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First Five-Year Review Report

for

Pemaco Superfund Site

Maywood, California

September 2010

U.S. Environmental Protection Agency, Region 9

San Francisco, California

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9/30/10

Table of Contents

Executive Summary **ES-1**

Five-Year Review Summary Form **ES-2**

1.0 Introduction **4**

2.0 Site Chronology **5**

3.0 Background **7**

3.1 Site Location and Physical Characteristics 7

3.2 Former, Current, and Future Land Use 8

3.3 History of Contamination 9

3.4 Initial Response 9

3.5 Basis for Taking Action 10

4.0 Remedial Actions **11**

4.1 Remedy Selection 11

4.1.1 Surface and Near-Surface Soil Remediation 12

4.1.2 Upper Vadose-Zone Soil and Perched Groundwater (3 –35 ft bgs) 12

4.1.3 Lower Vadose Zone Soil and Exposition Zone Groundwater 12

4.2 Remediation Levels 13

4.3 Remedy Implementation 16

4.3.1 Soil Capping 16

4.3.2 Groundwater- and Vapor-Extraction System 16

4.3.3 Electrical Resistance Heating System 19

4.3.4 Groundwater and Vapor Treatment Plant 19

4.3.5 Institutional Controls 20

4.4 Required Monitoring 20

4.5 System Operations/Operation and Maintenance (O&M) 21

5.0 Progress Since the Last Five-Year Review **25**

Table of Contents, Continued

6.0 Five Year Review Process 26

6.1 Administrative Components, Community Notification, Document Review 26

6.2 Community Notification and Involvement 26

6.3 Document Review 26

6.4 Data Review 27

6.4.1 Soil 27

6.4.2 Groundwater 28

6.5 Site Inspection 48

6.6 Interviews 49

6.6.1 Technical Interviews 49

6.6.2 Community Interviews 50

7.0 Technical Assessment 51

7.1 Question A: Is the remedy functioning as intended by the decision documents? 51

7.1.1 Remedial Action Performance 51

7.1.2 System Operations / O&M 52

7.1.3 Opportunities for Optimization 52

7.1.4 Early indicators of potential issues 53

7.1.5 Implementation of Institutional Controls 53

7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid? 54

7.2.1 Changes in Standards and To-Be-Considered Criteria (TBCs) 54

7.2.2 Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics 56

7.2.3 Exposure Pathways 56

7.2.4 Toxicity Factors 56

7.2.5 Changes in Risk Assessment Methods 56

7.2.6 Expected Progress towards Meeting RAOs 57

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy? 57

Table of Contents, Continued

8.0 Issues 58

8.1 Issue 1: Institutional Control Verification – Zoning 58

8.2 Issue 2: Institutional Control Verification – Deed Restriction 58

8.3 Issue 3: Exposition 'D' Zone Concentrations 58

9.0 Recommendations 59

10.0 Protectiveness Statement 60

11.0 Next Review 61

12.0 References 62

Figures

1-1 Site Map

4-1 Pemaco Site Groundwater and Vapor-Extraction System

4-2 Site Plan with All Monitoring and Extraction Wells

6-1 Recent TCE Detections above 25 µg/L

6-2 Pre-HVDPE Maximum Concentrations of TCE in Exposition 'A' Zone Groundwater, Pemaco Superfund Site, Maywood CA

6-3 Post-ERH Maximum Concentrations of TCE in Exposition 'A' Zone Groundwater, Pemaco Superfund Site, Maywood CA

6-4 Pre-HVDPE Maximum Concentrations of TCE in Exposition 'B' Zone Groundwater, Pemaco Superfund Site, Maywood CA

6-5 Post-ERH Maximum Concentrations of TCE in Exposition 'B' Zone Groundwater, Pemaco Superfund Site, Maywood CA

6-6 Pre-HVDPE Maximum Concentrations of TCE in Exposition 'C' Zone Groundwater, Pemaco Superfund Site, Maywood CA

6-7 Post-ERH Maximum Concentrations of TCE in Exposition 'C' Zone Groundwater, Pemaco Superfund Site, Maywood CA

6-8 TCE Concentrations in Exposition 'C' Zone Groundwater

6-9 TCE Concentrations in Exposition 'D' Zone Groundwater

6-10 D-zone Map

7-1 City of Maywood Municipal Wells

Table of Contents, Continued

Tables

2-1 Chronology of Site Events

4-1 SSRLs Specified in the 2005 ROD

4-2 Current Groundwater and Soil-Vapor Monitoring Program

4-3 Maintenance Log Summary: Significant O&M Activities at Pemaco Superfund Sitefrom 2007 – 2010

4-4 Summary of O&M Costs at Pemaco Superfund Site

6-1 Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Perched Zone Groundwater

6-2 Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition ‘A’ Zone Groundwater

6-3 Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition ‘B’ Zone Groundwater

6-4 Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition ‘C’ Zone Groundwater

6-5 Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition ‘D’ Zone Groundwater

7-1 Optimization Opportunities

7-2 Groundwater Analytical Results, March 2010

8-1 Issues and Recommendations

Appendices

A Public Notifications

B List of Documents Reviewed

C Technical Memorandum of Site-Specific Remediation Levels, ARARs, and TBCs

D Five-Year Site Inspection Checklist

E Interviews with Community Members and Technical Staff

F Optimization Opportunities

G Risk Assessment and Toxicology Analysis

H Table 4-3 Maintenance Log Summary Table

List of Acronyms

µg/kg	microgram per kilogram
µg/L	microgram per liter
AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
AST	aboveground storage tank
bgs	below ground surface
CCR	*California Code of Regulations*
CDHS	California Department of Health Services
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	*Code of Federal Regulations*
cis-1,2-DCE	cis-1,2-dichloroethylene
COC	Chemical of Concern
COPC	Chemical of Potential Concern
DAF	dilution attenuation factor
1,2-DCA	1,2-dichloroethane
1,1-DCE	1,1-dichloroethylene
DHS	Department of Health Services (State of California)
DTSC	Department of Toxic Substances Control (State of California)
EE/CA	Engineering Evaluation/Cost Analysis
EISB	Enhanced *in-situ* bioremediation
EPA	U.S. Environmental Protection Agency
ERH	Electrical Resistance Heating
ESD	Explanation of Significant Differences
FS	Feasibility Study
FSP	Field Sampling Plan
FTO	Flameless Thermal Oxidizer
GAC	Granular Activated Carbon
GPM	gallons per minute
HASP	Health and Safety Plan
HRS	Hazard Ranking System

List of Acronyms, Continued

HVDPE	High-Vacuum, Dual-Phase Extraction
HWCD	Hazardous Waste Control Department
IAG	Interagency Agreement
IC	Institutional Control
IRIS	Integrated Risk Information System
LAJR	Los Angeles Junction Railway
LARWQCB	Los Angeles Regional Water Quality Control Board
LRP	Liquid Ring Pump
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
mg/L	milligram per liter
MIRC	Maximum Individual Cancer Risk
MNA	Monitored Natural Attenuation
MRP	Maywood Riverfront Park
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NHVOC	non-halogenated volatile organic compound
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene
ppb	parts per billion
ppm	parts per million
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
RA	Remedial Action
RAL	Remedial Action Level
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design

List of Acronyms, Continued

RfD	reference dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Responsible Party
RPM	Remedial Project Manager
RSL	Regional Screening Level
RWQCB	Regional Water Quality Control Board
SCADA	System Control and Data Acquisition
SDLAC	Sanitation District of Los Angeles County
SOP	Standard Operating Procedure
SSL	Soil Screening Level
SSRL	Site-Specific Remediation Level
START	Superfund Technical Assessment and Response Team
SulTRAC	A joint venture of Sullivan International Group, Inc., and Tetra Tech EM, Inc.
SVE	soil-vapor extraction
SVOC	semi-volatile organic compound
TBC	To Be Considered Criteria
TCE	trichloroethylene
TMP	temperature monitoring probe
trans-1,2-DCE	trans-1,2-dichloroethylene
TRS	Thermal Remediation Services
USACE	U.S. Army Corps of Engineers
USC	United States Code
USGS	United States Geological Survey
UST	underground storage tank
UV-Ox	Ultraviolet Oxidation
VC	vinyl chloride
VMP	vapor monitoring point
VOC	volatile organic compound
WAM	Work Area Manager

Executive Summary

The United States Environmental Protection Agency (EPA) conducted a Five Year Review of the remedial actions implemented at the Pemaco Superfund Site located in Maywood, California. The purpose of the Five Year Review is to evaluate whether the remedial measures implemented at Pemaco continue to be protective of human health and the environment. This Five Year Review report is required because hazardous substances remain onsite above levels that allow for unlimited use and unrestricted access. The methodology, findings, and conclusions of the Five Year Review are documented in this report. In addition, issues identified and recommendations for follow-up actions are summarized.

Remedial actions have been implemented at the Pemaco Superfund Site to aggressively treat and remove contaminants from soil and groundwater. The remedy addresses three zones of contamination: (1) surface and near-surface soil remediation zone (0 – 3 feet below ground surface [ft bgs]); (2) upper vadose-zone soil and perched groundwater (3 – 35 ft bgs); and (3) lower vadose-zone soil and Exposition Zone groundwater (65 to 175 ft bgs). The ROD selected a multi-component remedy to treat each of the three remediation zones. For near-surface soils, the ROD called for soil capping and limited hot spot removal. For upper vadose-zone soil and perched groundwater, the ROD called for High-Vacuum, Dual-Phase Extraction (HVDPE) to capture and treat contaminated groundwater and soil vapors. For the lower vadose-zone soils and Exposition Zone groundwater, the ROD called for thermal treatment with Electrical Resistance Heating (ERH) in the area where soil and groundwater had the highest levels of contamination, coupled with HVDPE.

The groundwater treatment system is still in operation; in accordance with the sanitary sewer permit, the system treats and discharges 40,000 gallons per day of groundwater to the Los Angeles County Sanitary District sewer.

This is the first site-wide Five Year Review for the Pemaco Site.

1. The remedy at the Pemaco Superfund Site currently protects human health and the environment, because exposure pathways that could result in unacceptable risks are being controlled. However, in order to be protective in the long-term, the following actions should be taken:

    1) The City of Maywood should change the zoning of the Pemaco property;

    2) DTSC should finalize a Land Use Covenant to permanently change the site's land use to recreational;

    3) Assess the area around 'D' zone well MW-125-130 and evaluate whether further action is needed.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from CERCLIS)*: Pemaco Maywood		
EPA ID (*(from CERCLIS)*: CAD980737092		
Region: 9	**State: CA**	**City/County: Maywood**
SITE STATUS		
NPL status: √ Final Deleted Other (specify)		
Remediation status (choose all that apply): Under Construction √ Operating Complete		
Site Wide FYR √ YES NO	**Construction completion date:** September 24, 2007	
Has site been put into reuse? √ YES NO		
REVIEW STATUS		
Lead agency: √ EPA State Tribe Other Federal Agency _____		
Author name: Rose Marie Caraway		
Author title: Remedial Project Manager	**Author affiliation: U.S. EPA**	
Review period: 3 / 01 / 2010 to 8 /05 /2010		
Date(s) of site inspection: 03 / 09 / 2010		
Type of review: √ Post-SARA Pre-SARA NPL-Removal only Non-NPL Remedial Action Site NPL State/Tribe-lead Regional Discretion		
Review number: √ 1 (first) 2 (second) 3 (third) Other (specify) _____		
Triggering action: √ Actual RA Onsite Construction 8/1/2005 Actual RA Start ____ Construction Completion Previous Five-Year Review Report Other (specify)		
Triggering action date *(CERCLIS)*: 08/01/2005		
Due date *(five years after triggering action date)*: 08/01/2010		

Five-Year Review Summary Form (continued)

Issues:

Protectiveness Issues

The ROD required that the City of Maywood prohibit residential use of the property through zoning, and suggested that a State of California Land Use Covenant with the City of Maywood may be required to permanently change the allowable land use at the site. The City has yet to change this zoning ordinance, but deed restrictive documents have been recorded in the LA County Recorders office which restricts use of the former Pemaco property. The State of California has not yet finalized a Land Use Covenant for the site. Concentrations of TCE in Exposition 'D' Zone well MW-25-130 are currently 190 ppb. Downgradient well MW-05-135 shows concentrations below the SSRL's. EPA will assess whether further action is needed in this zone.

Recommendation

The City of Maywood should change the zoning of the Pemaco property and DTSC should finalize a Land Use Covenant to permanently change the site's land use to recreational. Pumping from 'D' zone well MW-25-130 may start during 2011. Additional 'D' zone wells may be installed during 2011.

Protectiveness Statement

The remedy at the Pemaco Superfund site currently protects human health and the environment, because exposure pathways that could result in unacceptable risks are being controlled. However, in order to be protective in the long term, the following actions should be taken:

1. The City of Maywood should change the zoning of the Pemaco property;
2. DTSC should finalize a Land Use Covenant to permanently change the site's land use to recreational;
3. Assess the area around 'D' zone well MW-125-130 and evaluate whether further action is needed.

1.0 INTRODUCTION

Pemaco was a former chemical blending facility and chemical distributor that operated from the late 1940s until June 1991. The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment.

The United States Environmental Protection Agency (EPA) Region 9 has conducted this Five-Year Review of the remedial actions implemented at the Pemaco Site in Maywood, California pursuant to CERCLA §121 and the National Contingency Plan (NCP). The Comprehensive Environmental Response, Compensation, and Liability Act (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.*

The Agency interpreted this requirement further in the National Contingency Plan (NCP); 40 Code of Federal Regulations (CFR) Section (§) 300.430(f)(4)(ii) states:

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

This is the first Five-Year Review for the Pemaco site. This Five-Year Review of the Pemaco site is a statutory review as required under CERCLA Section 121, 42 United States Code (USC) §9621, for remedies where hazardous substances will remain onsite above levels that allow for unlimited use and unrestricted exposure. The triggering action for this review is the date of the first remedial action that left hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure.

2.0 SITE CHRONOLOGY

The site chronology is summarized in Table 2-1.

Table 2-1
Chronology of Site Events

Event	Date
Environmental investigation performed by site owner to investigate potential leakage from tanks. Sixteen soil borings were converted to monitoring wells, but no water sampling was reported.	December 1990
Initial complaint to Los Angeles County Fire Department. It was determined by the responding health officers that the site was an imminent danger to human health.	May 28, 1992
Emergency response by LA County Fire: A fire occurred onsite, destroying the warehouse building and some materials inside.	December 12, 1993
EPA initiated removal action: EPA secured the site after the fire by removing 6 drums, verified that all storage tanks were empty, grouting an unmarked borehole and attaching locking caps to each standpipe.	December 1993
EPA completes Preliminary Assessment/Site Investigation of Pemaco site. Pemaco site entered into CERCLIS as Site CAD980737092.	June 1995
EPA conducts additional site characterization as part of Expanded Site Investigation and evaluates Hazard Ranking System (HRS) Factors.	February to May 1997
UST/AST removal begins. All USTs and ASTs are removed in preparation for soil-vapor extraction (SVE) system installation. Buildings demolished.	August 25, 1997
SVE system used to treat VOC-contaminated soil in the northeastern area of the site (now Maywood Riverfront Park). The wells included were SV-1 through SV-5. SVE system treated off-gas with thermal oxidation unit. SVE system was shut down in March 1998 due to community concerns about potential dioxin emissions from thermal oxidation unit. Over 90,000 pounds of hydrocarbons and solvents were removed by SVE.	March 1998
Pemaco site added to National Priorities List (NPL) based on the previous studies.	January 19, 1999
EPA conducts RI/FS at Pemaco site.	January 2000 to March 2002
EPA installs additional, deeper monitoring wells and conducts additional indoor air sampling in neighborhood surrounding the site.	March to August 2003
The Pemaco Record of Decision (ROD) is approved. Remedy includes hot-spot removal, soil capping, dual-phase extraction system, and Electrical Resistance Heating (ERH) to remediate source areas, and installation of groundwater and vapor monitoring wells around the site and in the surrounding neighborhood.	January 5, 2005
Maywood Riverfront Park constructed in conjunction with the Trust for Public Land and other agencies. Park construction involved removal of several hot spots along the northern edge of the Pemaco property, capping, grading and revegetation.	March 2005 to June 2006
Hot Spot Removal Action in the northeast corner of Pemaco site during	March 28, 2005

Table 2-1
Chronology of Site Events

Event	Date
construction of the Maywood Riverfront Park. Removal is conducted by the City of Maywood with EPA oversight.	
Remedial design report is finalized.	May 2005
Dual-phase extraction system construction begins.	August 26, 2005
Treatment-system construction, including building of treatment plant, trenching, piping, and additional wells.	August 1, 2005, to April 23, 2007
Installation of ERH electrodes begins.	October 2006
Groundwater extraction system complete and operational.	April 25, 2007
Soil vapor-extraction system complete and operational.	May 4, 2007
ERH operation begins.	September 25, 2007
ERH shutdown.	April 10, 2008

3.0 BACKGROUND

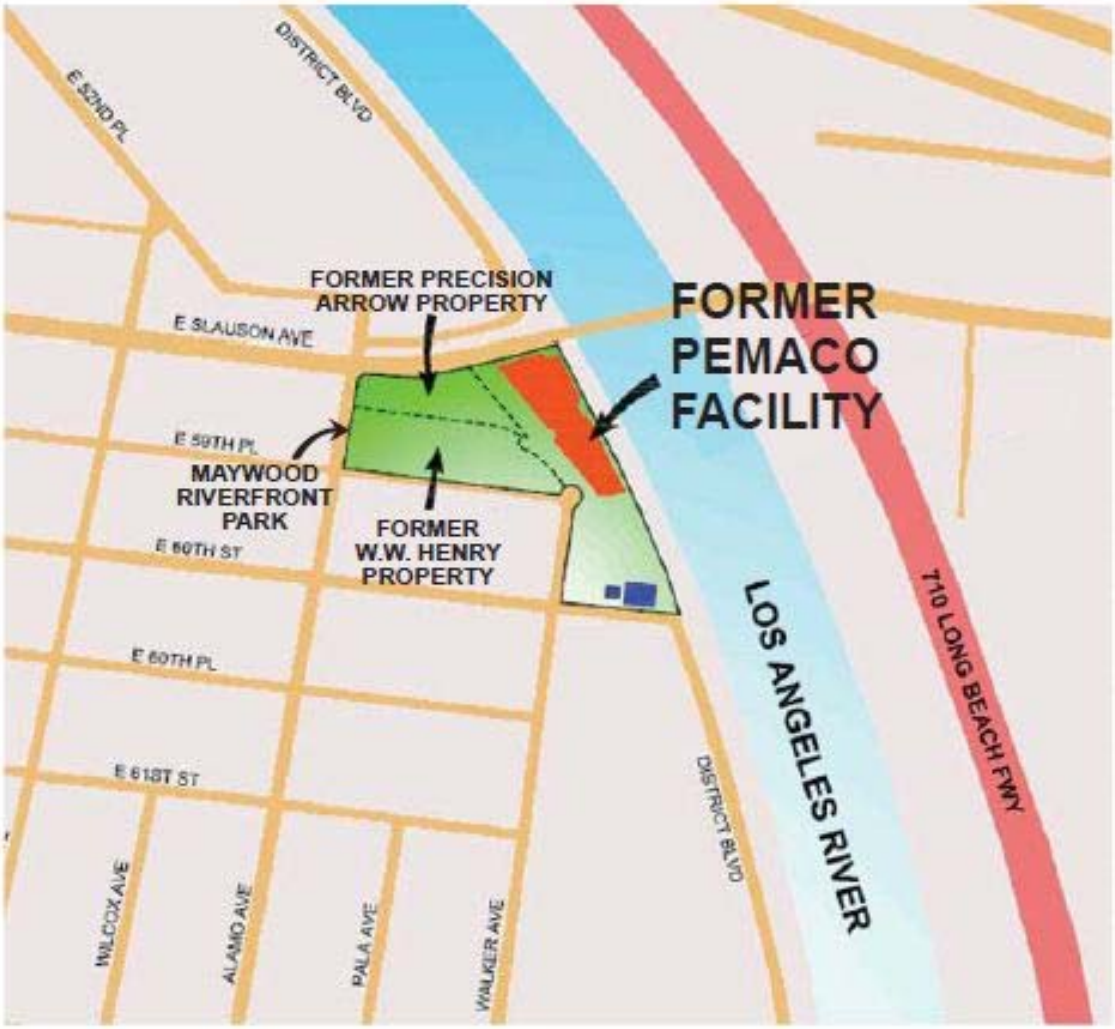
3.1 SITE LOCATION AND PHYSICAL CHARACTERISTICS

The Pemaco Superfund Site is located at 5973 S. District Blvd. in east Los Angeles County, in the City of Maywood, along the Los Angeles River (Figure 1-1). It is bounded to the north by Slauson Avenue. To the west and south are residential and light industrial properties, and the concrete-lined Los Angeles River lies to the east. The current site has been encompassed within the Maywood Riverfront Park which is primarily open space with concrete walking paths, and includes a small public restroom structure in the southwest portion of the former Pemaco property and an open-air gazebo in the central north part of the property. The original Pemaco site comprised approximately 4.1 acres . The Maywood Riverfront Park includes the original site, in addition to land previously owned by W. W. Henry, Precision Arrow, Catellus, Los Angeles Junction Railway (LAJR), and Lubrication and Oil Services. Construction of the park began in March 2005 and was completed in June 2006.

The topography of the site is relatively flat, sloping from the Los Angeles River Bike Path to the east toward Walker Avenue in the west.

There are six discrete saturated/groundwater zones underlying the Pemaco site. The groundwater gradient in all of these zones is generally to the south and southwest. The shallowest zone is the “Perched Zone,” which occurs between 30 ft and 35 ft bgs. Below the Perched zone are 5 saturated sandy lithosomes ranging from 3 ft to 15 feet thick; these zones are stratigraphic equivalents to the Exposition Aquifer. At Pemaco, these 5 saturated zones were informally named Exposition Zones ‘A’ through ‘E.’ Exposition Zone ‘A’ occurs between 75 and 80 ft bgs, followed by Exposition Zone ‘B’ from 80 to 90 ft bgs. Exposition Zone ‘C’ occurs from about 95 to about 110 ft bgs. Exposition Zone ‘D’ occurs from 124 to 145 ft bgs, and Exposition Zone ‘E’ occurs from about 160 to 175 ft bgs (Final Pemaco Record of Decision [ROD] EPA 2005).

Figure 1-1: Site Map



3.2 FORMER, CURRENT, AND FUTURE LAND USE

Pemaco Inc. is a former chemical blending and distribution facility that stored a wide variety of chemicals, including aromatic and chlorinated solvents, flammable liquids, specialty chemicals, and oils. These chemicals were stored in a combination of aboveground storage tanks (ASTs), underground storage tanks (USTs), and drums. Historically, the Pemaco facility consisted of a 22,000-square-foot warehouse in the northern portion of the property, and 31 USTs and at least 6 ASTs in the southern part of the property. Large quantities of chemicals were stored in the ASTs and USTs, which ranged in size from 500 to 20,000 gallons, as well as 55-gallon drums sporadically stored around the site. Chemicals brought to the site were delivered via railcar from a rail spur that branched out from the Los Angeles Junction Railway (LAJR) property west of the site. In addition, chemicals were trucked to the site and delivered to a loading dock located on the property. Pemaco Inc. operated on this site from the 1950s until April 1991, when the site was abandoned (Los Angeles County Report of Investigation, Biren 1992).

Currently, the Pemaco site is divided into the ERH Area in the south and the Maywood Riverfront Park area toward the north. The northern portion of the site was capped with one foot of clean fill and vegetated after dual-phase extraction wells were installed along the eastern edge of the property in June 2006. The Pemaco site has become fully incorporated into the Maywood Riverfront Park as part of the larger Los Angeles River Greenway program and the Los Angeles River Master Plan. The Park currently consists of soccer fields, basketball courts, a play area, native plant landscaping, and picnic areas. Pemaco, W. W. Henry, Precision Arrow, Catellus, railroad right-of-way, and portions of Lubrication and Oil Services properties have already been converted to park space.

3.3 History of Contamination

Pemaco Inc. operated on this site from the 1940s until April 1991, when the site was abandoned (E&E 1999). Soil and groundwater contamination, primarily by chlorinated solvents, resulted from site activities at the former chemical blending facility.

3.4 Initial Response

On May 28, 1992, the City of Maywood planning director filed a complaint with the Los Angeles County Fire Department, Hazardous Waste Control Department (HWCD) regarding the abandoned drums, USTs, and ASTs. It was reported that four hundred (400) drums were abandoned onsite, many of which were damaged, uncovered, leaking, or unlabeled (Report of Investigation, Biren 1992).

A fire broke out on December 12, 1993, at the site. This fire consumed the warehouse and several drums of unknown chemicals (HazMat Emergency Incident Report of 12/12/1993). The facility remained unsecured until December 15 through 21, 1993, when the EPA executed a removal action that included:

- erecting a chain-link fence topped with razor wire,
- grouting an unmarked borehole,
- verifying that all storage tanks were empty,
- securing all standpipes, and
- removing six 55-gallon drums offsite.

An Emergency Site Assessment/Remedial Investigation of the Pemaco site was conducted in 1997. The results of this investigation indicated that hazardous substances, as defined by CERCLA, including chlorinated and non-chlorinated VOCs, had been released into the groundwater. A layer of chlorinated and non-chlorinated VOCs ranging from 3 to 5 feet thick was found in the perched aquifer unit (Unilateral Administrative Order No. 97-13, EPA 1997).

A soil-vapor extraction (SVE) system was installed as an interim treatment method in 1997. It remained operational until 1998, when it was shut down due to concerns about dioxin emissions the SVE system may have produced as a byproduct of the thermal oxidation treatment system. By the time the SVE system was removed, it had treated over 90,000 pounds of hydrocarbons (Final Pemaco ROD, EPA 2005).

Based on these previous investigations, Pemaco was added to the National Priorities List (NPL) in January 1999.

3.5 BASIS FOR TAKING ACTION

The perched groundwater under the site is characterized as being of poor quality contained within a thin discontinuous aquifer with low transmissivity. The Exposition groundwater aquifer is classified by the Los Angeles Regional Water Quality Control Board (LARWQCB) as a potential drinking-water source. Therefore, the EPA used this classification in its reasonable-exposure assumption in its risk assessment. Other beneficial uses for groundwater beneath the Pemaco site include possible industrial applications, groundwater recharge, and freshwater replenishment.

The EPA examined several other exposure pathways as potential exposure routes. The potential exposure routes include the following; drinking the groundwater during residential use; inhaling the chemicals in the groundwater during use of groundwater; contact with contaminated surface soils via dermal, ingestion, and inhalation pathways; subsurface exposure from excavation work via dermal, ingestion, and inhalation pathways; and vapor intrusion from the subsurface by volatile chemicals.

Based on potential use of contaminated groundwater by future users, off-site migration of contaminated groundwater to existing users, direct contact with contaminated soils by Riverfront Park users, and the potential for soil-vapor intrusion into residences surrounding the site, the Pemaco Superfund site was added to the NPL on January 19, 1991. A variety of chemicals of concern (COCs) were identified, including VOCs (primarily trichloroethylene [TCE]), metals, and polycyclic aromatic hydrocarbons (PAHs).

4.0 REMEDIAL ACTIONS

The 2005 ROD stated that the Remedial Action Objectives (RAOs) for the Pemaco site are divided by media type:

Soil RAOs

- Prevent human exposure (by direct contact) to contaminated soils having COCs in excess of soil
- ARARs and standards that are protective of human health and the environment.
- Prevent migration of COCs from soil to groundwater at levels that would exceed drinking water standards.

Groundwater RAOs

- Restore the groundwater quality in perched groundwater zone, and Exposition Zones to drinking water standards (MCLs).
- Prevent vertical migration of COCs from the perched groundwater and deeper Exposition Zones at rates that would cause groundwater to exceed drinking water standards.
- Prevent further offsite migration of contaminated groundwater beneath additional adjacent properties.
- Prevent migration of contaminated groundwater to local production wells.

Indoor Air RAOs

- Remediate COCs in soil and groundwater to drinking water standards and other health based action levels to eliminate potential exposures to indoor air contaminants created by site contamination.
- Prevent further migration of soil vapor in excess of ARARs and standards that are protective of human health and the environment.

These RAOs for the Pemaco Superfund site were developed by EPA based on the following:

- Reasonable anticipated land use scenarios summarized in the human health risk assessment that include recreational land use, as the property is currently incorporated into redevelopment plans to be made into the Maywood Riverfront Park.
- The human health risk assessment identified the appropriate exposure pathways, routes, and receptors as well as COCs which required that a remedial action be performed at the site to protect human health and the environment.

4.1 REMEDY SELECTION

In January 2005 EPA issued a ROD which identified the methods that EPA would use to contain and clean up contaminated soil and groundwater at the Pemaco site. Since the subsurface

geologic and hydrogeologic environment and contamination at the site are highly variable, the EPA divided the site into three “remediation zones.” The remedy for the Pemaco Site addresses three zones of contamination: (1) surface and near-surface soil remediation zone (0 – 3 ft bgs); (2) upper vadose-zone soil and perched groundwater (3 – 35 ft bgs); and (3) lower vadose-zone and soil and Exposition Zone groundwater (65 to 175 ft bgs).

The ROD selected a multi-component remedy to treat each of the three remediation zones. For near-surface soils, the ROD called for soil capping. For the upper vadose-zone and perched groundwater, the ROD called for High-Vacuum, Dual-Phase Extraction (HVDPE) to capture and treat contaminated groundwater and soil vapors. For the lower vadose-zone soils and Exposition Zone groundwater, the ROD called for thermal treatment with Electrical Resistance Heating (ERH) in the area where soil and groundwater had the highest levels of contamination, coupled with HVDPE to capture and treat contaminated groundwater and soil vapors from the ERH Area and other parts of the site. The ROD selected pump and treat for “A” and “B” zone groundwater for the plume exceeding 10 ppb of TCE with Monitored Natural Attention for the plume areas less than 10 ppb. The ROD estimated a time frame of 5 years of active remediation and an additional 5 years of monitoring to achieve RAOs.

4.1.1 Surface and Near-Surface Soil Remediation

To prevent direct contact with contaminated soils, a surface soil cover was placed over contaminated soils at the Pemaco site. EPA and the City of Maywood agreed that a 1-foot-thick cover would provide a sufficient buffer zone to protect park users from dermal contact with site soils (“Final Construction Report,” TN&A 2007b). This remedy was implemented in March 2005, during the construction of Maywood Riverfront Park. It included the removal of hot spots of soil contamination from six areas in the proposed park. Of the six areas, one was on the former W. W. Henry property, one on the former Pemaco property, and four on the former Los Angeles Junction Railway (LAJR) property. After contaminated soils were removed, a 1 –3 foot certified fill protective cover was placed over the entire park.

4.1.2 Upper Vadose-Zone Soil and Perched Groundwater (3 –35 ft bgs)

The ROD selected HVDPE, with Ultraviolet Oxidation (UV-Ox) for treatment of extracted groundwater, and Flameless Thermal Oxidation (FTO) and Granular Activated Carbon (GAC) to treat vapors and perched groundwater extracted from the upper vadose-zone soils at the Pemaco site.. In addition vapor extraction would have the added benefit of capturing soil vapors and reducing or eliminating the potential for vapor intrusion to indoor air.

During the Remedial Design process it was determined that treatment of groundwater with only GAC, and subsequent discharge of treated water to the Los Angeles Sanitary Sewer district, was the most economical and environmentally prudent way of handling contaminated groundwater at the site. Therefore, the UV-Ox system was not installed. This action was consistent with the ROD which stated that GAC may be eventually used as a stand-alone technology for groundwater treatment, and that EPA will comply with the appropriate discharge requirements with the option recommended/selected during the design phase of the project.

4.1.3 Lower Vadose Zone Soil and Exposition Zone Groundwater

The ROD selected ERH with dual-phase extraction to address contamination in the lower vadose-zone soil and Exposition Zone groundwater in the area with the highest groundwater concentrations (referred to as the ERH area). The treatment of water and vapor was the same

as for the Upper Vadose and Perched Zone, Vacuum-Enhanced Groundwater Extraction, P&T), with the air and water treatment provided by a FTO and GAC coupled with UV-Ox and GAC to treat extracted groundwater and FTO and GAC to treat extracted vapors. This remedy was supported by field treatability tests performed during the FS which indicated that HVDPE could effectively remove and treat VOCs in soil and groundwater in this zone.

In addition, ERH heating with HVDPE was determined to be the most technically effective alternative and would also require the shortest time to reach remedial goals. As noted above, the ROD anticipated that GAC could be used alone if the RD phase determined that UV-Ox was unnecessary. As it turned out, the RD determined that GAC alone would adequately address contaminants in extracted groundwater, and UV-Ox was not employed at the site. The remedy for the lower vadose-zone soil and Exposition Zone groundwater anticipated that in situ chemical oxidation and/or in situ bioremediation might be used as a polishing step for groundwater after implementing ERH.

4.2 REMEDIATION LEVELS

Although the remedy will prohibit future residential use of the site through an institutional control (IC) of deed restriction, health-based remediation levels for soil and groundwater were also established to prevent direct contact and to restore groundwater for possible potable use. The remediation levels for soil were derived using Maximum Contaminant Levels (MCLs), preliminary remediation goals (PRGs), dilution attenuation factors (DAF), and site-specific hydrogeologic conditions. Remediation levels were not set for surface soils because the remedy required placement of a soil layer cover.

The ROD set site-specific remediation levels (SSRLs) for upper and lower vadose-zone soils (Table 4-1, below). For upper vadose-zone soils, the SSRL was the more conservative of the PRG or the 10^{-6} cancer risk for an excavation worker, as calculated in the Maywood Riverfront Park Risk Assessment (Willdan, 2002). For lower vadose-zone soils, the SSRL was set as the PRG, adjusted using a dilution attenuation factor of 20 (DAF 20). The ROD did not set SSRLs for soils below the vadose zone.

The ROD set SSRLs for both perched zone and Exposition Zone groundwater (Table 4-1). SSRLs for groundwater were set as the more stringent of the federal or California MCL. For chemicals that did not have an MCL, but which were present at concentrations above the PRG and outside of the EPA's acceptable cancer-risk range, the SSRL was set to the PRG. For lead and 1,4-dioxane, the California Department of Health Action Limit was used in the absence of an MCL. The Health Action Limit is more conservative than the PRG for tap water for these substances.

