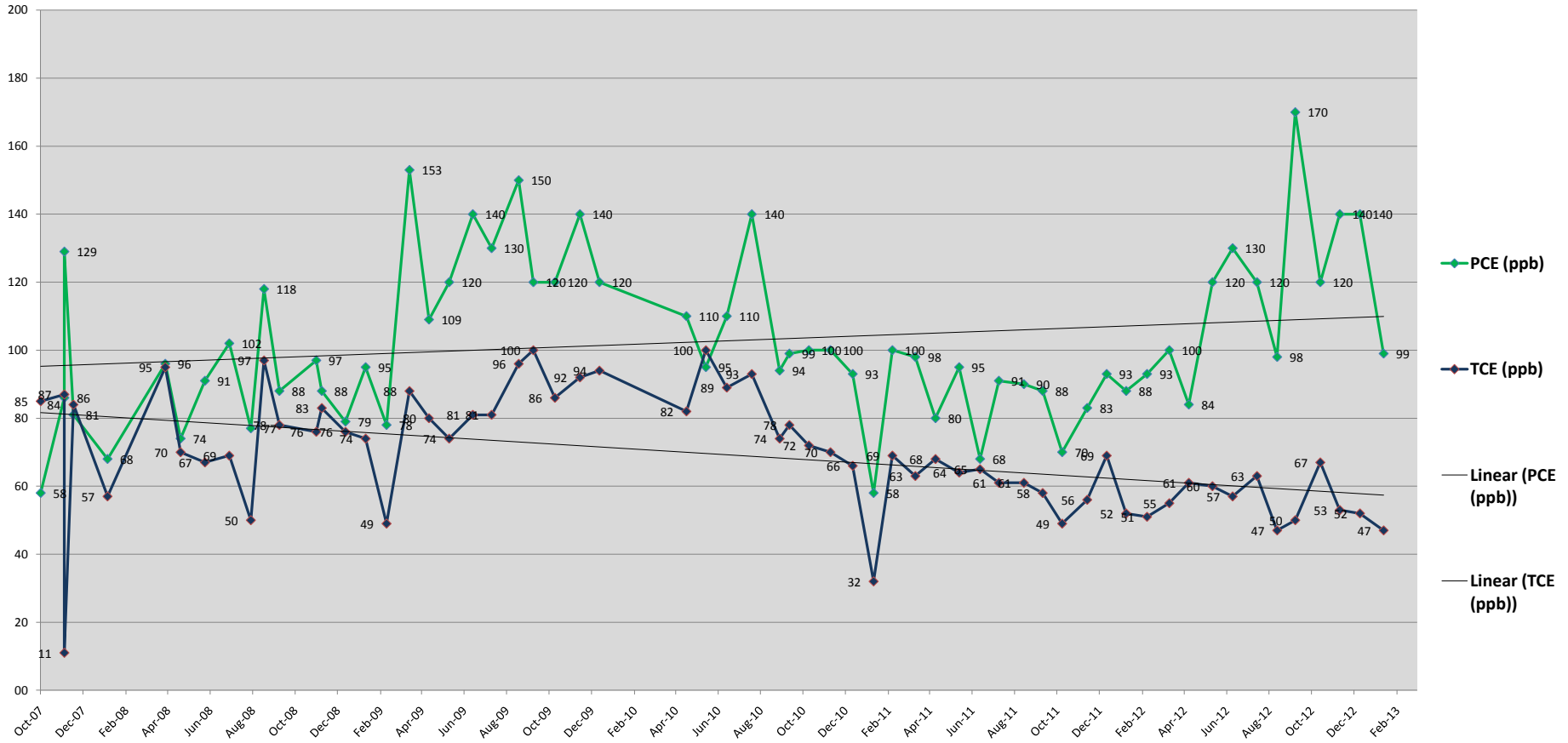
BOU Well VO-3


250
200
150
100
050
000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))

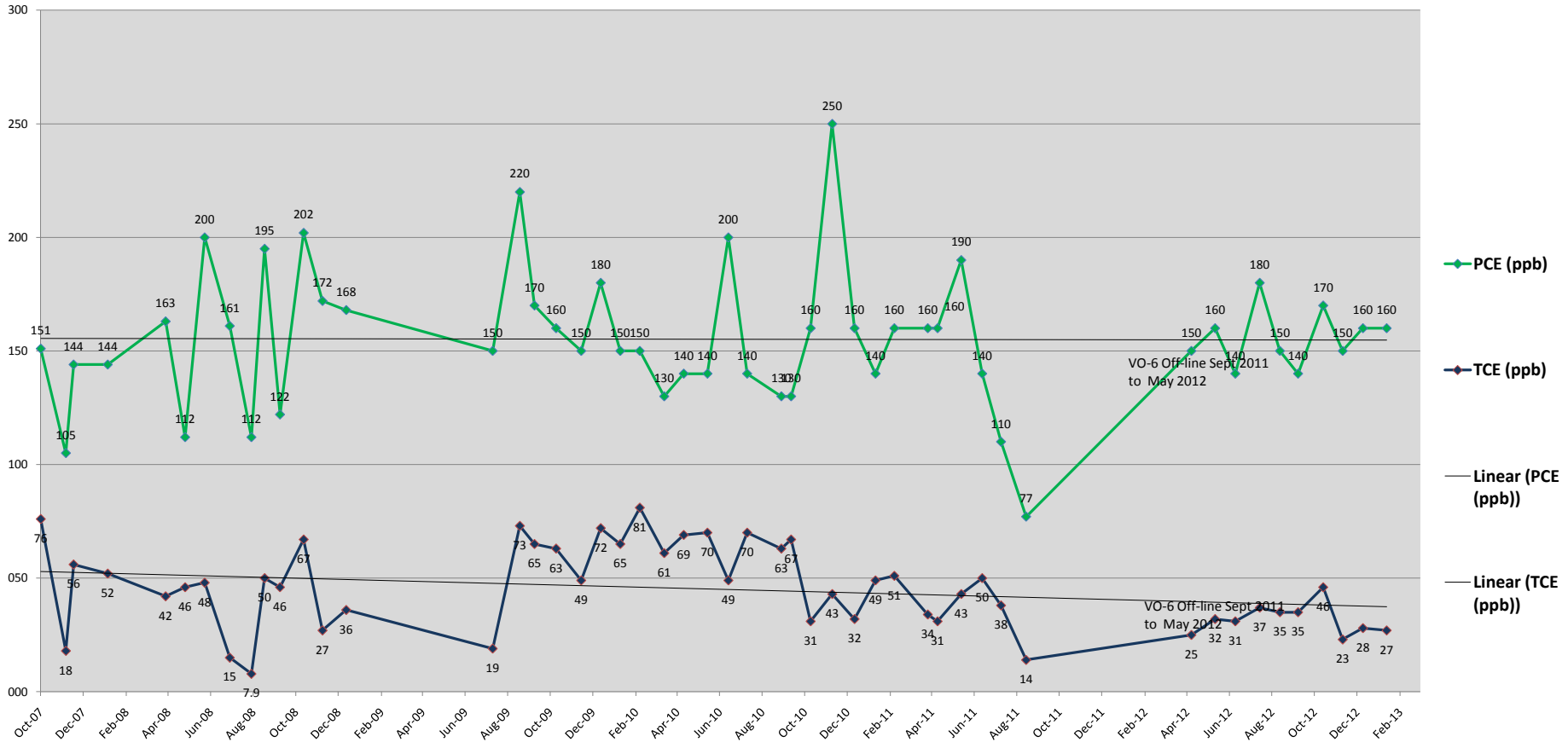
BOU Well VO-4


600
500
400
300
200
100
000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))

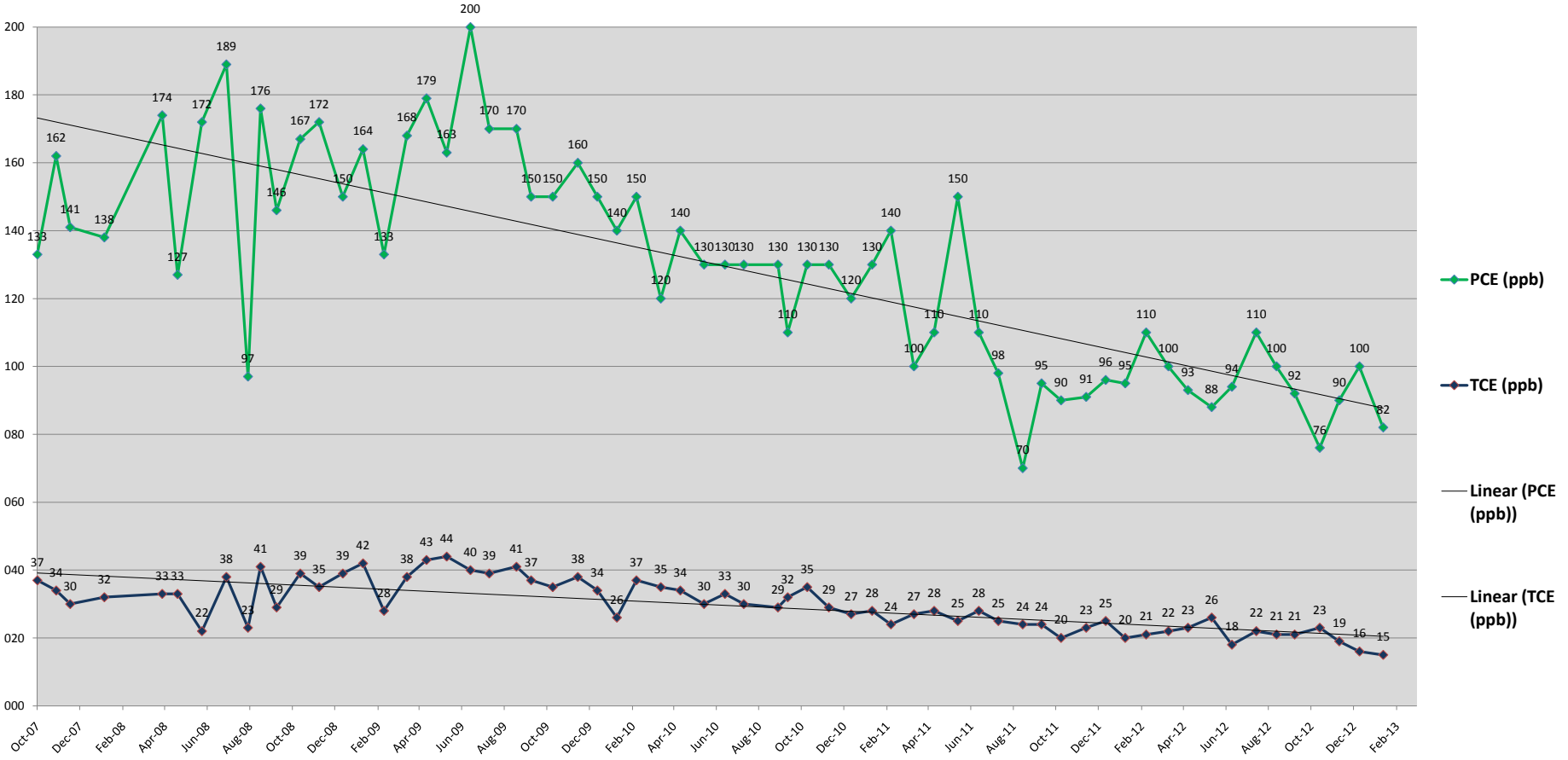
BOU Well VO-5


200
180
160
140
120
100
85
80
60
40
20
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))

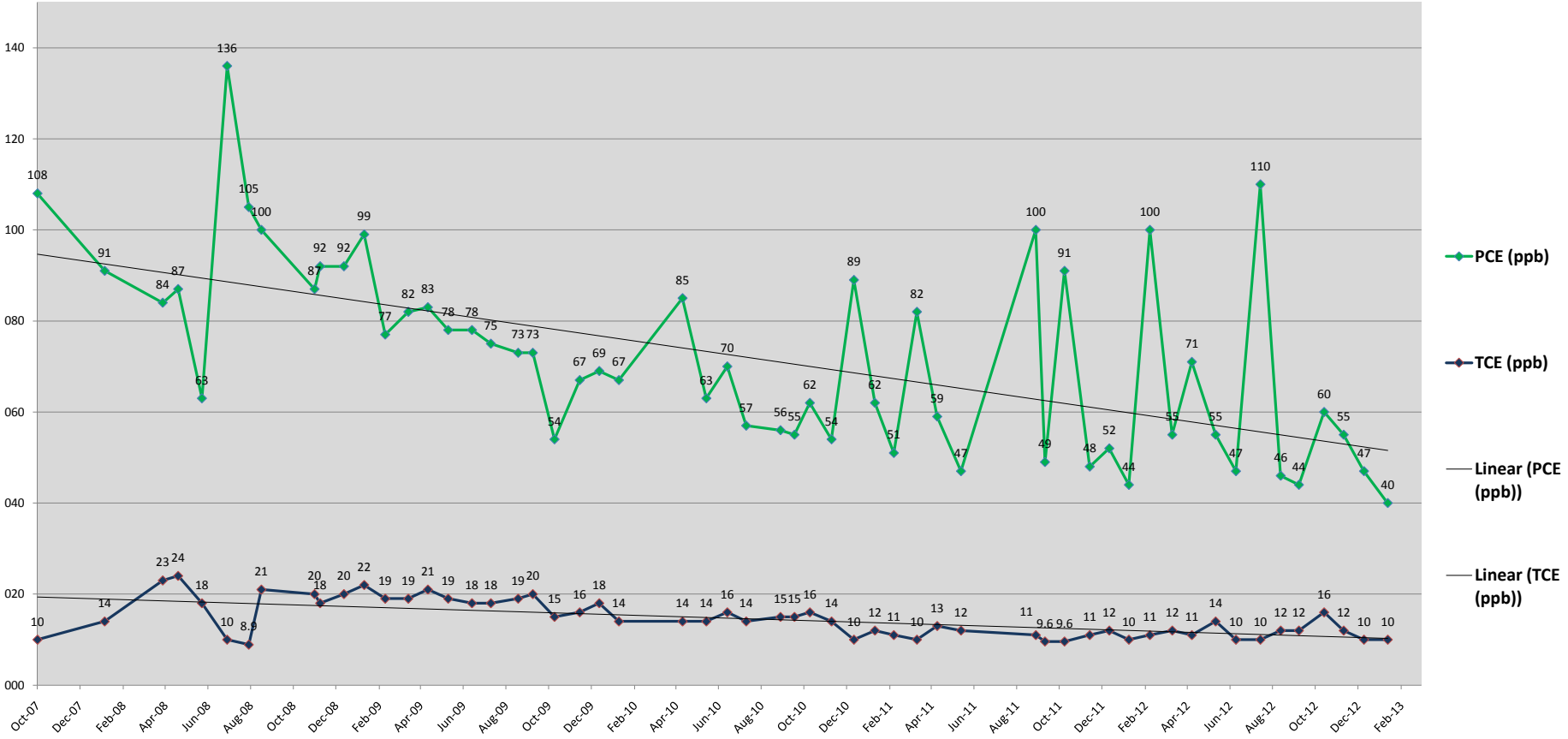
BOU Well VO-6


300
250
200
150
100
050
000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
VO-6 Off-line Sept 2011 to May 2012
VO-6 Off-line Sept 2011 to May 2012
PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))

