Third Five-Year Review Report

Purity Oil Sales, Inc. Superfund Site

Fresno County, California

September 2011

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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or relevant and appropriate requirement
bgs	Below ground surface
BHC	Hexachlorocyclohexane
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Act Information System
Chevron	Chevron Environmental Management Company
CFR	Code of Federal Regulations
COC	Contaminant of concern
DCA	Dichloroethane
DCE	Dichloroethene
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethylene
DFW	Definable Features of Work
DHS	Department of Health Services
DNAPL	Dense nonaqueous-phase liquid
DTSC	California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ERD	Enhanced reductive dechlorination
ESD	Explanation of Significant Differences
FID	Fresno Irrigation District
FS	Feasibility study
FFS	Focused feasibility study
FYR	Five-Year Review
GAC	Granular activated carbon
GCL	Geosynthetic clay layer
GDL	Geocomposite drainage layer
GSM	Golden State Market
GWT	Groundwater treatment
HASP	Health and Safety Plan
IC	Institutional control
MCL	Maximum contaminant level
MCWD	Malaga County Water District
mg/kg	Milligram per kilogram
MNA	Monitored natural attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and maintenance

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

OU	Operable Unit
OU-1	Operable Unit 1 - Groundwater and Tanks
OU-2	Operable Unit 2 - Soils
PAH	Polycyclic aromatic hydrocarbon
POTW	Publicly-operated treatment works
ppb	Parts per billion
ppmv	Parts per million volume
PRG	Preliminary Remediation Goal
PRP	Potentially responsible party
Purity Oil	Purity Oil Sales, Inc. Superfund Site
RAO	Remedial action objective
RAWP	Remedial action work plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
ROD	Record of decision
RSL	Regional Screening Level
SAP/QAPP	Sampling and Analysis Plan/Quality Assurance Project Plan
SARA	Superfund Amendments and Reauthorization Act
SSA	Sole source aquifer
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
TBC	To be considered
TCE	Trichloroethylene
Tetra Tech	Tetra Tech EM Inc.
TPH	Total petroleum hydrocarbons
VOC	Volatile organic compound
Water Board	California Central Valley Regional Water Quality Control Board

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) Region 9 has conducted the third Five-Year review (FYR) of the remedy implemented at the Purity Oil Sales, Inc. Superfund Site (Purity Oil) in Malaga, California. This review was performed by the EPA Remedial Project Manager between January 2011 and September 2011. The FYR covers the entire site, and spans the review period from September 28, 2006 through September 28, 2011. This report documents the results of the review.

Purity Oil Operable Units and Remedies:

The site remedies have been divided into two operable units (OU): Operable Unit 1 (OU-1), Groundwater and Tanks, and Operable Unit 2 (OU-2), Soils. The OU-1 remedy involves pumping and treatment of contaminated groundwater to restore the aquifer to beneficial use beneath the property within a reasonable timeframe, and implementation of a groundwater management zone institutional control (IC) strategy. The OU-2 remedy involves neutralization and capping of contaminated soils, extraction and treatment of vapors from contaminated soil, and ICs.

<u>OU-1 Groundwater and Tanks Remedy</u>: In 1990, Chevron removed and properly disposed of seven on-site tanks and their contents to eliminate the direct exposure threat they posed. The selected remedy for groundwater is extraction and treatment. During the period covered by this FYR, the OU-1 pump-and-treat system remedy described in the Record of Decision (ROD) had been decommissioned and the extraction wells removed. Groundwater monitoring data indicate that the groundwater plume remains stable, both in concentration and position, within the core plume area beneath the Purity Oil property.

Additional groundwater monitoring data were collected from monitoring wells installed within the plume area as part of the enhanced reductive dechlorination (ERD) pilot study. The preliminary results of the pilot study indicate that ERD could be an acceptable remedy for the volatile organic compounds (VOC) plume. However, the metals plume could increase if ERD is chosen as a remedy for the VOC plume. As a result, Chevron Environmental Management Company (Chevron) is considering alternate remedies for OU-1 that address both VOC and metals contaminants of concern (COC). Future remedies may rely on several remedial techniques including monitored natural attenuation (MNA), and a contingency plan in the event groundwater levels will return to previous levels (recently they dropped 10 feet). EPA awaits a Focused Feasibility Study (FFS) Addendum to assess remedial alternatives.

The groundwater management zone strategy specified by the OU-1 Record of Decision was intended to coordinate uses of the aquifer with nearby groundwater users, to prevent impact to the groundwater level and, indirectly, the plume and functionality of the associated treatment system. Although the groundwater management zone strategy has not yet been developed, nearby groundwater pumping has not impacted the site.