Table 4-1
SSRLs Specified in the 2005 ROD

Zone	Chemical of Concern	Site-Specific Remediation Levels[1] (IN BOLD)						
		ARARs[2]	10^{-6} Cancer Risk					
		Primary MCLs	Region IX PRGs *(type of PRG)*	Park User Exposure[3]		Excavation Worker Exposure[4]		Remediation Levels[5]
COCs only found in Upper Vadose Zone	***VOCs (µg/kg)***							
	1,1-Dichloroethene	--	60 µg/kg	--		722 µg/kg	ca	**60 µg/kg**
	Acetone	--	16,000 µg/kg	--		--		**16,000 µg/kg**
	Ethylbenzene	--	13,000 µg/kg	--		--		**13,000 µg/kg**
	Tetrachloroethene	--	60 µg/kg	--		11,300 µg/kg	ca	**60 µg/kg**
	Toluene	--	12,000 µg/kg	--		--		**12,000 µg/kg**
	Xylenes (total)	--	210,000 µg/kg	--		--		**210,000 µg/kg**
	SVOCs (µg/kg)		*DAF 20 SSL*					
	Benzo (a) anthracene	--	2000 µg/kg	--		2,610 µg/kg	ca	**2,000 µg/kg**
	Benzo (a) pyrene	--	8,000 µg/kg	--		261 µg/kg	ca	**261 µg/kg**
	Benzo (b) fluoranthene	--	5,000 µg/kg	--		2,610 µg/kg	ca	**2,610 µg/kg**
	Carbazole	--	600 µg/kg	--		--		**600 µg/kg**
	Dibenzo (a,h) anthracene	--	2,000 µg/kg	--		762 µg/kg	ca	**762 µg/kg**
	Indeno (1,2,3-cd) pyrene	--	14,000 µg/kg	--		2,610 µg/kg	ca	**2,610 µg/kg**
	Isophorone	--	500 µg/kg	--		--		**500 µg/kg**
COCs found in both Upper and Lower Vadose Zone Soils	***VOCs (µg/kg) DAF 20***		*DAF 20 SSL*					
	Benzene	--	30 µg/kg	--		--		30 µg/kg
	1,2-Dichloroethane	--	20 µg/kg	--		--		20 µg/kg
	cis-1,2-Dichloroethene	--	400 µg/kg	--		--		400 µg/kg
	Methylene chloride	--	20 µg/kg	--		--		20 µg/kg
	Trichloroethene	--	60 µg/kg	--		--		60 µg/kg
	Vinyl Chloride	--	10 µg/kg	--		--		10 µg/kg
	Metals (mg/kg) DAF 20		*DAF 20 SSL*					
	Chromium (total)	--	38 mg/kg	--		--		38 mg/kg
COCs found only in Perched Ground-water Zone	***VOCs (µg/L)***		*Tap Water*					
	1,1-Dichloroethane	5 µg/L	810/**0.2 µg/L***	--		--		**5 ug/L**
	1,1,2-Trichloroethane	5 µg/L	**0.2 µg/L**	--		--		**5 µg/L** **0.60 ug/l(7)**
	Chloroethane	--	**4.6 µg/L**	--				**100 ug/l(6)**
	Ethylbenzene	300 µg/L	1300 µg/L	--				**300 µg/L**
	Toluene	**150 µg/L**	720 µg/L	--				**150 ug/L**
	NHVOCs (µg/L)		*Tap Water*					
	Acetonitrile (Coelute w/ MIBK)	--	100 µg/L	--		--		**100 µg/L**
	Methyl isobutyl ketone (MIBK)	--	2000 µg/L	--		--		**2000 µg/L**
	SVOCs (µg/L)		*Tap Water*					
	1,4-Dioxane	**3.0 µg/L****	6.1 µg/L	--		--		**3.0 µg/L****
	bis(2-Ethylhexyl)phthalate	**4 µg/L**	4.8 µg/L	--		--		**4 µg/L**
	Naphthalene***	--	6.2 µg/L	--		--		**6.2 µg/L**
	Metals (µg/L)		*Tap Water*					
	Chromium (total)	**50 µg/L**	--	--		--		**50 µg/L**
	Iron	--	**11,000 µg/L**	--		--		**11,000 µg/L**
	Lead	**15 µg/L****	--	--		--		**15 µg/L**** **5 ug/l (7)**
	Selenium	**50 µg/L**	180 µg/L	--		--		**50 µg/L**
COCs found in both Perched and Exposition Groundwater Zones or in Exposition Groundwater zone only	***VOCs (µg/L)***		*Tap Water*					
	Acetone	--	5500 µg/L	--		--		**5500 µg/L** **700 ug/L(7)**
	1,1-Dichloroethene	**6 µg/L**	340 µg/L	--		--		**6 µg/L**
	1,2-Dibromo-3-chloropropane	0.2 µg/L	0.048/0.**0016 µg/L***	--		--		**0.2 µg/L**
	1,2-Dichloroethane	0.5 µg/L	**0.12 µg/L**	--		--		**0.5 µg/L** **0.38 ug/L(7)**
	Benzene	1 µg/L	0.34 µg/L	--		--		**1 µg/L**
	Chloroform	80 ug/L (THM)	.17/0.53 µg/L*	--		--		**80 ug/L**

Zone	Chemical of Concern	Site-Specific Remediation Levels[1] (IN BOLD)						
		ARARs[2]	10^{-6} Cancer Risk					
		Primary MCLs	Region IX PRGs *(type of PRG)*	Park User Exposure[3]		Excavation Worker Exposure[4]		Remediation Levels[5]
	cis-1,2-Dichloroethene	**6 µg/L**	61 µg/L	--		--		**6 µg/L**
	Dibromochloromethane	80 ug/L (THM)	**0.13 µg/L**	--		--		**80 ug/L**
	Methylene Chloride	5 µg/L	**4.3 µg/L**	--		--		**5 µg/L** **4.7 ug/L**[(7)]
	Methyl tert butyl ether	13 µg/L	**6.2 µg/L**	--				**13 µg/L** **5 ug/L**[(7)]
	Tetrachloroethene	5 µg/L	**0.1 µg/L**	--		--		**5 µg/L** **0.8 ug/L**[(7)]
	trans-1,2-Dichloroethene	**10 µg/L**	120 µg/L	--		--		**10 µg/L**
	Trichloroethene	5 µg/L	1.4 µg/L	--		--		**5 µg/L** **2.7 ug/L**[(7)]
	Vinyl Chloride	0.5 µg/L	**0.02 µg/L**	--		--		**0.5 µg/L**
	Metals (µg/L)		*Tap Water*					
	Aluminum	**1000 µg/L**	36,000 µg/L	--		--		**1000 µg/L**
	Arsenic	10 µg/L	0.045 µg/L/.0071	--		--		**10 µg/L**
	Manganese	--	**880 µg/L**	--		--		**880 µg/L**
	Thallium	**2 µg/L**	2.4 µg/L	--		--		**2 µg/L**
	Anions (µg/L)		*Tap Water*					
	Sulfide	--	**110 µg/L**[#]	--		--		**110 µg/L** **1 ug/L**[(7)]

NOTES:

1. *Concentrations in bold represent SSRLs (most conservative of numbers 2 through 5).*
2. *ARARs are discussed in Appendix C of this document. Primary Maximum Contaminant Levels (MCLs) are based on the most conservative of the federal EPA and California Department of Health Services MCLs for drinking water. For groundwater COCs with no available MCLs, EPA Region IX Preliminary Remediation Goals (PRGs) were used. Subsurface soils were screened against Region IX PRGs Soil Screening Levels (SSLs) with Dilution Attenuation Factors (DAF). DAF 20 PRGs are used when the contaminated soil is not directly adjacent to a drinking water source and dilution of the contaminant is occurring before it reaches the drinking water source. DAF 1 PRGs assume that the contaminated soil is directly adjacent to a drinking water source and no dilution of the contaminant is occurring along the pathway between the source soil and the drinking water source.*
3. *Park user exposure scenario calculated at 10-6 cancer risk (from Maywood Riverfront Park, or MRP, Risk Assessment).*

Remediation levels are risk-based values developed during the Pemaco Baseline Risk Assessment. These levels are calculated by rearranging the equations used to calculate each COC's hazard quotient or incremental cancer risk so that the equations can be used to solve for a concentration that will result in target hazard indexes of 1.0 or a target cancer risk of 1E-06. Remediation goal options differ for each risk driver. Due to the numerous receptor scenarios, the most conservative goal was listed when COCs overlapped from one receptor to another.

4. *Excavation worker exposure scenario calculated at 10-6 cancer risk (from MRP Risk Assessment).*
5. *DTSC recommended clean up levels based on background or ambient levels in Los Angeles for arsenic are 10-12 mg/kg and for benzo(a)pyrene are 900 µg/kg.*
6. *California Regional Water Quality Control Board Los Angeles Region Waste Discharge Requirements for Los Angeles and Ventura Counties.*
7. *California Regional Water Quality Control Board Los Angeles Region Waste Discharge Requirements for Los Angeles and Ventura Counties. The discharge limit applys when water is extracted from the aquifer, treated and discharged. The MCL or Federal Action Level applies for waters left in the groundwater aquifer.*

µg/kg: microgram per kilogram.
mg/kg: milligram per kilogram.
µg/L: microgram per liter.
ca: carcinogenic
nc: noncarcinogenic
** State of California modified PRG.*
*** California Department of Health Action Level, no available MCL*
+ The value of lead is The EPA remediation goal for residential exposure.
++ The lead value was derived using The Adult lead Model for non-residential exposure using parameters for a Mexican American Population.
[#] 110 µg/L is the Region IX Tap Water PRG for hydrogen sulfide.

ca: carcinogenic
nc: noncarcinogenic
** State of California modified PRG.*
*** California Department of Health Action Level, no available MCL*
+ The value of lead is The EPA remediation goal for residential exposure.
++ The lead value was derived using The Adult lead Model for non-residential exposure using parameters for a Mexican American Population.
[#] 110 µg/L is the Region IX Tap Water PRG for hydrogen sulfide.

4.3 REMEDY IMPLEMENTATION

The remedy implemented at the Pemaco site consisted of:

1) soil capping;

2) ERH to heat soils and groundwater in the most contaminated area of the site;

3) HVDPE to extract contaminated groundwater and to remove contaminated vapors liberated by the heating in the ERH Area;

4) HVDPE to extract contaminated groundwater from the vadose zone in areas at the Pemaco site outside the ERH Area and along 59th Place to intercept contaminated groundwater and soil vapors flowing toward the surrounding neighborhood;

5) a treatment plant to treat contaminated groundwater and soil vapors; and

6) institutional controls to prevent future residential reuse of the site.

The ERH and HDVPE addressed contamination in the upper vadose zone, lower vadose zone, perched groundwater, and Exposition Zone groundwater. Therefore, each component of the remedy is discussed in the sections that follow, rather than how the remedy was implemented in each of the three zones for which SSRLs were established.

4.3.1 Soil Capping

Between March and July 2005, six hot spots in what is now the Maywood Riverfront Park and the Pemaco site were removed by the City of Maywood. Approximately 2,160 cubic yards of soil were removed from the W. W. Henry site; about 80 cubic yards were excavated from the Pemaco site; and about 190 cubic yards of soil were removed from the Los Angeles Junction Railway property. The park was then capped with a minimum of 1 foot of clean soil, graded, and vegetated to create Riverfront Park. The actual grading cap thickness ranged from 1 foot to 3 feet in areas. The ERH Area at the Pemaco site was brought up to grade with Riverfront Park as well, but no ground cover or vegetation was planted ("Draft Final Construction Report, MRP," TN&A 2007a).

4.3.2 Groundwater- and Vapor-Extraction System

The groundwater and vapor-extraction system at the Pemaco site consists of groundwater pumping wells, vapor-extraction wells, and dual-phase extraction wells which are connected to subsurface piping trenches that convey the extracted groundwater and vapors to an on-site treatment plant.

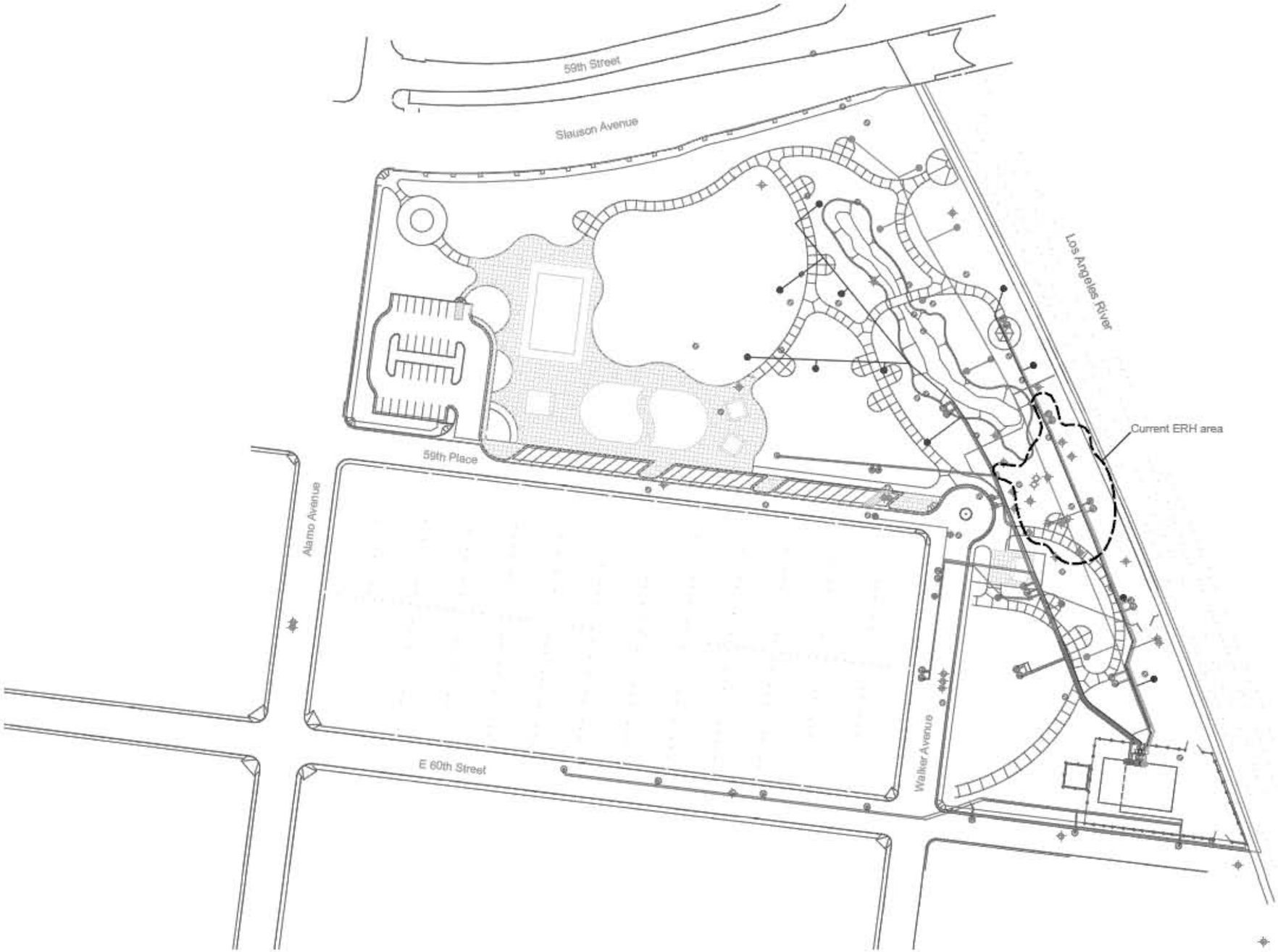
The extraction system extends beyond the boundaries of the Pemaco site to intercept contaminated groundwater and vapor before they reach the surrounding residential neighborhood. Each groundwater extraction well is equipped with a pneumatically driven bladder pump; vapors are extracted using vacuum pressure that is maintained at approximately 15 inches of mercury. The construction of the first component of the remedy at the Pemaco site commenced with installation of the dual phase extraction wells that began on August 26, 2005. Trenching, piping, and other construction activities followed.

Groundwater extraction: Groundwater extraction began on April 25, 2007, and continues to the present. The groundwater extraction system consists of perched zone, vadose zone, and Exposition Zone wells. There are 23 perched-zone wells, which range from about 30 to 40 feet deep and pump water extracted from perched zones in the Park to the treatment facility (Figure 4-1). There are 31 wells which extract groundwater from the lower vadose zone and the Exposition Zone, including twelve 'A' Zone (DA-1 through DA-12), twelve 'B' Zone (DB-1 through DB-12), and seven wells screened in both the 'A' and 'B' Zones (DAB-1 through DAB-7). Some of the wells within the ERH Area are dual-phase extraction wells

and utilize both pumps and vacuum pressure to extract groundwater and vapor. The State of California requested that EPA pump from one ‘D’ zone well. During early 2007, EPA decided to pump from the ‘C’ zone well first since the concentrations in that zone were slightly higher than the concentrations in the ‘D’ zone. Monitoring well MW24-110 in the ‘C’ Zone was equipped with a pump and connected to the treatment system in June 2007. Groundwater was extracted from this well until June 2008, when the pump failed. Attempts to replace the pump were unsuccessful, due to well damage from the thermal treatment. The well was abandoned and replaced in October 2008. In addition, ‘C’ Zone monitoring well MW25-110 was converted to a groundwater extraction well in January 2009.

Vapor recovery: Vapor recovery began on May 4, 2007, and continues to the present. The vapor recovery system consists of 58 combination electrode/vapor recovery wells in the ERH Area, 29 vapor recovery wells, 33 exposition wells, 25 perched zone wells, and 10 groundwater monitoring wells that were modified and connected to the vapor recovery system in November 2007.

Figure 4-1: Pemaco Site Groundwater and Vapor Extraction System



4.3.3 Electrical Resistance Heating System

Installation of the ERH system began in October 2006. The 58 ERH electrodes were installed between December 13, 2006, and February 20, 2007. The 58 electrodes heated the subsurface soils by using soil resistance to convert electrical energy to heat energy. Soils were heated to above the boiling point of water and the heating volatilized the contamination in the soil and groundwater, which was then collected by the vapor-recovery system. Extracted vapors were conveyed to the treatment plant via subsurface piping trenches. VMPs and TMPs in and around the ERH provided allowed monitoring of soil vapor and temperatures in the ERH Area.

The ERH was activated for 200 days, from September 25, 2007, to April 10, 2008. Post-ERH remediation has consisted of continued vapor and groundwater extraction with treatment by GAC at the treatment plant.

Overall success of the ERH remedy was based on the mass removal and reductions of COC concentrations in groundwater. The decision to turn off the ERH was made by EPA due to the following reasons:

1. Concentrations of COCs in the vapor stream reached asymptotic levels;

2. Maximum temperatures were reached and maintained in soil and groundwater for a period of time consistent with the design goals; and

3. Groundwater concentrations in and adjacent to the ERH area had declined significantly.

The ERH system was turned off on April 10, 2008. Following shutdown of the ERH, HVDPE continues to remove contaminated groundwater and vapor from the area and concentrations of COCs in groundwater within and adjacent to the ERH area have all shown decreasing trends over time.

4.3.4 Groundwater and Vapor Treatment Plant

Contaminated groundwater and vapors are treated in the on-site treatment plant. Construction of the Pemaco treatment plant was completed in March 2007, and the plant was considered fully operational after completion of a 30-day shakedown on April 23, 2007.

Groundwater and vapor are conveyed to the treatment plant by subsurface trenches and enter the plant via seven headers. Extracted groundwater is treated by (1) chlorination to reduce the potential for biofouling, (2) passing the groundwater through 10-micron filters to remove solids, and (3) passing the groundwater through GAC to remove contaminants. About 46,500 gallons of groundwater are treated and discharged to the LA County Sanitary District sewer system per day. Vapor is treated by cooling and passing through vapor-phase GAC, then discharged to ambient air though a stack at the top of the treatment plant. Condensate from extracted vapor is separated from the vapor and combined with groundwater for treatment.

Vinyl chloride (VC) was detected at concentrations that exceeded Maximum Individual Cancer Risk (MIRC) levels in the vapor influent. Because VC is not effectively treated by GAC, an FTO was installed as part of the vapor treatment system to reduce concentrations before passing through GAC. The FTO was disconnected because VC concentrations were low enough to be treated by GAC alone, as monitored by the pre- and post-FTO sampling. The FTO began operation on June 1, 2007, and continued until June 9, 2008. Although it is no longer used, the FTO remains onsite and is in good working order.

The ROD identified UV-Ox followed by GAC as a treatment technology that was to be used to treat VOC-contaminated groundwater. The ROD stated that GAC would also be evaluated as a stand-alone treatment process during the Remedial Design(RD) phase of the project. During the RD, engineers noted that influent concentrations in the groundwater to be treated could be effectively addressed using GAC alone, which was more cost effective ("Amendment of Liquid Phase Treatment of Vinyl Chloride Via GAC and Potassium Permanganate-Impregnated Media," TN&A 2006a). As a consequence, UV-Ox was never implemented at the site.

4.3.5 Institutional Controls

The objectives of the institutional controls (ICs) defined by the ROD included:

- Prohibit sensitive uses such as residential, hospital, school, child-care facility, and hospice;
- Prohibit groundwater extraction and/or use without prior review and written approval of DTSC, except as provided for in the ROD;
- Prohibit alteration, disturbance, or excavation of soil and caps without a DTSC-approved excavation work plan, except as provided for in the ROD;
- Require contaminated soils brought to the surface by grading, excavation, trenching, or backfilling to be managed in accordance with state and federal law.

The ROD required that the City of Maywood prohibit residential use of the property through zoning and required that a State of California Land Use Covenant with the City of Maywood might be required to permanently change the allowable land use at the site. EPA signed a Covenant Not to Sue Agreement with the Trust for Public Land and the City of Maywood during 2004. The Covenant discusses that the City of Maywood would allow EPA access to continue cleanup of the site and that residential housing would not be allowed on former Pemaco property. Work on the zoning change was started in 2004, and was incorporated into City of Maywood paperwork for construction of the park. EPA will work with the State of California and the City of Maywood to finalize the land use covenant for the site.

To date, the City of Maywood has not changed the zoning of the site to prevent residential use. In addition, the State of California has not yet finalized a land use covenant for the site.

4.4 REQUIRED MONITORING

Site-wide groundwater, vapor, and effluent monitoring is conducted to monitor conditions and evaluate the effectiveness of the remedial actions conducted at the site. The monitoring network includes a mix of 128 active groundwater extraction and monitoring wells to monitor groundwater quality; 29 vapor recovery wells, 21 soil-vapor monitoring probes; 30 multi-level temperature monitoring probes in the ERH Area; and groundwater and vapor sampling ports at various locations in the treatment plant to aid in performance analysis of the treatment system. The vapor and groundwater monitoring network is shown on Figure 4-2.

The site has a complex monitoring program, consisting of various subsets of monitoring points that are sampled daily, weekly, semi-weekly, monthly, quarterly, and annually. The monitoring network was intensively monitored during and immediately after the ERH implementation. A post-ERH monitoring program was subsequently developed to track progress of the remediation on a less frequent basis. The sampling frequency was further reduced 20 months later; only monthly sampling has been conducted since January 2010. Soil-vapor samples are collected

offsite between the ERH Area and the neighboring residential area biweekly to monitor the potential for soil-vapor intrusion. Monitoring data are also presented in Annual Groundwater Monitoring Reports. About 46,500 gallons per day of treated groundwater are discharged from the treatment plant to the LA County Sanitary Sewer under Discharge Permit No. 016961. Effluent from the plant is sampled every two months and reported quarterly, in accordance with the discharge permit. EPA pays LA County discharge fees of approximately $14,000 per year.

In addition, emissions from the FTO and GAC vapor treatment unit were also monitored to meet substantive requirements of treatment system permits issued by the South Coast Air Quality Management District (SCAQMD). This included sampling for dioxins/furans that could have potentially resulted from incomplete combustion of chlorinated compounds in the FTO. This sampling occurred bi-monthly between the Summers of 2007 and mid-2008. There were no concentrations of ay compounds that exceeded risk-based emission limits of the SCAQMD.

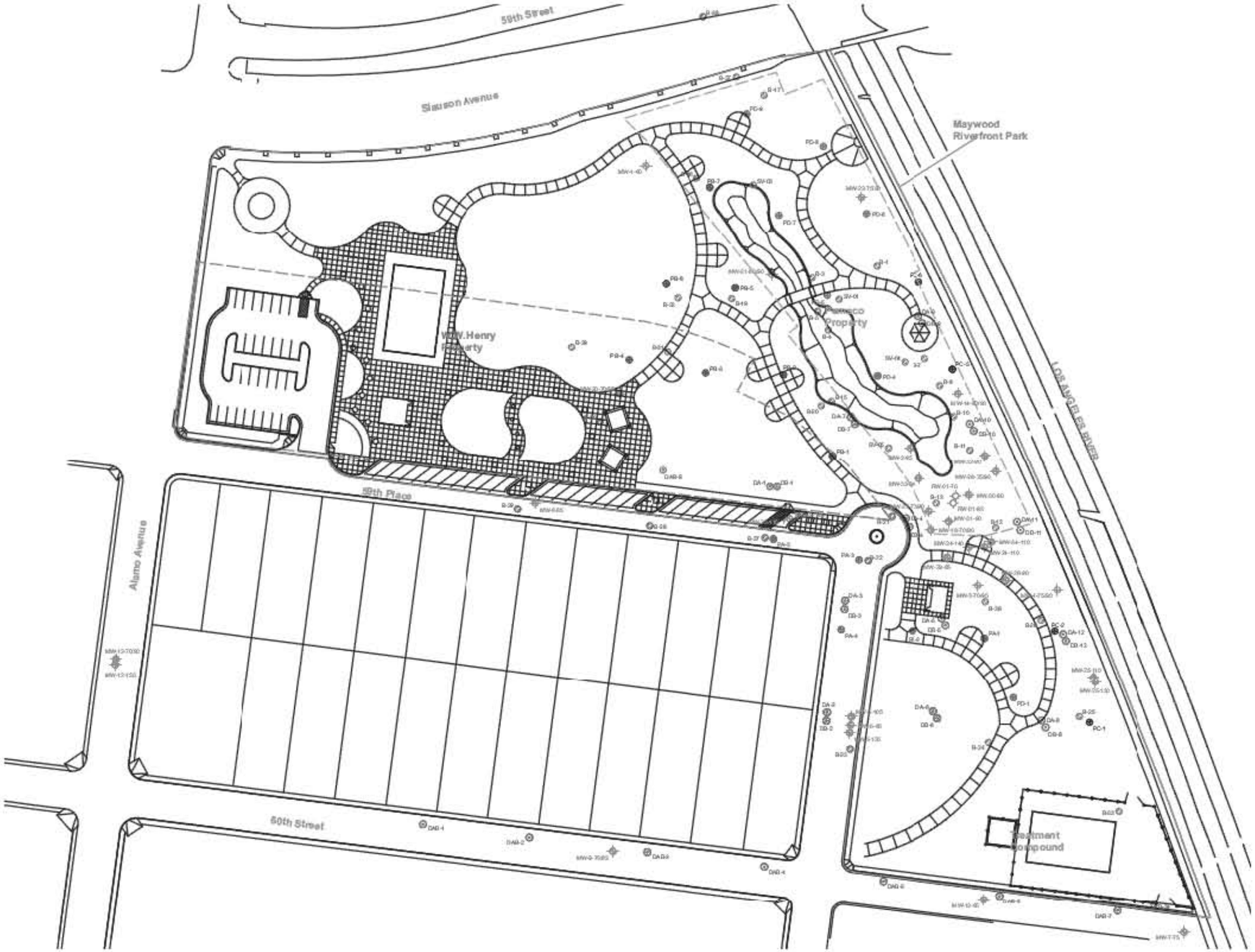
4.5 System Operations/Operation and Maintenance (O&M)

Operation and maintenance (O&M) of the treatment plant is described in the Pemaco Operation and Maintenance Manual dated May 23, 2007 (TN&A 2007c). Treatment plant O&M requires periodically replacing filter bags; replacing GAC in the liquid- and vapor-phase GAC vessels; obtaining conditioning chemicals (e.g., salt, sodium hypochlorite); repairing and maintaining vacuum pumps and blowers; disposal of filter bags, spent GAC, and other materials; and maintenance of the FTO from June 2007 to June 2008. Site O&M workers collect a variety of physical data and operational parameters daily, weekly, and monthly. These data are recorded on a series of forms, which are analyzed by project engineers to determine maintenance needs and system operational parameters. The treatment plant is equipped with a System Control and Data Acquisition (SCADA) system to alert site O&M workers to system maintenance needs.

O&M of the extraction system requires periodic cleaning, repair, and replacement of submersible pumps, well vault shoring and repairs, well redevelopment, and grounds maintenance. Plant maintenance activities are recorded on daily reports, which are circulated to the EPA RPM and project team. A summary of significant O&M activities at the site from 2007 to the present is included as Appendix H.

During the ERH remedy, weekly influent and effluent water and vapor sampling was performed to estimate mass removal. The liquid GAC was replaced every three months due to fine sediment and silt build-up in the vessels. As concentrations in groundwater and vapors treated by the plant have decreased, the need for GAC replacement has been reduced, and GAC replacement now occurs less frequently.

Figure 4-2: Site Plan with All Monitoring and Extraction Wells



One of the primary difficulties in operating and maintaining the treatment plant has been the high volume of solids entrained in groundwater treated by the plant. The solids accumulate in the filter bags, causing pressure buildup and necessitating frequent filter bag changes. Downhole camera profiling conducted in September 2009 showed that several wells have severely corroded well screens, including holes and gaps where no screen or filter pack is present to exclude formation silts and sands from the wells. The cause of the corrosion is likely related to the ERH; applying an electrical current across the wells which destroyed the CPVC piping. Elevated temperatures could also have accelerated the degradation of the well screens. A periodic well redevelopment program has been initiated to reduce silt build-up in the wells and silt passed through the treatment plant.

Review of Table 4-4 indicates that the ROD anticipated costs of approximately $14.2 million for capital costs and O&M for the first 5 years of the project, whereas actual costs of about $18.3 million were incurred through March 2010. The primary reasons for the differences between actual and anticipated costs are:

1) Mitigation of community concerns for the generation of dioxins/furans mandated the design and use of the FTO with a GAC polish. This led to substantial additional costs for design, shakedown, O&M and optimizations of the associated vapor conditioning package, as well as a comprehensive sampling and monitoring program.

2) Anticipated costs in the ROD were developed in early 2003, construction did not begin until late 2005, during this period there was an anomalous increase in commodity related materials such as fuel, PVC, steel, etc. which drove materials and shipping costs higher.

3) Higher than expected frequency of GAC change out and disposal, filter bag replacement and disposal due to high solids content.

4) Increased labor for O&M procedures due to the high temperature and solids content of the groundwater being treated.

5) Remedy included the first time use of the ERH technology for USEPA Region IX, substantial data collection costs were incurred to assist in future evaluations of the technology if applied at other Superfund sites.

Table 4-4:
Summary of Costs, Upper Vadose Zone, Perched Groundwater, Lower Vadose Zone and Exposition Groundwater Zones
Pemaco Superfund Site, Maywood, California

Year	Anticipated Costs per ROD (USEPA, 2005)[1]					
	Capital Cost	O&M	Groundwater Monitoring	Optimization Studies*	Totals	Years
0	$ 5,582,473			$ -	$ 5,582,473	2005
1		$ 2,174,289	$ 108,943	$ -	$ 2,283,232	2006
2		$ 1,469,613	$ 108,943	$ -	$ 1,578,556	2007
3		$ 1,469,613	$ 108,943	$ -	$ 1,578,556	2008
4		$ 1,469,613	$ 108,943	$ -	$ 1,578,556	2009
5		$ 1,469,613	$ 108,943	$ -	$ 1,578,556	2010
Totals:	**$ 5,582,473**	**$ 8,052,741**	**$ 544,715**	**$ -**	**$ 14,179,929**	

Year	Actual Costs					
	Capital Cost	O&M	Groundwater Monitoring	Optimization Studies[2]	Totals	Years[3]
0	$ 2,742,565				$ 2,742,565	2005
1	$ 3,556,735				$ 3,556,735	2006
2	$ 3,148,838	$ 1,100,000	$ 850,000	$ 165,000	$ 5,263,838	2007
3	$ -	$ 1,822,970	$ 610,875	$ 140,000	$ 2,573,845	2008
4	$ -	$ 1,800,000	$ 550,000	$ 106,000	$ 2,456,000	2009
5	$ -	$ 1,208,000	$ 402,000	$ 93,000	$ 1,703,000	2010
Totals:	$ 9,448,138	$ 5,930,970	$ 2,412,875	$ 504,000	$ 18,295,983	

1. Anticipated costs presented were caclulated by adding total costs in Tables 12-2 and 12-3 of ROD. City of Maywood paid for remedy of Surface and Near Surface Soil Zone, and therefore are not included.

2. Optimization Studies includes treatment equipment assessments, data dissemination, additional data gap investigations, website management, community relations, and progress reporting that was not included in estimates provided in the ROD.

3. Costs presented for calendar years, January 1st - December 31st, O&M began in April 2007, 2010 costs are only through March 2010.

5.0 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first five-year review for the Pemaco Site.

6.0 FIVE YEAR REVIEW PROCESS

6.1 ADMINISTRATIVE COMPONENTS, COMMUNITY NOTIFICATION, DOCUMENT REVIEW

The Five Year Review for the Pemaco Site consisted of the following activities:

- Community notification by EPA Region 9 that a Five Year Review was underway at the Pemaco Site, and interviews with community members and technical staff familiar with the site (Section 6.2);
- Review of relevant documents that describe the basis for the response action, how the remedial response was implemented, how the remedy is performing, and regulatory standards and ecological and human health risk evaluations (Section 6.3);
- Review of data obtained during the remedial response that demonstrate performance of the remedy (Section 6.4); and
- A site inspection conducted on March 9, 2010 (Section 6.5).

The relevant documents, data, technical interviews, and the site inspection have demonstrated that the key components of the Pemaco Superfund Site remedial action are being conducted in accordance with the ROD, dated January 13, 2005 (EPA 2005).

6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT

As part of the Five Year Review process, EPA is required to inform the community of the review and invite community members to be interviewed regarding the remedial action. The public notification (Appendix A) of the Pemaco Five Year Review was published in English in The Press (March 25, 2010) and in Spanish in La Opinión (April 9, 2010). In addition, both versions were posted on the City of Maywood website under “City Announcements” (March 22, 2010). Both versions of the public notification can be found in Appendix A. In addition, the public notification was posted on the City of Maywood website (www.cityofmaywood.com) under “City News, Hot Topics” on March 22, 2010 (also shown in Appendix A). EPA also changed the English and Spanish public information toll-free telephone numbers to indicate that a Five Year Review was taking place and soliciting public comments.

Community meetings were held during remedy selection and implementation to explain contamination at the site, the remedial technologies that were used, and progress of the remediation. From August 2005 to the present (the time period considered in this Five-Year review), community meetings were held in January 2006, August 2006, May 2007, August 2007, January 2008, October 2008, and February 2009.

Following the release of this Five Year Review report, EPA will generate and post an information sheet at the site and Maywood City Hall, and on their respective websites.