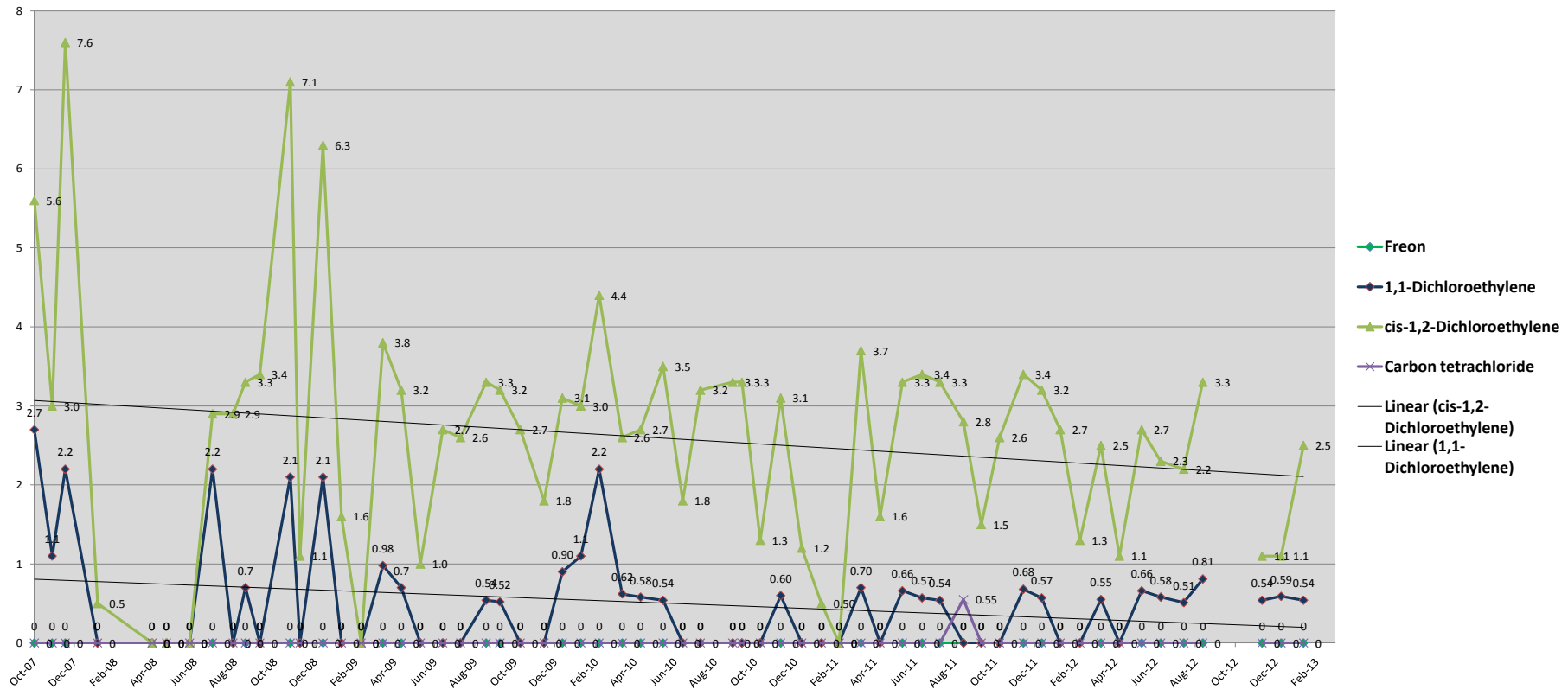
BOU Well VO-7


200
180
160
140
120
100
080
060
040
020
000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))

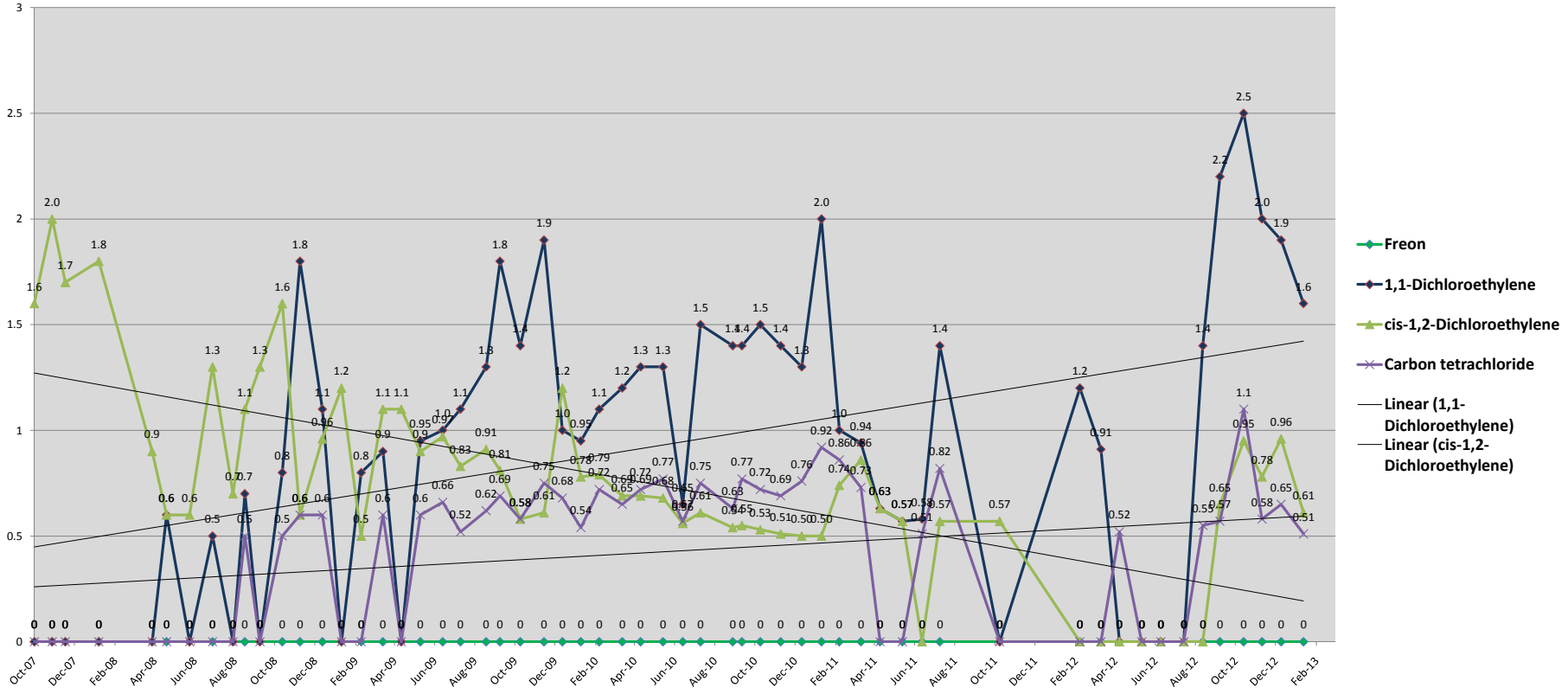
BOU Well VO-8


140
120
100
080
060
040
020
000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
PCE (ppb)
TCE (ppb)
Linear (PCE (ppb))
Linear (TCE (ppb))

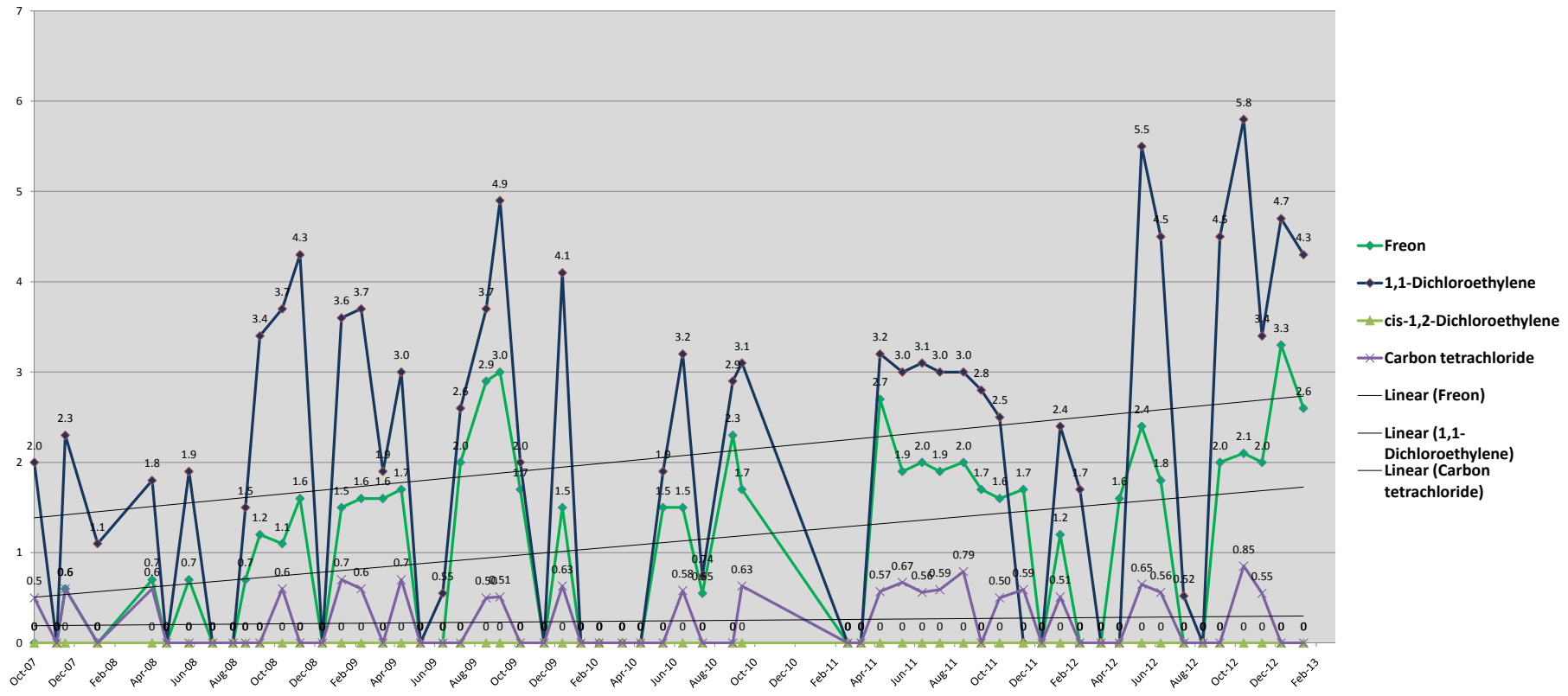
BOU Well VO-1


Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (cis-1,2-Dichloroethylene)
Linear (1,1-Dichloroethylene)
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13

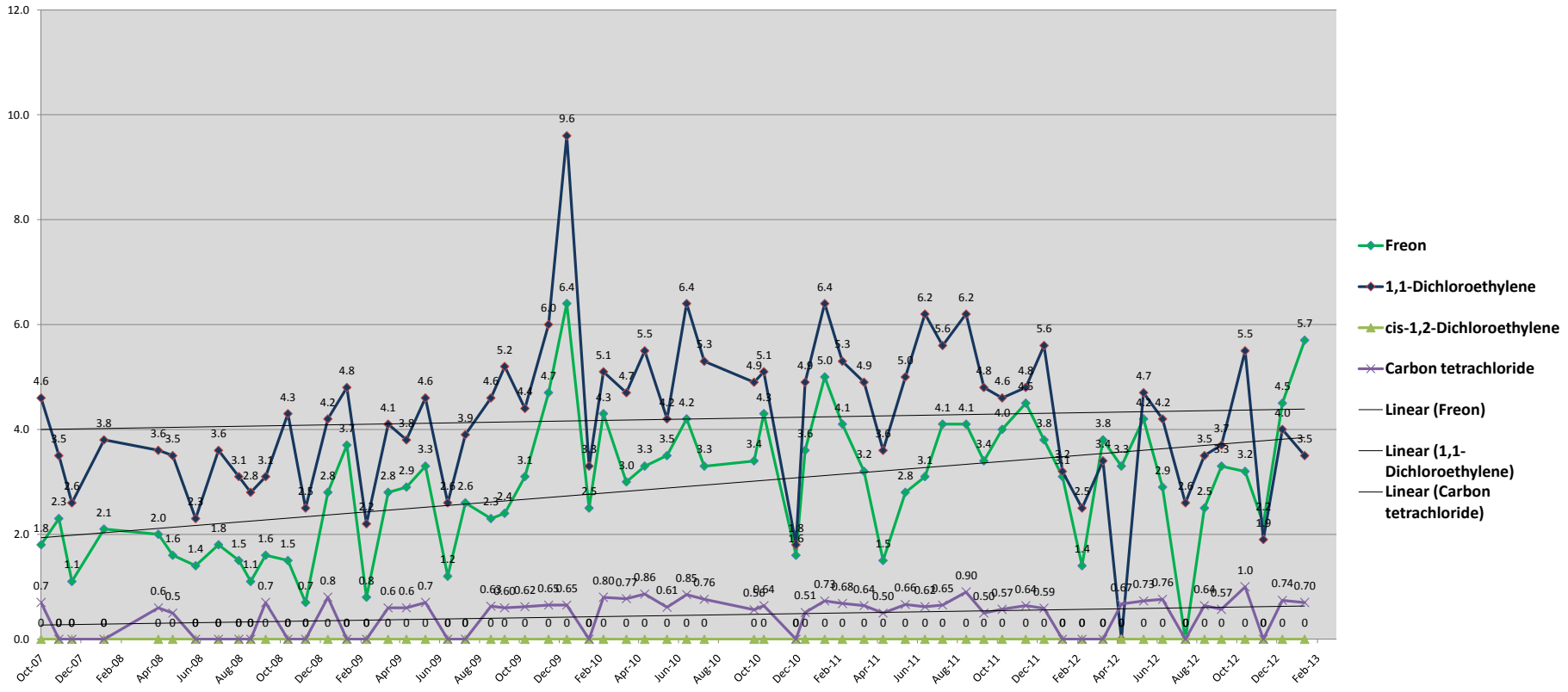
BOU Well VO-2


3
2.5
2
1.5
1
0.5
0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (1,1-Dichloroethylene)
Linear (cis-1,2-Dichloroethylene)

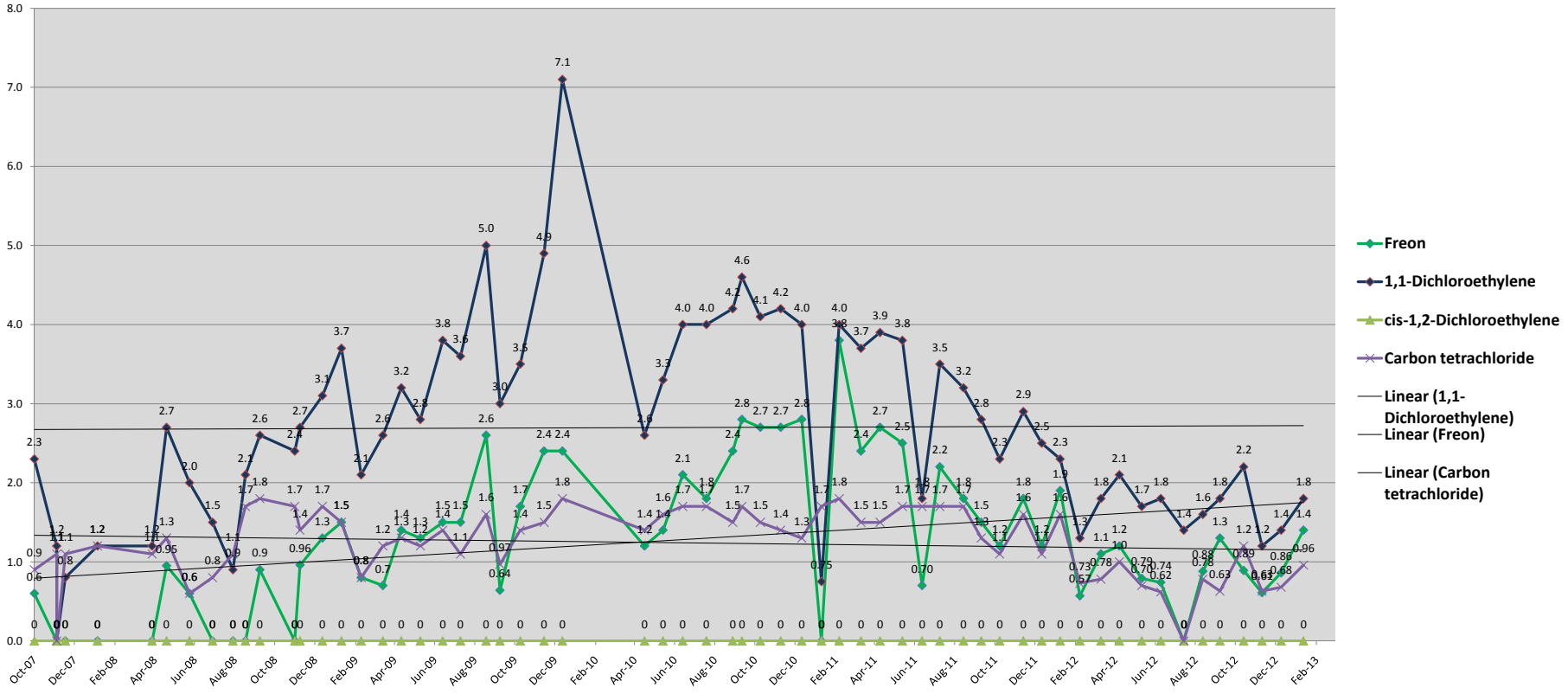
BOU Well VO-3


Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (Freon)
Linear (1,1-Dichloroethylene)
Linear (Carbon tetrachloride)
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13