<u>OU-2 Soil Neutralization and Capping Remedy</u>: In June 2006, construction of the OU-2 soils remedy began as described in the OU-2 ROD amendment. Sludge material was excavated both on the Purity Oil property and adjacent properties. Confirmation samples were collected and excavations on adjacent properties were backfilled with clean, imported fill. The sludge material was neutralized using calcium carbonate and was placed back into the on-site excavation. The neutralized material was then capped with a geosynthetic liner, a geocomposite drainage layer, and an imported fill vegetative cover layer. The cap was graded according to design plans to control

surface water runoff. The cap is being maintained per the 2009 Operations and Maintenance Manual (O&M) and is inspected on a biannual basis.

The OU-2 soils remedy construction was completed with the installation of the soil vapor extraction (SVE) treatment system in July 2010. The system was designed based on a pilot study performed at the site. The system extracts soil vapor with VOCs from the soil just above the groundwater table. The extracted vapors are then dewatered and sent through four 3,000-pound granular activated carbon vessels arranged in a series configuration. The carbon filters out the VOCs and remaining vapor is vented out a discharge stack.

Issues and Recommendations and Follow-Up Actions:

The following issues were identified during the Five-Year Review:

- The selected remedy for OU-1 (groundwater and tanks) is not operating.
- The groundwater management zone strategy called for in the OU-1 ROD has not been developed.
- The OU-2 remedy requirement for ICs to prevent damage to the remedy, as well as the requirement for off-property ICs to prevent exposure to contaminated soils, has not yet been addressed.

The following recommendations and follow-up actions were made to address these issues:

- Chevron will prepare a Focused Feasibility Study Addendum as a follow-up to the completion of a two year, in-situ Enhanced Reductive Dechlorination pilot study performed between 2008 and 2010. The Focused Feasibility Study Addendum will examine remedial alternatives for OU-1 based on data collected during the pilot study as well as data from current site conditions (i.e., operation of the soil vapor extraction system). A final remedy decision for the groundwater operable unit will be made in a decision document by EPA.
- An OU-1 groundwater management zone strategy needs to be developed to outline proper steps to reach the goal of preventing off-site aquifer users from impacting the groundwater plume at the Purity Oil site.
- An institutional controls strategy for OU-2 needs to be developed. This strategy will be included in the OU-2 O&M Manual for EPA approval.

Protectiveness Statement:

The remedy at OU-1 protects human health and the environment in the short term because there are no exposures to groundwater. However, to ensure long-term protection, the following actions need to be taken:

- Completion of a Focused Feasibility Study Addendum to examine remedial options for contaminated groundwater and implementation of a final remedy as specified in a decision document by EPA
- Development of an OU-1 groundwater management zone strategy to outline proper steps to reach the goal of preventing off-site aquifer users from impacting the groundwater plume at the Purity Oil site.

The remedy at OU-2 currently protects human health and the environment because the cap closure system eliminated the direct contact exposure pathway to contaminants. Additionally, the OU-2

remedy includes an SVE system to remove VOCs in the vadose zone soil and at adjacent properties to reduce the potential for vapor intrusion from COCs in underlying contaminated soils into buildings. However, to ensure long-term protection, the following actions need to be taken:

- Development of an implementable institutional controls strategy

Since the remedial actions at OU-1 (groundwater and tanks) and OU-2 (soils) are protective in the short-term, the Purity Oil Sales, Inc. Superfund Site is currently protective of human health and the environment.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Purity Oil Sales, Inc.		
EPA ID *(from WasteLAN)*: CAD 980736151 **CERCLIS ID:** 0921		
Region: 9	**State: CA**	**City/County: Malaga, Fresno County**
SITE STATUS		
NPL status: ☐ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete		
Multiple OUs?* ☒ YES ☐ NO	Construction completion date: N/A	
Has site been put into reuse? ☐ YES ☒ NO		
REVIEW STATUS		
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____		
Author name: Lily Tavassoli		
Author title: Remedial Project Manager	**Author affiliation:** US EPA Region 9	
Review period: 9/28/2006 through 9/28/2011		
Date(s) of site inspection: 1/7/2011 and 3/1/2011		
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 at OU #____ ☐ Actual RA Start at OU#____ ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 9 / 28 / 2006		
Due date *(five years after triggering action date)*: 9 / 28/ 2011		

FIVE-YEAR REVIEW SUMMARY FORM (cont.)

Issues:

- The selected remedy for OU-1 (groundwater and tanks) is not operating.
- The groundwater management zone strategy called for in the OU-1 ROD has not been developed.
- The OU-2 remedy requirement for ICs to prevent damage to the remedy, as well as the requirement for off-property ICs to prevent exposure to contaminated soils, has not yet been addressed in the OU-2 Operations and Maintenance Manual.