6.3 DOCUMENT REVIEW

As part of the Five Year Review process, a review of all documents related to the remedial action activities at the Pemaco Superfund Site was performed. The documents reviewed included the decision documents associated with the remedial action, the remedial design and implementation reports, remedial progress and performance reports, O&M documentation, legal

documents, and the community involvement plan. Appendix B provides a list of the documents reviewed during this Five Year Review.

Site RAOs, ARARs, and clean-up goals are identified in the Pemaco Site ROD signed in January 2005. Appendix C provides a detailed review of changes to ARARs and other criteria to be considered (TBCs) to determine whether any laws, regulations, or guidance promulgated since the ROD was approved have altered the protectiveness of the selected remedy for the Pemaco Site. Appendix G provides a detailed analysis of the risk assessment presented in the ROD, including an evaluation of any changes in site conditions, exposure pathways, contaminant characteristics, and toxicity values since the site remedy was selected for Pemaco.

6.4 DATA REVIEW

The 2007, 2008, and 2009 Groundwater Monitoring Reports (TN&A 2008, OTIE 2010a, and OTIE 2010b, respectively), and the ERH Summary Report (TN&A 2009) form the basis of this Five Year Review.

6.4.1 Soil

Soils at the Pemaco Superfund Site are subdivided into three zones:

1) Surface soils found between 0 and 3 ft bgs,

2) Upper vadose-zone soils between 3 and 35 ft bgs, and

3) Lower vadose-zone soils between 35 and 65 ft bgs.

There is a 1- to 10-foot-thick continuous clay layer about 30 to 40 ft bgs which divides the upper and lower vadose zones.

The remediation levels for soil specified in the ROD were developed based on the assumptions that soil contaminants could leach into the groundwater and that the groundwater could become a drinking-water source in the future. Since the remedy included “hot spot removal” and a soil cover layer, EPA chose not to set contaminant-specific remediation levels for the surface soils. However, contaminant-specific remediation levels for lower and upper vadose-zone soils were set, and the final remediation levels will prevent contaminant concentrations in groundwater from exceeding MCLs.

Results from pre-remedy soil sampling in 2001 and 2005 demonstrate that the majority of TCE, 1,2-DCE, and VC were detected below 25 ft bgs and were limited to the ERH Area. The upper vadose zone, specifically the area that has been incorporated into the Maywood Riverfront Park, primarily had detections of SVOCs and benzene in addition to several other VOCs. The upper vadose-zone contamination concentrations have not been evaluated since HVDPE, the remedy for this zone, began in 2007. Post-remedy soil sampling at the Pemaco site is limited to the ERH Area between 25 and 100 ft bgs, as described below.

Pre-ERH Soil Sampling. Prior to implementation of the remedy, soil samples were collected in November and December 2006, during the installation of the Temperature Monitoring Probes (TMPs) in the ERH Area. This pre-ERH sampling provided data to estimate the area and volume of the source zone identified for ERH treatment. Soil samples were collected at 5-foot intervals between 25 and 100 ft bgs at 19 of the 30 TMP locations. TCE, cis-1,2-dichloroethylene (cis-1,2-DCE), VC, and methylene chloride exceeded project-specific SSRLs. Prior to implementation of the remedy, TCE, was detected in 99% of the soil samples

collected between 25 and 65 ft bgs. The highest concentration of TCE (above 6,000 µg/kg) was found between 80 and 90 ft bgs. The ROD defined an SSRL for TCE of 60 µg/kg in soil between 25 and 65 ft bgs (below 65 ft bgs, the SSRL is only for groundwater). Soil samples from four TMP locations were also analyzed for 1,4-dioxane; there were no detections of 1,4-dioxane above the reporting limits (approximately 0.2 mg/kg).

Post ERH Soil Sampling. Post-ERH soil sampling was performed in October 2008 to evaluate the effectiveness of the ERH remedy. The effort was coupled with groundwater monitoring well installation at locations within 5 feet of existing TMP locations. The results of the post-ERH sampling show that there were significant reductions of VOCs. Post-ERH concentrations of COCs did not exceed the Pemaco SSRLs established between 25 and 65 ft bgs. There was an approximate 99% reduction in TCE concentrations between pre- and post-ERH soil samples.

6.4.2 Groundwater

Since the implementation of HVDPE at the Pemaco Superfund Site in May 2007, approximately 28 pounds of TCE and 121 pounds of total VOCs have been removed from the groundwater (TN&A 2008a, OTIE 2010a). Fluctuations of TCE and other COCs have occurred over the duration of the ERH remedy, but the overall size and extent of the plume have decreased significantly. Figure 6-1 depicts wells in Exposition Zones ‘A,’ ‘B,’ and ‘C’ that have had recent detections of the most prevalent contaminants, TCE and cis-1,2-DCE, above 25 µg/L.

6.4.2.1 Perched Zone Groundwater

Groundwater elevations in the perched zone are highly variable, and groundwater fluctuations of greater than 12 feet have been observed since 2001. The abnormally high water levels in various wells can be attributed to the Maywood Riverfront Park irrigation program. Similarly, the groundwater gradient is highly variable due to the complex hydrogeology and the park irrigation program. In general, groundwater flows to the south in the perched zone, but there are many localized areas of variable flow. In 2007, the overall groundwater flow in the perched zone was to the southwest, in 2008 to the south, and in 2009 to the southeast. Details of groundwater elevations and gradients can be found in the 2007, 2008, and 2009 Groundwater Monitoring Reports.

The most prevalent chemicals of concern in perched-zone groundwater are the chlorinated solvents tetrachloroethylene (PCE), TCE, cis-1,2-DCE, and VC, and the SVOC 1,4-dioxane. Other contaminants present in the perched zone include benzene, trans-1,2-dichloroethylene (trans-1,2-DCE), 1,1-dichloroethylene (1,1-DCE), and 1,2-dichloroethane (1,2-DCA). Significant decreases of these compounds have been observed since the implementation of the dual-phase extraction system in April/May2007. Table 6-1 shows maximum concentrations of these compounds in the perched-zone groundwater before HVDPE began in April 2007 and in 2009, post-ERH remedy. In 2007, the PCE and TCE concentrations decreased, and the cis-1,2-DCE and VC concentrations increased, suggesting natural attenuation of PCE and TCE. Since 2007, concentrations of 1,2-DCE and VC have also decreased.

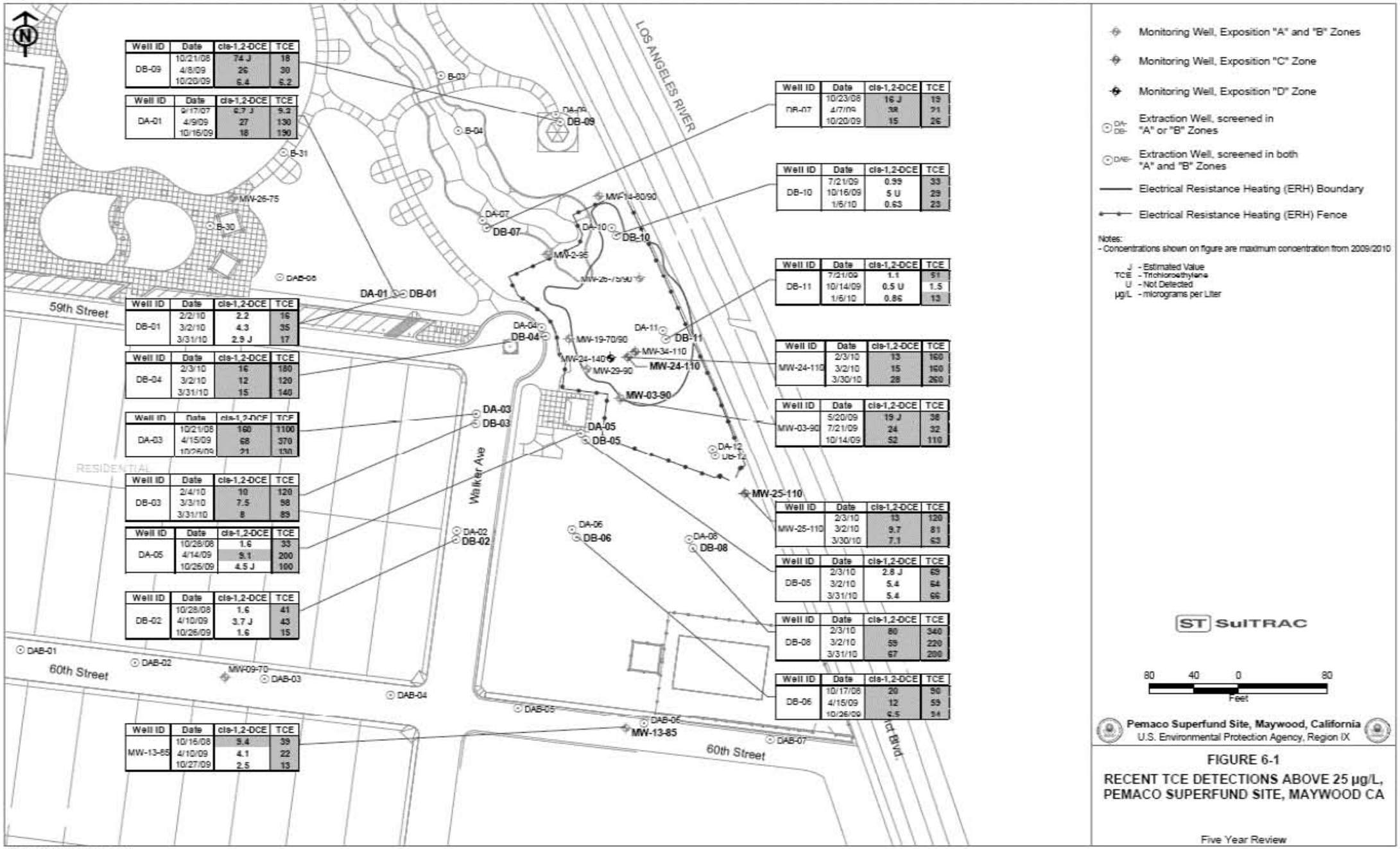
In October 2009, the compounds found in perched groundwater above the action limits were limited to four detections of cis-1,2-DCE, two detections of TCE, two detections of PCE, two detections of VC, one detection of benzene, and five detections of 1,4-dioxane. 1,4-Dioxane concentrations in the perched zone fluctuate but have not changed significantly. 1,4-Dioxane was detected above the SSRL of 3 µg/L in five perched-zone wells during the most recent semi-

annual event in October 2009, at concentrations ranging from 5.1 µg/L (PC-05) to 330 µg/L (PD-06).

Prior to 2010, wells within the Perched Zone that have historically contained free product have included B-15, B-28, B-29 and PD-04. The free product detected in wells B-15 and PD-04 is related to Pemaco historical contamination is addressed by the HVDPE System. The free product detected in wells B-28 and B-29 is related to the W.W. Henry property (former Pemaco neighbor) and is being addressed by a separate remediation system under the auspices of the Los Angeles Regional Water Quality Control Board. No free product associated with Pemaco has been observed since October 2008; it is likely that all free product has been removed by the HVDPE component of the remedy

.

Figure 6-1 Recent TCE Detections above 25 µg/L



Well ID	Date	cis-1,2-DCE	TCE
DB-09	10/21/08	74 J	18
	4/8/09	26	30
	10/20/09	6.4	6.2

Well ID	Date	cis-1,2-DCE	TCE
DA-01	9/17/07	6.7 J	9.2
	4/9/09	27	130
	10/16/09	18	190

Well ID	Date	cis-1,2-DCE	TCE
DB-01	2/2/10	2.2	16
	3/2/10	4.3	35
	3/31/10	2.9 J	17

Well ID	Date	cis-1,2-DCE	TCE
DB-04	2/3/10	16	180
	3/2/10	12	120
	3/31/10	15	140

Well ID	Date	cis-1,2-DCE	TCE
DA-03	10/21/08	160	1100
	4/15/09	68	370
	10/26/09	21	130

Well ID	Date	cis-1,2-DCE	TCE
DB-03	2/4/10	10	120
	3/3/10	7.5	58
	3/31/10	8	89

Well ID	Date	cis-1,2-DCE	TCE
DA-05	10/28/08	1.6	33
	4/14/09	9.1	200
	10/26/09	4.5 J	100

Well ID	Date	cis-1,2-DCE	TCE
DB-02	10/28/08	1.6	41
	4/10/09	3.7 J	43
	10/26/09	1.6	15

Well ID	Date	cis-1,2-DCE	TCE
MW-13-85	10/16/08	5.4	39
	4/10/09	4.1	22
	10/27/09	2.5	13

Well ID	Date	cis-1,2-DCE	TCE
DB-07	10/23/08	16 J	19
	4/7/09	38	21
	10/20/09	15	26

Well ID	Date	cis-1,2-DCE	TCE
DB-10	7/21/09	0.99	33
	10/16/09	5 U	29
	1/5/10	0.63	23

Well ID	Date	cis-1,2-DCE	TCE
DB-11	7/21/09	1.1	51
	10/14/09	0.5 U	1.5
	1/5/10	0.86	13

Well ID	Date	cis-1,2-DCE	TCE
MW-24-110	2/3/10	13	160
	3/2/10	15	160
	3/30/10	28	260

Well ID	Date	cis-1,2-DCE	TCE
MW-03-90	5/20/09	19 J	38
	7/21/09	24	32
	10/14/09	52	110

Well ID	Date	cis-1,2-DCE	TCE
MW-25-110	2/3/10	13	120
	3/2/10	9.7	81
	3/30/10	7.1	63

Well ID	Date	cis-1,2-DCE	TCE
DB-05	2/3/10	2.8 J	69
	3/2/10	5.4	64
	3/31/10	5.4	66

Well ID	Date	cis-1,2-DCE	TCE
DB-08	2/3/10	80	340
	3/2/10	59	220
	3/31/10	67	200

Well ID	Date	cis-1,2-DCE	TCE
DB-06	10/17/08	20	50
	4/15/09	12	59
	10/26/09	6.5	34

Table 6-1
Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs:
Perched Zone Groundwater

Analyte	SSRL (µg/L)	pre-HVDPE		2009	
		Conc. (µg/L)	Well (date)	Conc. (µg/L)	Well (date)
PCE	5	**590**	PD-08 (2/1/06)	**200**	PC-06 (4/9/09)
TCE	5	**250J**	B-36 (2/22/07)	**12J**	SV-03 (10/19/09)
cis-1,2-DCE	6	**130J**	PA-03 (2/14/07	**33**	PB-03 (4/16/09)
trans-1,2-DCE	10	**30J**	PA-03 (2/14/07)	7	SV-05 (4/17/09)
VC	0.5	**20 J**	PA-03 (2/14/07)	**14**	SV-05 (4/17/09)
1,4-Dioxane	3	**3300**	PD-08 (9/13/06)	**330**	PD-06 (10/20/09)
Benzene	1	**50**	PD-04 (2/2/06)	**2.7**	PD-04 (10/21/09)

Notes:

1) Pre-HVDPE maximum concentrations for period between the ROD (2005) and HVDPE implementation in April/May 2007.

2) Values above the SSRL are bolded.

µg/L Micrograms per liter

COC Chemical of concern

cis-1,2-DCE cis-1,2-Dichloroethylene

trans-1,2-DCE trans-1,2-Dichloroethylene

ERH Electrical Resistance Heating

HVDPE High-Vacuum, Dual-Phase Extraction

J Estimated detection; compound detected between the method detection limit and the method reporting limit.

ND Compound not detected above the method detection limit

PCE Tetrachloroethylene

SSRL Site-specific remediation level

TCE Trichloroethylene

VC Vinyl chloride

6.4.2.2 Exposition 'A' Zone Groundwater

The Exposition 'A' Zone is typically found between 65 and 75 feet below ground surface (bgs), and the hydraulic gradient was consistently towards the south or south-southwest. Groundwater fluctuations of up to 12 feet along with varying groundwater flow directions have been observed in this zone since measurements began in May 2001.

The most common contaminants found in the 'A' Zone are TCE, PCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, VC, and benzene. COC concentrations, especially those of TCE and cis-1,2-DCE, have decreased significantly since the ERH remedy and groundwater pump-and-treat system were implemented. Figure 6-2 shows the maximum TCE concentrations in 'A' Zone groundwater between the signing of the ROD in January 2005 and the implementation of the HVDPE system in May 2007. Figure 6-3 shows the maximum concentration of TCE in 'A' Zone groundwater in 2009. Within the ERH Area, groundwater samples from 'A' Zone wells have not exceeded SSRLs since 2008, except for one detection of TCE at 39 µg/L in MW03-70 (5/20/09). EPA conducted bio-treatment in an area of TCE contaminated groundwater located adjacent to the ERH Area prior to the start of heating. Extraction wells DA-01, DA-03, and DA-05 now contain TCE concentrations of approximately 100 µg/L in October 2009. EPA may follow-up with additional bio-remediation treatment sometime in the future.

By the end of 2007, the estimated surface area of the 'A' zone TCE plume decreased from approximately 6.07 acres (246,200 sq. ft.) in the first quarter (prior to extraction) to approximately 1.73 acres (75,500 sq. ft.) in the fourth quarter. This resulted in a 71.5% decrease in the size of the TCE plume. A total of 11 monitoring wells, 1 recovery well, and 10 extraction wells have become de-watered within this zone since pumping began.

Figure 6-1 shows the wells whose TCE concentrations are still above 25 µg/L. Table 6-2 shows the maximum concentrations of selected contaminants pre-HVDPE (April 2007) and in 2009.

Table 6-2
Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition 'A' Zone Groundwater

Analyte	SSRL (µg/L)	pre-HVDPE Max		2009	
		Conc. (µg/L)	Well (date)	Conc. (µg/L)	Well (date)
PCE	5	**13**	MW-22-75 (1/27/06)	3.5J	DA-03 (10/26/09)
TCE	5	**15,000 J**	RW-01-70 (1/24/06)	**370**	DA-03 (4/15/09)
cis-1,2-DCE	6	**6400**	RW-01-70 (1/24/06)	**68**	DA-03 (4/15/09)
trans-1,2-DCE	10	**79**	RW-01-70 (9/19/06)	3.8J	DA-03 (4/15/09)
VC	0.5	**670**	DA-04(9/14/06)	ND	----
1,1-DCE	6	**29J**	DA-04 (9/14/06)	5.4	DA-04 (1/14/09)
Benzene	1	**14**	DA-03 (1/25/06)	0.37J	DA-01 (4/9/09)

Notes:

Pre-HVDPE maximum concentration for period between the ROD (2005) and HVDPE implementation in April/May 2007.
Values above the SSRL are **bolded**.

µg/L Micrograms per liter
COC Chemical of concern
cis-1,2-DCE cis-1,2-Dichloroethylene
trans-1,2-DCE trans-1,2-Dichloroethylene
ERH Electrical Resistance Heating
HVDPE High-Vacuum, Dual-Phase Extraction
J Estimated detection; compound detected between the method detection limit and the method reporting limit.
ND Compound not detected above the method detection limit
PCE Tetrachloroethylene
SSRL Site-specific remediation level
TCE Trichloroethylene
VC Vinyl chloride

Figure 6-2 Pre-HVDPE Maximum Concentrations of TCE in Exposition 'A' Zone Groundwater, Pemaco Superfund Site, Maywood CA

Figure 6-3 Post-ERH Maximum Concentrations of TCE in Exposition 'A' Zone Groundwater, Pemaco Superfund Site, Maywood CA

6.4.2.3 Exposition 'B' Zone Groundwater

Prior to the implementation of HVDPE in April/May 2007, groundwater elevations in the 'B' Zone generally ranged between 80 to 90 feet below ground surface (bgs). After extraction began in April 2007 groundwater levels dropped. The historical groundwater flow was south, but groundwater began to flow in multiple directions after HVDPE began.

The most common contaminants in the 'B' Zone are benzene and the chlorinated solvents TCE, PCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and VC. TCE is the primary contaminant in the 'B' Zone. TCE concentrations decreased significantly after the ERH remedy and the groundwater extraction system were implemented. Figure 6-4 shows the maximum TCE concentrations in 'B' Zone groundwater between the signing of the ROD in January 2005 and the implementation of the HVDPE system in May 2007. Figure 6-5 shows the maximum concentration of TCE in 'B' Zone groundwater in 2009. The surface area of the plume was 4.56 acres in December 2007. Post-ERH sampling in October 2009 showed that TCE concentrations exceeded the SSRL in an area of 2.66 acres, a 42% decrease. TCE and cis-1,2-DCE continue to be detected in 'B' Zone extraction wells and select monitoring wells above their respective SSRLs. In 2009, TCE concentrations in the 'B' Zone ranged from 0.56 µg/L (MW30-90, 10/12/09) to 720 µg/L (DB-08, 5/19/09), and cis-1,2-DCE concentrations ranged from 0.28J µg/L (MW28-90, 7/22/09) to 130 µg/L (MW02-95, 3/17/09). In the ERH Area and immediate surroundings, TCE concentrations in 'B' Zone wells have decreased 97%. Wells that recently had detections of TCE and cis-1,2-DCE above 25 µg/L are depicted in Figure 6-1. The maximum concentrations of select COCs in 'B' Zone groundwater before HVDPE began in April 2007 and post-ERH remedy in 2009 are presented in Table 6-3.

Figure 6-4 Pre-HVDPE Maximum Concentrations of TCE in Exposition 'B' Zone Groundwater, Pemaco Superfund Site, Maywood CA

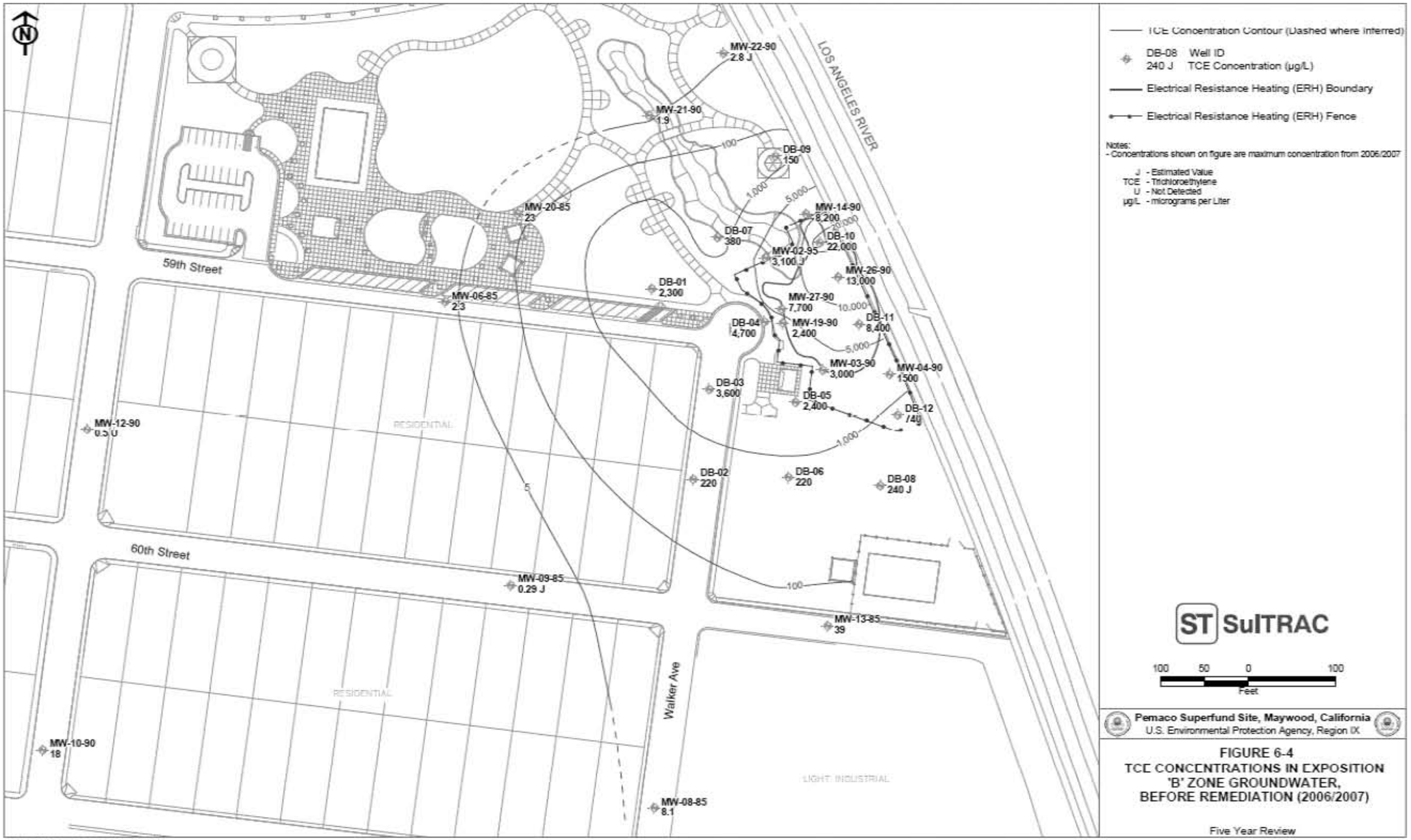


Figure 6-5 Post-ERH Maximum Concentrations of TCE in Exposition 'B' Zone Groundwater, Pemaco Superfund Site, Maywood CA

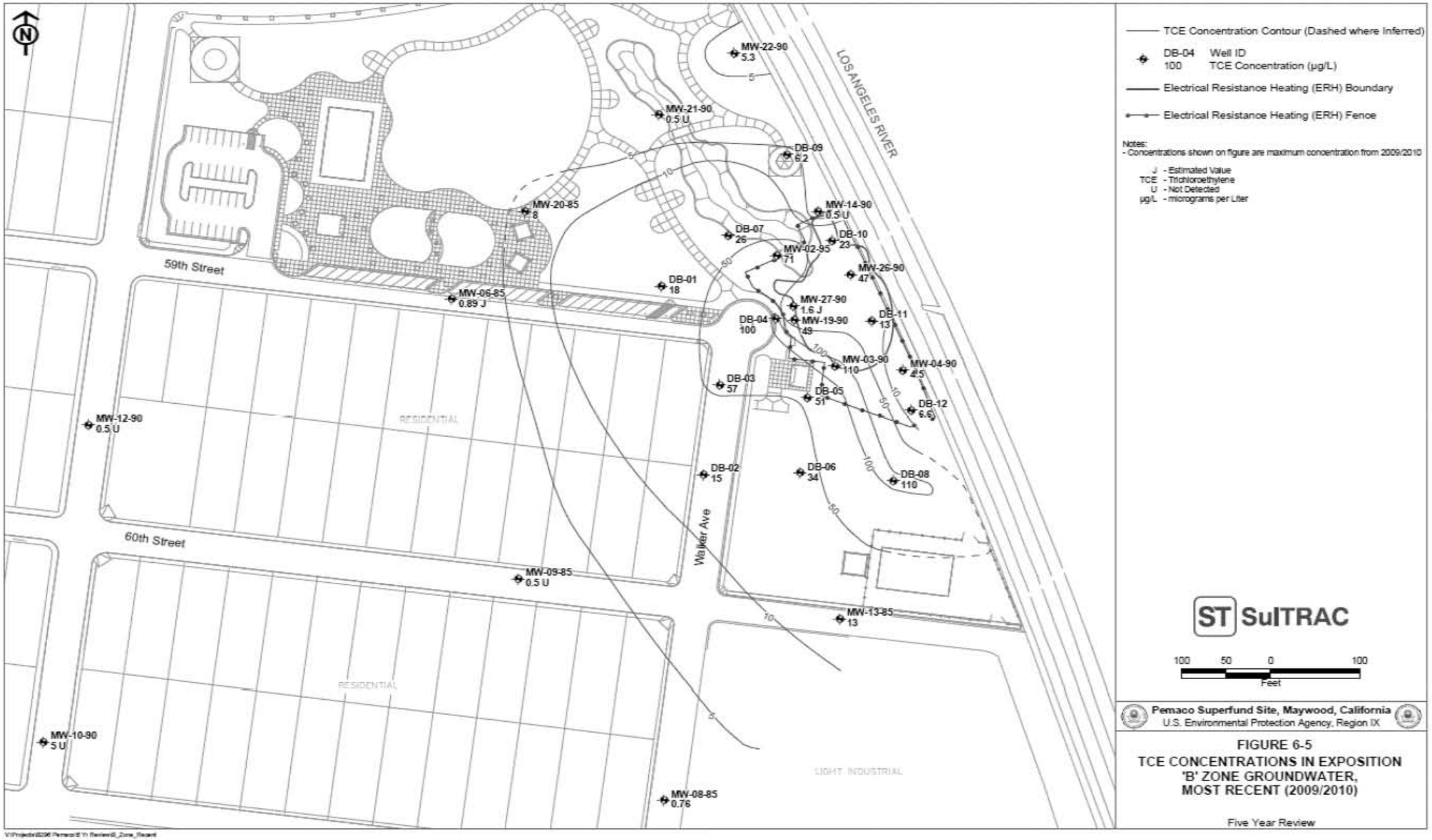


Table 6-3
Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition 'B' Zone Groundwater

Analyte	SSRL (µg/L)	2006		2009	
		Conc. (µg/L)	Well (date)	Conc. (µg/L)	Well (date)
PCE	5	**10**	RW-01-95 (2/23/07)	4.4J	DB-03 (10/26/09)
TCE	5	**22,000**	DB-10 (1/24/06)	**720**	DB-08 (5/19/09)
cis-1,2-DCE	6	**1500J**	RW-01-95 (2/23/07)	**130**	MW-02-95 (3/17/09)
trans-1,2-DCE	10	**28**	RW-01-95 (9/19/10)	8	MW-02-95 (2/19/09)
VC	0.5	**90J**	MW-02-95 (2/25/06)	**3.2J**	DB-08 (9/21/09)
1,1-DCE	6	**22J**	DB-11 (9/19/06)	**9.5**	MW-22-90 (4/8/09)
Benzene	1	**13J**	DB-03 (2/14/07)	**5.4**	DB-10 (3/19/09)

Notes:

Pre-HVDPE maximum concentration for period between the ROD (2005) and HVDPE implementation in April/May 2007. Values above the SSRL are bolded.

µg/L	Micrograms per liter
COC	Chemical of concern
cis-1,2-DCE	cis-1,2-Dichloroethylene
trans-1,2-DCE	trans-1,2-Dichloroethylene
ERH	Electrical Resistance Heating
HVDPE	High-Vacuum, Dual-Phase Extraction
J	Estimated detection; compound detected between the method detection limit and the method reporting limit.
PCE	Tetrachloroethylene
SSRL	Site-specific remediation level
TCE	Trichloroethylene
VC	Vinyl chloride

6.4.2.4 Exposition 'C' Zone Groundwater

The 'C' Zone is generally found between 100 and 105 feet bgs. Groundwater fluctuations of approximately 5 feet have been observed since monitoring began in 2001. The 'C' Zone groundwater gradient was historically south-southeast or southeast until groundwater extraction began in 'C' Zone wells MW24-100 and MW25-100 in 2008 and 2009. Currently, the groundwater flow in the 'C' Zone is characterized by localized flow in various directions.

The most prevalent contaminants in 'C' Zone groundwater are TCE, cis-1,2-DCE, VC, and benzene. Historical data indicate that 'C' Zone contamination, although present at low levels before ERH construction activities, increased significantly following the installation of TMPs and ERH electrodes in 2006. Figure 6-6 shows the maximum TCE concentrations in 'C' Zone groundwater between the signing of the ROD in January 2005 and the implementation of the HVDPE system in May 2007. Figure 6-7 shows the maximum concentration of TCE in 'C' Zone groundwater in 2009. Before ERH construction began in September 2006, TCE was detected in 'C' Zone wells between 0.13 J µg/L (MW23-110, March 2004) and 120 µg/L (MW24-110, January 2006). After ERH construction, concentrations of TCE in well MW24-110 increased to 2,400 µg/L in February 2007. To mitigate these increases, MW24-110 was converted into an extraction well in August 2007; by November 2008, TCE concentrations had decreased to 96 µg/L. TCE concentrations in MW25-110 began to increase in the summer of 2008, from 87 µg/L in March to 650 µg/L in August. MW25-110 was converted into an extraction well in January 2009, and concentrations have decreased since. The graph below shows the trend in TCE concentrations in the 'C' Zone since monitoring began in 2003.