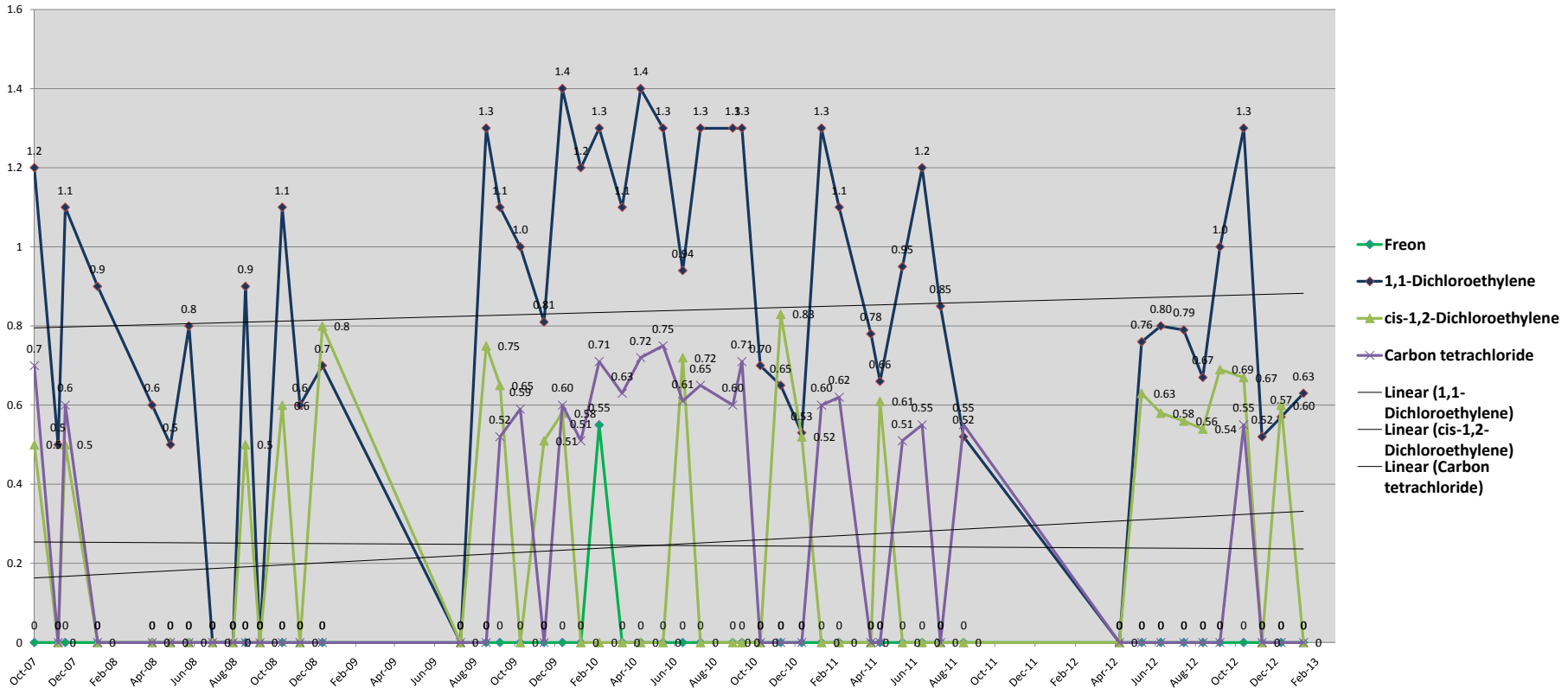
BOU Well VO-4


12.0
10.0
8.0
6.0
4.0
2.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (Freon)
Linear (1,1-Dichloroethylene)
Linear (Carbon tetrachloride)

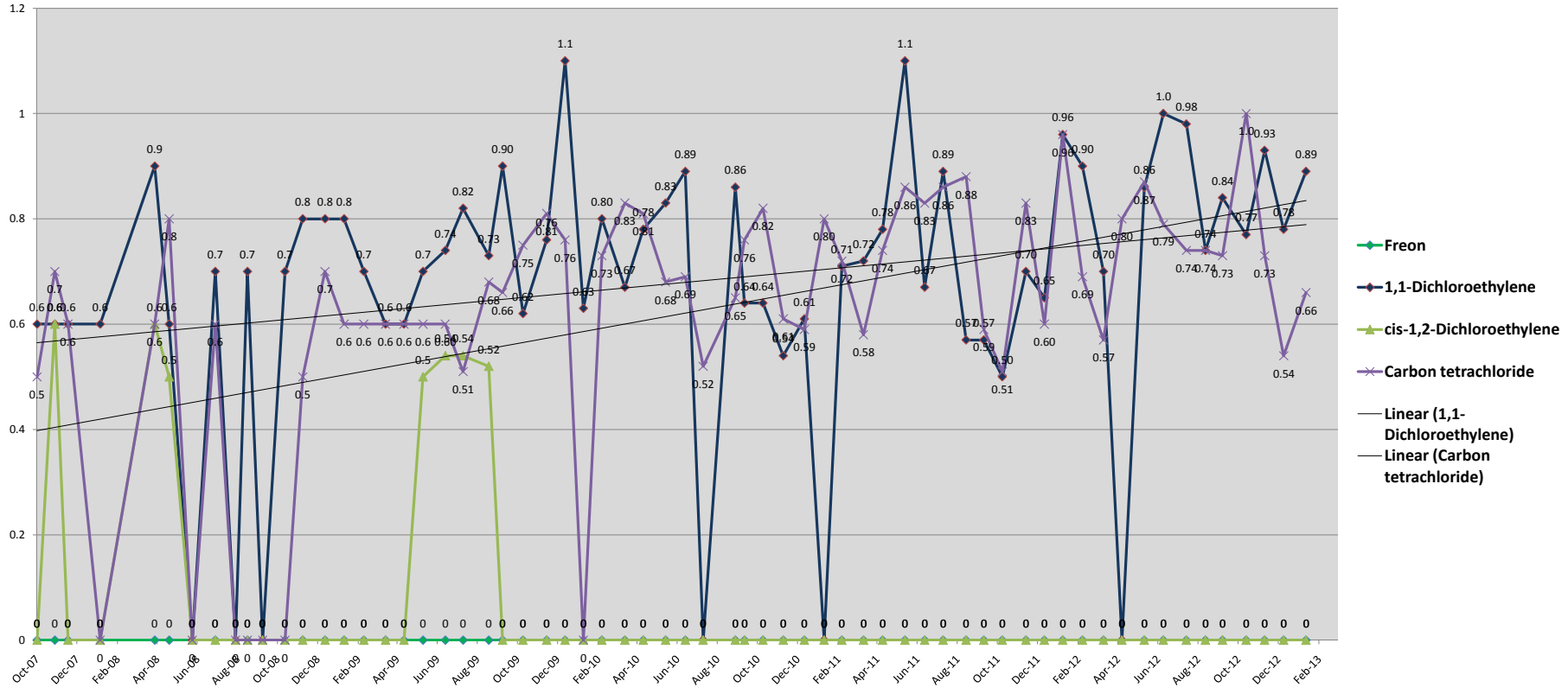
BOU Well VO-5


8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (1,1-Dichloroethylene)
Linear (Freon)
Linear (Carbon tetrachloride)

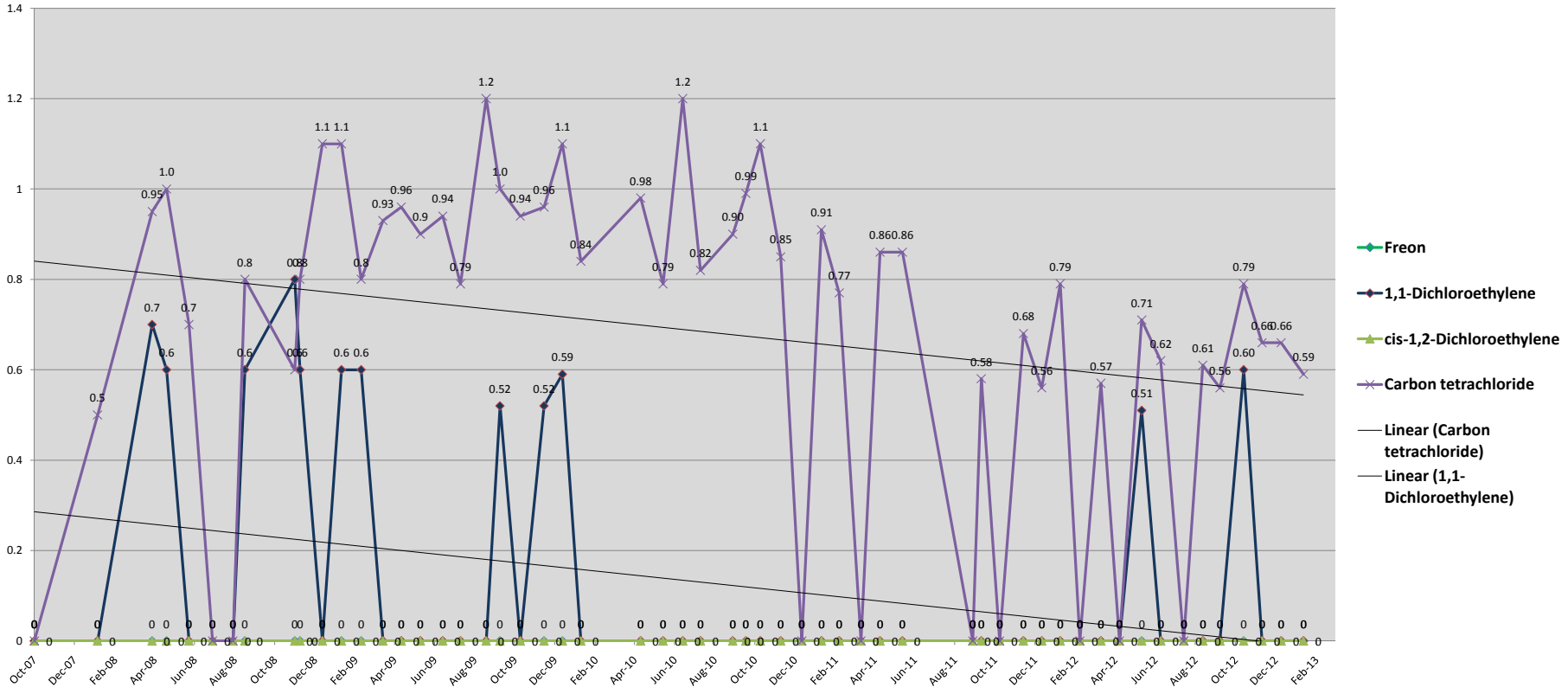
BOU Well VO-6


1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (1,1-Dichloroethylene)
Linear (cis-1,2-Dichloroethylene)
Linear (Carbon tetrachloride)

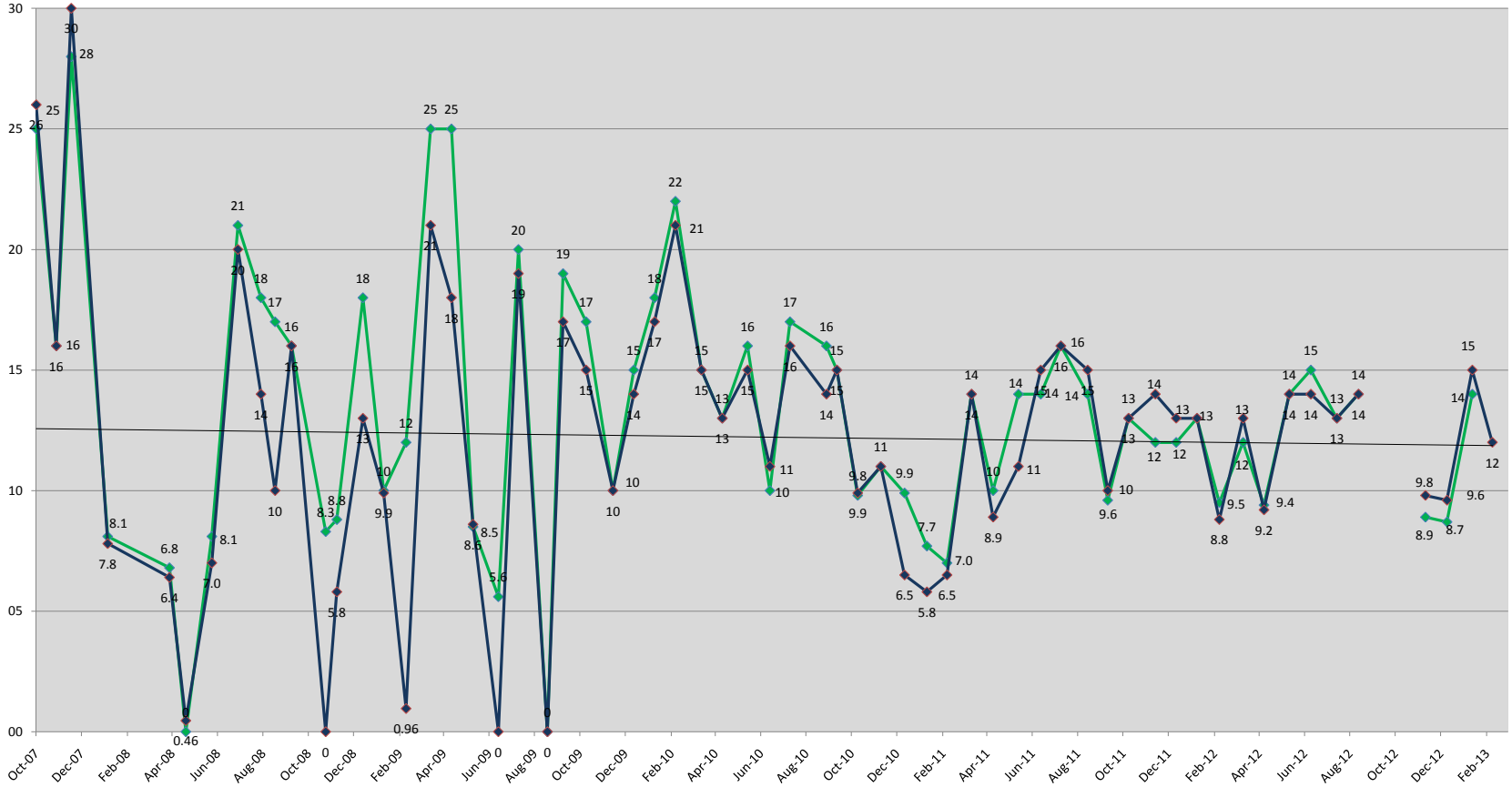
BOU Well VO-7


1.2
1
0.8
0.6
0.4
0.2
0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (1,1-Dichloroethylene)
Linear (Carbon tetrachloride)

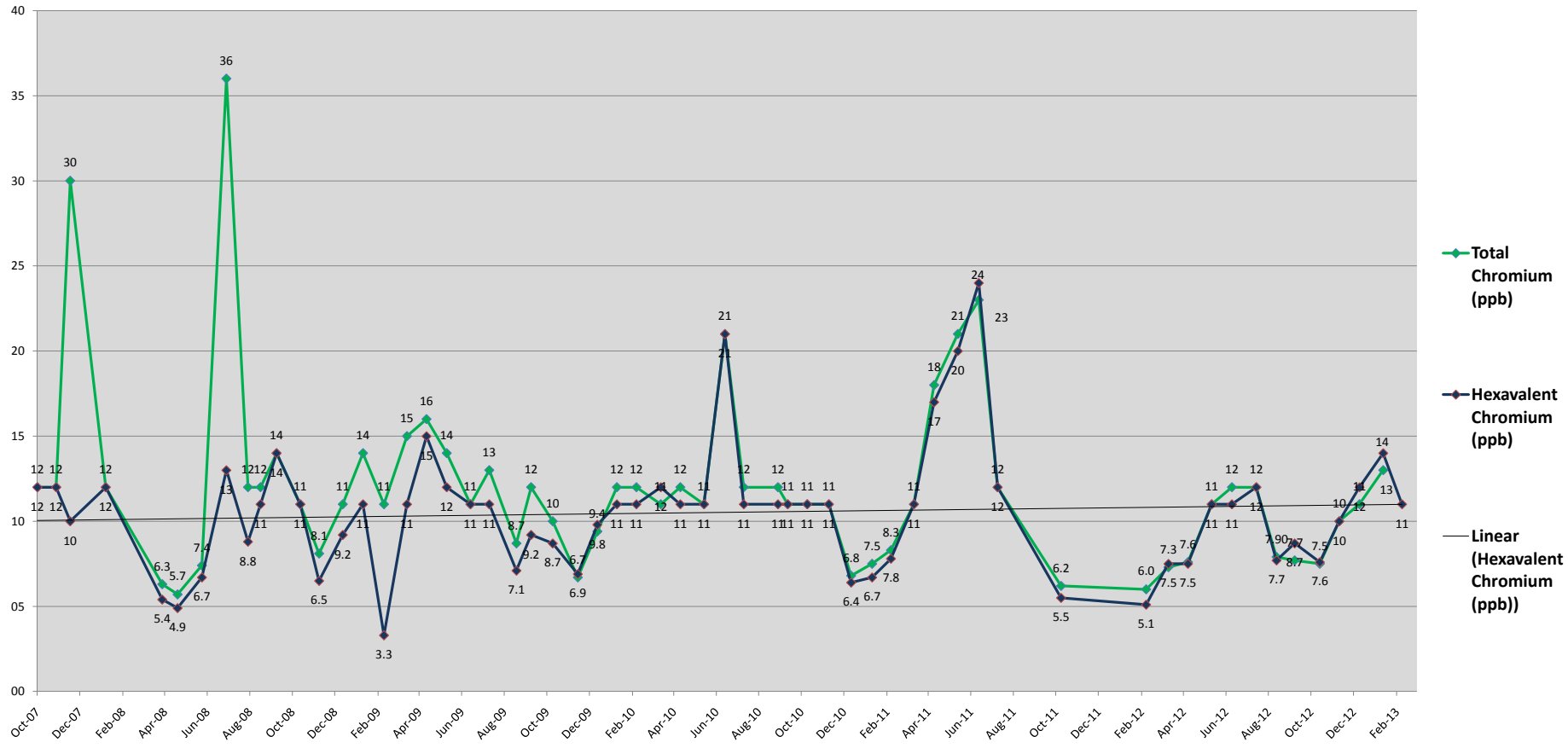
BOU Well VO-8


1.4
1.2
1
0.8
0.6
0.4
0.2
0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Freon
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
Carbon tetrachloride
Linear (Carbon tetrachloride)
Linear (1,1-Dichloroethylene)

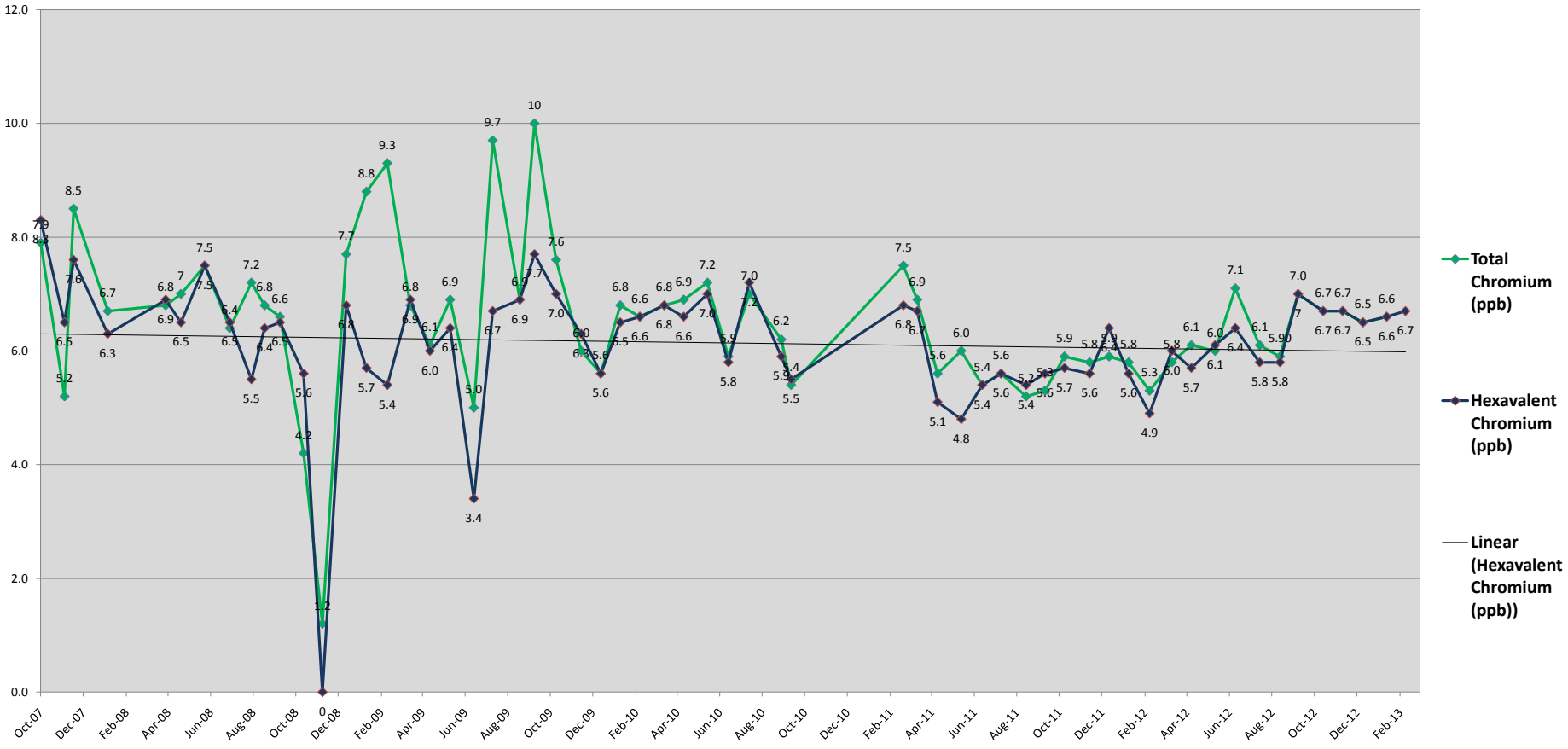
BOU Well VO-1


30
25
20
15
10
05
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))

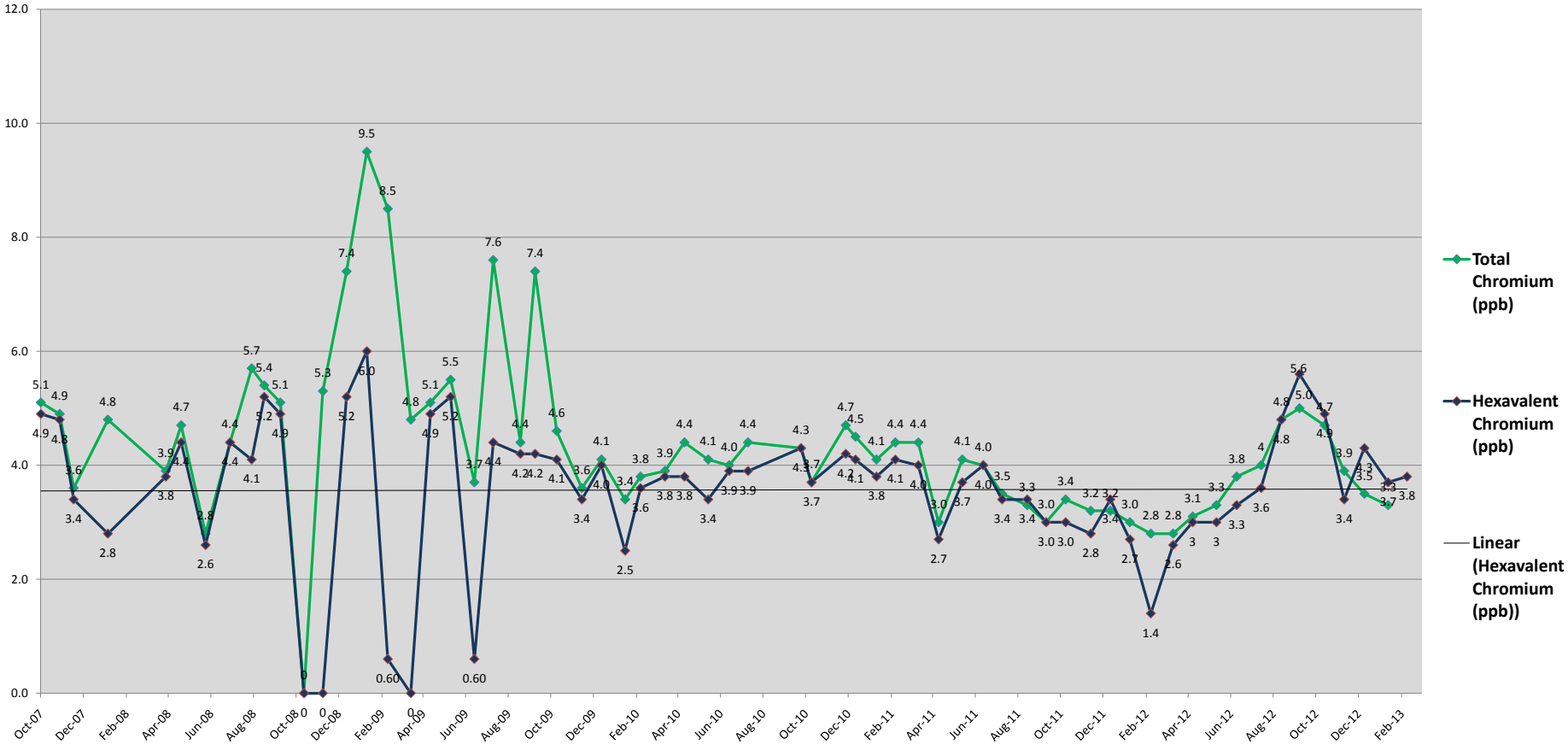
BOU Well VO-2


40
35
30
25
20
15
10
05
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))

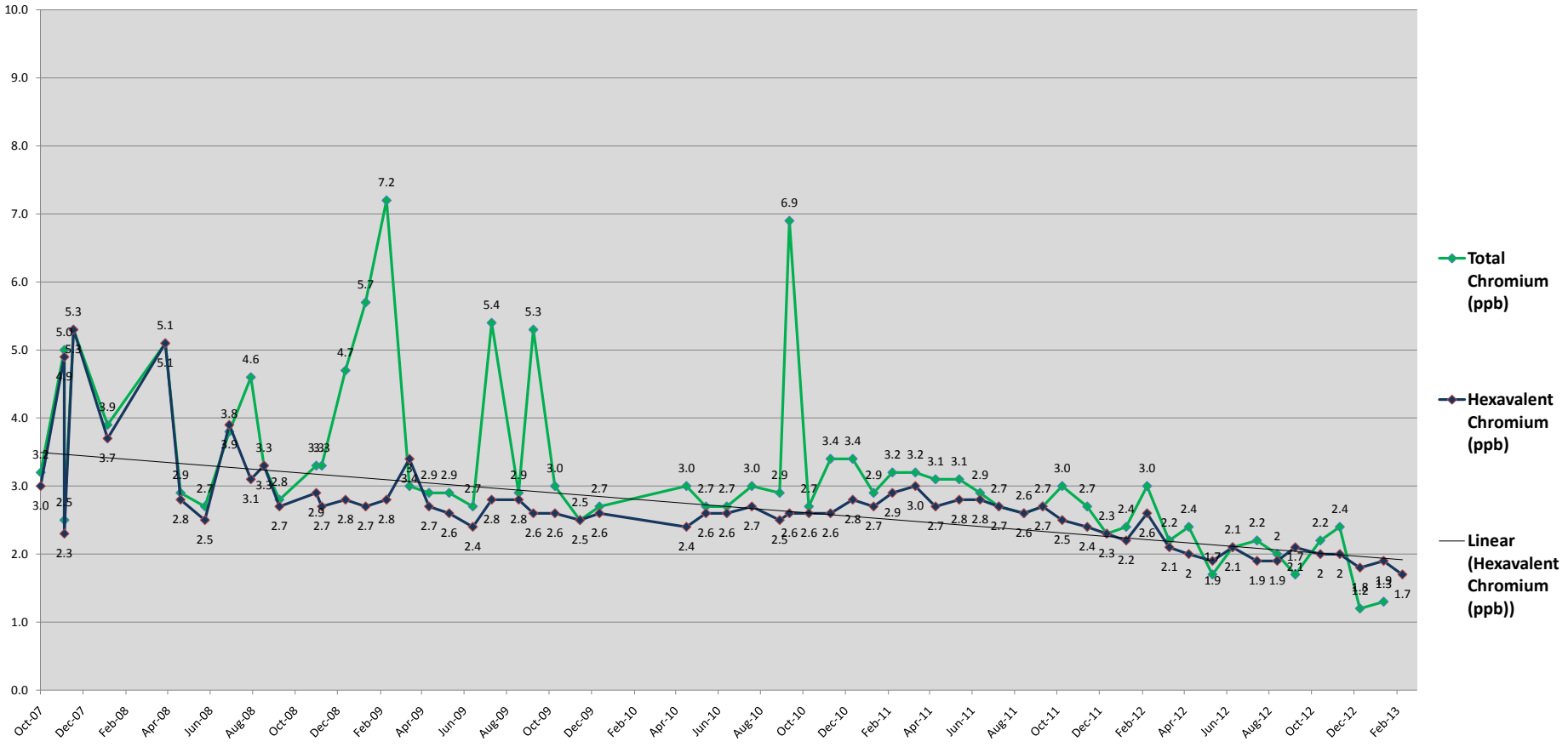
BOU Well VO-3


12.0
10.0
8.0
6.0
4.0
2.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))

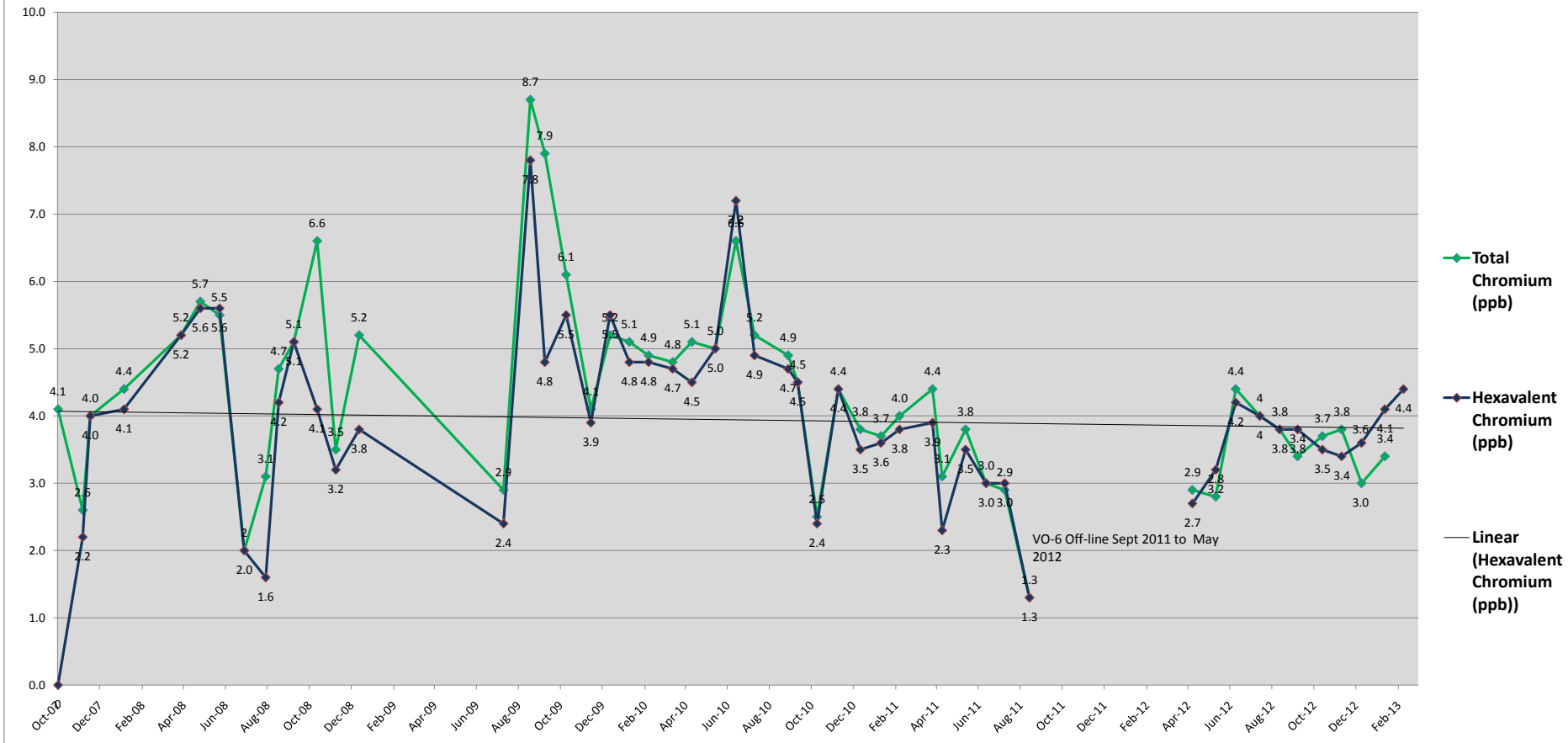
BOU Well VO-4


12.0
10.0
8.0
6.0
4.0
2.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))