Figure 6-6 Pre-HVDPE Maximum Concentrations of TCE in Exposition 'C' Zone Groundwater, Pemaco Superfund Site, Maywood CA

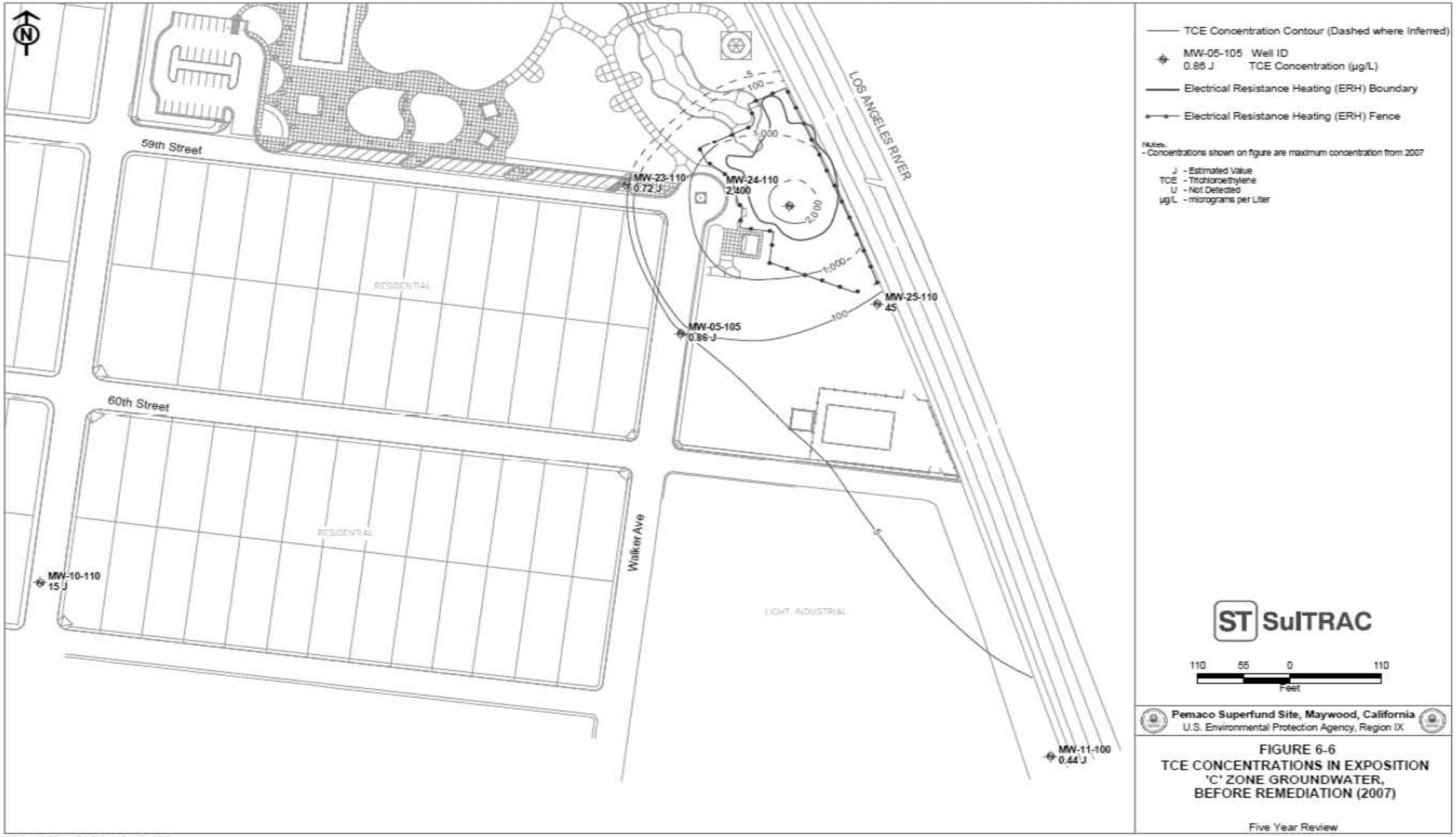


Figure 6-7 Post-ERH Maximum Concentrations of TCE in Exposition 'C' Zone Groundwater, Pemaco Superfund Site, Maywood CA

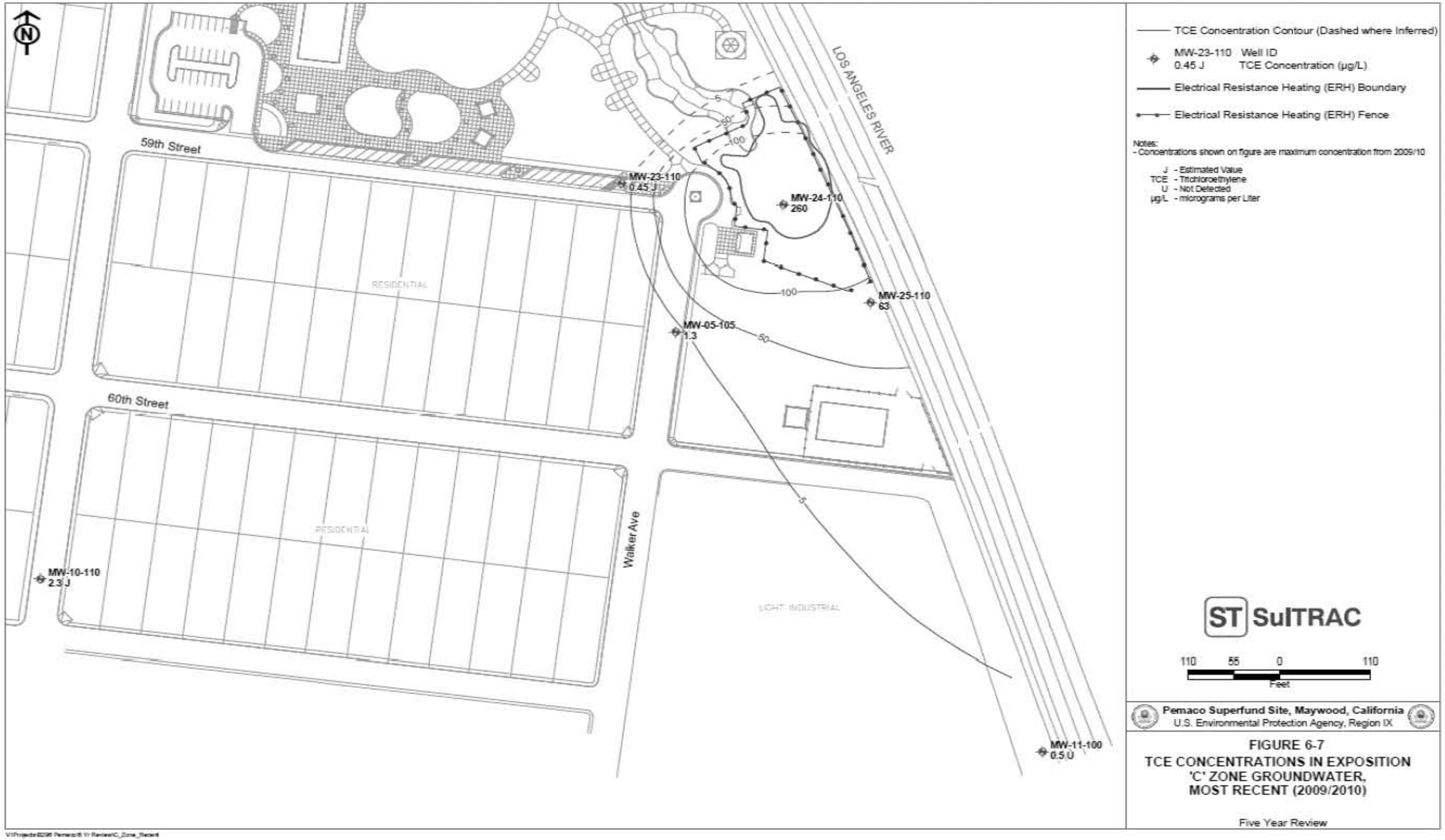
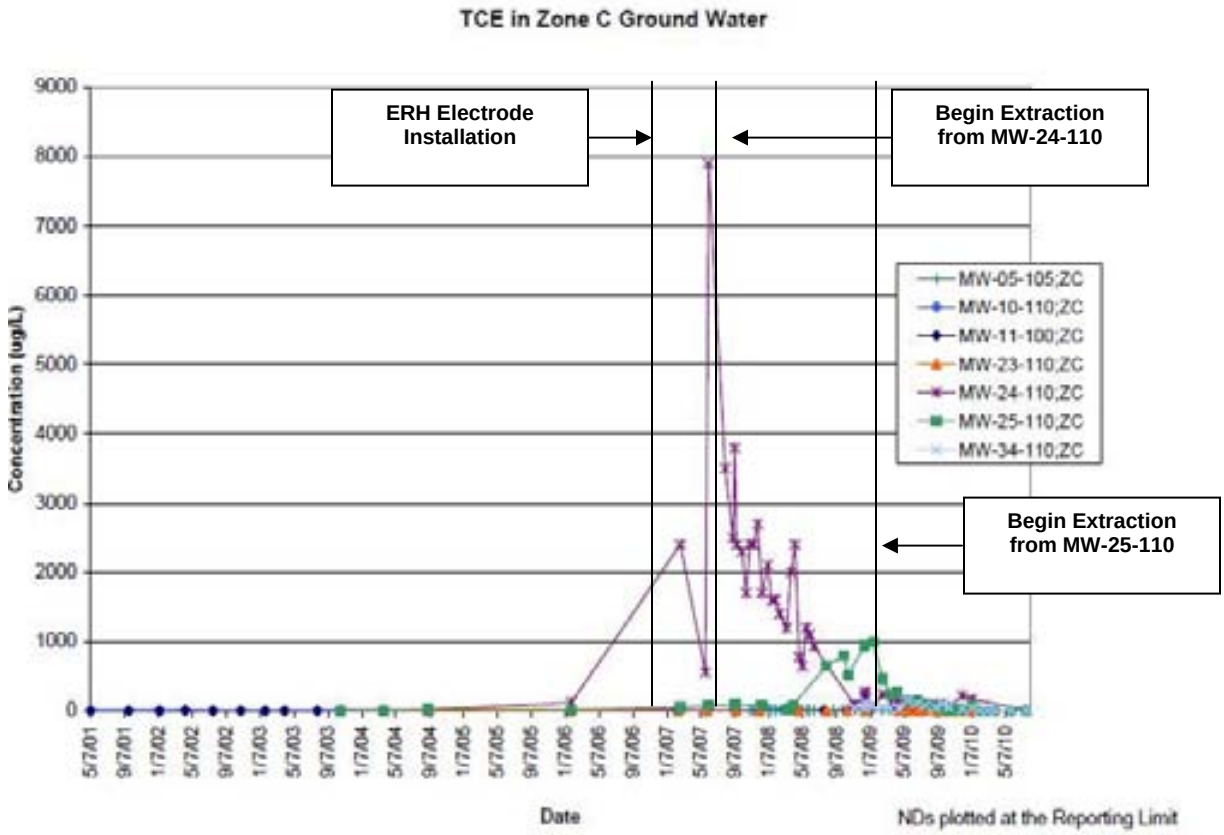


Figure 6-8: TCE Concentrations in Exposition 'C' Zone Groundwater



Currently, concentrations of COCs above SSRLs in the 'C' Zone are limited to TCE in wells MW24-110, MW25-110, and MW34-110; and cis-1,2-DCE in MW24-110 and MW25-110. The maximum concentrations of select COCs in 'C' Zone groundwater pre-HVDPE and post-ERH remedy in 2009 are presented in Table 6-4.

Table 6-4
Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition 'C' Zone Groundwater

Analyte	SSRL (µg/L)	2006		2009	
		Conc. (µg/L)	Well (Date)	Conc. (µg/L)	Well (Date)
PCE	5	0.098 J	MW-25-110 (2/22/07)	0.14J	MW-11-100 (8/31/09)
TCE	5	**2400**	MW-24-110 (2/23/07)	**990**	MW-25-110 (1/15/09)
cis-1,2-DCE	6	**180 J**	MW-24-110 (2/23/07)	**81**	MW-25-110 (1/15/09)
trans-1,2-DCE	10	4.1J	MW-24-110 (2/23/07)	1.1	MW-24-110 (6/22/09)
VC	0.5	**9.4J**	MW-25-110 (2/22/07)	0.5	MW-24-110 (5/20/09)
1,1-DCE	6	6J	MW-24-110 (2/23/07)	2.5J	MW-25-110 (6/22/09)
Benzene	1	0.67	MW-10-110 (1/26/06)	**5.1**	MW-24-110 (1/14/09)

Notes:
Pre-HVDPE maximum concentration for period between the ROD (2005) and HVDPE implementation in April/May 2007.
Values above the SSRL are **bolded**.

µg/L Micrograms per liter
COC Chemical of concern
cis-1,2-DCE cis-1,2-Dichloroethylene
trans-1,2-DCE trans-1,2-Dichloroethylene
ERH Electrical Resistance Heating
HVDPE High-Vacuum, Dual-Phase Extraction
J Estimated detection; compound detected between the method detection limit and the method reporting limit.
PCE Tetrachloroethylene
SSRL Site-specific remediation level
TCE Trichloroethylene
VC Vinyl chloride

6.4.2.5 Exposition 'D' Zone Groundwater

Groundwater elevations in the Exposition 'D' Zone typically range from 125 to 145 ft bgs, and the groundwater gradient is towards the southwest to south.

Groundwater from the 'D' Zone immediately downgradient from the site has historically exhibited low-level detections of chlorinated solvents TCE, PCE, 1,2-DCA, cis- and trans-1,2-DCE, benzene and chloroform. Outlying D Zone wells have historically been below SSRLs. Prior to 2006, detections of all COCs were below established SSRLs in all 'D' Zone wells, with the exception of TCE in well MW24-140 near the source area. Groundwater from MW24-140 has exhibited fluctuating concentrations of TCE since monitoring of this well began in 2003; however, TCE has not been detected above the SSRL since November 2008.

TCE concentrations have steadily increased in well MW25-130, which is just south of MW24-140 and the ERH Area (from 4.3J µg/L in 2003 to 120 µg/L in October 2009). In January 2006, MW07-130, which is further downgradient from MW25-130, had detections of TCE in groundwater slightly above the SSRL at 5.4 µg/L, and had increased to 9.5 µg/L by October 2009. The graph below shows the trend of TCE concentrations in 'D' Zone monitoring wells, MW-07-130, , MW24-140 and MW25-130.

Figure 6-9: TCE in Exposition 'D' Zone Groundwater

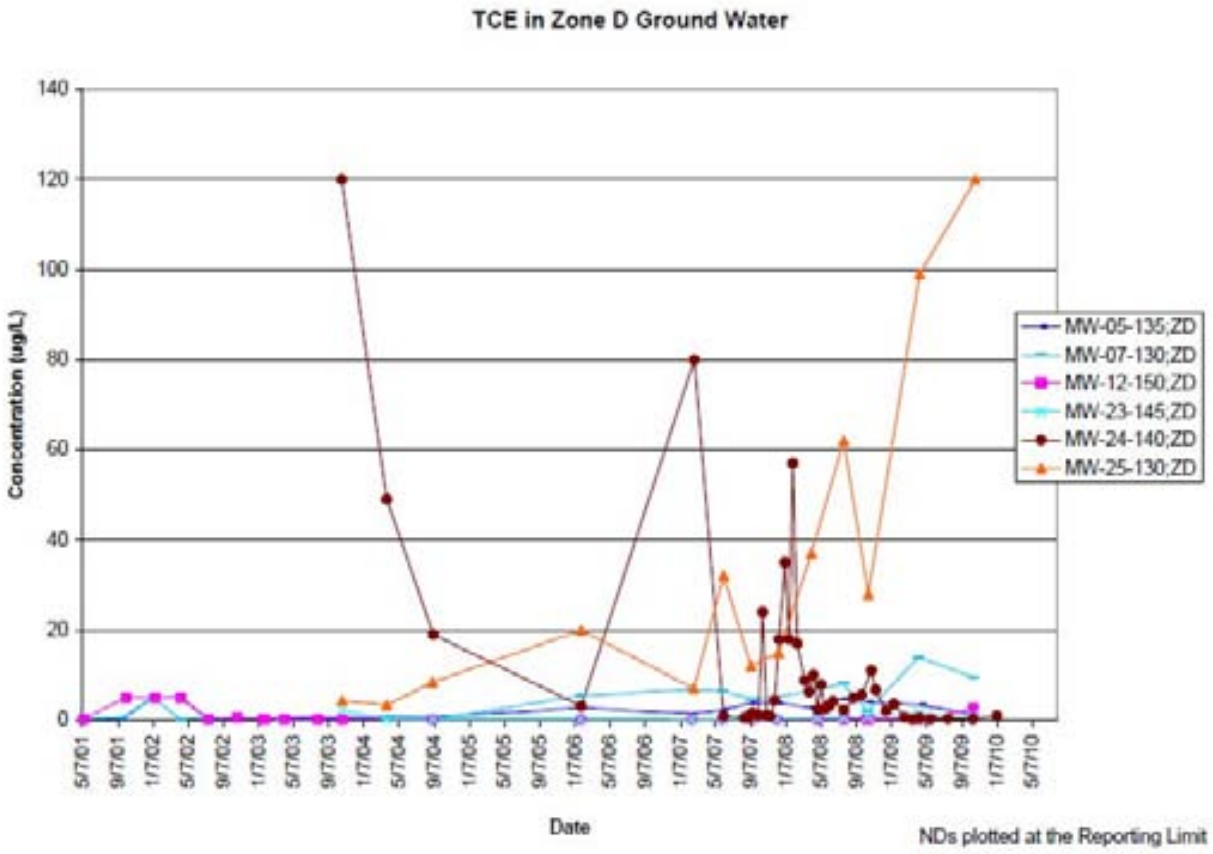


Figure 6-10: 'D' Zone Map

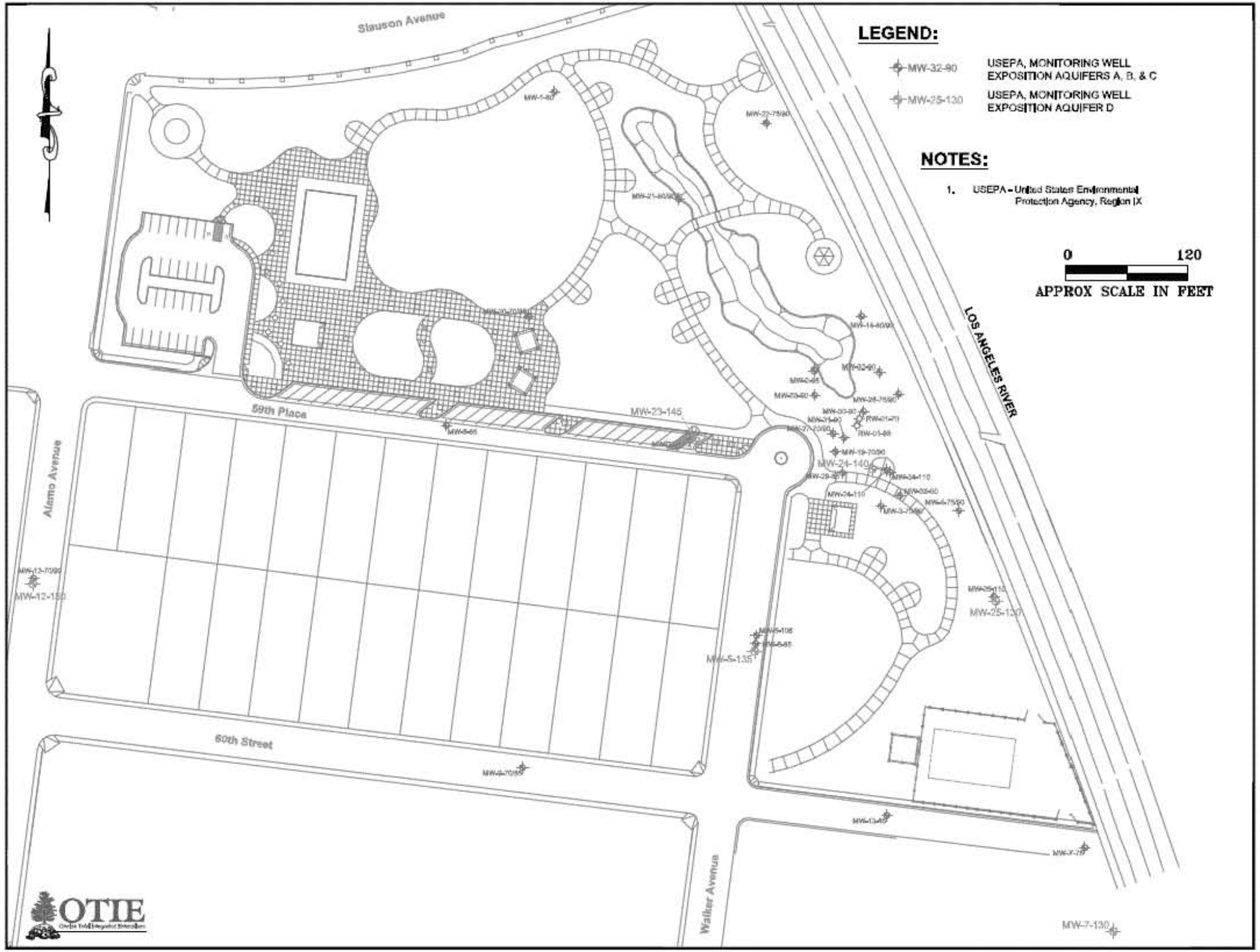


Table 6-5
Pre-HVDPE and Post-ERH Maximum Concentrations of Select COCs: Exposition 'D' Zone Groundwater

Analyte	SSRL (µg/L)	2007		2009	
		Conc. (µg/L)	Well (Date)	Conc. (µg/L)	Well (Date)
PCE	5	0.22J	MW-24-140 (2/23/07)	ND	--
TCE	5	**80J**	MW-24-140 (2/23/07)	**120**	MW-25-130 (10/23/09)
cis-1,2-DCE	6	2.5J	MW-24-140 (2/23/07)	3	MW-24-140 (1/14/09)
trans-1,2-DCE	10	0.39J	MW-24-140 (2/23/07)	ND	--
VC	0.5	**9.4J**	-- MW-24-140 (2/23/07)	**1.3**	CPT-7 (8/28/09)--
1,1-DCE	6	0.19J	MW-24-140 (2/23/07)	ND	--
Benzene	1	0.57J	MW-25-130 (2/21/07)	**16**	MW-24-140 (1/14/09)

Notes:

Pre-HVDPE maximum concentration for period between the ROD (2005) and HVDPE implementation in April/May 2007.
Values above the SSRL are **bolded**.

µg/L	Micrograms per liter
COC	Chemical of concern
cis-1,2-DCE	cis-1,2-Dichloroethylene
trans-1,2-DCE	trans-1,2-Dichloroethylene
ERH	Electrical Resistance Heating
HVDPE	High-Vacuum, Dual-Phase Extraction
J	Estimated detection; compound detected between the method detection limit and the method reporting limit.
ND	Compound not detected above the method detection limit
PCE	Tetrachloroethylene
SSRL	Site-specific remediation level
TCE	Trichloroethylene
VC	Vinyl chloride

6.4.2.6 Exposition 'E' Zone Groundwater

Only one monitoring well, MW10-170, has been installed in the Exposition 'E' Zone(160 to 175 feet bgs); therefore, no groundwater gradient data are available. There is a clayey silt interbedded with lean clays located between 140 to 160 feet bgs. Groundwater from MW10-170 has historically had a few low detections of TCE and cis-1,2-DCE, but concentrations above the SSRLs for these constituents have never been reported.

6.5 SITE INSPECTION

EPA conducted a site inspection on March 9, 2010, to evaluate site conditions and assess whether corrective actions are merited. The site inspection was conducted by Ms. Rose Marie Caraway (EPA), and attended by Ms. Lori Parnass and Ms. Tizita Bekele of the California Department of Toxic Substances Control, Mr. Rik Lantz (SulTRAC project manager), Mr. Jeff Waggle (SulTRAC site manager), Mr. Cory Reiter (SulTRAC site engineer), Mr. Jaime Hernandez and Mr. Mike Prostko (SulTRAC operation and maintenance technicians), and Mr. John Wingate (OTIE project engineer). The site inspection included reviewing on-site documents, drawings, monitoring data, and other records; touring the site and the treatment system to evaluate the condition of the monitoring wells, extraction wells, and operation of the system; and discussions about site conditions, contaminant concentration trends, and availability of records. The site inspection was documented by completing the Five-Year Site Inspection Checklist, which is included as Appendix D to this Five-Year Review report.

Significant findings of the site inspection included:

- The site is generally well maintained and kept in good operating condition. There is limited evidence of stormwater erosion in a steeply sloping area along the west boundary of the ERH Area. Such erosion is addressed on an as-needed basis by placing sandbags, berms, and straw wattles in and around areas of erosion.

- The site Emergency Response Action Plan was out of date and contained inaccurate contact information. An addendum to the Emergency Response Action Plan and the Accident Prevention Plan was prepared to correct any out of date information.

- Several of the signs outside the property bore outdated telephone numbers. The phone numbers on the signs were subsequently corrected.

- EPA has determined that the City of Maywood has not yet finalized an ordinance to maintain the site as parkland, and the State of California has not finalized a land-use covenant that would prohibit Maywood from changing the zoning to allow other land uses for the site.

- The outer casing was removed from the ERH electrodes during the week of January 8, 2010, leaving open casings at the surface. The open ends of the electrode casings were covered with caps and the annular space at the ground surface was grouted to prevent infiltration of rainwater on March 10, 2010.

- Maywood Riverfront Park contains a soccer field which is actively used by the local community. At the time of the Five-Year Site Inspection, the soccer field had been

reseeded to address some bare soil patches and was encircled by a temporary fence. The bare patches were minor and do not represent erosion of the cap.

6.6 INTERVIEWS

Both community and technical interviews were conducted with people who had knowledge and/or concerns related to the Pemaco Site. Copies of the completed interview forms are located in Appendix E.

6.6.1 Technical Interviews

The following individuals were interviewed regarding their knowledge of, or concerns about, technical aspects of the remedial actions that have been conducted at the Pemaco Site, and ongoing operation and maintenance activities.

- John Wingate – OTIE Solutions Inc.: Project Engineer
- Mark Prostko – OTIE Solutions Inc.: Remedial Construction Manager
- Tom Powell – Thermal Remediation Services: Operations Group Manager
- Eva Davis – US EPA: Hydrologist
- Dave Mango – City of Maywood Director of Building and Planning

The following subsections summarize the key comments from the technical interviews.

6.6.1.1 Project Contractor Interviews

Mr. John Wingate, of OTIE Solutions Inc., was the Project Engineer at the Pemaco Site for the first three years of operation, including the construction and heating phases of operation. Mr. Mark Prostko was the Remedial Construction Manager at the Pemaco Site during the first three years of operation. Both Mr. Wingate and Mr. Prostko felt that the site has performed very well. They both have fulfilled integral roles in the construction and maintenance of the site from the first phases of construction. Neither is aware of any complaints or violations at the site, and both felt well informed of the site's progress. Mr. Prostko had no suggestions to improve implementing the remedy at the site, while Mr. Wingate indicated that some wells might be disconnected to improve efficiency.

Mr. Tom Powell, of Thermal Remediation Services (TRS), was the Operations Group Manager for the design, installation, and operation of the ERH remediation system. Mr. Powell felt that the design of the ERH system (by his company) was successful. During the course of the ERH monitoring, he felt well informed as to the progress of the site, although he is no longer updated about progress at the site. Mr. Powell stated that, while communication with TN&A was good, the EPA and USACE did not include him in decision making. He was not aware of any complaints or violations. Mr. Powell suggested that, if he were to conduct this procedure again, he would like to see the project focus on remediation-oriented goals rather than temperature-dependent milestones as indicators of success.

6.6.1.2 Local Official Interviews

Mr. Dave Mango, of the City of Maywood, was a representative of the City of Maywood during all phases of the construction and treatment at the site. He said that the site was once politically charged, but has settled down. He went on to say that he had been in regular communication with Mark Prostko, but was no longer in contact with representatives of the site. Mr. Mango said he felt well informed, and was unaware of any complaints or violations regarding the site and had no suggestions for improvement.

6.6.1.3 State Agency Interviews

Ms. Lori Parnass of DTSC was contacted by telephone on May 20, 2010, but declined to comment, suggesting that she would prefer to reply in writing. The interview questions listed in "State and Local Considerations" from EPA's Comprehensive Five-Year Review Guidance (EPA 2001) were forwarded to Ms. Parnass on May 20, 2010.

6.6.2 Community Interviews

The following individuals were interviewed regarding their knowledge of, or concerns about, technical aspects of the remedial actions that have been conducted at the Pemaco Site and ongoing operation and maintenance activities.

- Hector Cervantes – Local Resident
- Louis Caravello – Heliotrope Elementary School Principal
- Jane Williams – California Communities Against Toxics

Interviewees were asked to participate based on their role in the community or location relative to the Pemaco Site. Interviewees included the local elementary school principal, one resident living adjacent to the Pemaco Site, and a representative of California Communities Against Toxics, who acted as a liaison between the residents and the EPA. All three interviewees indicated that the community had worries about the safety of the Riverfront Park. They indicated that the local residents had fears that the park remained contaminated after it was opened. All three acknowledged that it was indeed clean; however, Ms. Williams would like EPA to be more open and communicate more with her and the community. Mr. Caravello and Mr. Cervantes indicated that they had each spent some time assuaging the concerns of some parents regarding the park. Ms. Williams expressed some concerns regarding the "experimental nature" of the ERH system. She said that she felt this experimental nature led to questions about the effectiveness of the remediation technology within the community. Mr. Caravello had a good overall impression of the efforts put forth at the site. Mr. Cervantes said he had a good feeling about the site and the people working there.

7.0 TECHNICAL ASSESSMENT

7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

7.1.1 Remedial Action Performance

7.1.1.1 Soil

All remedial actions pertaining to soil have been implemented in accordance with the 2005 ROD. The six contaminated hot spots were removed and a 1- to 3-foot clean soil cap was placed over the site in March 2005, as documented in the Final Construction Report (TN&A 2007b). The ERH remedy was implemented from September 2007 to April 2008, and HVDPE and treatment has been ongoing since May 2007. Post-ERH soil sampling results indicate that VOC detections between 25 and 65 ft bgs are below SSRLs. The remedial actions for soil are functioning as intended by the decision document.

7.1.1.2 Groundwater

All remedial actions pertaining to groundwater have been implemented in accordance with the 2005 ROD. The groundwater remediation system continues to extract and treat groundwater from Exposition ‘A,’ ‘B,’ and ‘C’ Zones. Concentrations of COCs in groundwater have decreased significantly within the ERH treatment area, and continue to trend downwards. The treatment system meets the permit requirements for vapor discharge into ambient air and water discharge into the County of Los Angeles Sanitation District’s sewer.

Currently, several extraction wells just beyond the ERH boundary have TCE concentrations an order of magnitude higher than the SSRL of 5 µg/L (see Figure 6-1). Continued HVPDE and groundwater monitoring are necessary to ensure that RAOs are met. This area will also be addressed with a second bio-treatment injection if necessary.

Increased detections of TCE in the ‘D’ zone at MW25-110 may require further assessment. The results of the CPT C-Zone investigation performed in August 2009 demonstrated that the TCE concentration at the site boundary equaled the SSRL of 5 µg/L (SulTRAC 2009). Continued HVDPE and groundwater monitoring within the plume boundaries will indicate whether further remedial actions are required.

The groundwater plume does not appear to pose a threat to off-site receptors. The City of Maywood public water supply wells are located a minimum of 1,800 feet from the boundaries of the site (see Figure 7-1 below). Bob Roth, City of Maywood Municipal Water District 3 engineer, stated that all three of the city wells withdraw water from 350 to 600 ft bgs, and thus are not likely to be affected by relatively low-level contamination in shallower lithologic zones. Any contamination that does migrate toward the municipal wells is expected to be attenuated by natural processes such as diffusion, dispersion, and adsorption to organic materials in the aquifer. This is based on the relatively large lateral distances between the site boundaries and the municipal wells, the vertical differences between the stratigraphic intervals that are contaminated (‘A,’ ‘B,’ ‘C’ and ‘D’ Zones, which extend to about 145 ft bg, and the zones that produce water for the municipal wells (350 to 600 ft bgs).

Figure 7-1: City of Maywood Municipal Wells

7.1.2 System Operations / O&M

The system is currently functioning as designed, and current operating procedures at the site can be expected to maintain the effectiveness of the remedy. The O&M costs that have been incurred at the site are somewhat higher than the costs anticipated in the ROD. However, these variances do not appear to indicate potential remedy problems. O&M of the system is somewhat more labor-intensive than anticipated partially due to damage that has occurred to well screens while the ERH system was operating. This damage allows silt to enter the treatment system, requiring more frequent changes of filter bags, cleaning of equalization tanks, and placing stress on the system. Mineral deposits on the pumps also create a need for more frequent pump maintenance than was anticipated. However, the elevated O&M costs do not appear to indicate remedy problems. As the system is optimized to focus treatment on the limited remaining areas of contamination, O&M costs are expected to decline accordingly.

7.1.3 Opportunities for Optimization

Possible changes to the treatment system enumerated in Appendix F ("Optimization Opportunities") are driven by a desire to focus remediation on areas that are still in need of remediation rather than those areas which may have met or surpassed remedial criteria.

7.1.4 Early indicators of potential issues

New steel cased wells and CPVC wells were installed in the ERH prior to turn-on. Some of the CPVC wells did not survive the heating even though the ratings indicated that they would not break-down. The frequent maintenance of equipment is likely the result of the challenges posed by pumping groundwater that was heated to boiling and wells that contain high concentrations of silt. The ERH system appears to have created electrolytic conditions that promoted degradation of some of the well screens in the CPVC wells and increased silt concentrations in the groundwater pumped through the treatment system. As soils and groundwater cool after cessation of the heating, problems associated with elevated heat are expected to decrease, and have been observed to decrease. Degradation of the well screens is an issue that can be managed with periodic well development, such as the two well-development exercises conducted in March and September 2009, and with limited well replacements, discussed in the well redevelopment technical memorandum (SulTRAC 2009). These issues create operational challenges and require increased O&M of the treatment system, but they do not affect the protectiveness of the remedy and are expected to attenuate over time as the system is optimized to focus treatment on the limited remaining areas of contamination.

7.1.5 Implementation of Institutional Controls

The ROD states that the institutional control (IC) objectives to be achieved through land-use restrictions included the following:

- prohibit sensitive uses such as residential, hospital, school, child-care facility, and hospice;
- prohibit groundwater extraction and/or use without prior review and written approval of DTSC, except as provided for in the ROD;
- prohibit alteration, disturbance, or excavation of soil and caps without a DTSC-approved excavation work plan, except as provided for in the ROD; and
- require contaminated soils brought to the surface by grading, excavation, trenching, or backfilling to be managed in accordance with state and federal law.

The Trust for Public Land recorded a covenant dated December 30, 2002, restricting certain uses of the property, including prohibiting residential use of the property and prohibiting the alteration of the soil cover. The ROD required that the City of Maywood prohibit residential use of the property through zoning, and suggested that a State of California Land Use Covenant with the City of Maywood may be required to permanently change the allowable land use at the site. The Assistant City Planner was contacted in May 2010, and he stated that Maywood has not yet changed the zoning of the site to prohibit residential use and that the proposed zoning change is “on hold,” so this IC has not yet been completed. Likewise, DTSC representatives stated during the site inspection that the State of California has not yet finalized a Land Use Covenant for the site.

Although these ICs have not yet been implemented, the ICs are not currently necessary to prevent current exposure, and no actions have violated the land-use restrictions described above. Fencing and warning signs are in place to prohibit entry to the site and exposure to

areas that have not yet been remediated, and no residential receptors or other sensitive receptors are present at the Pemaco site.

7.2 QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS, AND REMEDIAL ACTION OBJECTIVES (RAOS) USED AT THE TIME OF THE REMEDY SELECTION STILL VALID?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid. The potential exposure pathways and potentially exposed receptors present at the time of the remedy selection have not changed. The only major physical change at Pemaco since the ROD was completed in 2005 is that the northern portion of the site has become part of the Maywood Riverfront Park. This change has not affected RAOs or the protectiveness of the current remedy. This has not resulted in any additional receptors potentially at risk. The site is still located in an urban area with light industrial properties to the south, the concrete-lined Los Angeles River to the east, and residential properties and the Maywood Riverfront Park to the north and west.

Remedial actions have been implemented to aggressively treat and remove contaminants from soil and groundwater. In addition, “hot spot” soil removal occurred prior to the placement of the soil cover. The soil cover was installed to eliminate or minimize human exposure to metals and SVOCs in surface and near-surface soil. Pursuant to Title 22, *California Code of Regulations* (CCR), §67391.1, DTSC may be required to implement an additional layer of institutional controls after the cleanup is complete in the form of a State of California Land Use Covenant with the City of Maywood to maintain the protectiveness of the remedy.

7.2.1 Changes in Standards and To-Be-Considered Criteria (TBCs)

There are no changes to ARARs that would affect the protectiveness of the remedy. Although changes in TBCs used to establish remediation levels in soil and groundwater have been identified, this has not affected the protectiveness of the remedy. Appendix F provides a detailed review of changes to ARARs and TBCs to determine whether any laws, regulations, or guidance promulgated since the ROD was approved have altered the protectiveness of the selected remedy for Pemaco.