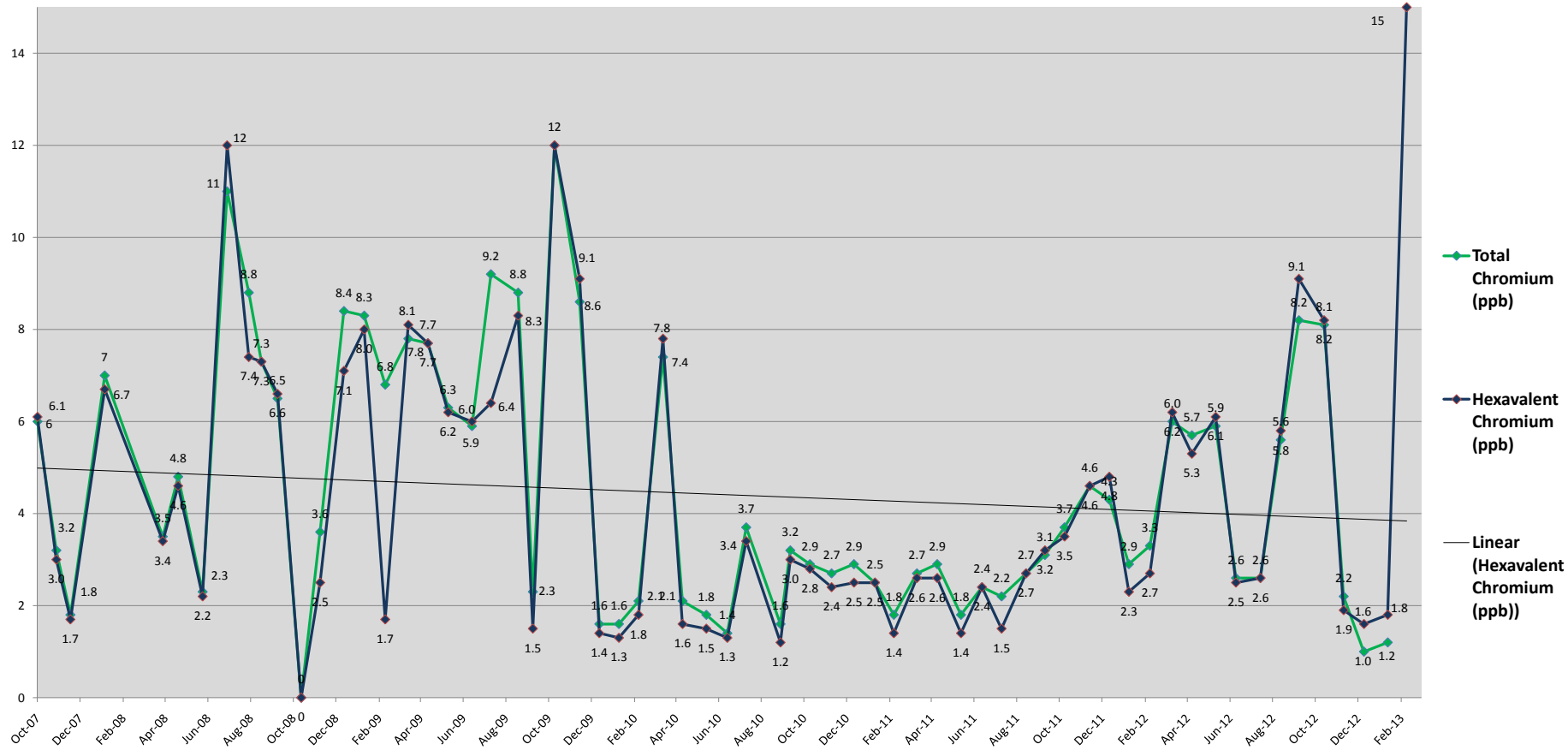
BOU Well VO-5


10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))

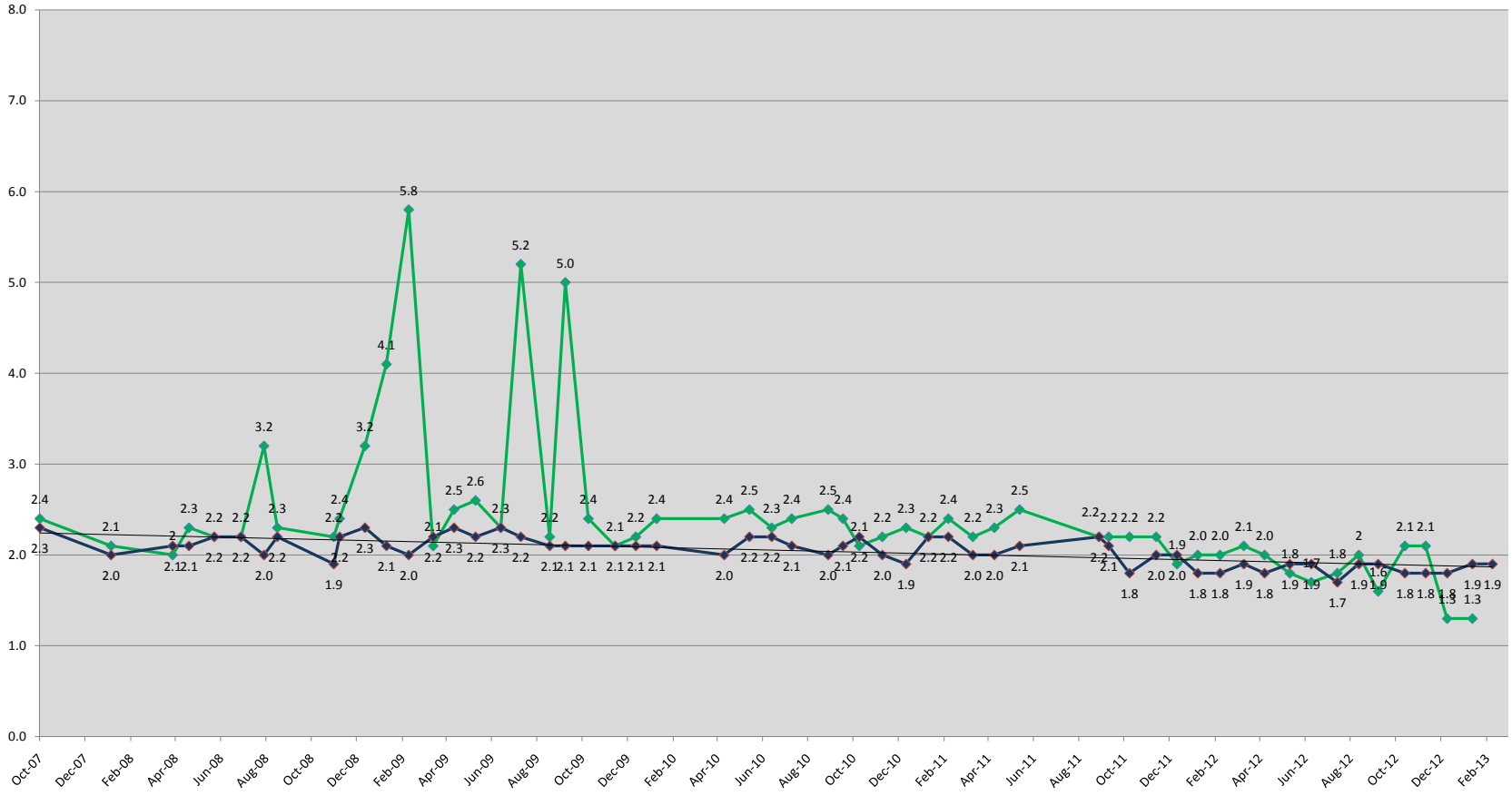
BOU Well VO-6


10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
VO-6 Off-line Sept 2011 to May 2012
Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))

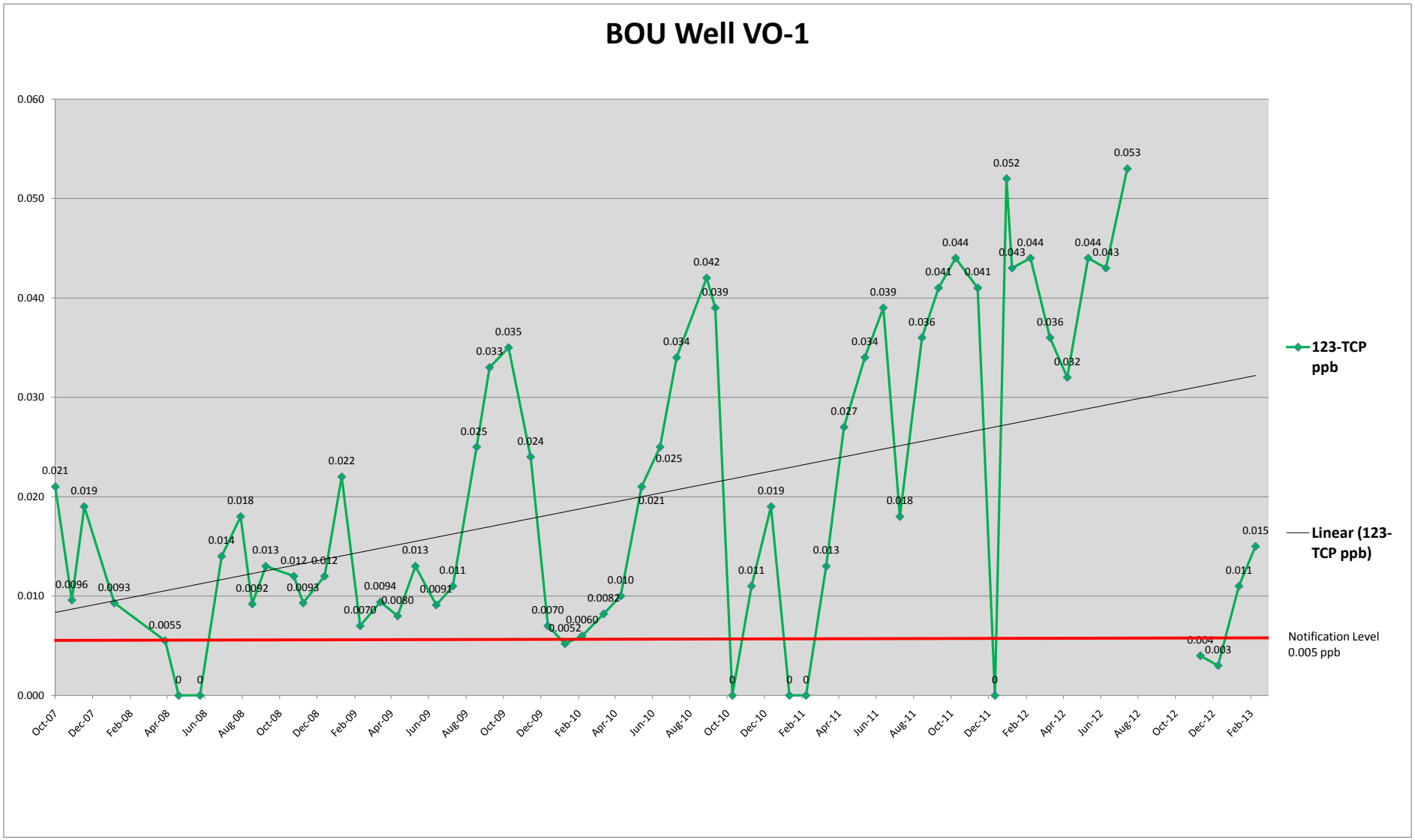
BOU Well VO-7


Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))
0
2
4
6
8
10
12
14
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13

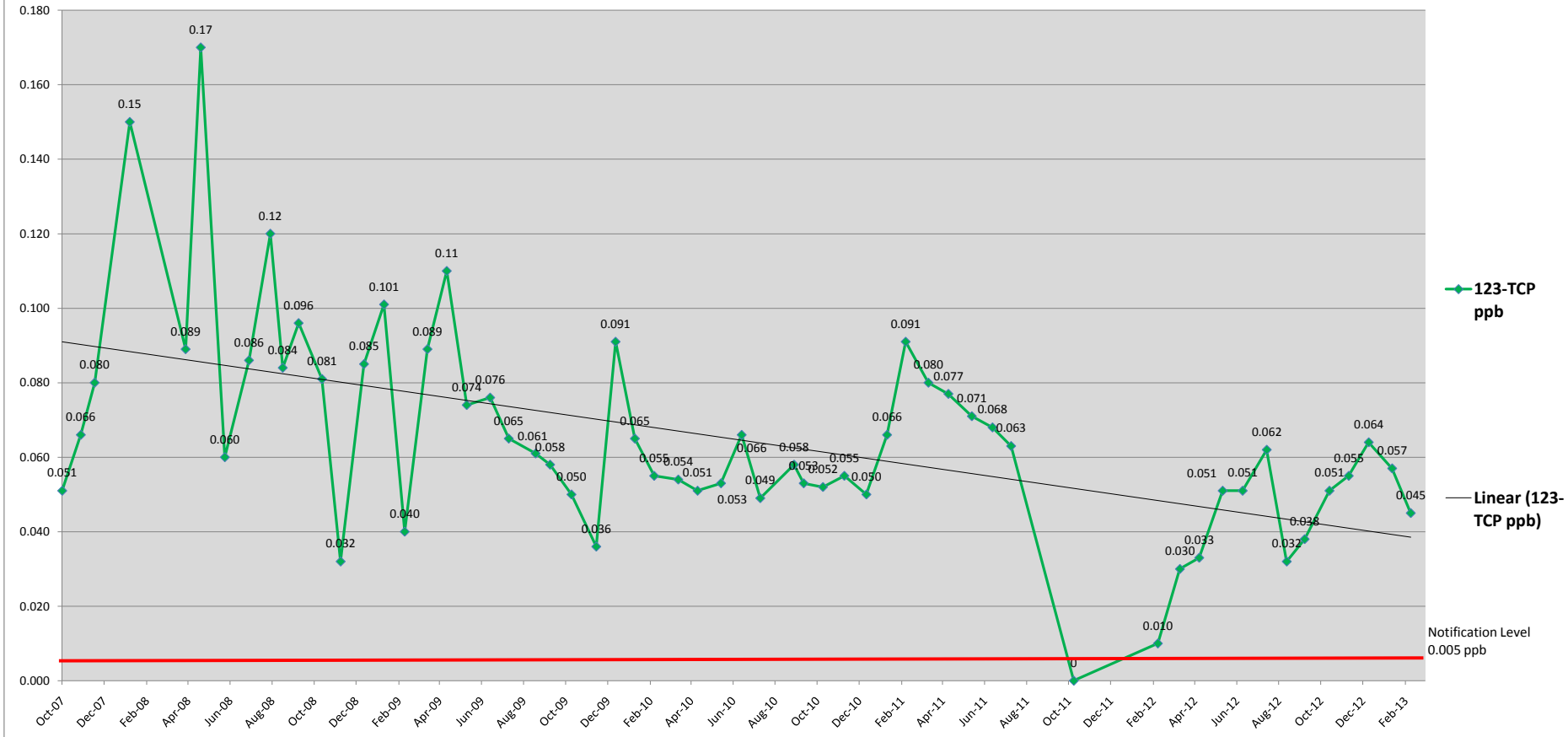
BOU Well VO-8


8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Total Chromium (ppb)
Hexavalent Chromium (ppb)
Linear (Hexavalent Chromium (ppb))

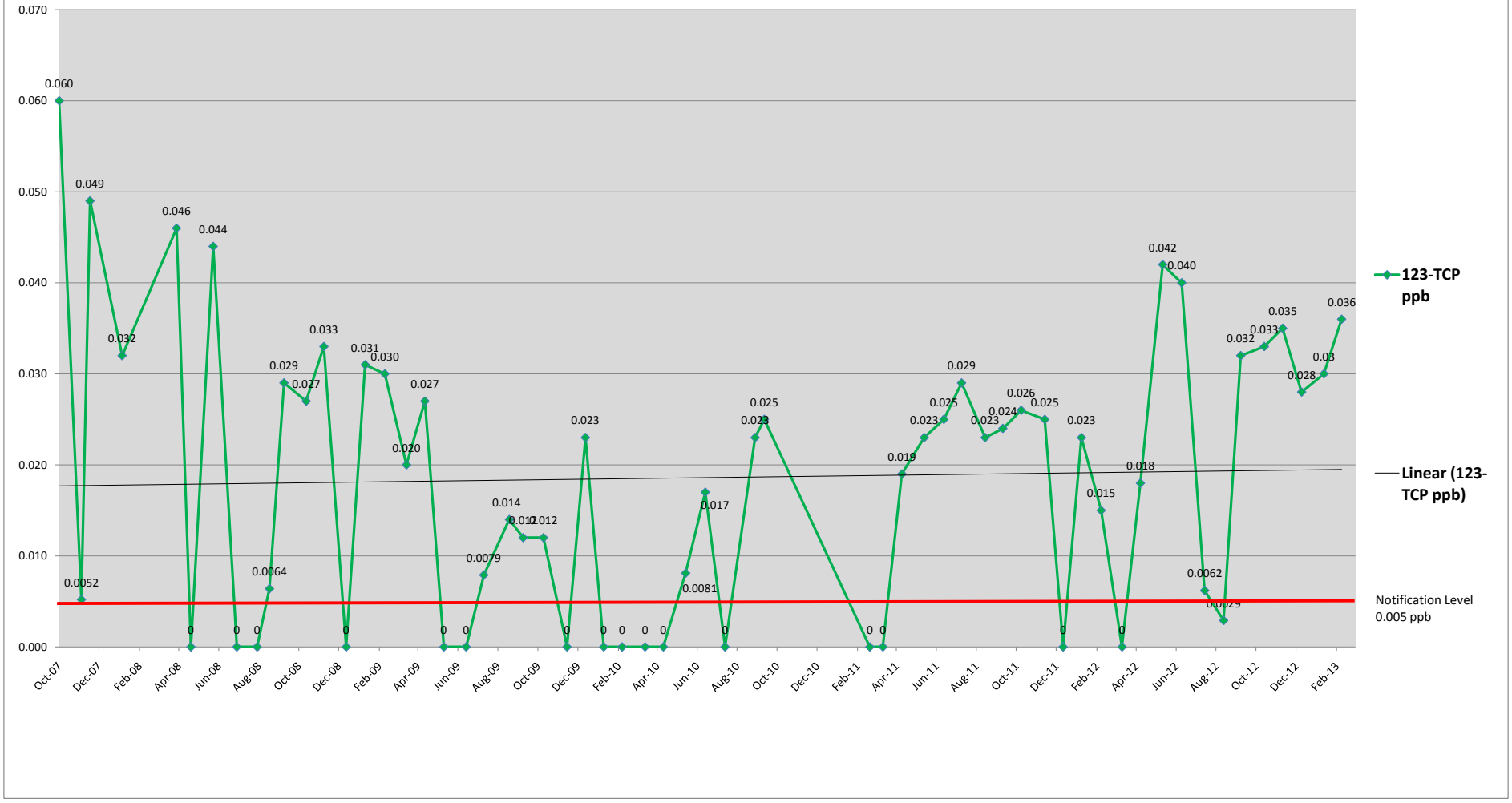
BOU Well VO-1


0.060
0.050
0.040
0.030
0.020
0.010
0.000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
123-TCP ppb
Linear (123-TCP ppb)
Notification Level 0.005 ppb

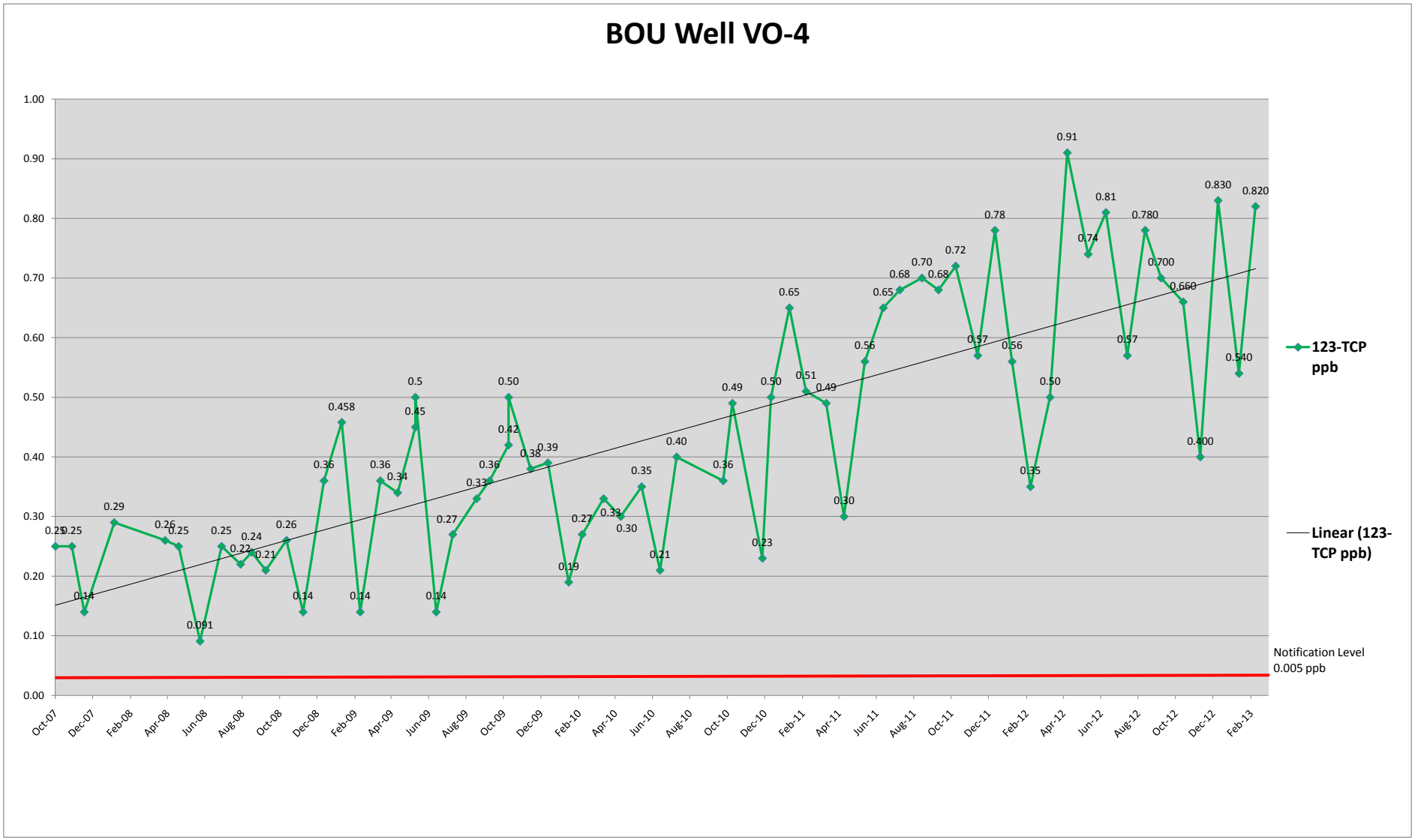
BOU Well VO-2


0.180
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
123-TCP ppb
Linear (123-TCP ppb)
Notification Level 0.005 ppb

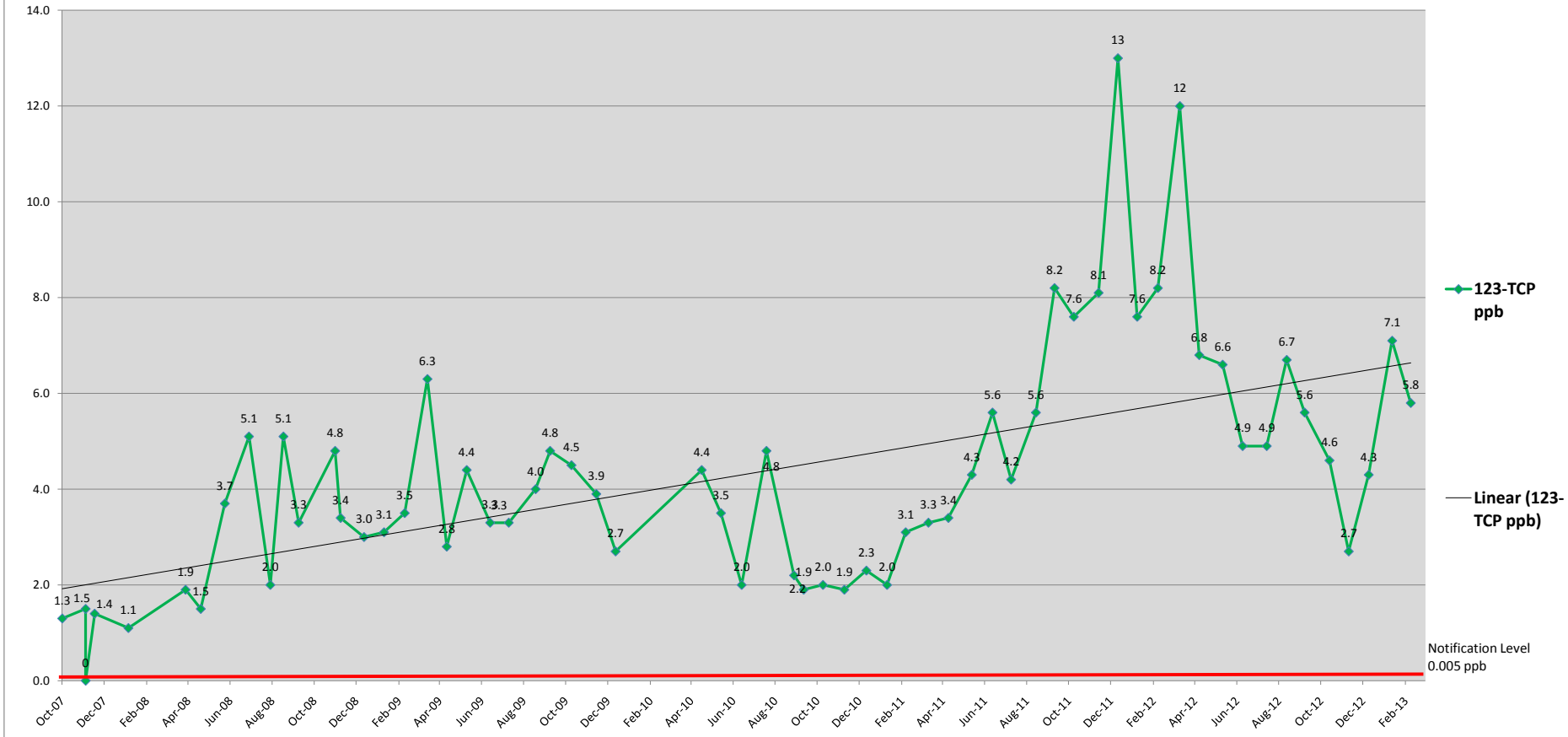
BOU Well VO-3


0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
123-TCP ppb
Linear (123-TCP ppb)
Notification Level 0.005 ppb

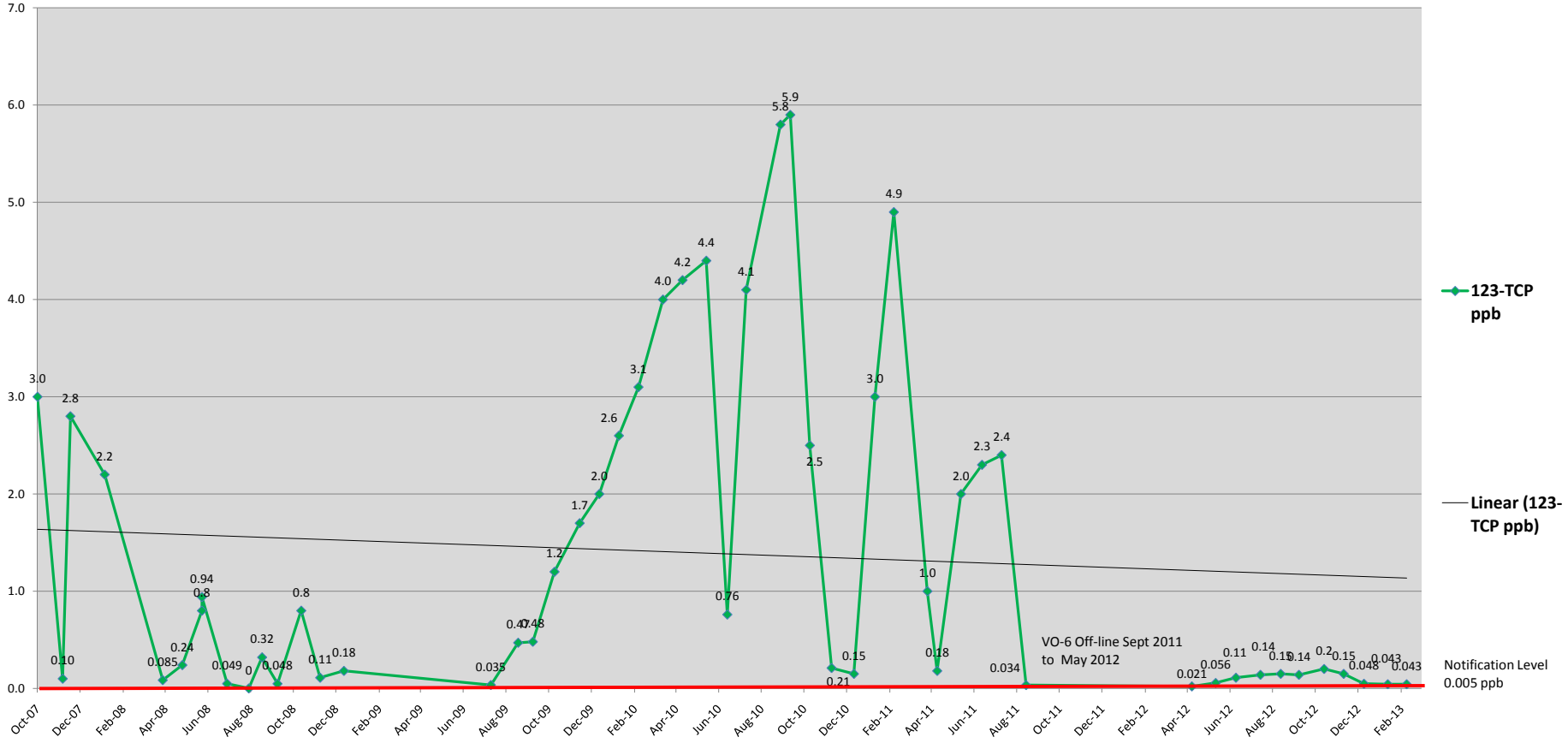
BOU Well VO-4


1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
123-TCP ppb
Linear (123-TCP ppb)
Notification Level 0.005 ppb

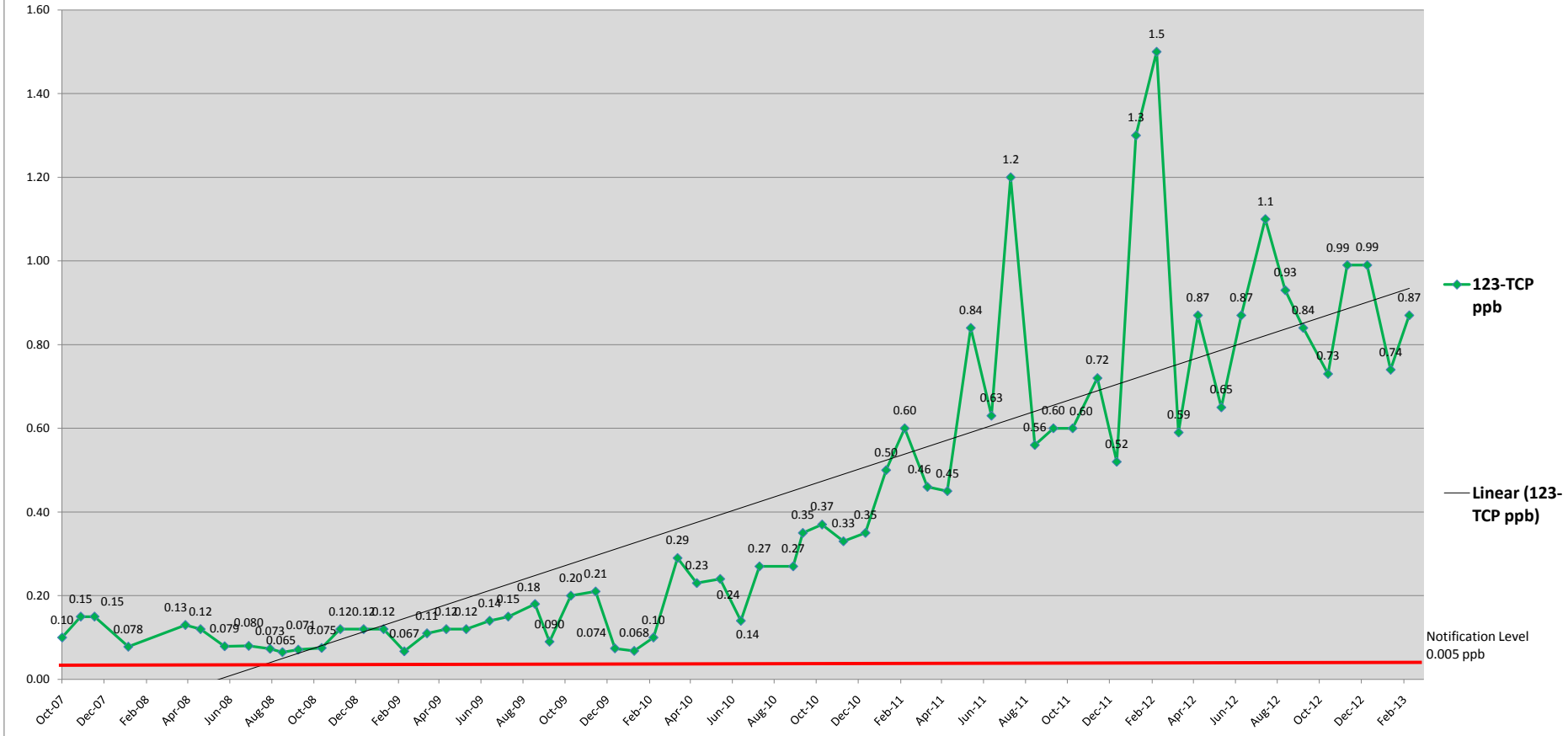
BOU Well VO-5


14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
123-TCP ppb
Linear (123-TCP ppb)
Notification Level 0.005 ppb