7.2.1.1 Soil Remediation Levels

The remediation levels for subsurface soil were developed under the assumption that contaminants in soil could leach to groundwater, and that groundwater may be used for domestic purposes by future hypothetical residents. For the Pemaco Site, EPA developed soil remediation levels to protect a worker who may excavate properties that are being redeveloped. EPA used the more stringent value of these two exposure scenarios when selecting soil remediation levels. EPA calculated remediation levels for an excavation worker using a 1×10^{-6} target cancer risk.

Surface and near-surface soils with SVOCs greater than the SSRLs were removed as part of the hot spot removal action conducted during the construction of Maywood Riverfront Park. SVOCs in deeper soil zones were not part of the remedy since only 1 of 1,075 soil samples contained concentrations of a SVOC (isophorone) greater than the SSRL.

The soil-to-groundwater RSLs EPA calculated for the SVOCs are based on a 1 × 10-6 cancer risk. The RSLs for these SVOCs are within an order of magnitude of the current remediation levels for subsurface soil. The current soil remediation levels for these SVOCs in soil are based on the potential exposure to an excavation worker and not on the soil-to-groundwater RSLs.

Using EPA's on-line RSL calculator (http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search), soil-to-groundwater RSLs calculated using a DAF of 20 and a cancer risk of 1 × 10-5 would result in RSLs greater than the current remediation levels, based on potential exposure to an excavation worker. Thus, the current site-specific remediation levels are still within EPA's risk management range of 1 × 10-4 and 1 × 10-6. Thus, since SSRLs at Pemaco are more stringent than RSLs, the more stringent level has been applied and changes to the RSLs have not affected the protectiveness of the remedy.

Thus, changes to the RSLs have not affected the protectiveness of the remedy.

7.2.1.2 Groundwater Remediation Levels

Groundwater remediation levels for Pemaco were developed under the assumption that groundwater may be used in the future for domestic purposes. The more stringent of the California or federal MCL was used as the groundwater remediation level. If a designated MCL was not available, EPA Region 9 tap-water PRGs were used as remediation levels. For chemicals lacking MCLs or PRGs, other health-based standards and effluent limits were used as remediation levels.

The ROD identified EPA Region 9 PRGs for tap water as TBCs relevant to Pemaco. The ROD selected and adopted these PRGs as groundwater remediation levels for chemicals lacking MCLs. EPA has revised the tap-water RSLs for many chemicals (EPA 2010). The current tap-water RSLs have become more stringent for the following chemicals: 1,2-dibromo-3-chloropropane, 1,1-dichloroethene, 1,2-dichloroethane, trans-1,2-dichloroethene, ethylbenzene, VC, and naphthalene. However, except for naphthalene, MCLs were used to establish the remediation levels for these chemicals, and the MCLs have not changed since the ROD was completed in 2005. The current tap-water RSL for naphthalene is 0.14 microgram per liter (µg/L), and the former RSL was 6.2 µg/L. Using EPA's on-line RSL calculator (http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search), a tap-water RSL of 6.2 µg/L results in a cancer risk of 5 × 10-5. Thus, the current site-specific remediation level of 6.2 µg/L is still within EPA's risk management range of 1 × 10-4 and 1 × 10-6. Treatment of groundwater is still ongoing, and institutional controls currently prevent the use of groundwater at the site. Thus, changes to tap-water RSLs have not affected the protectiveness of the remedy.

Waste discharge requirements for the discharge of treated groundwater to surface water have also been used to establish groundwater treatment levels. These treatment levels using these requirements have not become more stringent for the COCs in groundwater. In addition, treated groundwater is not discharged to surface water. Treated groundwater is discharged to the sanitary sewer in accordance with Self-Monitoring Requirements Permit No. 16961 with the Sanitation District of Los Angeles County, Industrial Waste Section.

7.2.2 Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

Changes to exposure pathways, toxicity factors, and contaminant characteristics are discussed below. Appendix G provides a comprehensive evaluation of the exposure pathways, toxicity factors, and contaminant characteristics used at the time the remedy was selected.

7.2.3 Exposure Pathways

The remediation levels for Pemaco are currently protective for the potential exposure pathways present under current and future land uses proposed at the Pemaco property. Future land use at Pemaco includes the full incorporation of the site into the Maywood Riverfront Park and the conservative (health-protective) assumption that groundwater from the perched zone and the Exposition Zone at Pemaco may be used in the future for domestic purposes. A soil cover and institutional controls currently prevent human exposure to contaminants in soil and groundwater. Institutional controls include prohibiting the alteration of the soil cover, prohibiting residential use of the Pemaco property, and prohibiting the extraction of groundwater other than for remediation.

Vapor intrusion was evaluated extensively during the RI phase of the project and during implementation of the ERH phase of the remedy. EPA conducted indoor sampling of the residents homes located on Walker Avenue, 59th Place and on 60th Street prior to the start of ERH system during the Spring of 2007. The conclusion of the indoor air sampling was that concentrations were not significantly different from the concentrations in the outdoor air; therefore, any contribution possibly associated with vapor intrusion could not be determined.

EPA also collected soil vapor samples weekly from permanent probes set into the Walker Avenue and 59th Place. The purpose of the soil vapor probe sampling was to determine whether or not vapors within the subsurface increased during the implementation of the thermal heating remedy. Concentrations within the probes did not exceed action levels.

7.2.4 Toxicity Factors

Table G-1 of Appendix G compares the toxicity factors used in the ROD with current toxicity values. Many of the toxicity values have changed since the ROD was completed in 2005. Cancer slope factors have become more stringent for 1,2-dichloroethane, chloroform, dibromochloromethane, ethylbenzene, PCE, and VC. The noncancer oral reference dose (RfD) has become more stringent for 1,2-dichloroethane and manganese. The VOCs do not appear to be a concern in soil because ERH has effectively remediated the VOCs in soil where ERH was conducted (TN&A 2009). Groundwater remediation levels for these chemicals were selected using the California MCL, and the MCLs for these chemicals have not changed. Groundwater monitoring and treatment are still ongoing at Pemaco. Institutional controls currently prohibit the extraction of groundwater at Pemaco for purposes other than treatment.

7.2.5 Changes in Risk Assessment Methods

There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. Appendix G provides a more comprehensive discussion of the risk assessment.

7.2.6 Expected Progress towards Meeting RAOs

Currently, the remedy is meeting the RAOs and progressing as expected, and remains protective of human health and the environment. Institutional controls for the selected remedy need to be fully implemented and maintained to ensure that the remedial action remains protective of human health and the environment.

7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

There is no new information that might affect the protectiveness of the remedy.

8.0 ISSUES

TABLE 8-1- ISSUES

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
8.1 ISSUE 1: INSTITUTIONAL CONTROL VERIFICATION – ZONING The ROD states that the City of Maywood changed the zoning from industrial to recreational, therefore prohibiting residential use of the property, however the City of Maywood indicated that the zoning change has not been completed.	N	Y
8.2 ISSUE 2: INSTITUTIONAL CONTROL VERIFICATION – DEED RESTRICTION The ROD reports that a deed restriction was entered against the property restricting the use of groundwater, copies of the deed restriction and associated land use covenant documents are recorded in the County Recorders Office. However, the City of Maywood and the State of California have not entered into a State Land Use Covenant to permanently change the site's land use to recreational.	N	Y
8.3 ISSUE 3: EXPOSITION 'D' ZONE CONCENTRATIONS Concentrations of TCE in MW-25-130 have been detected above MCL's. The current concentration of TCE during 2010 is 190 ppb.	N	Y

9.0 RECOMMENDATIONS

TABLE 9-1- RECOMMENDATIONS AND FOLLOW UP ACTIONS

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
9.1 Recommendation 1: Institutional Control	City of Maywood needs to complete the zoning change from industrial to recreational and prohibit residential housing on the properties.	City of Maywood	DTSC/EPA	09/30/2013	N	Y
9.2 Recommendation 2: Institutional Control– Deed Restriction	DTSC and the City of Maywood needs to record a State Land Use Covenant that permanently changes the site's land use to recreational.	EPA / City of Maywood / County of Los Angeles	DTSC/EPA	9/30/2013	N	Y
9.3 Recommendation 3: Exposition 'D' Zone Concentrations	EPA will access area around well MW-25-130 and evaluate whether further action is needed.	EPA	DTSC/EPA	9/30/2012	N	Y

10.0 PROTECTIVENESS STATEMENT

The remedy at the Pemaco Superfund site currently protects human health and the environment, because exposure pathways that could result in unacceptable risks are being controlled. However, in order to be protective in the long-term, the following actions should be taken:

1. The City of Maywood should change the zoning of the Pemaco property
2. DTSC should finalize a Land Use Covenant to permanently change the site's land use to recreational.
3. EPA will access the area around MW-25-130 and evaluate whether further action is warranted.

11.0 NEXT REVIEW

The next FYR for the Pemaco Site is required by September 2015, five years from the date of this review.

12.0 REFERENCES

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Federal Law/Regulations:

40 Code of Federal Regulations (CFR) Section (§) 300.430(f)(4)(ii), regarding the National Contingency Plan.

40 CFR §300.430(f)(ii)(B)(1), criteria to be considered for protecting human health and the environment.

40 CFR §300.400(g)(3), “to be considered” (TBC) criteria during risk assessment.

42 United States Code (USC) §9601 et seq., the CERCLA or “Superfund” Act.

State of California Law/Regulations:

Title 22, California Code of Regulations (CCR), §67391.1, instructing the DTSC with regard to institutional controls.

US Environmental Protection Agency

Appendix A
Public Notification / Community Involvement for Pemaco Superfund Site Maywood, California

Prepared by: SulTRAC
Chicago, Illinois, and
San Francisco, California

Prepared for: US Environmental Protection Agency, Region 9,
San Francisco, California

August 2010

Appendix A
Public Notifications

PUBLIC NOTICE
THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
INITIATES FIVE-YEAR REVIEW OF CLEANUP AT THE PEMACO SUPERFUND SITE PUBLIC NOTICE

The United States Environmental Protection Agency (EPA) has initiated the first five-year review of cleanup actions undertaken at the Pemaco Superfund Site, in Maywood CA. The review will evaluate whether the cleanup actions for the Site remain protective of human health and the environment. The review is expected to be complete by September 30, 2010.

THE REVIEW PROCESS

When EPA's cleanup remedy leaves some waste in place or the remedy takes longer than five years to complete, the Superfund law requires an evaluation of the protectiveness of remedial systems every five years, until the Site has been cleaned up sufficiently to allow unrestricted access. The purpose of the five-year review is to understand how the constructed remedy is operating, measure the progress towards achieving the Site's cleanup objectives, and ensure that the remedy is protective of human health and the environment.

EPA will evaluate the movement and/or breakdown of the Site's remaining contaminants, the operation of engineered systems, the integrity of fencing and barriers, and changes in scientific knowledge about site contaminants and exposure pathways that could affect the protectiveness of the remedy. The EPA will also talk with applicable stakeholders about the remedy to ensure it continues to be protective.

Upon completion of the review, a copy of the final report will be placed in the local information repository listed below and a notice will appear announcing the completion of the Five-Year Review Report in the local paper. EPA will monitor the Site and conduct additional five-year reviews until the Site has been sufficiently cleaned up to allow unrestricted use.

SITE HISTORY

The Pemaco Site was formerly used as a chemical mixing facility, operating from the 1950s until 1991. The Site was placed on the National Priorities List (NPL) in January of 1999 to address contaminants, which included chlorinated solvents and other volatile organic compounds (VOCs). Following extensive site investigation work, The Record of Decision (ROD) was signed in 2005. The ROD documented EPA's remedy selection. Cleanup work began that summer.

CLEANUP OBJECTIVES

Cleanup objectives for soil, groundwater, and indoor air quality are outlined in the Site's ROD. Soil cleanup objectives are to prevent human contact with contaminated soils and prevent contamination of groundwater. Groundwater cleanup objectives are to restore groundwater to drinking water standards, designated by maximum contaminant levels (MCLs), and to prevent contamination from spreading to deeper aquifers and laterally into other areas. Indoor air quality objectives are to prevent migration of soil vapors into overlying buildings, including homes and businesses.

To achieve these goals the EPA has covered the park area with clean fill, installed a system of groundwater and soil vapor extraction wells, and conducted electrical resistance heating to remove contaminants from the subsurface in the most contaminated part of the site. Regular sampling of groundwater and of extracted water entering and exiting the treatment systems allows EPA to track the plant's progress.

COMMUNITY INVOLVEMENT

EPA is always interested in hearing from the public. If you have any issues or concerns about the Pemaco Site's cleanup plan, and particularly if you have direct knowledge regarding the operation or implementation of the remedy, EPA would like to talk with you. Please contact Rose Marie Caraway or Alejandro Díaz at the numbers below. If you would like to be included in our postal mailing list and receive future fact sheets, please contact Alejandro Díaz.

FOR MORE INFORMATION

Please visit the Pemaco website at: www.epa.gov/region09/pemaco

Or visit the information repositories to review the administrative record or contact EPA representatives.

INFORMATION REPOSITORIES:

Maywood Public Library
4323 East Slauson Avenue
Maywood, CA 90207
(323) 771-8600

Superfund Records Center
75 Hawthorne St.
San Francisco, CA 94105
(415) 947-8000

CONTACT INFORMATION:

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Remedial Project Manager
75 Hawthorne St. (SFD 7-2)
San Francisco, CA 94105
(415) 972-3158
Caraway.RoseMarie@epa.gov

Alejandro Díaz
75 Hawthorne St. (SFD-3)
San Francisco, CA 94105
(415) 972-3242
Toll Free: 1(800) 231-3075 or
diaz.alejandro@epa.gov

AVISO PÚBLICO
AGENCIA DE PROTECCIÓN AMBIENTAL DE LOS ESTADOS UNIDOS INICIA LA REVISIÓN DE CINCO AÑOS DE LIMPIEZA EN EL SITIO SUPERFUND PEMACO

La Agencia de Protección Ambiental de los Estados Unidos (EPA, por sus siglas en inglés) ha iniciado la primera revisión de cinco años del Sito Superfund Pemaco, en Maywood, CA. La revisión evaluará si las acciones de limpieza continúan protegiendo la salud humana y el medio ambiente. Se espera que se complete la revisión para el 30 de Septiembre, 2010.

EL PROCESO DE REVISIÓN

Cuando la acción de limpieza de la EPA deja contaminación en su lugar o cuando la limpieza tarda más de cinco años para completarse, la ley Superfund requiere una evaluación cada cinco años de que tal protegen los sistemas de recuperación para permitir acceso sin restricciones hasta que el Sitio ha sido suficientemente limpiado. El propósito de la revisión de cinco años es para entender cómo el remedio construido está funcionando, medir el progreso hacia lograr los objetivos de limpieza del Sitio, y asegurar que la acción protege la salud humana y el medio ambiente.

La EPA evaluará el movimiento y/o la descomposición del resto de los contaminantes del Sitio, el funcionamiento de los sistemas mecánicos, la integridad de las cercas y barreras, y los cambios en conocimiento científico sobre los contaminantes del Sitio, y las vías de exposición que pueden afectar la protección de la solución. La EPA también hablara con los partidos interesados relevantes sobre el remedio para asegurar que continúe protegiendo. Al completarse la revisión, una copia del reporte final será puesta en el depósito de información local que aparece a continuación y en un aviso que aparecerá en un periódico local anunciando el fin de la evaluación. La EPA monitoreara el Sitio y conducirá revisiones de cinco años hasta que el Sito ha sido suficientemente limpiado.

HISTORIA DEL SITIO

El Sitio Pemaco fue usado como una fábrica de mezcla de sustancias químicas, operando desde los años 1950 hasta 1991. El Sitio fue agregado a la Lista de Prioridades Nacionales (NPL) en Enero de 1999 para abordar los contaminantes, que incluyeron solventes clorados y otros compuestos orgánicos volátiles (VOC). Después del trabajo de investigaciones extensas se firmo el Registro de Decisión (ROD) en 2005. El ROD documento el remedio seleccionado de la EPA. Trabajo de limpieza empezó el mismo verano.

OBJETIVOS DE LIMPIEZA

Los objetivos de limpieza de la tierra, el agua subterránea y la calidad de aire del interior están perfilados en el ROD del Sitio. Objetivos de limpieza de las tierras son prevenir el contacto con las tierras contaminadas y prevenir la contaminación de las aguas subterráneas. Objetivos de limpieza de las aguas subterráneas son rehabilitar el agua subterránea hacia estándares de agua potable, perfiladas por los niveles de contaminantes máximos (MCLs), y prevenir que la contaminación se extienda a acuíferos más profundos o lateralmente hacia otras áreas. Objetivos de limpieza para la calidad de aire

del interior son para prevenir la migración del los vapores de la tierra hacia edificios cercanos, incluyendo casas y negocios.

Para lograr estos objetivos la EPA ha cubierto el área del parque con tierra limpia, instalado un sistema de pozos de extracción del agua subterránea y de vapores de la tierra, e hizo Calentamiento por Resistencias Eléctricas (ERH) para sacar los contaminantes de la por debajo de la tierra subterránea en la mayoría de las áreas más contaminadas del Sito. Muestras frecuentes de el agua subterránea y del agua extraída que entra y sale de los sistemas de tratamiento permiten que la EPA sigua el progreso de la planta.

PARTICIPACIÓN DE LA COMUNIDAD

La EPA siempre está interesada en escuchar a la opinión pública. Si usted tiene algunas preguntas o preocupaciones sobre el plan de limpieza del sitio Pemaco, y particularmente si usted tiene conocimiento directo sobre el funcionamiento o implementación de la acción, la EPA gustaría hablar con usted. Por favor póngase en contacto con Rose Marie Caraway o Alejandro Díaz, en español, a los números que se encuentran a continuación. Si usted desea ser incluido en nuestra lista de correo y quiere recibir hojas de información en el futuro, también póngase en contacto con Alejandro Díaz.

PARA MÁS INFORMACIÓN
Por favor visite la página de internet de Pemaco al: www.epa.gov/region09/pemaco

O visite los depósitos de información para revisar el récord administrativo o póngase en contacto con los representantes de la EPA.

LOS DEPOSITOS DE INFORMACIÓN:

Maywood Public Library
4323 East Slauson Avenue
Maywood, CA 90207
(323) 771-8600

EPA Superfund Records Center
75 Hawthorne St.
San Francisco, CA 94105
(415) 947-8000

INFORMACIÓN DE CONTACTO:

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caraway.rosemarie@epa.gov

75 Hawthorne St. (SFD 6-3)
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1(415) 972-3242 o
Gratis al: 1(800) 231-3075
diaz.alejandro@epa.gov

Alejandro Díaz
Coordinador de Participación Comunitaria

City of Maywood

Home
About Us
City History
Mission Statement
General Plan
Strategic Plan
Phone Directory
Map & Directions
FAQs
City Government
City Council
Council Members
Mayor Rizo
Vice-Mayor Guardado
Councilmember Aguirre
Councilmember Martin
Councilmember Varela
Awards & Recognitions
Commission & Committees
Description
Planning Commission
Agendas & Minutes
Community Impact Comm.
Agendas & Minutes
Community Development
Agendas & Minutes
City Manager's Office
Reports
City Manager's Message
City Clerk
Agendas & Minutes
Voter Information
Election Information
Notice Inviting Bids
Municipal Code
Administration
Finance
Forms
Reports
SA 2008 Rpt.
RDA Report 2008
City FS Report 2008
Budget Report 08 - 09
City Budget & Finance
Business Fee Schedule
Human Resources
Building & Planning
CDBG (Grants)
Housing
Building Division
Planning Division
Code Enforcement
Upcoming Projects
Engineering Dept.
Parks & Recreation
Description
M.A.C. Events & Trips
M.A.C. Banquet Hall

Aquatics (Pool) Information
Youth Sports
Youth Clubs
Arts & Crafts
Weight Room

Adult Sports
Fitness Classes
Senior Classes & Activities
Police Dept.
Fire Services
Services
Utilities
Listing & Hours
Pay A Bill
Animal Control Services
Solid Waste & Recycling
Graffiti Abatement
Dial-A-Ride
Public Library
Mosquito Abatement
Parking Citation Payment
Residents
Grant Programs
Local Schools
Maywood Scholarship Program
MTA Bus Pass Subsidy Program
Senior Citizen Programs
Garage/Yard Sale Permits
Parking Permit
ESL Classes/Clases de Ingles
Banquet Room Rental
Police Activities League (PAL)
Family Services
Fair Housing
Businesses
Business Licenses
New Businesses
Business License Payment
Business Waste & Recycling
Business Fee Schedule
Tobacco Retail Fees
Rental/Apartment Business Fees
Doing Business w/ Maywood
Filming Permit
False Alarms
City News
Hot Topics
LAUSD Update Video
H1N1 Flu News
City Calendar
Announcements
Programs & Services
Maywood News
City TV
Emergency Alerts
View Emergency Alerts
SignUp For Alerts

Hot Topics

Public Notice - PEMACO Superfund Site

PUBLIC NOTICE

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
INITIATES FIVE-YEAR REVIEW OF CLEANUP AT THE
PEMACO SUPERFUND SITE

The United States Environmental Protection Agency (EPA) has initiated the first five-year review of cleanup actions undertaken at the Pemaco Superfund Site, in Maywood CA. The review will evaluate whether the cleanup actions for the
Site remain protective of human health and the environment. The review is expected to be complete by September 30,
2010.

Hot Topics Page 2 of 6
http://www.cityofmaywood.com/index.php?option=com_content&view=category&layout...
6/10/2010

COMMUNITY INVOLVEMENT

EPA is always interested in hearing from the public. If you have any issues or concerns about the Pemaco Site's cleanup
plan, and particularly if you have direct knowledge regarding the operation or implementation of the remedy, EPA would
like to talk with you. Please contact Rose Marie Caraway or Alejandro Díaz at the numbers below. If you would like to be
included in our postal mailing list and receive future fact sheets, please contact Alejandro Díaz at (415) 972-3242 or diaz.alejandro@epa.gov .

FOR MORE INFORMATION

Please visit the Pemaco website at: www.epa.gov/region09/pemaco

AVISO PÚBLICO

AGENCIA DE PROTECCION DEL MEDIO AMBIENTE DE LOS ESTADOS UNIDOS
INICIO DE REVISION DE CINCO DE LIMPIEZA EN LA
LOCALIDAD DE PEMACO SUPERFUND

La Agencia de Proteccion del Medio Ambienta (EPA) ha iniciado la primera revision de cinco años de acciones de limpieza
adoptadas en la localidad de Pemaco Superfund, en Maywood CA. La revisión evaluará si las acciones de limpieza para la
localidad permaneceran protegiendo la salud humana y el medio ambiente. Se espera que la revisión sea completada en
Septiembre 30, 2010.

PARTICIPACIÓN DE LA COMUNIDAD

La EPA siempre está interesada en escuchar a la opinión pública. Si usted tiene algunas preguntas o preocupaciones sobre el
plan de limpieza del la localidad de Pemaco, y particularmente si usted tiene conocimiento directo sobre el funcionamiento
o implementacion de la solución ,la EPA le gustaría hablar con usted. Por favor contactarse Rose Marie Caraway o Alejandro Díaz en los números que se encuentran abajo. Si usted desea ser incluido en nuestra lista de correo y quiere
recibir cartas de hechos en el futuro, por favor contactarse con Alejandro Díaz (415) 972-3242 or diaz.alejandro@epa.gov .

PARA MÁS INFORMACIÓN

Por favor visite la página de internet de Pemaco al www.epa.gov/region09/pemaco

City TV

The City TV viewer is a Flash Player and you need to have at least Adobe Flash Player 6 or higher installed to view the
videos. You can start and stop the video at any time by using the controls at the bottom of the viewer screen. Use the selection list at the right of the view to pick which video you wish to view. If there are English and Spanish versions available, it will be listed in the selection descriptions.

Maywood Mutual Water Co. No. 2 - Notice of Water Increase

Maywood Mutual Water Co. No. 2

Notice of Water Increase
Dear Customer:
The Board of Directors of this company held a special meeting in September 2009 to discuss and analyze the costs of water
in the region and water rates of our company.
Since January 2007, government agencies of the County of Los Angeles, such as the Central Basin Municipal Water District
and the Water Replenishment District, from which we purchase water or the rights to pump underground water, have

increased their fees by more than 30%. For this reason, we are obligated to increase the water rates from $2.05 to $2.25 per
748 gallons, which is equivalent to one unit of water. In addition, the service fee for water meters with a diameter of 5/8",
3/4" and 1"will increase $5.00 dollars per billing period (2 months).
Further increasing the costs of delivering water to you is the installation of water treatment plant to remove minerals,
including manganese and iron, etc., which is now a reality. The treatment plant will be located on 4421 E. 52nd Street and
will be completed around February 2010, at a cost of approximately $1.1 million.
While every effort has been made to receive Federal, State, and Local government assistance in order to repair our aging
infrastructure, parts of which are more than 90 years old, no government agency has provided any financial resource and we
must pay for the repairs ourselves.
We believe this is the most sensible and effective mode of communication to keep you informed. Please call the office if
you have any questions, need clarification, or have any suggestions. The telephone number is (323) 581-5816.
Thank You.
Maywood Mutual Water Co. 2
Central Basin Municipal Water District
Response
Maywood Mutual Water Co. No. 2
In response to the letter dated October 15, 2009 by Maywood Mutual Water Co. No. 2. In which the water company
attributed proposed rate increase to Central Basin Municipal Water District, Maywood Mutual Co. 2 has not purchased
water from Central Basin since May 2007.
Report Air Quality Problems
The South Coast Air Quality Management District (AQMD) is the air pollution control agency for all of Orange County and
urban portions of Los Angeles, Riverside and San Bernardino counties.
You can help AQMD protect public health in the South Coast Air Basin by calling 1-800-288-7664 to report your
observations of smoking vehicles as well as excessive odors, smoke, dust, or other air contaminants. The agency evaluates
and responds to air quality complaints 24 hours a day. Complaints received after normal business hours or during the
weekend are dispatched via pager to an AQMD inspector for follow-up.

Reportando Problemas Sobre La Calidad Del Aire

El Distrito de Administracion de la Calidad de la Costa Sur (AQMD) es la agencia regional con la responsabilidad de
controlar la contaminacion del aire en el Condado de la Naranja y partes de los condados de Los Angeles, Riverside y San
Bernardino.
Usted puede ayudar al AQMD a proteger la salud publica en la Costa Sur. Por Favor reporte sus obseraciones de vehiculos

emitiendo humo y tambien el exceso de olores, humos, polvo, u otros contaminantes en el aire llamando al 1-800 - 876-3666.
Se acepta quejas las 24 horas al dia, 7 dias a la semana.

Report
Report Suspected Election Fraud to Los Angeles County at 1(800) 815-2666 option 6.
search...

City Of Maywood

City Council
Agendas & Minutes
City Manager
Police Department
Job Opportunities
Contact Us

User Login

« < **June 2010** > »
S M T W T F S
30 31 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 1 2 3
Username
Password
Remember Me
Login

Translate

Select Language
Gadgets powered by Google

Forgot your password?
Forgot your username?
Create an account
Joomla Templates by Joomlashack

US Environmental Protection Agency

Appendix B
List of Documents Reviewed
for
Pemaco Superfund Site
Maywood, California

Prepared by: SulTRAC
Chicago, Illinois, and
San Francisco, California

Prepared for: US Environmental Protection Agency, Region 9,
San Francisco, California

August 2010

Appendix B
List of Documents Reviewed

Basis for the Response Action

Biren, Paul. 1992. County of Los Angeles: Fire Department Prevention Bureau, Hazardous Waste Control Program, Investigative Section: Report of Investigation. Log #921691-063. September 25.

T N & Associates, Inc. (TN&A). 2002a. Environmental Site Assessment, Los Angeles Junction Railway Property, Maywood, California.

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———. 2004. Final Feasibility Study, Pemaco Superfund Site, 5050 E. Slauson Avenue, Maywood, California. February.

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Willdan Engineers and Planners. 2002. City of Maywood Riverfront Park, Final Environmental Impact Report, State Clearinghouse Number 2002051146. November.

Implementation of the Response

Ecology & Environment, Inc. (E&E). 1999. Pemaco Removal Site Final Report, Pemaco Superfund Site, Maywood, CA. May.

Thermal Remediation Services, Inc. (TRS). 2005. Design Report, In Situ Thermal Remediation, (Electrical Resistance Heating) Pemaco Superfund Site, 5050 East Slauson Avenue, Maywood, California 90270. May.

TN&A. 2007b. Final Construction Report Maywood Riverfront Park, Pemaco Superfund Site, Maywood, CA. May.

TN&A. 2007e. Final Construction Completion Report for the Pemaco Remedial Action, Pemaco Superfund Site, Maywood, CA. September 30.

Operation and Maintenance

TN&A. 2007. DRAFT FINAL MONITORING, OPERATIONS AND MAINTENANCE PLAN (MOMP) for The Remedial Action, Pemaco Superfund Site, 5050 E. Slauson Avenue, Maywood, California. October.

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Community Involvement

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US Environmental Protection Agency

Appendix C
Technical Review Memorandum of Site-Specific Remediation Levels, ARARs, and TBCs for Pemaco Superfund Site Maywood, California

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Appendix C
Technical Review of Site-Specific Remediation Levels, Applicable or Relevant and Appropriate Requirements (ARARs), and Other Criteria to be Considered (TBCs)

C1.0 INTRODUCTION

This technical memorandum reviews site-specific remediation levels, ARARs, and other criteria to be considered (TBCs) to determine whether any laws, regulations, or guidance promulgated since the ROD was approved have altered the protectiveness of the selected remedy for the Pemaco Superfund Site (Pemaco). In the five-year review process, requirements promulgated or modified after the ROD is signed "must be attained (or waived) only when they are determined to be applicable or relevant and appropriate and necessary to ensure that the remedy is protective of human health and the environment" (40 CFR §300.430(f)(ii)(B)(1)).

C2.0 ARARS AND TBCS: BACKGROUND

ARARs are defined to include any standard, requirement, criterion, or limitation under state or federal environmental law. An ARAR may be either "applicable" or "relevant and appropriate." These terms are defined in the National Oil and Hazardous Substance Contingency Plan (referred to as the National Contingency Plan [NCP]) (40 CFR §300.5) to include:

- "Applicable requirements" means those cleanup standards, standards of control, or other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site.
- "Relevant and appropriate requirements" means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

TBC criteria are requirements that may not meet the definition of an ARAR, but still may be useful in determining whether to take action at a site or to what degree action is necessary. TBC criteria, as defined in 40 CFR §300.400(g)(3), are non-promulgated advisories, criteria, or guidance developed by federal or state government that are not legally binding but may provide useful information or recommended procedures for remedial action. Although TBC criteria do not have the status of ARARs, they are considered together with ARARs to establish the required level of cleanup for protection

of human health and the environment. Once a TBC is identified and adopted in the ROD, it becomes an enforceable performance standard.

EPA classifies ARARs into three categories: action-specific, chemical-specific, and location-specific requirements. These categories of ARARs are described below.

- **Chemical-specific ARARs** usually include risk-based limits that are used to establish acceptable concentrations of a chemical that may be found in, or discharged to, the ambient environment.
- **Location-specific ARARs** requirements are restrictions placed on the concentration(s) of hazardous substances or on the conduct of activities because they occur in sensitive locations such as wetlands.
- **Action-specific ARARs** are requirements that apply to specific actions that may be associated with site remediation. Action-specific ARARs often define acceptable handling, treatment, and disposal procedures for hazardous substances. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy.

C3.0 REVIEW OF ARARS AND TBCS

This section evaluates ARARs and TBCs to determine whether any laws, regulations, or guidance promulgated since the ROD was approved have altered the protectiveness of the selected remedy for the Pemaco site. Table C-1 evaluates chemical-specific ARARs and TBCs, and Table C-2 evaluates action-specific ARARs and TBCs originally identified in the 2005 ROD. There were no location-specific ARARs identified in the ROD for Pemaco.

There were no substantive changes to action-specific ARARs; the only changes to chemical-specific ARARs and TBCs were to the EPA Regional Screening Levels (RSLs) and the California Notification Levels. The EPA RSLs (formerly called Preliminary Remediation Goals [PRG]) and the California Notification Levels (formerly called action levels) were identified as TBCs in the ROD and were used to establish site-specific remediation levels. The following section evaluates changes to site-specific remediation levels and the impact they may have on the protectiveness of the selected remedy for Pemaco.

C4.0 REVIEW OF SITE-SPECIFIC REMEDIATION LEVELS

This section evaluates the criteria used to establish site-specific remediation levels to determine whether any changes have altered the protectiveness of the selected remedy for Pemaco.

C4.1 Evaluation of Site-Specific Remediation Levels for Soil

Table C-3 evaluates the criteria used to establish remediation levels for soil. EPA developed remediation levels for subsurface soil under the assumption that contaminants in soil could leach to groundwater, and that groundwater at Pemaco may be used for domestic purposes by future hypothetical residents. To address the soil-to-groundwater

exposure pathway, EPA used the soil-to-groundwater PRGs (EPA 2004) as remediation levels. The PRGs used as remediation levels were based on a dilution attenuation factor (DAF) of 20 and used either MCLs or risk-based concentrations as the target concentrations in groundwater.

EPA also developed remediation levels for soil under the assumption that a future worker at the site may excavate soil if the site is ever redeveloped. To address potential exposure to a future excavation worker, EPA calculated a remediation level using equations from the human health risk assessment for Pemaco and a cancer risk of 1×10^{-6}. EPA used the more stringent remediation level from the soil-to-groundwater and the future-worker-exposure pathways to select the site-specific remediation level for subsurface soil at Pemaco.

The equations and toxicity factors used to calculate soil remediation levels for a future excavation worker have not changed. EPA, however, has revised many of the soil-to-groundwater PRGs (see Table C-3). The text below discusses changes to soil-to-groundwater PRGs.

EPA Soil-to-Groundwater PRGs. The soil-to-groundwater PRGs used as site-specific remediation levels for chemicals of concern (COCs) in groundwater at Pemaco are shown in Table C-3. Since the ROD was completed in 2005, the RSLs (formerly called PRGs) using a DAF of 20 have become more stringent for the following chemicals: 1,1-dichloroethene, tetrachloroethene, trichloroethene, xylenes, benz(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and isophorone. The RSLs for the VOCs 1,1-dichloroethene, tetrachloroethene, trichloroethene, and xylenes are based on the MCLs as the target concentrations in groundwater. Soil sampling conducted after Electrical Resistance Heating (ERH) was conducted to treat the subsurface soil indicates that the concentrations of 1,1-dichloroethene, tetrachloroethene, trichloroethene, and xylenes are well below the revised RSLs for these VOCs (TN&A 2009). These results suggest that, for the areas where ERH was conducted to treat VOCs in soil, ERH has effectively remediated the potential risks from these VOCs in soil. Thus, the changes in the RSLs for these VOCs have not changed the protectiveness of the remedy for VOCs in subsurface soil.

Semi-volatile organic compounds (SVOCs) were not analyzed in the soil samples collected after the ERH was conducted. Thus, it cannot be determined whether the ERH treatment has reduced concentrations of benz(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and isophorone to below remediation levels or below the revised RSLs. The soil-to-groundwater RSLs calculated for the SVOCs are based on a 1×10^{-6} cancer risk. The RSLs for these SVOCs are within an order of magnitude of the current remediation levels for subsurface soil. The remediation levels currently selected for Pemaco for these SVOCs in soil were calculated based on the potential exposure to an excavation worker. Using EPA's on-line RSL calculator (http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search), soil-to-groundwater RSLs calculated using a DAF of 20 and a cancer risk of 1×10^{-5} would be higher than the current remediation levels selected for Pemaco. Thus, the current site-specific remediation levels are still within EPA's risk management range of 1×10^{-4} and 1×10^{-6}.

In addition, treatment of soil through the use of dual-phase extraction is still ongoing, and institutional controls currently prevent the use of groundwater at the site.

Background Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs). The revised soil-to-groundwater RSLs for PAHs are lower than background concentrations observed in several studies of background concentrations of PAHs in soil. One study, for example, developed a methodology to use background concentrations of PAHs in the vicinity of manufactured gas plant (MGP) sites in northern and southern California to support remediation decisions (Environ 2002). This study calculated an upper tolerance limit (UTL) of 0.9 mg/kg for background concentrations of benzo(a)pyrene equivalents using 95% coverage and 95% confidence, which means one is 95% confident that 95% of the background values are equal to or less than 0.9 milligrams per kilogram (mg/kg). This study recommended using this concentration as an initial target concentration to help guide the remediation of MGP sites in southern California. The California Department of Toxic Substances Control (DTSC) has reviewed the data from this study and has also recommended using 0.9 mg/kg as a pragmatic target for benzo(a)pyrene equivalents at MGP sites (DTSC 2009).

C4.2 Evaluation of Site-Specific Remediation Levels for Groundwater

Table C-4 evaluates the criteria used to establish remediation levels for groundwater. The groundwater remediation levels for Pemaco were developed under the assumption that groundwater at Pemaco may be used in the future for domestic purposes. The more stringent of either the California or federal Maximum Contaminant Levels (MCLs) were used as groundwater remediation levels. If a designated MCL was not available, EPA Region 9 tap-water Preliminary Remediation Goals (PRGs) were used as remediation levels. For chemicals lacking MCLs or PRGs, other health-based standards and effluent limits were used as remediation levels. The following paragraphs discuss changes to criteria used to establish remediation levels in groundwater.

Safe Drinking Water Act Primary Maximum Contaminant Levels (MCLs). Maximum contaminant level goals (MCLGs) are the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals. MCLs are enforceable standards that are set as close to MCLGs as feasible considering costs, benefits, and the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

Federal and California MCLs are chemical-specific ARARs selected as groundwater remediation levels for Pemaco. Federal MCLs are found at 40 CFR Part 141. California MCLs for organics are found at 22 CCR §64444 and for inorganics are found at 22 CCR §64431. EPA used the more stringent of either the federal or California MCLs as remediation levels. The federal and California MCLs adopted as groundwater remediation levels at Pemaco have not changed since 2005.

California Secondary Drinking Water Standards [22 CCR §64449]: The ROD identified California Secondary MCLs as ARARs for the site. The original reference to the California regulations in the ROD (22 CCR §64471) has been changed to 22 CCR §64449. Table 13-1 of the ROD incorrectly states that "since there are no primary MCLs for aluminum, iron, manganese, and methyl tert-butyl ether (MTBE), the secondary

mice at high dose only) that naphthalene may be carcinogenic in humans. The EPA Integrated Risk Information System (IRIS) website currently states the following with regard to naphthalene:

> "Using criteria of the 1986 Guidelines for Carcinogen Risk Assessment, naphthalene is classified in Group C, a possible human carcinogen. This is based on the inadequate data of carcinogenicity in humans exposed to naphthalene via the oral and inhalation routes, and the limited evidence of carcinogenicity in animals via the inhalation route.
>
> "Using the 1996 Proposed Guidelines for Carcinogen Risk Assessment, the human carcinogenic potential of naphthalene via the oral or inhalation routes 'cannot be determined' at this time based on human and animal data; however, there is suggestive evidence (observations of benign respiratory tumors and one carcinoma in female mice only exposed to naphthalene by inhalation [NTP, 1992a]). Additional support includes increase in respiratory tumors associated with exposure to 1-methylnaphthalene."

The current tap water RSL for naphthalene is 0.14 µg/L; the former RSL was 6.2 µg/L. A tap-water concentration of 6.2 µg/L results in a cancer risk of 5×10^{-5} using Cal/EPA's inhalation cancer slope factor and EPA's on-line RSL calculator (http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search). Thus, the current site-specific remediation level for naphthalene of 6.2 µg/L is still within EPA's risk management range of 1×10^{-4} and 1×10^{-6}. Treatment of groundwater is still ongoing, and institutional controls currently prevent the use of groundwater at the site. Thus, changes to tap-water RSLs have not affected the protectiveness of the remedy.

C5.0 REVIEW SUMMARY

As described in the previous sections, the only changes to ARARs and TBCs were to EPA RSLs and California Notification Levels. The EPA RSLs (formerly called PRGs) and the California Notification Levels (formerly called action levels) were identified as TBCs in the ROD and were used to establish site-specific remediation levels.

Tables F-3 and F-4 evaluate the criteria used to establish site-specific remediation levels for soil and groundwater. As shown in these tables, criteria have become more stringent for several chemicals in soil and groundwater. However, this has not altered the protectiveness of the selected remedy. Soil-sampling data indicate that ERH has effectively remediated the potential risks from VOCs in soil, and the current site-specific remediation levels for SVOCs in soil are still within the risk management range of 1×10^{-4} and 1×10^{-6} for the SVOCs with revised criteria. Similarly, the site-specific remediation levels for chemicals with revised criteria in groundwater are still within the risk management. Thus, changes to the criteria used to establish site-specific remediation levels in soil and groundwater have not affected the protectiveness of the remedy.

C6.0 REFERENCES

(**note:** to be constructed along the same lines as References to the main Five Year Review report text: documents alphabetically by author, then Federal Law/Regulations, followed by State of California Law/Regulations.)

TABLE C-1
Evaluation of Chemical-Specific ARARs and TBCs Identified in the 2005 ROD

Media	Citation	Requirement	ARARs Determination	Comments
Groundwater	Federal Primary Drinking Water Standards. 40 Code of Federal Regulations (CFR) Part 141	Federal primary MCLs under the Safe Drinking Water Act (SDWA) protect the public from contaminants that may be found in drinking water. The NCP defines MCLs as relevant and appropriate for groundwater that is a potential source of drinking water. Although neither the perched nor the Exposition groundwater is a viable aquifer, the San Pedro Aquifers, which are used for municipal and industrial purposes, may lie beneath the site. To prevent potential migration to possible lower aquifers, the selected remedy will use federal MCLs, unless California MCLs are more stringent, as remediation goals for perched and exposition groundwater.	Relevant and Appropriate	Federal primary MCLs have not changed for the chemicals warranting re-evaluation of groundwater remediation levels since the ROD was signed in 2005.
Groundwater	Health and Safety Code (H&S Code) §4010 22 California Code of Regulations (CCR) §§64431 and 64444	California primary MCLs protect public health from contaminants that may be found in drinking-water sources.	Relevant and Appropriate	California primary MCLs have not changed for the chemicals warranting re-evaluation of groundwater remediation levels since the ROD was signed in 2005.
Groundwater	Secondary Drinking Water Standards 22 CCR §64449	The ROD identified California secondary MCLs as ARARs for the site. The original reference to the California regulations in the ROD (22 CCR §64471) has been changed to 22 CCR §64449. Iron and manganese are the two chemicals with remediation goals in groundwater that have no primary MCLs but do have secondary MCLs. The secondary MCL for iron is 300 µg/L; the secondary MCL for manganese is 50 µg/L. However, the remediation goals for these two metals are not based on the secondary MCLs. The remediation goals for iron (11,000 µg/L) and manganese (880 µg/L) are derived from the EPA Region 9 PRG in 2005.	Relevant and Appropriate	California secondary MCLs have not changed for the chemicals warranting re-evaluation of groundwater remediation goals since the ROD was signed in 2005.

TABLE C-1 (CONTINUED)
Evaluation of Chemical-Specific ARARs and TBCs Identified in the 2005 ROD

Media	Citation	Requirement	ARARs Determination	Comments
Groundwater	State Water Resources Control Board (SWRCB) Resolution No. 92-49 III.G Policy and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code §13304 (amended 4/21/94)	To protect groundwater, this resolution requires cleanup to either background water quality or the best water quality that is reasonable, if background water quality cannot be restored. Non-background cleanup levels must be consistent with maximum benefit to the public, present and anticipated future beneficial uses, and must conform to water quality control plans and policies.	Relevant and Appropriate	There have been no substantive changes to this regulation.
Groundwater	Water Quality Control Plan – Los Angeles Region California Water Code § *13240 et seq.*	Establishes beneficial uses of ground and surface waters, establishes water quality objectives (WQO), including narrative and numerical standards, establishes implementation plans to meet WQOs and protect beneficial uses, and incorporates statewide water quality control plans and policies. Only the WQOs for groundwater are ARARs. While the stratigraphic equivalent zones present below the site are thin and low-yielding (i.e., do not, at present, meet the strict definition of "aquifer," since that definition includes the "ability to yield commercially significant quantities of water"), the zone still falls within the potential drinking water beneficial use designation per the Water Quality Control Plan for the Los Angeles Region.	Relevant and Appropriate	There have been no substantive changes to this regulation.
Soil and Groundwater	DTSC Hazardous Waste Regulations Hazardous Waste Definition Standards 22 CCR Part 261	Contaminated soil and groundwater, once extracted for treatment, must be managed as state and federal hazardous waste if such soil or groundwater contains levels of hazardous substances that meet or exceed state and federal hazardous waste toxicity criteria for specific hazardous wastes and/or contains one or more RCRA-listed hazardous wastes.	Applicable	There have been no substantive changes to these regulations.
Soil and Groundwater	EPA Regional Screening Levels (formerly PRGs). http://www.epa.gov/region	RSLs are risk-based tools used to evaluate and clean up contaminated sites. The ROD adopted RSLs (formerly called PRGs) as a TBC to be implemented as	Relevant	RSLs adopted as soil and groundwater remediation goals have changed. See previous text and Tables F-3 and F-4 for

TABLE C-1 (CONTINUED)
Evaluation of Chemical-Specific ARARs and TBCs Identified in the 2005 ROD

Media	Citation	Requirement	ARARs Determination	Comments
	9/superfund/prg/	remediation goals for soil and groundwater.		additional details.
Groundwater	California Notification Levels (Action Levels) H&S Code §116455	The California Department of Public Health (CDPH) has established health-based advisory levels, called "notification levels," for chemicals in drinking water that lack MCLs. Notification levels (known as "action levels" through 2004) are advisory in nature and are not enforceable standards. However, state law (Health & Safety Code §116455) requires timely notification of the local governing bodies (e.g., city council, county board of supervisors, or both) by drinking-water systems whenever a notification level is exceeded in a drinking-water source. The ROD adopted an action level for 1,4-dioxane as a TBC to be implemented as a remediation goal.	Relevant	The notification level (action level) adopted as a remediation goal for 1,4-dioxane has not changed. See previous text and Table C-4 for additional details.

TABLE C-2
Evaluation of Action-Specific ARARs Identified in the 2005 ROD

Media	Citation	Requirement	ARARs Determination	Comments
Groundwater	NPDES Non-Point Source Discharge 40 CFR §122.26	Non-point sources addressed by using best management practices (BMPs) for control of contaminants to stormwater runoff from construction activities on sites greater than one acre.	Relevant and Appropriate	There have been no substantive changes to this regulation.
Groundwater	NPDES Point Source Discharge 40 CFR §§122-125	The substantive provisions of an NPDES permit for discharges to a State body of water, i.e., waste discharge requirements, will apply if the treated water is discharged to the LA River.	Applicable	Treated groundwater is not discharged to the LA River.
Groundwater	SWRCB Resolution No. 68-16 Statement of Policy with Respect to Maintaining High Quality of Waters in California Water Code §13140	Applies to the discharge of waste to waters, including re-injection into the aquifer.	Applicable	Treated groundwater is not discharged into the aquifer.
Soil	California Water Code §§13140–13147, 13172, 13260,13263, 13267,13304 27 CCR Div.2, Subdiv.I.Chap.3, Subchap.2, Art.2	Wastes classified as a threat to water quality (designated waste) may be discharged to a Class I hazardous waste or Class II designated waste management unit. Nonhazardous solid waste may be discharged to a Class I, II, or HI waste management unit. Inert waste would not be required to be discharged into a SWRCB-classified waste management unit.	Applicable	There have been no substantive changes to this regulation.
Groundwater	SWRCB Resolution No. 88-63 Sources of Drinking Water	This policy specifies that ground and surface waters of the state are either existing or potential sources of municipal and domestic supply, except for water supplies with: a. Total dissolved solids exceeding 3,000 milligrams per liter, or b. Natural or anthropogenic contamination (unrelated to a specific pollution incident) that cannot reasonably be treated for domestic use using either BMPs or best economically achievable	Applicable	There have been no substantive changes to this regulation.

TABLE C-2 (CONTINUED)
Evaluation of Action-Specific ARARs Identified in the 2005 ROD

Media	Citation	Requirement	ARARs Determination	Comments
		treatment practices, or c. The water source does not provide a sustained yield of 200 gallons per day.		
Soil and Groundwater	Hazardous Waste Regulations Hazardous Waste Determination by Generators 22 CCR §66262.11, 66264.13(a)&(b)	A generator must determine if the waste is classified as a hazardous waste in accordance with the criteria provided in these requirements.	Applicable	There have been no substantive changes to this regulation.
Soil and Groundwater	Hazardous Waste Regulations Accumulation Time 22 CCR §66262.34	Onsite hazardous waste accumulation is allowed for up to 90 days as long as the waste is stored in containers or tanks, on drip pads, inside buildings, is labeled and dated, etc.	Applicable for any operation where hazardous waste is generated.	There have been no substantive changes to this regulation.
Soil and Groundwater	Hazardous Waste Regulations Hazardous Waste Security 22 CCR §66264.14	A treatment facility should maintain a fence in good repair which completely surrounds the active portion of the facility. A locked gate at the facility should restrict unauthorized personnel entrance. The security standards to prevent entry from unauthorized personnel for the proposed remedial treatment alternatives should be applied.	Relevant and appropriate if waste is determined to be RCRA hazardous waste	There have been no substantive changes to this regulation.
Soil and Groundwater	Hazardous Waste Regulations Hazardous Waste Facility General Inspection Requirements and Personnel Training 22 CCR §66264.15-66264.16	The hazardous waste facility standards require routine facility inspections conducted by trained hazardous waste facility personnel. Inspections are to be conducted at a frequency to detect malfunctions and deterioration, operator errors, and discharges which may be causing or leading to a hazardous waste release and a threat to human health or the environment.	Relevant and appropriate if waste is determined to be RCRA hazardous waste	There have been no substantive changes to this regulation.
Soil and Groundwater	Hazardous Waste Regulations Preparedness and Prevention 22 CCR Div. 4.5, Chap. 14, Art. 3	Facility design and operation to minimize potential fire, explosion, or unauthorized release of hazardous waste.	Relevant and appropriate if waste is determined to be RCRA hazardous	There have been no substantive changes to this regulation.

TABLE C-2 (CONTINUED)
Evaluation of Action-Specific ARARs Identified in the 2005 ROD

Media	Citation	Requirement	ARARs Determination	Comments
			waste	
Groundwater	Hazardous Waste Regulations Water Quality Monitoring and Response Systems for Permitted Systems 22 CCR Div 4.5, Chap. 14, Art.6	There is a requirement for the groundwater monitoring system to evaluate the effectiveness of the corrective action program (remedial activities).	Relevant and Appropriate	There have been no substantive changes to this regulation.
Soil and Groundwater	Hazardous Waste Regulations Use and Management of Container 22 CCR Div 4.5, Chap. 14, Art. 9	Maintain container and dispose to a Class I hazardous waste disposal facility within 90 days. The 90-day storage limit prevents greater environmental hazard than already exists.	Relevant and appropriate if waste is determined to be RCRA hazardous waste	There have been no substantive changes to this regulation.
Groundwater	Hazardous Waste Regulations Tank Systems 22 CCR Div 4.5, Chap. 14, Art. 10	Minimum design standards (i.e., shell strength foundation, structural support, pressure controls, seismic considerations) for tank and ancillary equipment are established. The requirements for minimum shell thickness and pressure controls to prevent collapse or rupture prevents a greater environmental hazard than already exists.	Relevant and appropriate if waste is determined to be RCRA hazardous waste	There have been no substantive changes to this regulation.
Soil and Groundwater	Hazardous Waste Regulations Miscellaneous Units Requirements 22 CCR Div 4.5, Chap. 14, Art. 16; 22 CCR §66264.601 – 66264.603	Minimum performance standards are established for miscellaneous equipment to protect health and the environment "Miscellaneous units" are units that are not a container, tank surface impoundment pile, land treatment unit, landfill, incinerator, boiler or any industrial furnace other than industrial furnaces.	Relevant and appropriate if waste is determined to be RCRA hazardous waste	There have been no substantive changes to this regulation.
Air	SCAQMD Rules and Regulations Regulation IV, Rule 402, Nuisance	A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public or which cause to have a natural tendency to cause injury or damage to	Applicable	There have been no substantive changes to this regulation.

TABLE C-2 (CONTINUED)
Evaluation of Action-Specific ARARs Identified in the 2005 ROD

Media	Citation	Requirement	ARARs Determination	Comments
		business or property.		
Air	SCAQMD Rules and Regulations Regulation IV, Rule 403, Fugitive Dust	Emissions of fugitive dust shall not remain visible in the atmosphere beyond the property line of the emission source. Activities conducted in the South Coast Air Basin shall use best available control measures to minimize fugitive dust emissions and take necessary steps to prevent the track-out of bulk material onto public paved roadways as a result of their operations.	Applicable	There have been no substantive changes to this regulation.
Air	SCAQMD Rules and Regulations Regulation IV, Rule 404, Particulate Matter - Concentration.	Particulate matter in excess of the concentration standard conditions shall not be discharged from any source. Particulate matter in excess of 450 milligrams per cubic meter (0.196 grain per cubic foot) in discharged gas, calculated as dry gas at standard conditions, shall not be discharged to the atmosphere from any source.	Applicable	There have been no substantive changes to this regulation.
Soil and Groundwater	Land Use Covenant Regulation 22 CCR §67391.1 (a), (b), (c) (1), (d), (g), (i)	If hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property after implementation of the remedy, at levels which are not suitable for unrestricted use of the land, this requirement would be relevant and appropriate.	Relevant and Appropriate	There have been no substantive changes to this regulation.
Soil and Groundwater	Environmental Covenant Requirements Civil Code §1471	If hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property after implementation of the remedy at levels which are not suitable for unrestricted use of the land, this requirement would be relevant and appropriate.	Relevant and Appropriate	There have been no substantive changes to this regulation.

Table C-3: Evaluation of Criteria Used to Establish Site-Specific Remediation Levels for Soil [(1)]

Chemical of Concern	Soil to Groundwater Region 9 PRG, DAF 20, 2005 [2]	Excavation Worker Exposure [3]	Site-Specific Remediation Levels	Soil to Groundwater RSL, MCL-Based, DAF 20, 2010 [4]	Soil to Groundwater RSL, Risk-Based, DAF 20, 2010 [4]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs					
Acetone	16		16		90
Benzene	0.030		0.030	0.052	0.0042
1,1-Dichloroethene	0.060	0.72	0.060	0.050	2.4
1,2-Dichloroethane	0.020		0.020	0.028	0.000036
cis-1,2-Dichloroethene	0.40		0.40	0.42	2.20
Ethylbenzene	13		13	15.6	0.034
Methylene chloride	0.020		0.020	0.026	0.024
Tetrachloroethene	0.060	11	0.060	0.046	0.0010
Trichloroethene	0.060		0.060	0.036	0.012
Toluene	12		12	13.8	32
Vinyl chloride	0.010		0.010	0.0138	0.00011
Xylenes (total)	210		210	196	4.0
SVOCs					
Benz(a)anthracene	2.0	2.61	2.0		0.20
Benzo(a)pyrene	8.0	0.261	0.261	4.8	0.070
Benzo(b)fluoranthene	5.0	2.61	2.61		0.70
Carbazole	0.60		0.60		--

TABLE C-3 (CONTINUED)
Evaluation of Criteria Used to Establish Site-Specific Remediation Levels for Soil

Chemical of Concern	Soil to Groundwater Region 9 PRG, DAF 20, 2005 [2]	Excavation Worker Exposure [3]	Site-Specific Remediation Levels	Soil to Groundwater RSL, MCL-Based, DAF 20, 2010 [4]	Soil to Groundwater RSL, Risk-Based, DAF 20, 2010 [4]
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Dibenz(a,h)anthracene	2.0	0.762	0.762		0.22
Indeno(1,2,3-cd)pyrene	14	2.61	2.61		2.4
Isophorone	0.50		0.50		0.46
Metals					
Chromium (total)	38		38	3,600,000	--

Notes:

1. Concentrations shaded in gray indicate which TBCs have become more stringent since the ROD was completed in 2005.
2. EPA Region 9 s oil-to-groundwater PRGs (2004). http://www.epa.gov/region9/superfund/prg/files/04prgtable.pdf Soil-to-groundwater PRGs are back-calculated from acceptable groundwater concentrations (i.e., MCLs or human-health risk-based levels). First, the acceptable groundwater concentration is multiplied by a DAF to obtain a target leachate concentration. For example, if the DAF is 10 and the acceptable groundwater concentration is 0.05 mg/L, the target soil leachate concentration would be 0.5 mg/L. The partition equation is then used to c alculate the total soil concentration corresponding to th is soil leachate concentration. EPA used a default DAF of 20 for Pemaco . According to EPA guidance, a DAF of 20 is protective for sources up to 0.5 acre in size, and analyses indicate that it can be protective of larger sources as well (EPA 1996).
3. Risk-based value calculated for an excavation worker scenario using a 1×10^{-6} cancer risk.
4. EPA Regions 3, 6, and 9 (Accessed April 2010). Regional Screening Levels for Chemical Contaminants at Superfund Sites. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

Table C-4: Evaluation of Criteria Used to Establish Site-Specific Remediation Levels for Groundwater [1]

	Primary MCL, 2005 [2]	EPA Region 9 PRG, 2005 [3]	Site-Specific Remediation Levels	Primary MCL, 2010 [2]	EPA Region 9 RSL, 2010 [4]
VOCs	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Acetone	--	5,500	5,500/700 [5]	--	22,000/700 [6]
Acetonitrile	--	100	100	--	130
Benzene	1	0.34	1	1	0.41
Chloroethane	--	4.6	100 [5]	--	21,000/100 [6]
Chloroform	80 (THM)	0.17/0.53 [6]	80	80 (THM)	0.19/100 [6]
Dibromochloromethane	80 (THM)	0.13	80	80 (THM)	0.15
1,2-Dibromo-3-chloropropane	0.2	0.048/0.0016 [7]	0.2	0.2	0.00032
1,1-Dichloroethane	5	810/0.2 [7]	5	5	2.4/5 [6]
1,1-Dichloroethene	6	340	6	6	340
1,2-Dichloroethane	0.5	0.12	0.5/0.38 [5]	0.5	0.0065/0.38 [6]
cis-1,2-Dichloroethene	6	61	6	6	370
trans- 1,2-Dichloroethene	10	120	10	10	110
Ethylbenzene	300	1300	300	300	1.5
Methylene Chloride	5	4.3	5/4.7 [5]	5	4.8/4.7 [6]
Methyl isobutyl ketone	--	2,000	2,000	120 [9]	2,000
Methyl tert-butyl ether	13	6.2	13/5 [5]	13	12/5 [6]
Tetrachloroethene	5	0.10	5/0.8 [5]	5	0.11/0.8 [6]
Toluene	150	720	150	150	2,300

Table C-4: Evaluation of Criteria Used to Establish Site-Specific Remediation Levels for Groundwater [1] (Continued)

	Primary MCL, 2005 [2]	EPA Region 9 PRG, 2005 [3]	Site-Specific Remediation Levels	Primary MCL, 2010 [2]	EPA Region 9 RSL, 2010 [4]
VOCs (cont'd.)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
1,1,2-Trichloroethane	5	0.2	5/0.60 [5]	5	0.24/0.60 [6]
Trichloroethene	5	1.4	5/2.7 [5]	5	2.0/2.7 [6]
Vinyl chloride	0.5	0.02	0.5	0.5	0.016
SVOCs					
1,4- Dioxane	3.0 [9]	6.1	3.0 [9]	3 [9]	6.1
bis(2-Ethylhexyl)phthalate	4	4.8	4	4	4.8
Naphthalene	--	6.2	6.2	17 [9]	0.14
Metals					
Aluminum	1,000	36,000	1,000	1,000	37,000
Arsenic	10	0.045/0.0071 [7]	10	10	0.045
Chromium (total)	50		50	50	--
Iron	--	11,000	11,000	300 [10]	26,000
Lead	15 [8]		15/5 [5]	15	
Manganese	--	880	880	500 [9]/50 [10]	880
Selenium	50	180	50	50	180
Thallium	2	2.4	2	2	--
Anions					
Sulfide	--	110 [11]	110/1 [5]	--	--

Table C-4: Evaluation of Criteria Used to Establish Site-Specific Remediation Levels for Groundwater [1] (Continued)

Notes:

1. Concentrations shaded in gray indicate TBCs which have become more stringent since the ROD was completed in 2005.
2. Primary MCL is the most stringent of the federal or California MCL.
3. EPA Region 9 tap-water PRGs (2004). http://www.epa.gov/region9/superfund/prg/files/04prgtable.pdf
4. EPA Regions 3, 6, and 9 (Accessed April 2010). Regional Screening Levels for Chemical Contaminants at Superfund Sites. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm
5. California Regional Water Quality Control Board, Los Angeles Region. Waste Discharge Requirements for Discharges of Treated Groundwater from Investigation and/or Cleanup of Volatile Organic Compounds Contaminated-Sites to Surface Water in Coastal Watersheds of Los Angeles and Ventura Counties. 2005.
6. California Regional Water Quality Control Board, Los Angeles Region. General NPDES Permit No. CAG914001. Waste Discharge Requirements for Discharges of Treated Groundwater from Investigation and/or Cleanup of Volatile Organic Compounds Contaminated-Sites to Surface Water in Coastal Watersheds of Los Angeles and Ventura Counties. April 5, 2007.
7. California-modified PRG (2004): http://www.epa.gov/region9/superfund/prg/files/04prgtable.pdf
8. Treatment technique action level.
9. California Department of Health Notification Level: http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Notificationlevels/NotificationLevels.pdf
10. California secondary MCL.
11. EPA Region 9 tap-water PRG for hydrogen sulfide (2004): http://www.epa.gov/region9/superfund/prg/files/04prgtable.pdf

US Environmental Protection Agency

Appendix D
Five-Year Site Inspection Checklist
for
Pemaco Superfund Site
Maywood, California

Prepared by: US Environmental Protection Agency, Region 9,
San Francisco, California

August 2010

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Pemaco Superfund Site	**Date of inspection: 3/9/2010**
Location and Region: Maywood, CA, Region 9	**EPA ID: CERCLIS No. CAD980737092**
Agency, office, or company leading the five-year review: U.S. EPA	**Weather/temperature: sunny, windy, low 60s**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Monitored natural attenuation
- ☐ Access controls (see note 1)
- ☐ Groundwater containment
- ☐ Institutional controls
- ☐ Vertical barrier walls
- ☑ Groundwater pump and treatment
- ☐ Surface water collection and treatment (see note 2)
- ☑ Other: Electrical resistance heating (ERH)
- ☑ Other: Engineered barrier (see note 3)

Note 1: Access controls are employed at the site, but are not part of the remedy

Note 2: Storm water management practices are employed, but are not part of site remedy

Note 3: Surface soils in the park area were addressed by hot spot removal, regrading, and covering with a one-foot cap of clean soil.

Inspection team roster

Ms. RoseMarie Caraway, U.S. EPA Project Manager, (415) 972 3158

Ms. Lori Parnass, CA Department of Toxic Substance Control, (818) 717 6500 x 6516

Ms. Tizita Bekele, CA Department of Toxic Substances Control, (714) 484 5450

Mr. Rik Lantz, SulTRAC Project Manager, (312) 443 0550 X 16

Mr. Jeff Waggle, SulTRAC Resident Engineer, (619) 200 5900

Mr. Cory Reiter, SulTRAC Project Engineer, (317) 910 1906

Mr. Jamie Hernandez, SulTRAC Operations and Maintenance, (562) 335 4999

Mr. Mike Prostko, SulTRAC Operations and Maintenance, (805) 890 5630

Mr. John Wingate, OTIE Project Engineer, (805) 585 6389

II. INTERVIEWS (Check all that apply)

1. O&M site manager
Name: Jeff Waggle
Title: Resident Engineer
Date Interviewed: March 9, 2010
☑ at site ☐ at office ☐ by phone, Phone no.: (619) 260 1432
Problems, suggestions; ☐ Report attached _____

2. **O&M staff**
Names: Mike Prostko, Jaime Hernandez
Title: Site Operations and maintenance staff
Date Interviewed: March 9, 2010
☑ at site ☐ at office ☐ by phone, Phone no.: Prostko: 805 890 5630, Hernandez: 562 335 4999
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.

No local regulatory Authorities or response agencies attended the site inspection on March 9, 2010.

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

Dave Mango, Director of City of Maywood Building and Planning Department (323) 562-5721 was contacted for interviews on several dates, and sent questions to be discussed by e-mail. Mr. Mango preferred to respond via e-mail on March 23, 2010. Mr. Mango's e-mail response is included as Attachment 1.

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: Daily QC reports that summarize site operations and focus on daily maintenance of the plant, including filter bag changes, pump maintenance and the like, are prepared and submitted daily via e-mail to a group of interested parties. These daily reports are posted on the project web site under the heading "Files and documents: Daily Reports.". Review of daily reports posted on web site during the 5-year inspection on March 9, 2010, showed that daily logs were not current. Further, the daily logs were not convenient to review or search.

Resolution: SulTRAC has collated the daily QC reports by month and posted all daily logs to date on project web site. SulTRAC has also prepared a summary of major maintenance activities (ex: carbon filter changes) and posted to the web site under the heading "Files and documents: Pemaco Ops Summary."

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: The contingency/emergency response plan is part of the accident prevention plan (APP). The procedures and policies listed in the plan have not changed. However, the contacts are no longer accurate and some of the plan addresses concerns about the heat and electrical hazards associated with electrical resistance heating, which is no longer occurring at the site. An Addendum has been appended to the APP to address these inaccuracies.

	III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Continued)
3.	**O&M and OSHA Training Records** ☑ Readily available ☑ Up to date ☐ N/A Remarks:
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: The only permit currently required for the site is the wastewater discharge permit for the Los Angeles County Sanitation District, Account number 2099500. The permit is current and posted in the site trailer.
5.	**Gas Generation Records** ☐ Readily available ☐ Up to date ☑ N/A Remarks: A landfill remedy is not employed at the site.
6.	**Settlement Monument Records** ☐ Readily available ☐ Up to date ☑ N/A Remarks: A landfill remedy is not employed at the site.
7.	**Groundwater Monitoring Records** ☑ Readily available ☑ Up to date ☐ N/A Remarks: Groundwater monitoring records are posted on the project website [http://ees.tnainc.com/pemaco/] and are current. DTSC representatives noted that although current information is available, it's difficult to visualize the plume by looking at concentration trends in individual wells. *Resolution*: SulTRAC will post information that is shared among the project team in the form of periodic progress reports on the project web site, under the heading "plume maps."
8.	**Leachate Extraction Records** ☐ Readily available ☐ Up to date ☑ N/A Remarks: A landfill remedy is not employed at the site.
9.	**Discharge Compliance Records** Air ☐ Readily available ☐ Up to date ☑ N/A Water (effluent) ☑ Readily available ☑ Up to date ☐ N/A Remarks: The most recent discharge compliance report (4th quarter 2009) was present at the site and available for review.
10.	**Daily Access/Security Logs** ☑ Readily available ☑ Up to date ☐ N/A Remarks: A folder containing site security logs was present on site for review. The security logs in the folder were up-to-date.

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: Pemaco is a fund-lead U.S. EPA site. Operations and Maintenance are currently performed for U.S. EPA by SulTRAC, a federal contractor.

2. **O&M Cost Records**

☑ Readily available ☑ Up to date
Funding mechanism/agreement in place

The Record of Decision (ROD) for the Pemaco Maywood Superfund Site (January 13, 2005) identified three remedies for the Pemaco site:

1. Soil cover and revegetation (Table 12-2)
2. High-vacuum dual-phase extraction for the upper vadose zone soils and perched groundwater (Table 12-2), and
3. ERH with Vacuum extraction, groundwater pump and treat, and flameless thermal oxidizer (Table 12-3).

Estimated O&M costs were taken from Tables 12-1, 12-2, and 12-3 of the ROD. O&M costs for remedy 1 above are borne by the City of Maywood and are not included in this analysis. O&M costs for remedies 2 and 3 were combined in the estimated annual costs below. Operation and maintenance of the site began in April 2007, when the water and vapor treatment plant began operation, so only the first three years of estimated and actual O&M costs are presented below.

Original O&M cost estimate $5,440,329 ☑ Breakdown attached (first three years only, see attachment 2)

Total annual cost by year for review period if available
From 4/ 2007 To 4/2008 Total cost: $4,070,000 ☑ Breakdown attached
From 5/2008 To 4/2009 Total cost: $3,698,000 ☑ Breakdown attached
From 5/2009 To 3/2010 Total cost: $2,506,000 ☑ Breakdown attached
From To Total cost ☐ Breakdown attached
From To Total cost ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period** Describe costs and reasons:

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

A. Fencing

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

Remarks: Fencing surrounding the site is in good condition with no gaps or unsecured points of entry. The site gate is fully functional and lockable. The gate is locked when personnel are not present at the site.

B. Other Access Restrictions

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

Remarks: Site signs are appropriately posted. However, one of the three phone numbers listed on the signs was out-of-date at the time of the site visit. Signs are not required in the ROD, but DTSC suggested that there may be requirements for posting signs through state regulations such as Proposition 65.

Resolution: The phone numbers on the site signs were updated on March 10 (see Attachment 3). DTSC agreed to research whether the State of California requires additional signs at Superfund sites.

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) _____ Frequency _____ Responsible party/agency _____ Contact
Name Title Date Phone no.