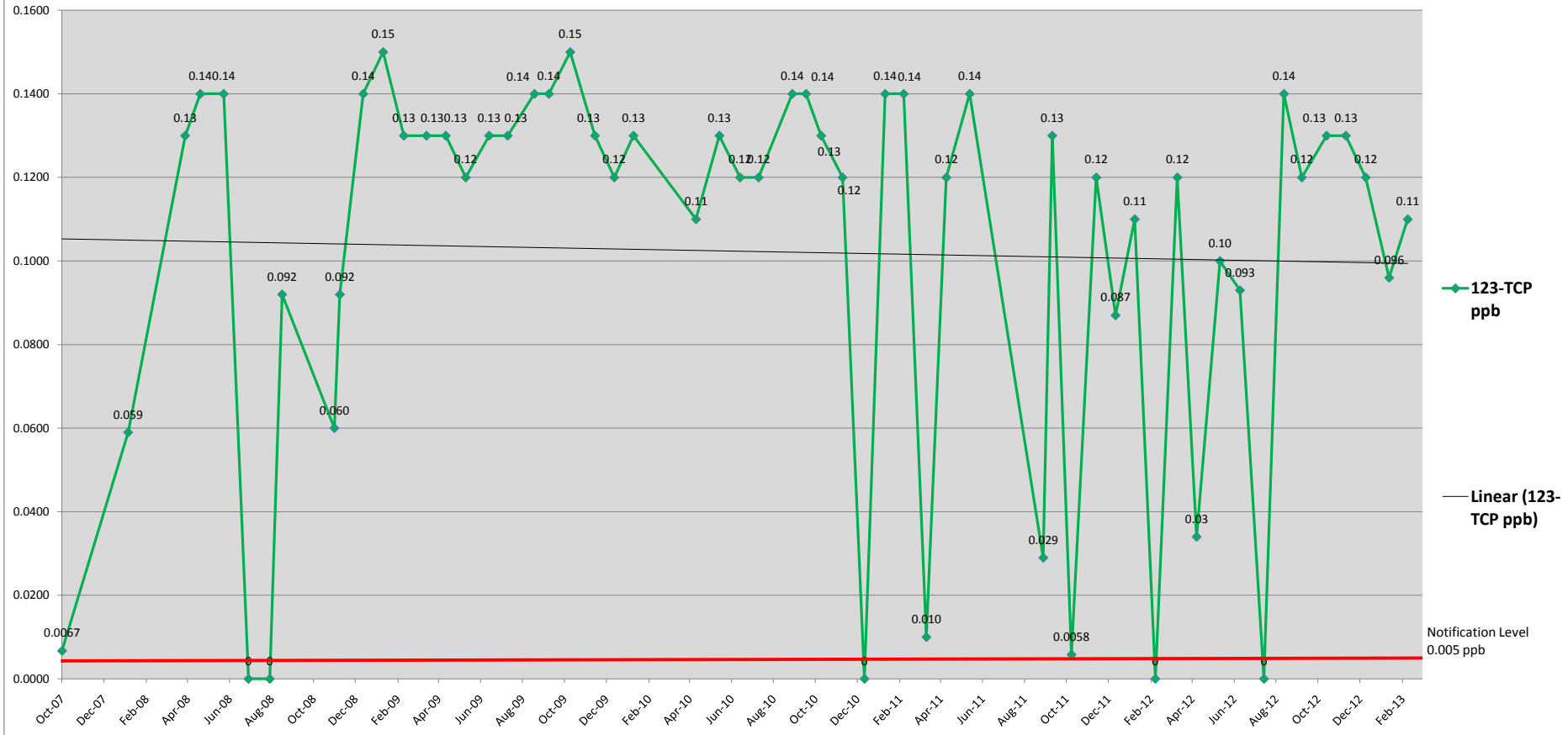
BOU Well VO-6


7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
3.0
0.10
2.8
2.2
0.085
0.24
0.94
0.8
0.049
0
0.32
0.048
0.8
0.11
0.18
0.035
0.48
1.2
1.7
2.0
2.6
3.1
4.0
4.2
4.4
0.76
4.1
5.8
5.9
2.5
0.21
0.15
3.0
4.9
1.0
0.18
2.0
2.3
2.4
0.034
0.021
0.056
0.11
0.14
0.15
0.14
0.2
0.15
0.048
0.043
0.043
VO-6 Off-line Sept 2011
to May 2012
123-TCP ppb
Linear (123-TCP ppb)
Notification Level
0.005 ppb

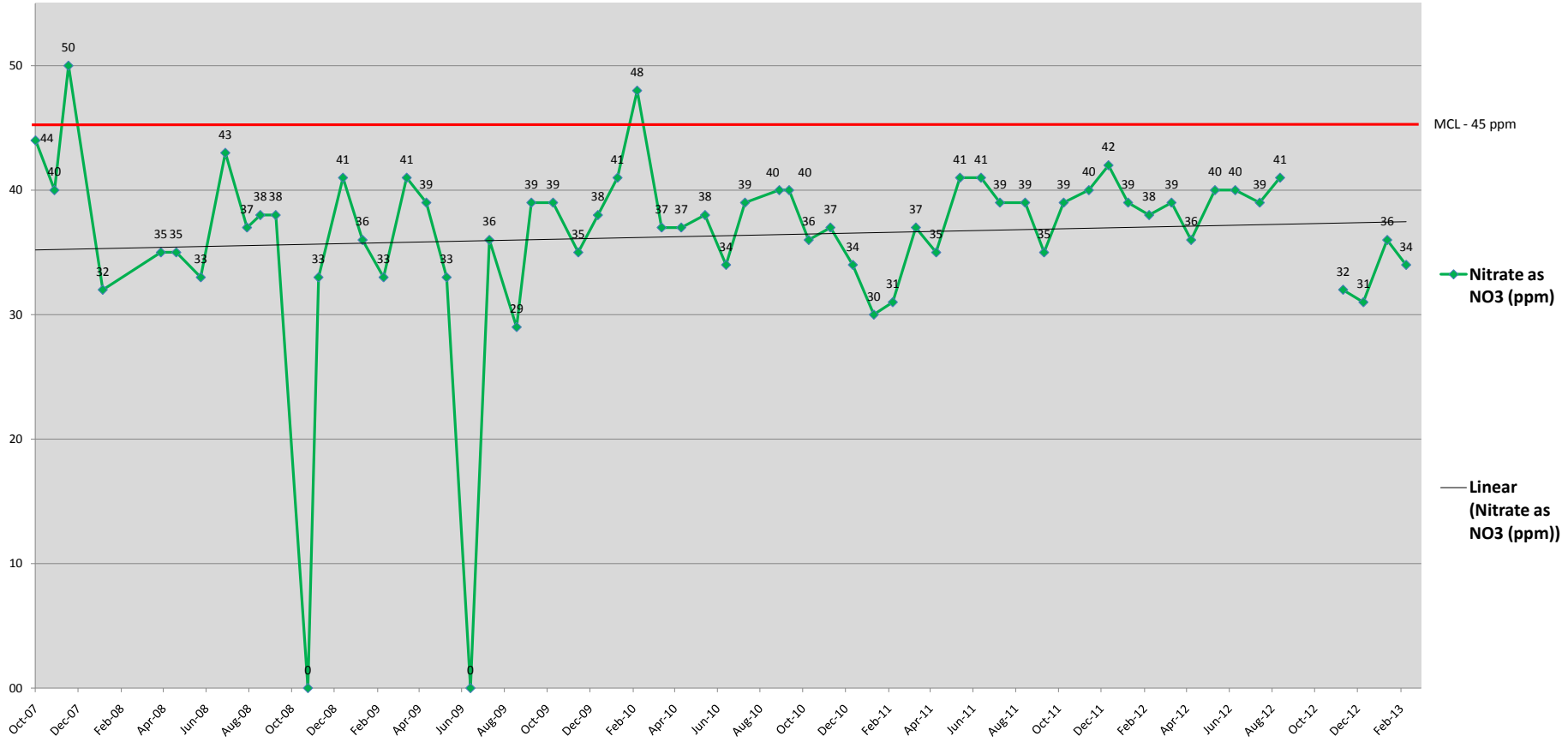
BOU Well VO-7


1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
123-TCP ppb
Linear (123-TCP ppb)
Notification Level
0.005 ppb

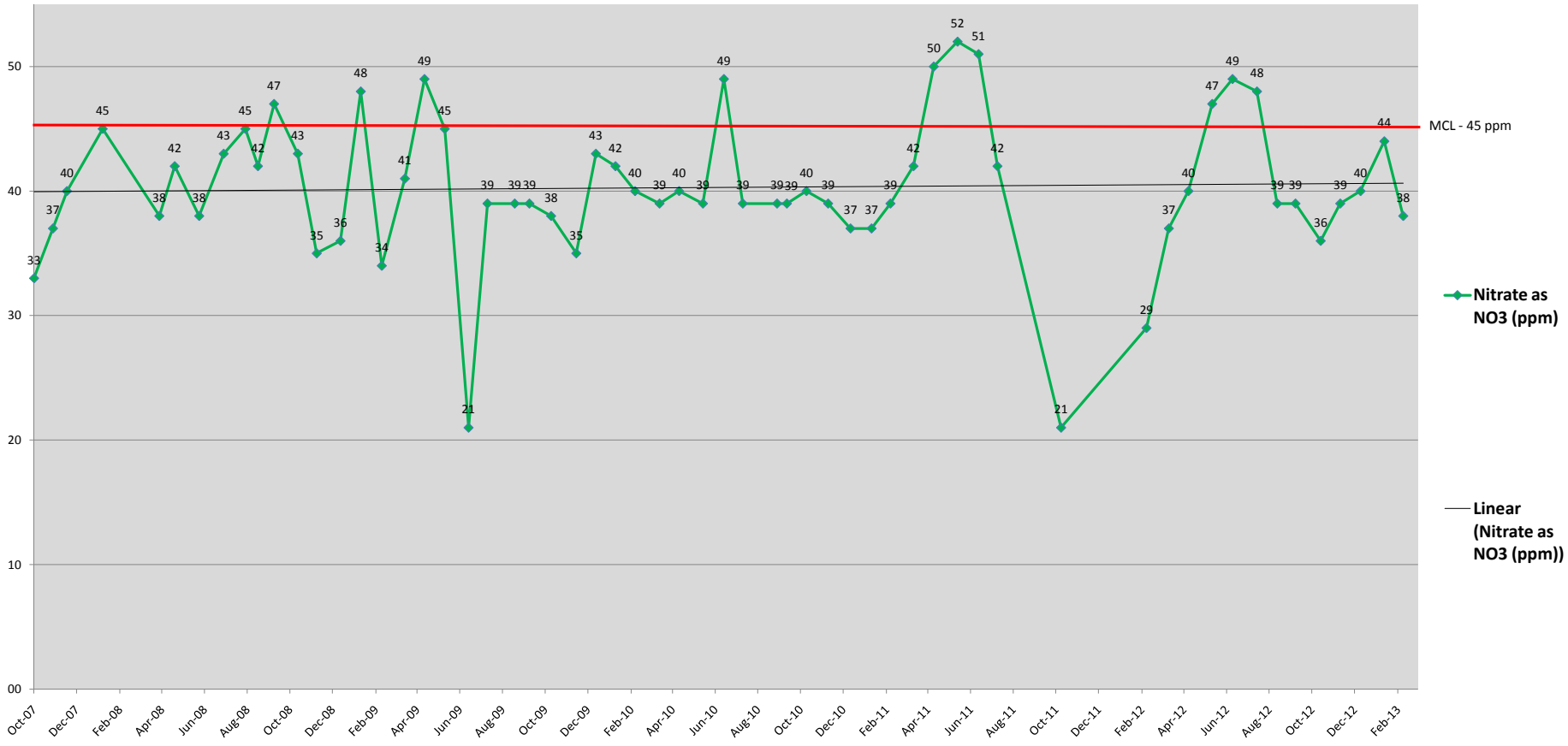
BOU Well VO-8


0.1600
0.1400
0.1200
0.1000
0.0800
0.0600
0.0400
0.0200
0.0000
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
123-TCP ppb
Linear (123-TCP ppb)
Notification Level 0.005 ppb

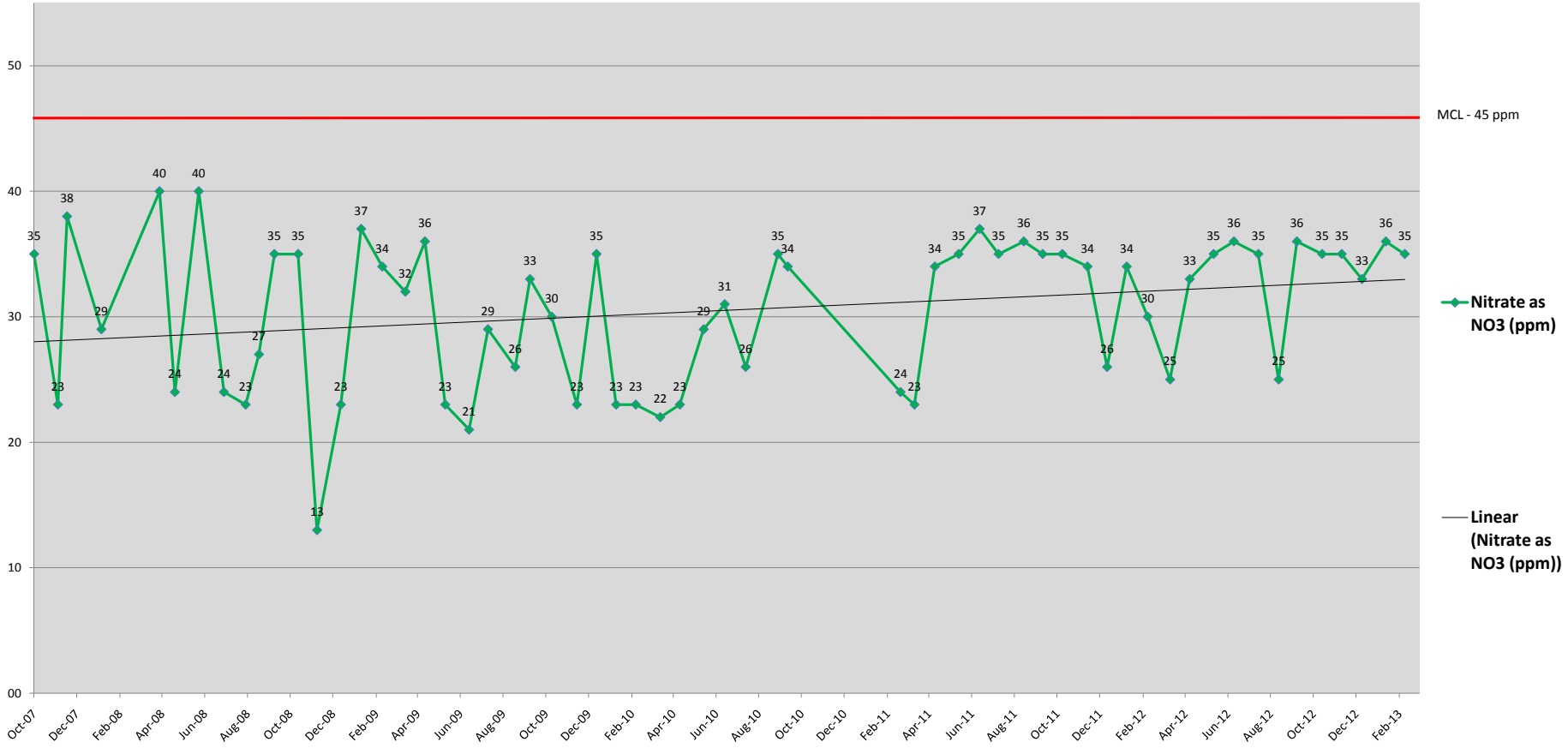
BOU Well VO-1


50
40
30
20
10
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))

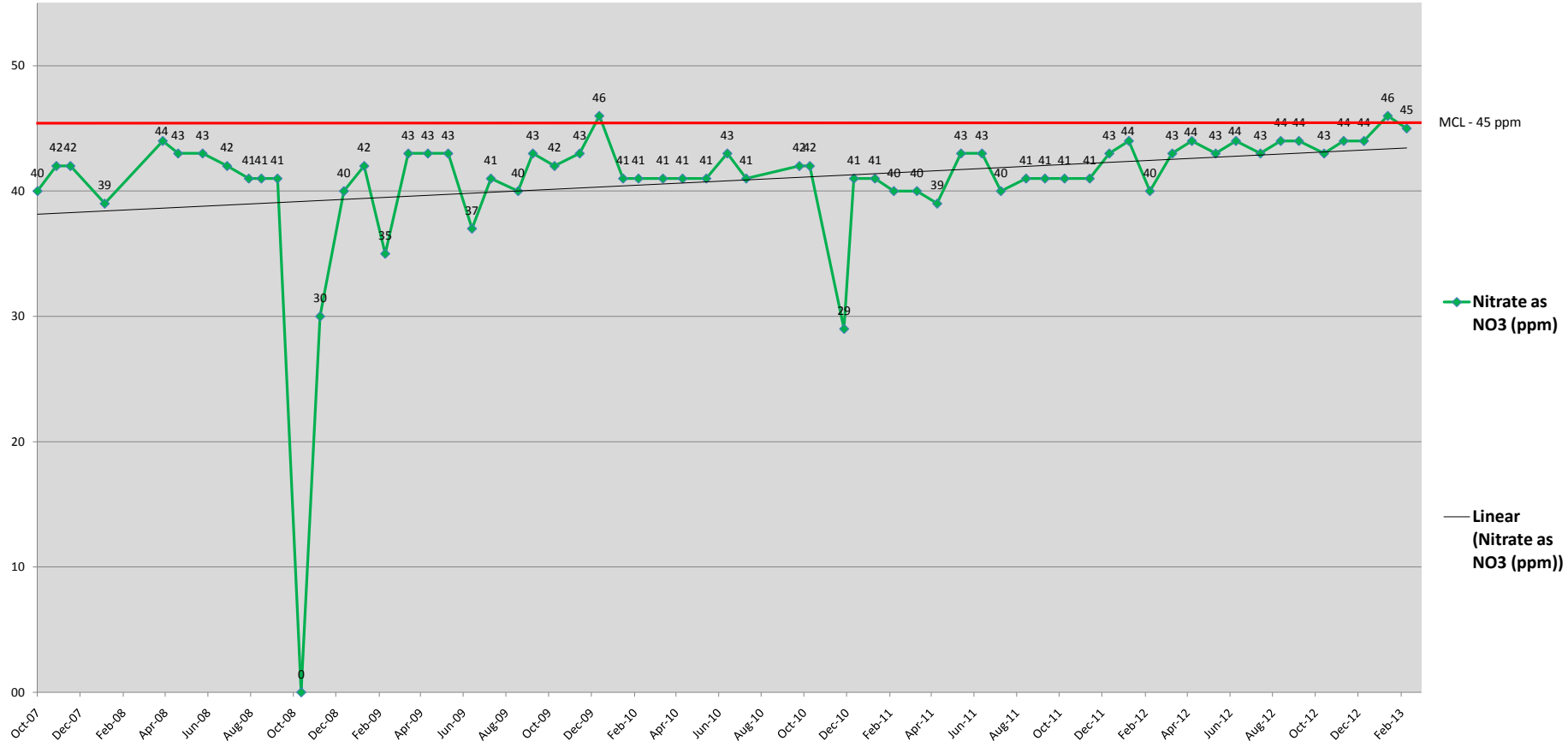
BOU Well VO-2


50
40
30
20
10
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))