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

According to the Pemaco ROD, the current deed for the property contains a covenant that prohibits future residential land use and prohibits groundwater extraction for potable water or other domestic purposes. U.S. EPA has verified that the City of Maywood has an ordinance to maintain the site as parkland, but the State of California has not finalized a land use covenant that would prohibit Maywood from changing the zoning to allow other land uses for the site.

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

Remarks: As noted in item 1, above, the State of California needs to finalize the land use covenant that would prohibit the City of Maywood from changing land use at the site.

V. ACCESS AND INSTITUTIONAL CONTROLS (Continued)
D. General
1. Vandalism/trespassing ☐ Location shown on site map ☐ No vandalism evident Remarks: There have been three incidents involving vehicles losing control on District Boulevard, entering the Pemaco site, and damaging property during the past three years: September 28, 2007; August 10, 2008; and December 25, 2008. None of the incidents damaged the wells or the treatment plant, or interrupted operation of the site. The December 25, 2008 incident involved a vehicle that crashed through the gate, destroying the gate, damaging the site trailer, and knocking the trailer off its supports. In response to the December 2008 incident, SulTRAC replaced the gate, repaired the trailer, purchased flashing lights to draw attention to the curve, purchased water-filled traffic barriers to minimize damage to the trailer and gate, and approached the City of Maywood to install speed bumps. As of March 9, 2009, the Director of the City of Maywood Building and Planning Department is actively pursuing placement of speed bumps on District Boulevard south of the Pemaco site. There is some graffiti on the east side of the site, on the wall that runs parallel to the Los Angeles River. The graffiti predates remedial activities at the site, as evidenced by the fact that conduit installed along the wall in 2007 overlies the graffiti.
2. **Land use changes on site** ☐ N/A Remarks: The land use in the ERH area (currently fenced off) will be changed to a city park when the remediation is complete and the site is turned over to the City of Maywood for incorporation into Riverfront Park.
3. **Land use changes off site** ☐ N/A Remarks: Land use on the northern half of the Pemaco site and the adjacent W.W. Henry and Precision Arrow properties was changed from an industrial area to Riverfront Park in 2005.

VI. GENERAL SITE CONDITIONS
A. Roads ☐ Applicable ☑N/A
1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☑ N/A Remarks: There are no roads that currently run through the site
B. Other Site Conditions
Remarks: The site is generally well maintained and kept in good operating condition. Fencing surrounding the ERH area is screened with heavy fabric as an aesthetic consideration for Riverfront Park. There is limited evidence of storm water erosion in a steeply sloping area along the west boundary of the ERH area. Such erosion is addressed on an as-needed basis by placing sandbags, berms, and straw wattles in and around areas of erosion.

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: Pumps, wellhead, and plumbing for the extraction wells are in good condition. Hissing sounds were observed in the field at a few locations during the March 9, 2010, site inspection, indicating a few leaks in the vacuum lines that may reduce the effectiveness of the vacuum. The outer casing was removed from the electrical resistance heating (ERH) electrodes during the week of January 8, 2010, leaving open casings at the surface. The open ends of the electrode casings were covered with caps and the annular space at the ground surface was grouted to prevent infiltration of rainwater on March 10, 2010 (see Attachment 4). A schematic diagram of the electrodes is included as Attachment 5. The conductive backfill identified on the diagram is steel shot; the neat cement grout identified on the diagram is high temperature Class G grout (neat silica flour cement), which was used instead of normal Portland cement because of the expected high heat flow.

Abandonment of the electrodes was not addressed in the ERH work plan, but since the electrodes are no longer needed to remediate the ERH area, the electrodes should be abandoned. The ERH electrodes do not appear to meet the technical definition of a well as defined in Section 13710 of the California Water Code — "any artificial excavation constructed by any method for the purpose of extracting water from, or injecting water into, the underground" — because the electrodes were designed to remove vapor, not water, from the subsurface. Nevertheless, the wells should be properly abandoned to avoid acting as conduit for contamination.

Resolution: SulTRAC will prepare an electrode abandonment plan.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☑ Good condition ☑ All required wells properly operating ☐ Needs Maintenance ☐ N/A

Remarks: The extraction system and all appurtenances are in good condition and operating properly.

3. Spare Parts and Equipment
☑ Readily available ☑ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: Spare parts and equipment are readily available in the stock room and control room of the wastewater treatment plant.

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 (Filter bags and oil filters for compressor present)
☑ Additive (*e.g.*, chelation agent, flocculent) (water softening salt, 2 drums of Sodium hypochlorite present)
☐ 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: 16,988,347 gal (1/12009 to 12/31/2009)
Quantity of surface water treated annually: no surface water treated

Remarks: Daily QC reports that summarize site operations and focus on daily maintenance of the plant,

including filter bag changes, pump maintenance and the like, are prepared and submitted daily via e-mail to a group of interested parties. These daily reports are posted on the project web site under the heading "Files and documents: Daily Reports.". Review of daily reports posted on web site during the 5-year inspection on March 9, 2010, showed that daily logs were not current. Further, the daily logs were not convenient to review or search. Resolution: SulTRAC has collated the daily QC reports by month and posted all daily logs to date on project web site. SulTRAC has also prepared a summary of major maintenance activities (ex: carbon filter changes) and posted to the web site under the heading "Files and documents: Pemaco Ops Summary." (Attachment 6)

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☑ Good condition ☐Needs Maintenance

Remarks: Electrical panels were clearly labeled and in good condition.

3. Tanks, Vaults, Storage Vessels
☐ N/A ☑ Good condition ☑Proper secondary containment ☐ Needs Maintenance

Remarks: Tanks, vaults, and storage vessels were properly labeled and in good condition. Storage vessels have secondary containment, and the entire treatment building is surrounded by an elevated cement lip that acts as additional secondary (or tertiary) containment.

4. Discharge Structure and Appurtenances
☐ N/A ☑ Good condition ☐Needs Maintenance

Remarks: Effluent from the treatment plant discharges to the sanitary sewer through a vault at the south side of the treatment plant. The vault is properly labeled, and in good operating condition.

5. Treatment Building(s)
☐ N/A ☑ Good condition (esp. roof and doorways) ☐ Needs repair
☑ Chemicals and equipment properly stored

Remarks: The treatment building, roof, and doorways are in excellent condition. Chemicals are properly stored in the building.

6. **Monitoring Wells** (pump and treatment remedy)
☑ Properly secured/locked ☑ Functioning ☑ Routinely sampled (See notes, below)
☑ Good condition ☑ All required wells located ☑ Needs Maintenance ☐ N/A

Remarks: Subsets of monitoring wells are sampled on a weekly, monthly, quarterly, and semi-annual basis. All wells are functional and available for sampling, except for wells B-37, MW14-80, and MW14-90. Wells DA-11, MW2-95, MW3-70, and MW24-140 appear to be damaged, but can be sampled with specialized equipment. Specific recommendations for repair, replacement, or abandonment of these wells are presented in *Technical Memorandum: Monitoring Well Redevelopment, September and October 2009, Pemaco Superfund Site, Maywood, California (November 6, 2009).*

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: Monitored natural attenuation is not currently a part of this remedy.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Surface soils in Maywood Riverfront Park were remediated by excavating hot-spots, regrading, and covering with a one-foot cap of clean soil. (The ERH area and the southern part of the Pemaco site are not currently capped or regraded, but will be capped to match the rest of Riverfront Park when subsurface remediation in this area is sufficiently complete to remove the surface appurtenances). Maywood Riverfront Park contains a soccer field which is actively used by the local community. At the time of the 5-year site inspection, the soccer field had been reseeded to address some bare soil patches and was encircled by a temporary fence. The bare patches were minor and do not represent erosion of the cap. Photographs of the bare patches are included as Attachment 7.

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 objectives of the remedial action at the Pemaco site were to: (1) prevent any further migration of contaminants from soil into groundwater, (2) prevent possible future exposure to the public of soil vapor containing contaminants from the site, (3) prevent possible exposure to the public of contaminated soil, (4) prevent further migration of contaminants onto adjacent properties, and (5) prevent contamination of underlying drinking water aquifers. The selected remedy focused on capping surface soils and using Dual Phase Extraction and ERH to reduce contaminant concentrations in subsurface soil and groundwater. Data collected to date indicates that the remedy has been successfully implemented and is effectively accomplishing the remedial action objectives (RAOs).

- The remedy has successfully prevented further migration of contaminants from soil into groundwater, as evidenced by consistently decreasing contaminant concentrations in groundwater. However, the RAOs for groundwater have not yet been reached, which may be attributed to the fact that the temperature milestone for the deeper parts of the treated zone was not fully realized. More details on this topic are included in the 5-year report.
- The remedy has successfully prevented exposure to the public of soil vapor containing contaminants from the site. EPA conducted indoor air sampling at 28 homes at the site in August 2003, analyzed data from this sampling round and previous sampling efforts, and determined that a separate remedy for the homes was not necessary. In addition, EPA samples wells SSV 06 and 07 biweekly to monitor vapor

movement toward the residential area, and contaminant concentrations remain within acceptable limits.

- The remedy has successfully prevented exposure to contaminated soil by (1) installing a soil cap at Riverfront Park and (2) fencing that excludes the public from the ERH area.
- The remedy has successfully prevented further migration of contaminants onto adjacent properties, as evidenced by perimeter groundwater monitoring. Contaminant concentrations downgradient from the site are at background levels indicating no further offsite migration of contaminants from the site. A cone penetrometer investigation of the C Zone in August 2009 determined that contaminant concentrations in C-zone groundwater were above site-specific remediation levels (SSRLs) on site but did not exceed SSRLs at the site boundary.
- The remedy has been partially successful in preventing contamination of underlying drinking water aquifers. Historical data indicate that C zone contamination, although present at low levels before ERH construction activities, increased significantly following installation of temperature monitoring probes (TMPs) and ERH electrodes in 2006. Contamination in the C Zone has decreased significantly from ERH remediation and C zone groundwater extraction. Monitoring wells MW10-170 and MW23-145, which monitor groundwater in deeper aquifers downgradient (southwest) of the site, have historically been uncontaminated.

Source reduction in subsurface soil and groundwater in the ERH area has been accomplished as demonstrated by significant decreases in soil and groundwater contamination after heating ceased in the ERH area. Post-ERH soil sampling performed in October 2008 indicates that contaminants of concern were below the SSRLs and therefore the site-specific RAOs for soil have been achieved within the ERH area. The site-specific RAOs for groundwater have not yet been met, although concentrations have declined pre-ERH levels by several orders of magnitude.

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.

Current O&M procedures at the site are effective and are suitable to implement the pump-and-treat remedy at the site and to ensure the long-term effectiveness of the remedy.

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.

Overall, there is no indication of any significant problem with implementing the remedy or of issues that would compromise the overall effectiveness of the remedy.

Review of the O&M costs presented in Attachment 2 shows that the realized costs are somewhat higher than those anticipated in the ROD. In part, the realized costs reflect increased O&M at the plant due to high sediment load in the extracted groundwater, which causes frequent changes of filter bags and frequent adjustments to the pump and treat system outside normal working hours (i.e. during evenings and weekends). The high sediment load is caused in part by damaged well screens, which allow introduction of sediment to the extracted groundwater. The well screens may have been damaged by unanticipated corrosion caused by the electrical resistance heating. Sediment can be removed from the system by periodic well redevelopment. Other specific recommendations for repair, replacement, or abandonment of damaged wells are presented in

Technical Memorandum: Monitoring Well Redevelopment, September and October 2009, Pemaco Superfund Site, Maywood, California (November 6, 2009).

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

As a result of observed reductions in contaminant concentrations in soil vapor and groundwater extracted by the dual-phase extraction system, there are several opportunities to optimize the treatment system in order to reduce operational costs and improve the efficiency of the system. These include disconnecting various groundwater and vapor extraction wells, disconnecting some of the vapor treatment equipment, selling the Flameless thermal oxidizer, and others. Detailed recommendations will be presented in the five year review report.

Appendix D (continued)

Site Inspection
Pemaco Superfund Site,
Maywood, California

Attachments
to Site Inspection Checklist

Attachment 1

Summary of Interview with Dave Mango, Director of City of Maywood and Planning Department, submitted via e-mail to Jeff Waggle, Resident Engineer, on March 23, 2010.

Jeff,

I'm going to go ahead and answer your questionnaire in this email. If you need a letter, let me know.

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

I have worked for the City of Maywood since well before the beginning of this project. From the start, I have been involved as a representative of the City and I must say that, after difficulties early in the project, I have been rather impressed with the overall project. EPA and RoseMarie Caraway in particular have persevered despite a very difficult political environment. It is their hard work that has assured the public so that the cleanup work can now proceed without interference from the activist community.

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

Although my office has not determined the need for an inspection program for the site, through the years we have been in regular communication with the EPA consultant on-site. In 2006, the City of Maywood developed a park on the site adjacent to the Superfund site, and in those days, contact and coordination was on a daily basis. EPA was drilling and developing wells on the park site, so coordination with the City's general contractor was necessary. After completion of the park, contacts have been much less regular, but we have worked in cooperation with the EPA consultant nonetheless. One example was when we met to go over traffic control measures, due to vehicles crashing through the site fence on a much too regular basis. We have also been in contact recently due to potential overwatering of the park landscape.

3. 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 results of the responses.

None.

4. Do you feel well informed about the site's activities and progress?

Yes.

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

None at this time.

David Mango
Director of Building and Planning
City of Maywood
office (323) 562-5721
cell (213) 453-8027
fax (323) 773-2806
david.mango@cityofmaywood.org

Attachment 2

Pemaco O&M Cost Summary

Pemaco O&M summary

	Anticipated costs	Actual costs
	source:	
Soil cover/revegetation	Table 12-1 ROD	
Year 1	$ 24,729	unknown
Year 2	$ 24,729	unknown
Year 3	$ 24,729	unknown
Year 4	$ 24,729	
Year 5	$ 24,729	

dual-phase extraction/ERH	Anticipated costs			Actual costs			
	Dual-phase extraction	ERH	total		Contractor costs	utility costs	total
	source:	source:				source: RM	
	Table 12-2 ROD	Table 12-3 ROD				Caraway 2/19/10	
						e-mail	
Year 1 (4/07 - 4/08)	$ 1,026,590	$ 1,256,627	$ 2,283,217	source: OTIE provided spreadsheet >	$ 3,932,000	$ 138,000	$ 4,070,000
Year 2 (4/08 - 4/09)	$ 658,255	$ 920,301	$ 1,578,556	source: Sullivan billing records >	$ 3,560,000	$ 138,000	$ 3,698,000
Year 3 (4/09 - 3/10)	$ 658,255	$ 920,301	$ 1,578,556	source: Sullivan billing records >	$ 2,391,000	$ 115,000	$ 2,506,000
Year 4	$ 658,255	$ 920,301	$ 1,578,556				
Year 5	$ 658,255	$ 920,301	$ 1,578,556				

Pemaco O&M Costs March 2007 thru March 2008

Date	Total Cost (x 1000)	Labor (x 1000)	Subs (x 1000)	OCDs (x 1000)	Comments
March '07	$ 792	$ 114	$ 510	$ 60	Construction Finished
April '07	$ 392	$ 82	$ 275	$ 35	Start of plant operation - O&M
May '07	$ 232	$ 103	$ 106	$ 23	Start of vapor extraction
June '07	$ 370	$ 135	$ 178	$ 57	Baseline sampling and plant O&M
July '07	$ 476	$ 85	$ 358	$ 33	ERH finished construction and plant O&M
Aug '07	$ 348	$ 125	$ 162	$ 61	EISB baseline sampling program and plant O&M
Sept '07	$ 315	$ 148	$ 123	$ 44	Start of ERH
Oct '07	$ 232	$ 101	$ 105	$ 26	Full plant and ERH operation
Nov '07	$ 229	$ 96	$ 113	$ 20	Full plant and ERH operation
Dec '07	$ 276	$ 104	$ 116	$ 56	Full plant and ERH operation
Jan '08	$ 540	$ 123	$ 370	$ 47	First ERH milestone payment, plus O&M
Feb '08	$ 300	$ 117	$ 141	$ 42	Monthy ERH O&M fee, plus O&M
March '08	$ 222	$ 45	$ 156	$ 21	Monthy ERH O&M fee, plus O&M
12 mos. O&M	**$ 3,932**	**$ 1,264**	**$ 2,293**	**$ 465**	
	Total Cost	Labor	Subs	OCDs	
Monthly Ave.	$ 328	$ 105	$ 184	$ 39	

Average is calculated for the period April 2007 thru March 2008 - 12 months.
This period included payments to TRS for the thermal remediation.
The cost of energy for ERH was directly paid by EPA, and is not included in this sum

Attachment 3

Photographs of the updated phone numbers on the site signs

Photograph of site entrance sign showing updated phone number

Close-up of site entrance sign with updated phone number

Attachment 4

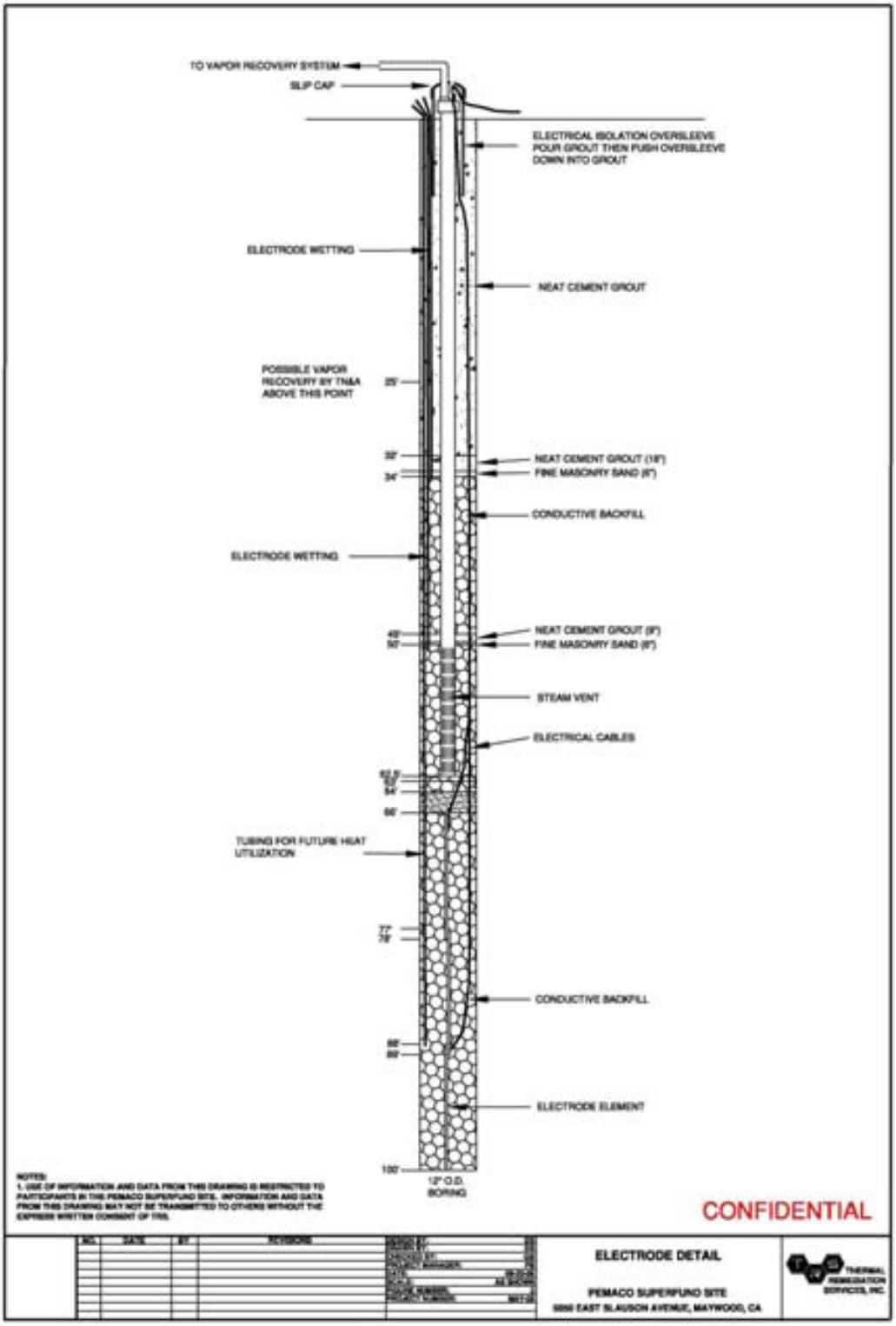
Includes photos of electrode casings taken on March 10, 2010

Caps and grout on electrode pipe taken March 10, 2010

Attachment 5

Includes a schematic illustration of ERH electrodes

ERH electrode schematic



Attachment 6

Includes photos of soccer field area in Maywood Riverfront Park

Maywood Riverfront Park soccer field area taken March 9, 2010

Maywood Riverfront Park soccer field area taken March 23, 2010

Maywood Riverfront Park soccer field area taken March 23, 2010

Maywood Riverfront Park soccer field area taken March 23, 2010

Appendix D (continued)

Site Inspection
Pemaco Superfund Site,
Maywood, California

Photo Log

Photo 1: SP-110 to SP-117. May 27, 2010

Photo 2: Knockout tank T-101 in foreground with Carbon tanks T-302 in background. May 27, 2010.

Photo 3: Compressed air tank. T-601. May 27, 2010

Photo 4: SP-204 and clean filter bag ready to be inserted into filter bag housing. May 27, 2010.

Photo 5: Liquid phase carbon adsorber tanks T-302, and SP-205 to SP-208. May 27, 2010.

Photo 6: Vacuum blowers. May 27, 2010

Photo 7: Flame Thermal Oxidizer at East end of plant. May 27, 2010.

Photo 8: Flame Thermal Oxidizer view 2. May, 27 2010

Photo 9: SP-104 and blower control panel. May 27, 2010

Photo 10: View of treatment plant facing southwest and vapor condenser. May 27, 2010.

Photo 11: View of ERH area facing North. DB-12 in foreground.

Photo 12: View of Maywood Riverfront Park arroyo area facing North. May 27, 2010.

Photo 13: View of ERH area fencing and MW-2-95 and SV-05. May 27, 2010.

Photo 14: Jeff Waggle repairing well box at PB-04. May 26, 2010.

US Environmental Protection Agency

Appendix E
Interviews with Community Members and Technical Staff for Pemaco Superfund Site Maywood, California

Prepared by: US Environmental Protection Agency, Region 9, San Francisco, California

August 2010

Appendix E
Interviews with Community Members and Technical Staff

INTERVIEW DOCUMENTATION FORM			
The following is a list of individuals interviewed for the technical and residential interview evaluation performed for this five-year review. See the attached contact records for a detailed summary of the interviews. Interviews were conducted by Joe Corrick and Tiffany Angus of Sullivan International Group.			
Name	**Title/Position**	**Organization**	**Date**
1. John Wingate	Project Engineer	OTIE Solutions	05/04/10
2. Mark Prostko	Remedial Construction Manager	OTIE Solutions	05/04/10
3. Tom Powell	Operations Group Manager	TRS	05/04/10
4. Eva Davis	Hydrologist	US EPA	05/05/10
5. Hector Cervantes	Resident	N/A	05/05/10
6. Louis Caravello	Principal	Heliotrope Elementary	05/10/10

INTERVIEW RECORD

Site Name: Pemaco	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 0930	**Date:** 05/04/10
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Joe Corrick	**Title:** Environmental Scientist	**Organization:** Sullivan International

Individual Contacted:

Name: John Wingate	**Title:** Project Engineer	**Organization:** OTIE Solutions
Telephone No: (805) 585-6389 **Fax No:** **E-Mail Address:** jWingate@otie.com	**Street Address:** OTIE Solutions 317 East Main Street **City, State, Zip:** Ventura, CA 93001	

Summary Of Conversation

1. **What is your overall impression of the project? (scale of 1-5 and why)**
Mr. Wingate indicated that he would give the project an overall score of 4 because he felt that there were opportunities for improvement that includes the shutdown of SVE at select wells where contaminants concentrations are non-detectable.

2. **Have there been routine communications or activities conducted by your office regarding the site?**
Mr. Wingate indicated that while in the past 2 years he had only been contacted when problems arose with the SCADA or totalizer, his office played a critical role in managing the site and its routine sampling activities.

3. **Have there been complaints, violations, or other incidents related to the site requiring a response from your office?**
Mr. Wingate said that there were no violations, complaints, or incidents that required a response from OTIE.

4. **Do you feel well informed of the sites progress?**
He felt that, while his current role in limited, he was aware of the site progress.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
He indicated that there were several opportunities for plant optimization that included the turning off of wells whose vapor contaminant output concentrations were non-detectable, and shutting down the refrigerated chiller (RC-201) along with the cooling tower (CT-201) and heater (H-202) due to the temperature and relative humidity readings.

INTERVIEW RECORD

Site Name: Pemaco	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 1045	**Date:** 05/04/10
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Joe Corrick	**Title:** Environmental Scientist	**Organization:** Sullivan International

Individual Contacted:

Name: Mark Prostko	**Title:** Remedial Construction Manager	**Organization:** OTIE Solutions
Telephone No: (856) 491-6950 **Fax No:** **E-Mail Address:** mprostko@otie.com	**Street Address:** OTIE Solutions 317 East Main Street **City, State, Zip:** Ventura, CA 93001	

Summary Of Conversation

1. **What is your overall impression of the project? (scale of 1-5 and why)**
Mr. Prostko gave the site a 5. He felt that the design was good. While there were some problems during the initial phases of construction and operation including the collapse of the knockout tank, there were no major problems. He illustrated this by describing how the FTO, once operational, was off in 6-8 months indicating a successful pump and treat design.

2. **Have there been routine communications or activities conducted by your office regarding the site?**
As the former site manager Mr. Prostko was aware of and participated in all communications and activities regarding the site.

3. **Have there been complaints, violations, or other incidents related to the site requiring a response from your office?**
There were some community complaints but none turned out to be the fault of the site itself. All other incidents were dealt with in a timely fashion. He is not aware of any violations that occurred at the site.

4. **Do you feel well informed of the sites progress?**
While he was involved at the site he felt well informed of all site progress and activities.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
Mr. Prostko had no suggestions for change at the site.

INTERVIEW RECORD

Site Name: Pemaco	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 1400	**Date:** 05/04/10
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Joe Corrick	**Title:** Environmental Scientist	**Organization:** Sullivan International

Individual Contacted:

Name: Tom Powell	**Title:** Operations Group Manager	**Organization:** TRS
Telephone No: (406) 837-0862 **Fax No:** **E-Mail Address:**	**Street Address:** TRS 7421-A Warren SE **City, State, Zip:** Snoqualmie, WA 98065	

Summary Of Conversation

1. **What is your overall impression of the project? (scale of 1-5 and why)**
Mr. Powell said that the site was a success. He gave the design and implementation of the ERH system a rating of 5.

2. **Have there been routine communications or activities conducted by your office regarding the site?**
Mr. Powell indicated that there was a weekly management review conference call that he was part of during his participation on the project (during the installation and ERH heating activities). He also indicated that there was regular monitoring of the TMPs and this data was available.

3. **Have there been complaints, violations, or other incidents related to the site requiring a response from your office?**
Mr. Powell was not aware of any violations or complaints, but there was an incident where an electrode failed. He expressed that he would have liked to replace it. Other than that there were no incidents that he was aware of.

4. **Do you feel well informed of the sites progress?**
He felt as though he had good communications with OTIE/TN&A, however he felt as though he was on the outside looking in, in the sense that he was not part of the regular decision making process with the Army Corps and EPA.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
He said that if he were to do it again he would have liked to see focus change from temperature-driven to remediation-driven progress goals. He felt that the focus had changed from site remediation to temperature milestones during the course of the heating process. He felt that the success of the ERH system was being judged solely by temperature milestones rather than by actual decreases in contamination levels.

INTERVIEW RECORD

Site Name: Pemaco	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 1015	**Date:** 05/05/10
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Joe Corrick	**Title:** Environmental Scientist	**Organization:** Sullivan International

Individual Contacted:

Name: Eva Davis	**Title:** Hydrologist	**Organization:** US EPA
Telephone No: (580) 436-8548 **Fax No:** **E-Mail Address:** davis.eva@epamail.epa.gov	**Street Address:** U.S. EPA Region 9 75 Hawthorne Street **City, State, Zip:** San Francisco, CA, 94105	

Summary Of Conversation

1. **What is your overall impression of the project? (scale of 1-5 and why)**
Ms. Davis indicated that she would give the site a 5. She felt that the thermal remediation, which was where she was most involved, was very successful. She indicated that she felt there was a lack of NAPL, which is more typical of sites of this kind, and that she was pleased that the system was effective in reducing groundwater and soil vapor concentrations.

2. **Have there been routine communications or activities conducted by your office regarding the site?**
Ms. Davis indicated that she was a part of a weekly conference call regarding the progress of the site.

3. **Have there been complaints, violations, or other incidents related to the site requiring a response from your office?**
She was not aware of any violations or complaints. She said that once issues with the system were worked out everything seemed to work well.

4. **Do you feel well informed of the sites progress?**
Although she is no longer involved in the project she indicated that she was no longer able to access the Pemaco website to review the latest data from the ERH.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
She did not have any suggestions regarding the current operations.

INTERVIEW RECORD

Site Name: Pemaco	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 1015	**Date:** 05/05/10
Type: ☐ Telephone ☑Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Tiffany Angus	**Title:** Project Chemist	**Organization:** Sullivan International

Individual Contacted:

Name: Hector Cervantes	**Title:** None	**Organization:** None
Telephone No: (**Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. **What is your overall impression of the project? (scale of 1-5 and why)**
Mr. Cervantes indicated that he felt the project was good. He said that although he no longer works on site or goes to meetings, he knew things there were going well and getting better. He also indicated that other residents ask him about the site.

2. What effects have site operations had on the surrounding community?
Mr. Cervantes expressed that in general, the community feels good and that they feel safe. He said in the beginning he had the opportunity to explain to people what the system was doing because he worked on site. He said that because he had ten years of previous experience at another system so he knew things were getting better. He indicated that he has explained to other community members that they are safer because of site activities. He said that when the park was first constructed mothers were afraid to bring their children to the park, but now people use it all the time and feel safe.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**
Mr. Cervantes said that a few people are scared about soil piles. They asked him "why are they there? What are they going to do with it?" He told them it is safe, and if the plastic is ripped you can call the City of Maywood. He also said that he thought people are concerned about their (tap) water and sometime think it is something to do with the site. He said the City of Maywood explains at City Hall meetings that is a different problem. Sometimes people ask him when it will be done and he tells them in 5 years or more. He said that residents do not know how long cleanup will take.

4. **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.**
He said that no, he was not aware of any. He mentioned that the guards are always there, and the residents talk to each other. He felt that this neighborhood is the most secure part of Maywood, because the police always come at night on the 59 (59th St). Mr. Cervantes mentioned that sometimes people from other cities come up walk (river walkway) and do drugs and drink on walkway. He felt that the police can't do anything about it because they run to the next city.

5. **Do you feel well informed about the site's activities and progress?**
He said that right now people in the community are thinking about other things, like the high school they want to build on King St., and (tap) water problems. Mr. Cervantes indicated that people no longer go to meetings because they do not understand. He said that residents felt that the meetings are too technical and people do not understand what that means to them. He said that maybe residents are not worried anymore because the park is open.

6**. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
Mr. Cervantes indicated that no, he sees the guys working there and feels good.

INTERVIEW RECORD

Site Name: Pemaco	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 1015	**Date:** 05/10/10
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Joe Corrick	**Title:** Environmental Scientist	**Organization:** Sullivan International

Individual Contacted:

Name: Louis Caravello	**Title:** Principal	**Organization:** Heliotrope Elementary School
Telephone No: (323) 560-1230 **Fax No:** **E-Mail Address:**	**Street Address:** 5911 Woodlawn Avenue **City, State, Zip:** Maywood, CA 90003	

Summary Of Conversation

1. **What is your overall impression of the project? (scale of 1-5 and why)**
Mr. Caravello had a good overall impression of the site. He indicated that he was aware of the site having contaminated groundwater and soil and that the park was clean. He also said that in a previous job he worked for a state assembly person who was directly involved in the DTSC, so he was able to assuage concerns that parents have been having regarding the site and that he didn't want people to believe political scare tactics.

2. What effects have site operations had on the surrounding community?
Mr. Caravello said that some parents had been worried about the park being clean for their kids. He reiterated that he was familiar with Superfund sites and was able to discuss it with parents. He said that he remembered when there was a "smoke stack" at the site a few years ago and there were many concerns regarding the output from that but he was confident that it was safe.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**
No, he was not aware of any complaints or current concerns.

4. **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, he was not.

5. **Do you feel well informed about the site's activities and progress?**
As the Principal of the Elementary School he felt informed about reports and community meetings. He said that they were too technical for him to fully understand, but he felt as though he has been kept in the loop.

6**. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
He indicated that he felt it was positive to have the community meetings at the Elementary School. He thought that it provides a safe place were community members could feel comfortable. He thought that the meetings were conducted well. He indicated that although people that already have a negative opinion will probably keep their

negative opinion. He also expressed some dissatisfaction with the City of Maywood with regard to them fencing off the Riverfront Park when it first opened. He stated that he had heard from many parents regarding their concerns about the park's safety for their children. He had been frustrated because he felt that the City officials had closed the site for political reasons.

INTERVIEW RECORD

Site Name: Pemaco	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 1015	**Date:** 05/10/10
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Joe Corrick	**Title:** Environmental Scientist	**Organization:** Sullivan International

Individual Contacted:

Name: Dave Mango	**Title:** Director of Building and Planning	**Organization:** City of Maywood
Telephone No: (323) 562-5721 **Fax No:** **E-Mail Address:**	**Street Address:** 4319 East Slauson Avenue **City, State, Zip:** Maywood, California 90270	

Summary Of Conversation

1. **What is your overall impression of the project? (scale of 1-5 and why)**
Mr. Mango said that he would consider this project to be a success. He said that although it was politically charged, it settled down and is doing well.

2. **Have there been routine communications or activities conducted by your office regarding the site?**
No. Mr. Mango said that although he used to be in regular communication with Mark Prostko, he is no longer in regular communication regarding the site.

3. **Have there been complaints, violations, or other incidents related to the site requiring a response from your office?**
He has not received any.

4. **Do you feel well informed of the sites progress?**
Mr. Mango said yes, he does feel well informed.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**
He said no, he does not have any suggestions.