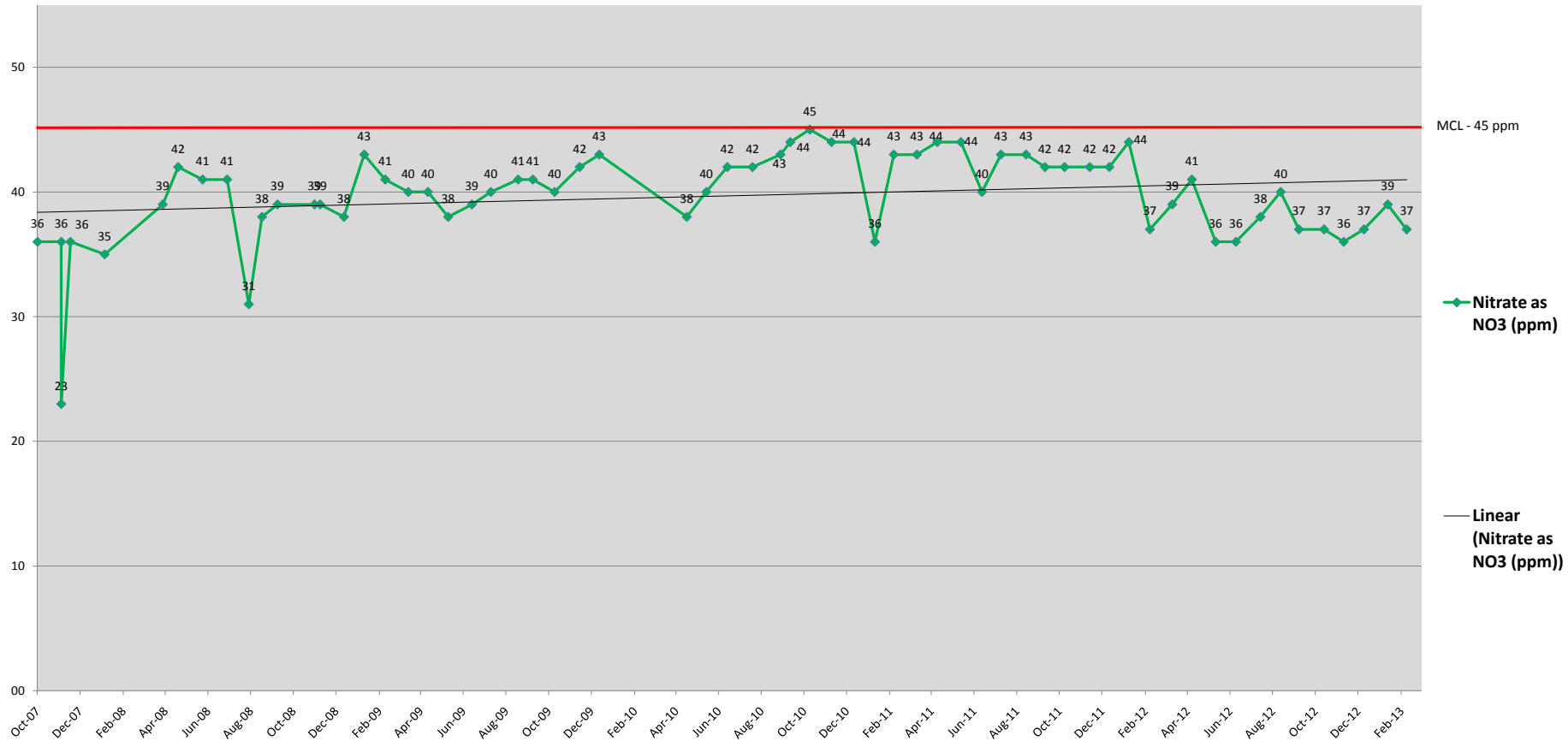
BOU Well VO-3


50
40
30
20
10
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))

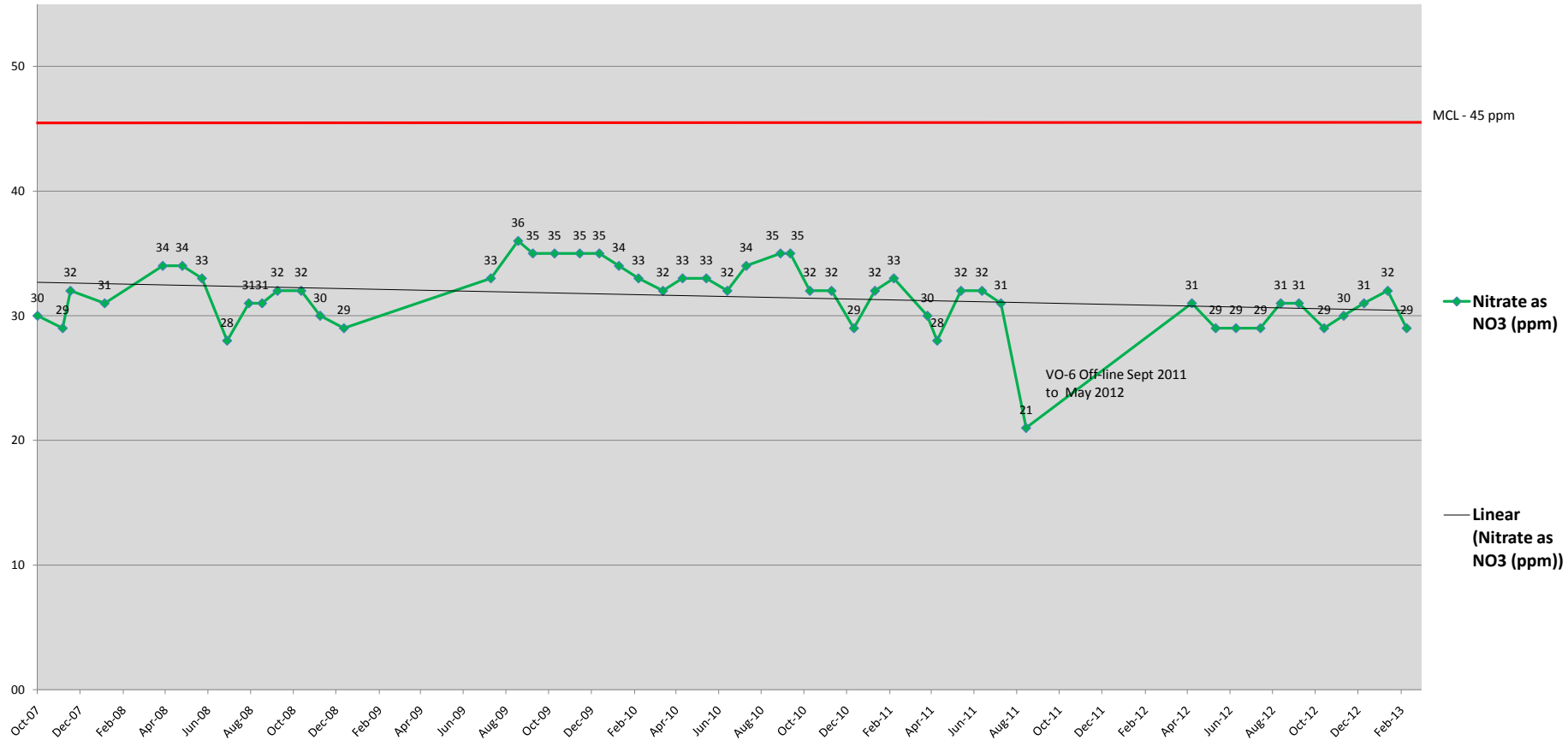
BOU Well VO-4


50
40
30
20
10
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))

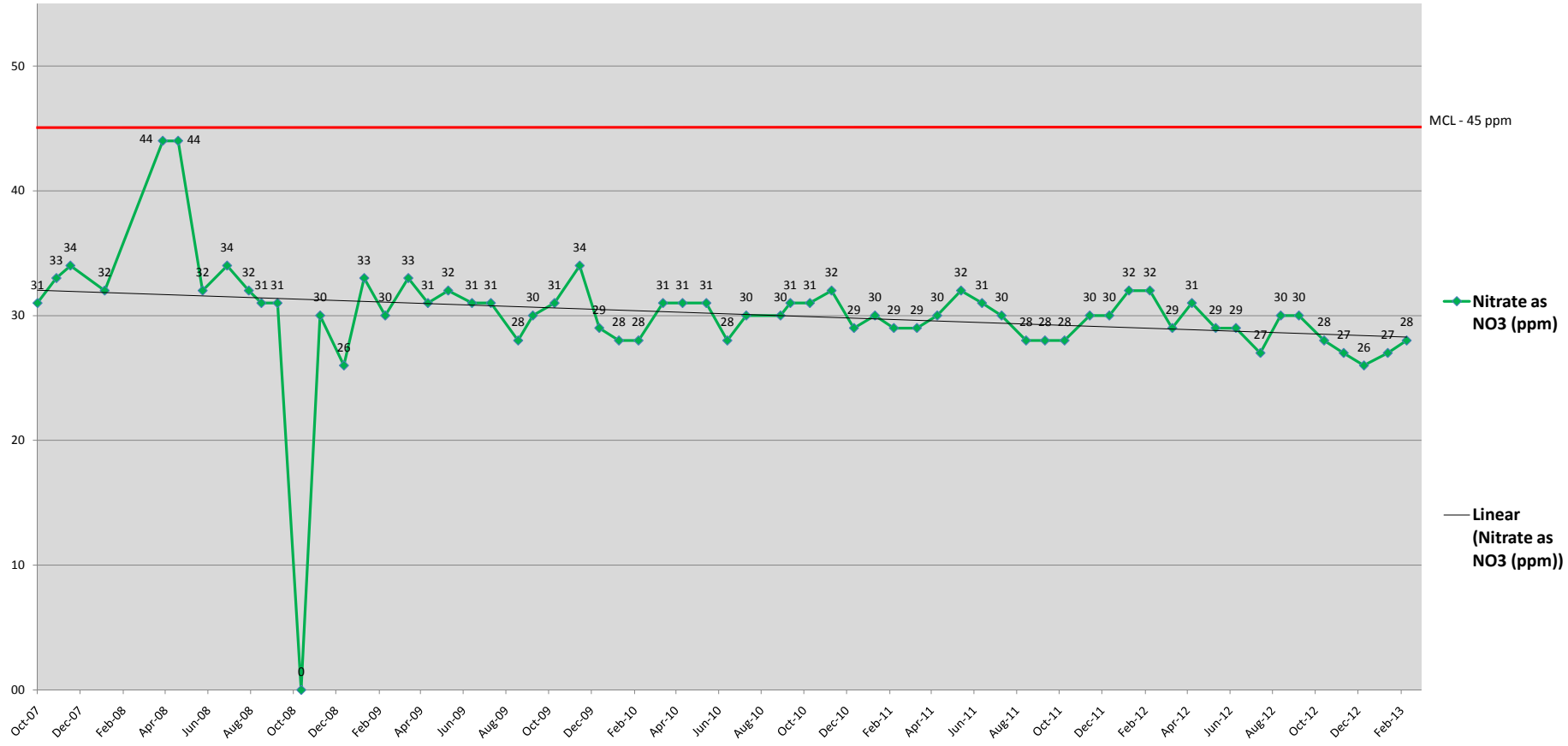
BOU Well VO-5


50
40
30
20
10
00
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))

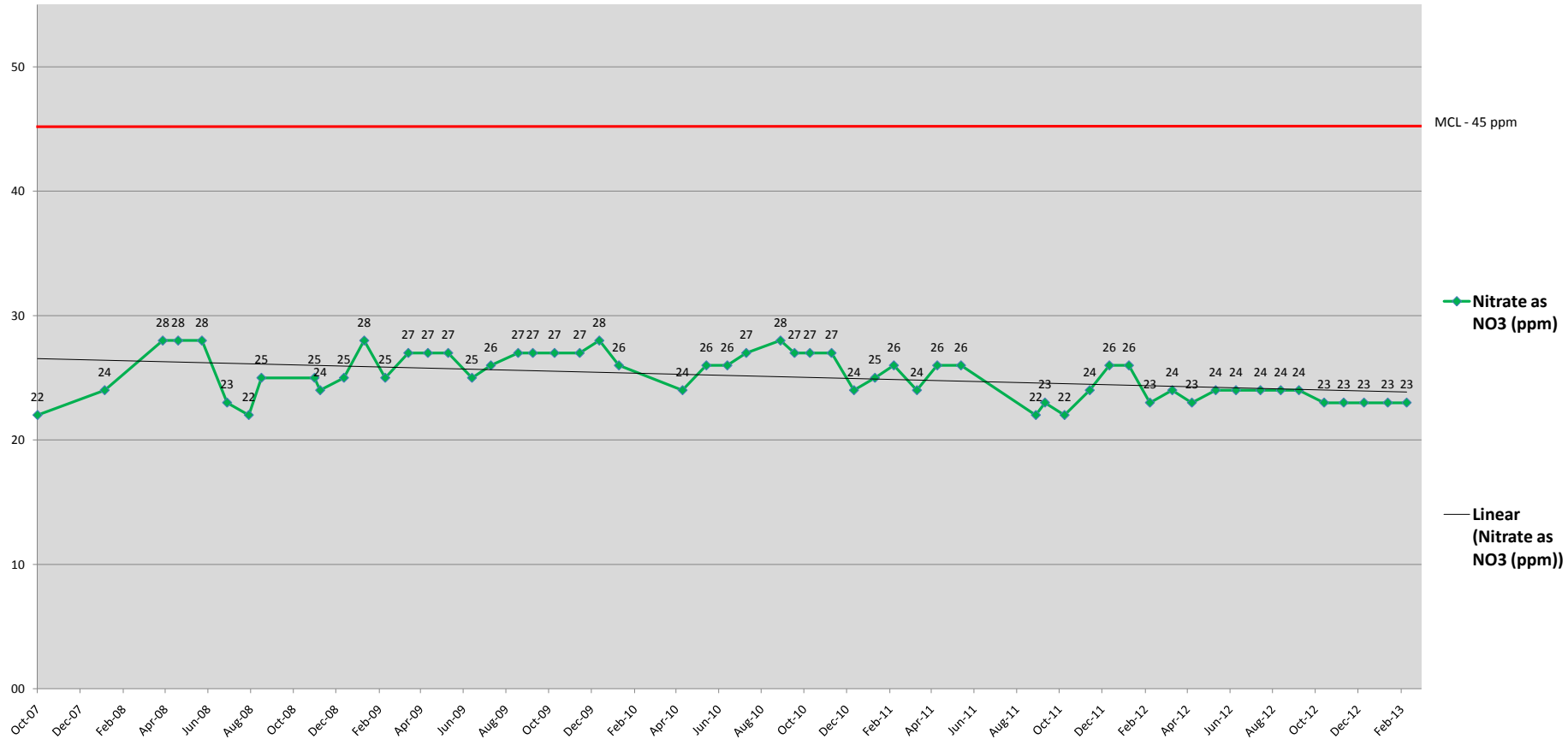
BOU Well VO-6


50
40
30
20
10
00
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))
VO-6 Off-line Sept 2011 to May 2012
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13

BOU Well VO-7


50
40
30
20
10
00
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13

BOU Well VO-8


50
40
30
20
10
00
MCL - 45 ppm
Nitrate as NO3 (ppm)
Linear (Nitrate as NO3 (ppm))
Oct-07
Dec-07
Feb-08
Apr-08
Jun-08
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13