APPENDIX F

Table 7-1
Optimization Opportunities

Appendix F
Optimization Opportunities

Item #	Optimization Opportunity	Justification
(1)	Disconnect wells DA-2 and DA-6 from extraction system.	Recent (October 2009 and January 2010) contaminant concentrations in vapor and groundwater in DA-2 and DA-6 have been below detection limits. By shutting these wells down, the system could draw from wells with higher contaminant concentrations, thus enabling the system to operate more efficiently. Similarly, all other wells with concentrations below detection limits should be taken offline. This will allow the system to operate more efficiently, drawing only from those wells with the highest contaminant concentrations. The off-line wells should be checked for rebound as soon as new monitoring data become available, and groundwater extraction restored, if needed. Also: Several wells (e.g., DA-2) contain very silty water that is being pumped into the system, causing the bag filters to need frequent replacement. Slowly shutting these wells off, as their concentrations drop below detection limits, could also assist in reducing the number of needed changes of the bag filters.
(2)	Disconnect the refrigerated chiller (RC-201), the cooling tower (CT-201), and heater (H-202).	The current temperature (80-90°F) and relative humidity reading (25-37%) of vapor flowing through the treatment system are within the ideal operational range of the granular activated carbon (GAC); i.e., relative humidity at or below 50% and temperatures between 80 and 120°F. As long as the observed temperature and relative humidity are within range, there is no need for the vapor to run through the refrigerated chiller, the cooling tower, and the heater. The pressure, temperature, and relative humidity are measured daily; if these values fall outside the ideal operational range of the GAC, the vapor-conditioning systems can be brought back online. For example, in the summer, when temperatures in the treatment plant exceed 100°F, the temperature in the lines may exceed 120°F, and the vapor-conditioning system can be reconnected. The System Control and Data Acquisition (SCADA) system will need to be re-programmed to allow the by-pass of the refrigerated chiller, the cooling tower, and heater when the vapor is within the operational range of the GAC, to prevent alarm activation.
(3)	Alternate running vacuum pumps (B-101 and B-102).	Using the same logic as in Item #1, the Liquid Ring Pumps (LRPs; B-101 and 102) should not be used to extract vapor from wells with low or non-detectable vapor concentrations. On a quarterly basis, wellhead vapor concentrations should be measured; those wells with vapor concentrations above the clean-up threshold should continue to be extracted from, and those that are below the threshold should be turned off. It is estimated that the plant can be operated in this manner using a single vacuum pump. Since the LRPs are the largest consumer of electricity in the plant, this practice will yield a significant electrical savings.
(4)	Plant floor layout optimization. (Sell the flameless thermal oxidizer.)	The flameless thermal oxidizer (FTO) is the most expensive piece of equipment in the plant, takes up the most floor space, and is no longer cost-efficient to operate at the Pemaco Site. The value of the FTO is depreciating, even in its idle state, because new technologies are being developed that will make it obsolete. If the project is to recoup any funds from the FTO, it needs to be sold ASAP. With the FTO (and associated NaOH tank) removed, the plant floor will have improved functionality for maintenance and space for an office, so that the trailer can be removed from the site.

Table 7-1: Optimization Opportunities (Continued)

Item #	Optimization Opportunity	Justification
(5)	New vapor-line connection from F-103 and F-104 (Oil Mist Filter) to the vapor line prior to H-201A/B/C (Vapor Heat Exchanger).	A new straight line between these two systems (now possible, with the FTO permanently offline) would allow for more accurate vapor-flow measurements, which are critical to optimizing the extraction scenario in Item #3. It is proposed that new temperature and relative humidity monitoring ports be installed in the new line to help determine when the vapor-conditioning system will need to be put back online.
(6)	Concentrations of TCE and total VOCs before treatment by GAC is less than discharge permit.	Since the TCE and total VOC concentrations are well below the discharge permit limit of 1,000 µg/L for total VOC concentrations (typically <100 µg/L) prior to treatment by the GAC, then the GAC could be by-passed to reduce treatment costs.
(7)	Change Liquid Phase GAC filters from series arrangement to individual arrangement.	Gradual particulate buildup on the LGAC causes backpressure, necessitating more frequent change-outs of F-403 and F-404 and causing more frequent alarms. The cause appears to be particles, predominantly <1 micron, which cake the top of the GAC. If contaminant concentrations in groundwater are below sewer permit levels, then changing the LGAC from a series arrangement to a "one at a time" arrangement will reduce backpressure, prolong the life of F-403/404, and reduce the frequency of alarms. This change requires a review of tank valving, an operational practice update, and the addition of tank signage.
(8)		EPA Headquarters will work with the Army Corps of Engineers to conduct a full system optimization during fiscal year 2011.

US Environmental Protection Agency

Appendix G
Risk Assessment and Toxicology Analysis

for
Pemaco Superfund Site
Maywood, California

Prepared by: SulTRAC
Chicago, Illinois, and
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Prepared for: US Environmental Protection Agency, Region 9,
San Francisco, California

August 2010

Appendix G
TECHNICAL MEMORANDUM

Risk Assessment and Toxicology Analysis Memorandum for the Pemaco Superfund Site

This memorandum presents an analysis of the risk assessment presented in the Record of Decision (ROD) for the Pemaco Superfund Site (Pemaco). The ROD, which EPA officially signed on January 13, 2005, presents the overall selected remedy for Pemaco. This analysis includes an evaluation of any changes in site conditions, exposure pathways, contaminant characteristics, and toxicity values since the site remedy was selected for Pemaco. This evaluation will aid in the 5-year review of the remedy selected for Pemaco to determine if the selected remedy is still protective of human health and the environment.

Background

Because the subsurface environment and contamination levels found at Pemaco are highly variable, EPA has divided Pemaco into three remediation zones and developed cleanup remedies for each individual zone. These remediation zones include 1) the surface and near-surface soil zone (0 - 3 feet below ground surface [ft bgs]); 2) the upper vadose zone soil and perched groundwater (3 - 35 ft bgs); and 3) the lower vadose zone soil and Exposition groundwater (35 - 100 ft bgs). Perched groundwater typically occurs at depths ranging from 20 to 40 ft bgs. Exposition groundwater includes five distinct saturated zones separated by silt/clay intervals. These zones have been informally named, from top to bottom, Exposition 'A' through 'E' groundwater zones, with zones 'A' through 'E' typically found from 65 to 75 ft bgs, 80 to 90 ft bgs, 95 to 110 ft bgs, 125 to 145 ft bgs, and 160 to 175 ft bgs, respectively. The groundwater remediation zone for the Exposition Zone includes groundwater only from the 'A' and 'B' zones.

Perched groundwater under Pemaco has poor quality and very low transmissivity. The Exposition groundwater zone is not currently used as a drinking-water source. However, the Exposition groundwater zone is designated by the Los Angeles Regional Water Quality Control Board as being a potential drinking-water source. Local production wells for drinking water are screened in aquifers located in the deeper San Pedro Formation (350 to 1,500 ft bgs).

The overall selected remedy for the entire site is composed of all the remedial alternatives selected for each remediation zone. Remedial alternatives implemented for the surface and near-surface soil zone include excavation and disposal of contaminated soil and soil capping. Dual-phase extraction and treatment of extracted groundwater and vapors have been implemented for both 1) the upper vadose zone and perched groundwater and 2) the lower vadose zone and Exposition Zone. Electrical Resistance Heating (ERH) has also been implemented to remediate source areas in the lower vadose zone and Exposition Zone. In addition, the ROD requires that the City of Maywood prohibit residential use of the property through zoning and suggested that a State of California Land Use Covenant with the City of Maywood. These institutional controls (ICs), once implemented, will protect the integrity of the remedial action to protect against future

land and groundwater use risks. Although these ICs have not yet been implemented, they are not currently necessary to prevent exposure and no actions have violated the land-use restrictions.

Current Site Conditions

The Pemaco Superfund Site is located in east Los Angeles County, in the City of Maywood along the Los Angeles River. It is bounded to the north by Slauson Avenue, to the west and south by residential and light industrial properties, and to the east by the concrete-lined Los Angeles River. The current site covers 1.4 acres adjacent to the Maywood Riverfront Park; however, the original site comprised approximately 4 acres. The northern portion of the original site, in addition to land previously owned by W. W. Henry, Precision Arrow, Catellus, Los Angeles Junction Railway, and Lubrication and Oil Services, became part of the Maywood Riverfront Park. Construction of the park began in March 2005 and was completed in June 2006.

The only major physical change at Pemaco since the ROD was completed in 2005 is that the northern portion of the site has become part of the Maywood Riverfront Park. This has not resulted in any additional human or ecological receptors potentially at risk or any additional exposure pathways and has not changed the protectiveness of the selected remedies. The risk assessment presented in the ROD concluded that "Due to the urban location of Pemaco, no risks to ecological receptors are anticipated, therefore an ecological risk assessment was not performed."

Exposure Pathways Evaluated in the Risk Assessment

The potential receptors and exposure pathways evaluated in the human health risk assessment presented in the ROD include the following:

- A current trespasser exposed to surface soils via the ingestion, dermal, and inhalation exposure pathways.
- A future park user exposed to surface soil via the ingestion, dermal, and inhalation exposure pathways. Playing soccer was used as the activity representative of the reasonable maximum exposure of a park user.
- A future excavation worker exposed to surface and subsurface soils (to 15 ft bgs) by the ingestion, dermal, and inhalation exposure pathways. An excavation worker represents a worker who may excavate properties that are being redeveloped after previous industrial activities.
- A future on-site resident exposed to surface soils and to groundwater via the ingestion, dermal, and inhalation exposure pathways, and by vapor intrusion from volatile organic compounds (VOCs) detected in on-site shallow soil gas.
- A current off-site resident inhaling chemicals volatilizing from the on-site subsurface soil and the perched groundwater, or from perched groundwater plumes that were migrating offsite prior to remediation activities.

These potential receptors and exposure pathways evaluated in the ROD remain appropriate for current and future land uses at Pemaco. Future land use at Pemaco includes the full incorporation of the site as part of the Maywood Riverfront Park. In addition, EPA has made a conservative (health-protective) assumption that groundwater from the perched zone and the Exposition Zone at Pemaco may be used in the future for domestic purposes. Although institutional controls will be implemented to prohibit residential use of the property and to restrict groundwater use at the site, the human health risk assessment evaluated these pathways in the event current land use plans change at Pemaco.

Exposure Pathways Accounted for by Remediation Levels

The groundwater remediation levels for Pemaco were developed under the assumption that groundwater from the perched zone and the Exposition Zone may be used in the future for domestic purposes. The remediation levels for subsurface soil were developed under the assumption that contaminants in soil could leach to groundwater in either the perched zone or the Exposition Zone, and that groundwater from these zones may be used for domestic purposes by hypothetical future residents. The more stringent of the California Department of Public Health maximum contaminant levels (MCLs) or the federal EPA MCLs were used as groundwater remediation levels. If a designated MCL was not available, EPA Region 9 tap-water Preliminary Remediation Goals (PRGs) were used as remediation levels. For chemicals lacking MCLs or PRGs, other health-based standards and effluent limits were used as remediation levels. Exposure pathways considered in the calculation of tap-water PRGs include groundwater ingestion and inhalation of volatiles from household use of groundwater (e.g., showering, laundering, and dish washing).

The remediation levels for Pemaco are currently protective for the potential exposure pathways present under current and future land uses proposed at the Pemaco property. Future land use at Pemaco includes the full incorporation of the site into the Maywood Riverfront Park and the conservative (health-protective) assumption that groundwater from the perched zone and the Exposition Zone at Pemaco may be used in the future for domestic purposes. The remediation levels do not account for exposure pathways that would be present under an unrestricted land use scenario such as residential or industrial land use. Remediation levels, for example, have not been established for surface and near-surface soils, because a soil cover and institutional controls currently prevent human exposure to contaminants in surface soil. In addition, remediation levels for polycyclic aromatic hydrocarbons (PAHs) in the upper vadose zone (3 to 35 ft bgs) were established for the soil-leaching-to-groundwater exposure pathway and are less stringent than EPA Region 9 Regional Screening Levels (RSLs) derived to protect residents from direct contact.

Contaminant Characteristics

For this memorandum, analytical data were reviewed to determine if contaminant characteristics have changed and if any additional chemicals should be identified as chemicals of concern (COCs) in soil, groundwater, or vapor. Inorganic chemicals in soil were excluded as COCs if concentrations were less than background levels. The ROD identified COCs warranting remediation if the maximum detected concentration of a chemical was greater than the EPA Region 9 PRG. Unlike the risk assessment presented in the ROD, the frequency of detection or

the statistical distribution of the detected concentrations was not considered when identifying which COCs warranted cleanup goals. As described in the ROD, "by setting remediation levels for the majority of the COCs at MCLs, PRGs, health-based standards, or effluent limits, it is anticipated that the concentrations of the remaining COCs, i.e., those for which no cleanup levels were selected, will be reduced." This is particularly applicable for any COCs that are collocated in soil and groundwater.

Soil Gas. Soil gas sampling has shown that concentrations are well below the California Human Health Screening Levels (CHHSLs) for soil gas for a residential land use scenario (Cal/EPA 2005). Vapor intrusion does not currently appear to be a concern, and no new COCs are present in soil gas.

Soil. Soil sampling has confirmed that VOC concentrations in soil where ERH was performed have decreased to below remediation levels and that no additional VOCs were identified as potential COCs in soil (TN&A 2009). It should be noted that the soil sampling conducted after the ERH was performed was limited to soil samples collected from 25 to 100 ft bgs at locations near temperature monitoring points, and did not include analyses for semivolatile organic compounds (SVOCs) or metals. Thus, analytical data are inadequate to determine whether SVOCs or metals concentrations in soil have changed since the ROD was completed in 2005.

Groundwater. VOC concentrations in groundwater in the perched zone and in Exposition zones 'A' and 'B' have decreased in response to remediation efforts. Analytical results from the latest sampling round in March 2010 did not identify any additional VOCs exceeding current health-based standards in Exposition Zones 'A' and 'B.' VOC concentrations have increased in Exposition Zone 'C' since the ROD was completed in 2005, and in the latest sampling round in March 2010, concentrations of cis-1,2-dichloroethene and trichloroethene (TCE) exceeded MCLs (refer to Figure 6-8 of the Five Year Review report for 'C' Zone data). In addition, TCE concentrations in Exposition Zone 'D' at monitoring well MW25-130 have increased since the ROD was completed in 2005. The TCE concentration in MW25-130 in October 2009 was 120 µg/L, which exceeds the MCL of 5 µg/L (refer to Figure 6-9 of the Five Year Review report for 'D' Zone data). Groundwater from Exposition Zone 'C' is currently being monitored, extracted, and treated. EPA has proposed installing new pumps at monitoring wells MW24-140 and MW25-130 to extract and treat groundwater in Exposition Zone 'D.' Insufficient analytical data are available to determine whether SVOC and metals concentrations in groundwater have increased or decreased since the ROD was completed in 2005.

Changes in Toxicity

Toxicity values used in the human health risk assessment were selected from the following sources, in the following order of preference: 1) EPA's Integrated Risk Information System (IRIS), 2) the Health Effects Assessment Summary Tables (HEAST) (EPA 1997), and 3) toxicity values used to develop the EPA Region 9 PRGs. Consistent with a long-standing agreement between Region 9 and the California Environmental Protection Agency (Cal/EPA), where toxicity values were available from both agencies, Cal/EPA values were applied to evaluate risks at Pemaco whenever the toxicity value was determined to be four times more conservative than the corresponding EPA values (Cal/EPA 1996).

Table G-1 compares the toxicity factors used in the ROD with current toxicity values cited in the EPA Region 9 RSLs (December 2009) and the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database (April 2010). The RSL tables are available at the "Regional Screening Levels for Chemical Contaminants at Superfund Sites" website at http://www.epa.gov/region9/superfund/prg/. Cal/EPA provides cancer slope factors (SFs) in the OEHHA toxicity criteria database; the SFs are available at http://www.oehha.org/risk/ChemicalDB/index.asp.

Many of the toxicity values have changed since the ROD was completed in 2005. As shown in Table G-1, the cancer SFs for 1,2-dichloroethane, chloroform, dibromochloromethane, ethylbenzene, tetrachloroethylene, and vinyl chloride have become more stringent since 2005. The noncancer oral reference dose (RfD) for 1,2-dichloroethane and manganese has also become more stringent. Although the toxicity values have changed for these chemicals, this does not appear to have changed the protectiveness of the selected remedies for Pemaco. The cleanup goals for these chemicals are based on MCLs, and the MCLs have not changed. In addition, the VOCs in soil, for example, do not appear to be a concern because ERH has effectively remediated the VOCs in soil where ERH was performed (TN&A 2009). Furthermore, groundwater monitoring and treatment are still ongoing at Pemaco, and institutional controls will prohibit future extraction of groundwater at Pemaco for purposes other than treatment.

Summary of Analysis

As part of the review of the risk assessment presented in the ROD, this memorandum evaluated changes in site conditions, exposure pathways, contaminant characteristics, and toxicity values since the site remedy was selected for Pemaco. As described above, although changes in site conditions, contaminant characteristics, and toxicity values have occurred since the ROD was completed in 2005, this has not affected the protectiveness of the remedy selected for Pemaco. It should be noted that VOC concentrations in groundwater have increased in Exposition Zones 'C' and 'D.' The remedy is still protective, because groundwater monitoring and treatment are still ongoing at Pemaco and institutional controls will prohibit the extraction of groundwater at Pemaco for purposes other than treatment. EPA has proposed installing new pumps at monitoring wells MW24-140 and MW25-130 to extract and treat groundwater in Exposition Zone 'D.'

Table G-1: Comparison of Toxicity Values Used in the ROD with Current Toxicity Values

Chemicals of Concern	Ingestion Exposure					Inhalation Exposure				
	Oral SF (mg/kg-day)$^{-1}$			Oral RfD (mg/kg-day)		Inhalation SF (mg/kg-day)$^{-1}$			Inhalation RfD (mg/kg-day)	
	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]	Cal/EPA, April 2010 [c]	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]	Cal/EPA, April 2010 [c]	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]
1,1,2-Trichloroethane	5.7E-02	5.7E-02	7.2E-02	4.0E-03	4.0E-03	5.6E-02	5.6E-02	5.7E-02	--	--
1,1-Dichloroethane	5.7E-03	5.7E-03	5.7E-03	1.0E-01	2.0E-01	5.7E-03	5.6E-03	5.7E-03	1.4E-01	--
1,1-Dichloroethene	not listed	--	--	5.0E-02	5.0E-02	--	--	--	5.7E-02	5.7E-02
1,2-Dibromo-3-chloropropane	not listed	8.0E-01	7.0E+00	not listed	2.0E-04	not listed	2.1E+01	7.0E+00	not listed	5.7E-05
1,2-Dichloroethane	9.1E-02	2.0E+00	4.7E-02	3.0E-02	9.0E-03	9.1E-02	2.1E+00	7.2E-02	1.4E-03	2.6E-03
1,4-Dioxane	not listed	1.1E-02	2.7E-02	not listed	1.0E-01	not listed	2.7E-02	2.7E-02	not listed	1.0E+00
Acetone	--	--	--	1.0E-01	9.0E-01	--	--	--	--	8.9E+00
Acetonitrile	not listed	--	--	not listed	--	not listed	--	--	not listed	1.7E-02
Aluminum	--	--	--	1.0E+00	1.0E+00	--	--	--	--	1.4E-03
Arsenic	1.5E+00	1.5E+00	1.5E+00	3.0E-04	3.0E-04	1.5E+01	1.5E+01	1.2E+01	--	4.3E-06
Benz(a)anthracene	7.3E-01	7.3E-01	1.2E+00	--	--	7.3E-01	3.9E-01	3.9E-01	--	--
Benzene	5.5E-02	5.5E-02	1.0E-01	3.0E-03	4.0E-03	2.9E-02	2.7E-02	1.0E-01	1.7E-03	8.6E-03
Benzo(a)pyrene	7.3E+00	7.3E+00	1.2E+01	--	--	7.3E+00	3.9E+00	3.9E+00	--	--
Benzo(b)fluoranthene	7.3E-01	7.3E-01	1.2E+00	--	--	7.3E-01	3.9E-01	3.9E-01	--	--
bis(2-Ethylhexyl)phthalate	1.4E-02	1.4E-02	3.0E-03	2.0E-02	2.0E-02	1.4E-02	8.4E-03	8.4E-03	--	--
Carbazole	not listed	--	--	not listed	--	not listed	--	--	not listed	--
Chloroethane	not listed	--	--	not listed	--	not listed	--	--	not listed	2.9E+00

Table G-1: Comparison of Toxicity Values Used in the ROD with Current Toxicity Values (Continued)

Chemicals of Concern	Ingestion Exposure					Inhalation Exposure				
	Oral SF (mg/kg-day)$^{-1}$			Oral RfD (mg/kg-day)		Inhalation SF (mg/kg-day)$^{-1}$			Inhalation RfD (mg/kg-day)	
	Table 7-2a from ROD [(a)]	Region 9 EPA, December 2009 [(b)]	Cal/EPA, April 2010 [(c)]	Table 7-2a from ROD [(a)]	Region 9 EPA, December 2009 [(b)]	Table 7-2a from ROD [(a)]	Region 9 EPA, December 2009 [(b)]	Cal/EPA, April 2010 [(c)]	Table 7-2a from ROD [(a)]	Region 9 EPA, December 2009 [(b)]
Chloroform	3.1E-02	3.1E-02	3.1E-02	1.0E-02	1.0E-02	1.9E-02	8.1E-02	1.9E-02	8.6E-04	2.8E-02
Chromium (total)	not listed	--	--	not listed	--	not listed	--	--	not listed	--
cis-1,2-Dichloroethene	--	--		1.0E-02	1.0E-02	--	--	--	--	--
Dibenz(a,h)anthracene	7.3E+00	7.3E+00	4.1E+00	--	--	7.3E+00	4.2E+00	4.1E+00	--	--
Dibromochloromethane	8.4E-02	8.4E-02	--	2.0E-02	2.0E-02	8.4E-02	9.5E-02	--	--	--
Ethylbenzene	3.9E-03	1.1E-02	1.1E-02	1.0E-01	1.0E-01	3.9E-03	8.8E-03	8.7E-03	2.9E-01	2.9E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	7.3E-01	1.2E+00	--	--	7.3E-01	3.9E-01	3.9E-01	--	--
Iron	--	--	--	3.0E-01	7.0E-01	--	--	--	--	--
Isophorone	not listed	9.5E-04	NA	not listed	2.0E-01	not listed	--	--	not listed	5.7E-01
Lead	--	--	8.5E-03	--	--	--	--	4.2E-02	--	--
Manganese	--	--	--	4.66E-02	2.4E-02	--	--	--	1.4E-05	1.4E-05
Methyl isobutyl ketone	not listed	--	--	not listed	8.0E-02	not listed	--	--	not listed	8.6E-01
Methyl tert-butyl ether	1.8E-03	1.8E-03	1.8E-03	8.6E-01	--	1.8E-03	9.1E-04	1.8E-03	8.6E-01	8.6E-01
Methylene chloride	not listed	7.5E-03	1.4E-02	not listed	6.0E-02	not listed	1.6E-03	3.5E-03	not listed	2.9E-01
Naphthalene	not listed	--	--	not listed	2.0E-02	not listed	1.2E-01	1.2E-01	not listed	8.6E-04
Selenium	--	--	--	5.0E-03	5.0E-03	--	--	--	--	5.7E-03
Sulfide	not listed	--	--	not listed	--	not listed	--	--	not listed	--
Tetrachloroethene	5.2E-02	5.4E-01	5.4E-01	1.0E-02	1.0E-02	1.0E-02	2.1E-02	2.1E-02	--	7.7E-02
Thallium	not listed	--	--	not listed	--	not listed	--	--	not listed	--

Table G-1: Comparison of Toxicity Values Used in the ROD with Current Toxicity Values (Continued)

Chemicals of Concern	Ingestion Exposure					Inhalation Exposure				
	Oral SF (mg/kg-day)$^{-1}$			Oral RfD (mg/kg-day)		Inhalation SF (mg/kg-day)$^{-1}$			Inhalation RfD (mg/kg-day)	
	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]	Cal/EPA, April 2010 [c]	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]	Cal/EPA, April 2010 [c]	Table 7-2a from ROD [a]	Region 9 EPA, December 2009 [b]
Toluene	--	--	--	not listed	8.0E-02	not listed	--	--	not listed	1.4E+00
trans-1,2-Dichloroethene	--	--	--	2.0E-02	2.0E-02	--	--	--	--	1.7E-02
Trichloroethene	4.0E-01	5.9E-03	5.9E-03	3.0E-04	--	4.0E-01	7.0E-03	7.0E-03	1.0E-02	--
Vinyl chloride (adult)	1.5E+00	7.2E-01	2.7E-01	3.0E-03	3.0E-03	4.4E-03	1.5E-02	2.7E-01	2.9E-02	2.9E-02
Xylenes (total)	not listed	--	--	not listed	2.0E-01	not listed	--	--	not listed	2.9E-02

Notes:

Values shaded in grey have become more conservative (health-protective) since the ROD was completed in 2005.

a	Toxicity values taken from Tables 7-2a, 7-2b, 7-3a, and 7-3b in the ROD.
b	Toxicity value used to develop EPA Region 9 RSLs, dated December 2009 (**http://www.epa.gov/region9/superfund/prg/index.html).**
c	Toxicity value taken from Cal/EPA OEHHA Toxicity Criteria Database, accessed April 2010 (http://www.oehha.org/risk/ChemicalDB/index.asp).
--	Toxicity value not available.
not listed	A cleanup goal was developed for this chemical, but this chemical was excluded from the risk assessment. Chemicals were excluded from the risk assessment if a chemical was detected in less than 5 percent of the samples analyzed.

Cal/EPA	California Environmental Protection Agency
EPA	United States Environmental Protection Agency
mg/kg-day	Milligrams per kilogram per day
OEHHA	Office of Environmental Health Hazard Assessment
RfD Reference	dose
ROD	Record of Decision, Pemaco Superfund Site, Maywood, California (EPA 2005)
RSL	Regional Screening Level
SF Slope	factor

APPENDIX H

Table 4-3
Maintenance Log Summary

Table 4-3: Maintenance Log Summary: Significant O&M Activities at Pemaco Superfund Site, 2007 – 2010	
Date	**Event**
2007	
January 2, 2007	Impacted Soil transported by Belshire Environmental Services to Clean Harbors, Button Willow, CA; approx. 391 cubic yards in roll-off bins between Jan 2, 2007 and Feb 20, 2007
April 26, 2007	PSC Transportation picks up for transport to Chemical Waste Management, Kettleman City, 5 drums of drill tailings Manifest Foc 54139-A
May 10, 2007	Haz Mat Trans transports used filter bags to Chemical Waste Management
May 27, 2007	Haz Mat Trans transports used filter bags to Chemical Waste Management
June 20, 2007	Replaced granular activated carbon (GAC) in one 3,000-lb liquid-phase vessel
July 3, 2007	Installation of solar panels on treatment system building complete.
July 13, 2007	Haz Mat Trans transports used filter bags to Chemical Waste Management
July 17, 2007	Replaced granular activated carbon (GAC) in one 3,000-lb liquid-phase vessel
July 20, 2007	Haz Mat Trans transports used filter bags to Chemical Waste Management
September 28, 2007	Vehicle crashes into onsite Office Trailer - Locals racing on nearby street
November 2, 2007	Replaced granular activated carbon (GAC) in one 3,000-lb liquid-phase vessel
November 27, 2007	Replaced granular activated carbon (GAC) in one 3,000-lb liquid-phase vessel
2008	
January 3, 2008	Haz Mat Trans transports used filter bags to Chemical Waste Management, Kettleman City
January 24, 2008	Installed moisture trap for B-101 and B-102 to prevent water accumulation in oil reservoirs.
January 31, 2008	Replaced granular activated carbon (GAC) in one 4,000-lb vapor-phase vessel
February 5, 2008	Replaced granular activated carbon (GAC) in one 3,000-lb liquid-phase vessel
February 20, 2008	New water discharge meter installed.
March 3, 2008	Air Compressor - air supply for well pumps serviced
March 11, 2008	Replaced granular activated carbon (GAC) in one 4,000-lb vapor-phase vessel
March 24, 2008	Replacement FTO fan from manufacturer installed. Temperature gauge and differential pressure gauge installed to monitor system fan operation.
March 27, 2008	Haz Mat Trans transports used filter bags to Chemical Waste Management, Kettleman City
April 15, 2008	Replacement of solenoid valve (SV-864) on FTO.
May 6, 2008	FTO maintenance. Repositioning of the impeller shaft within the fan housing.
May 23, 2008	Replaced granular activated carbon (GAC) in second 4,000-lb vapor-phase vessel
June 9, 2008	FTO shut down because concentration of VOCs in vapors decreased enough that use not warranted.
June 12, 2008	Hazmat Trans transports 5 cubic yard bins of used filter bags for disposal by Siemens, Vernon, CA Manifest # 56059-A

Table 4-3: Maintenance Log Summary: Significant O&M Activities at Pemaco Superfund Site, 2007 – 2010	
Date	**Event**
August 10, 2008	Vehicle crashes into onsite Office Trailer - Locals racing on nearby street
August 19, 2008	Haz Mat Trans transports used filter bags to Chemical Waste Management, Kettleman City
September 11, 2008	V&M Iron Works repairs wrought iron fence iron front gate.
October 3 - 10, 2008	New groundwater monitoring wells MW-28 through MW-34 installed by Cascade Drilling
October 8, 2008	Replaced granular activated carbon (GAC) in one 3,000-lb liquid-phase vessel
October 9, 2008	Replaced granular activated carbon (GAC) in one 4,000-lb vapor-phase vessel
October 12, 2008	Air Compressor - air supply for well pumps serviced
October 17, 2008	SCADA reprogrammed to allow well field air supply to be manually opened or closed
October 21, 2008	Groundwater monitoring wells MW-33, -34 and MW-25-110 converted to water pumping wells
October 25, 2008	Monitoring well MW-24-410 re-drilled and new pump installed because heating well field melted pump parts
October 31, 2008	Haz Mat Trans transports used filter bags to Chemical Waste Management, Kettleman City
November 7, 2008	Well Top of Casings re-surveyed using registered surveyors to record elevation
December 17 - 19, 2008	Pumping test conducted in C-zone around MW-24-110.
December 25, 2008	Vehicle crashes through front gate and into onsite Office Trailer - Locals racing on nearby street
2009	
January 9, 2009	Leak fixed at MW-24-140
January 14, 2009	V&M Iron Works removes damaged front gate for repairs
January 15, 2009	Vapor-extraction system shut down to replace Blower B-301 drive belts.
January 15, 2009	Container Outlet Conex box brought to site for storage of excess materials
January 16, 2009	Two cubic yard bins of used filter bags sent to Siemens for disposal in Vernon, CA. Tracking # 58692-A
January 20, 2009	Well MW25-110 converted to pumping well to extract contaminated groundwater from C-Zone.
January 27, 2009	Air Compressor - air supply for well pumps serviced
January 29, 2009	Mobile Modular repairs damage to trailer after vehicle crash incident.
February 11, 2009	V&M Iron Works installs repaired front gate.
March 13, 2009	Cone penetrometer boring CPT-1 advanced by Gregg Drilling south of site trailer, southeast corner of site.
March 18, 2009	Belshire Environmental Services transported a roll-off bin of 17 cubic yards of non-hazardous impacted soil from MW-24-110 to Clean Harbors in Button Willow Landfill for disposal. Manifest No. 53768A, EPA Form No. 678825
March 23 – April 3, 2009	Well redevelopment by Cascade Drilling.
April 22, 2009	Haz Mat Trans transports used filter bags to Chemical Waste Management, Kettleman City

Table 4-3: Maintenance Log Summary: Significant O&M Activities at Pemaco Superfund Site, 2007 – 2010	
Date	**Event**
June 11, 2009	New water discharge meter installed.
July 1, 2009	Haz Mat Trans transports used filter bags to Chemical Waste Management, Kettleman City
July 27, 2009	Replaced internal piping within tanks T-403 and T-404. Replaced granular activated carbon (GAC) in both 3,000-lb liquid-phase vessels
August 17, 2009	Replaced granular activated carbon (GAC) in both 4,000-lb vapor-phase vessels, replaced Dekker oil filters in blowers
August 20, 2009	Well top of casings re-surveyed using registered surveyors to record elevation
August 24, 2009	Golf cart purchased to transport materials and equipment around site
August 27- September 3, 2009	Cone penetrometer test of C-zone. CPT borings CPT-2 through CPT-7 advanced by Gregg Drilling
September 1, 2009	Used oil filters sent to Siemens for disposal in Vernon, CA. Tracking No. 58692- B
September 28 – October 8, 2009	Well Redevelopment and downhole video conducted by Cascade Drilling
October 20, 2009	Air Compressor - air supply for well pumps serviced
October 21, 2009	Water produced through plant has increased by ~ 10% after well development. Water produced before well development - 45,455 gal/day (9/17/09 to 9-24/09) Water produced after well development - 46,119 gal/day (10/13/09 to 10/20/09) Increase in water processed: 4646 gallons (664 gal/day)
October 30, 2009	Safety Kleen – pick up for disposal 5 boxes of used filter bags for disposal at landfill.
November 11, 2009	Brenntag Pacific arrived today and removed 5 empty 50-gallon plastic drums that contained Sodium Hypochlorite 12.5% solution. Drums were returned to their facilities for recycling.
November 19, 2009	Waste oil from blowers and compressor stored in four 55-gallon drums vacuumed out by Evergreen Environmental Vacuum Truck.
November 20, 2009	Evergreen removes 200 gal of waste-oil sludge
November 23, 2009	Paid DTSC permit fees
November 24, 2009	Jaime Hernandez and Ryan Swenson cleaned four Perched Zone wells of sediment, PB-2, PC-6, PD-4, and PD-8. Verified total depth.
November 30, 2009	Haz Mat Trans transports used filter bags to Chemical Waste Management, Kettleman City.
December 9, 2009	New Aqua Loop belts for electric motor driving the cooling tower installed.
December 16, 2009	Safety Kleen picks up 6 drums of oily waste sludge, two CY bins of used filter bags for disposal, and one drum of Acetone free product.
December 29, 2009	Safety Kleen picks up two CY bins of used filter bags for disposal.
2010	
January 12 and 13, 2010	Surface completions of electrodes removed.

Table 4-3: Maintenance Log Summary: Significant O&M Activities at Pemaco Superfund Site, 2007 – 2010	
Date	**Event**
January 14, 2010	Tank 401 cleaned and T added to inlet pipe to diffuse air from well field pumps to minimize sediment disturbance at bottom of tank, thereby minimizing turbidity in water prior to entering filter pots.
February 18, 2010	West Coast Pump electrician services LRP Breaker and LRP connections. Main breaker for LRP good condition, switch mechanism hung up on loose screw. LRP panel in good condition AMP differential of 10 amps at L3 @ 80 and L1 and L2 @ 70. Draw configuration explains difference and working within parameters.
March 9, 2010	Five-year review site inspection.
March 10, 2010	Cap all electrode wells per DTSC recommendation.
March 22, 2010	Float valve replaced in chiller water storage reservoir.
May 25, 2010	Replaced granular activated carbon (GAC) in two 3,000-lb liquid-phase vessels