Recommendations and Follow-Up Actions:

- Chevron will prepare a Focused Feasibility Study Addendum as a follow-up to the completion of a two year, in-situ Enhanced Reductive Dechlorination pilot study performed between 2008 and 2010. The Feasibility Study Addendum will examine remedial alternatives for OU-1 based on data collected during the pilot study as well as data from current site conditions (i.e. operation of the soil vapor extraction system). A final remedy decision for the groundwater operable unit will be made in a decision document by EPA.
- An OU-1 groundwater management zone strategy needs to be developed to outline proper steps to reach the goal of preventing off-site aquifer users from impacting the groundwater plume at the Purity Oil site.
- An institutional controls strategy for OU-2 needs to be developed. This strategy will be included in the OU-2 O&M Manual for EPA approval.

FIVE-YEAR REVIEW SUMMARY FORM (cont.)

Protectiveness Statement(s):

The remedy at OU-1 protects human health and the environment in the short term because there are no exposures to groundwater. However, to ensure long-term protection, the following actions need to be taken:

- Completion of a Focused Feasibility Study Addendum to examine remedial options for contaminated groundwater and implementation of a final remedy as specified in a decision document by EPA
- Development of an OU-1 groundwater management zone strategy to outline proper steps to reach the goal of preventing off-site aquifer users from impacting the groundwater plume at the Purity Oil site.

The remedy at OU-2 currently protects human health and the environment because the cap closure system eliminated the direct contact exposure pathway to contaminants. Additionally, the OU-2 remedy includes an SVE system to remove VOCs in the vadose zone soil and at adjacent properties to reduce the potential for vapor intrusion from COCs in underlying contaminated soils into buildings. However, to ensure long-term protection, the following actions need to be taken:

- Development of an implementable institutional controls strategy

Since the remedial actions at OU-1 (groundwater and tanks) and OU-2 (soils) are protective in the short-term, the Purity Oil Sales, Inc. Superfund Site is currently protective of human health and the environment.

1.0 INTRODUCTION

The purpose of the Five-Year Review (FYR) is to determine whether the remedy implemented at the Purity Oil Sales, Inc. Superfund Site (Purity Oil) is, or is expected to be protective of human health and the environment. This report documents the methods, findings, and conclusions of the FYR. In addition, this FYR report identifies issues found during the review and recommendations to address them.

The U.S. Environmental Protection Agency (EPA), Region 9 Remedial Project Manager, with the assistance of Pacific Western Technologies, Ltd., and Tetra Tech EM Inc. (Tetra Tech), conducted the third FYR from January 2011 through September 2011 of the remedy implemented at the Purity Oil site in Malaga, California. The FYR covers the entire site, and spans the review period from September 28, 2006 through September 28, 2011. This report documents the results of the review.

The EPA prepared this FYR review report for the Purity Oil site in Fresno County, California, pursuant to the following requirements in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section (§) 121:

> *"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 5 years after the initiation of such remedial action to assure that human health and the environment is 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."*

This requirement is further described as follows in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) in Title 40 of the *Code of Federal Regulations* (CFR), § 300.430(f)(4)(ii):

> *"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 5 years after the initiation of the selected remedial action."*

The third statutory FYR is required because hazardous substances, pollutants, or contaminants remain on site at levels that exceed levels required to allow unlimited site use and unrestricted exposure. This is the third FYR for the Purity Oil site. The triggering action for this review was the completion of the second FYR report on September 28, 2006. The completed third FYR report will be available in the information repository for the Purity Oil site. Notice of its completion will be placed in the local newspaper.

2.0 SITE CHRONOLOGY

This section lists the chronology of events for the Purity Oil site.

Date	Event
1980-1981	California Central Valley Regional Water Quality Control Board (Water Board) conducts surface water and groundwater sampling.
February 1982	EPA, Department of Health Services (DHS), and Water Board perform site investigation.
September 1983	Site placed on National Priorities List (NPL).
January 1986	EPA becomes lead agency.
May 1986	DHS issues a remedial investigation (RI) report.
May 1986	EPA implements emergency response "tarry" soil removal.
September 1987	EPA implements emergency response oil and water removal.
October 1988	EPA issues supplemental RI report.
April 1989	EPA issues feasibility study (FS) and proposed plan for soils and groundwater.
September 1989	EPA issues Record of Decision (ROD) for Operable Unit 1 (OU-1), Groundwater and Tanks.
October 1990	EPA conducts remedial action to remove seven tanks.
September 1991	Unilateral Administrative Order issued to potentially responsible parties (PRP) to design and construct groundwater remedial action.
March 1992	Alternate drinking water supply provided to down-gradient private well users.
June 1992	PRPs prepare revised proposed plan for Operable Unit 2 (OU-2), Soils.
September 1992	EPA issues ROD for OU-2.
January 1994	On-site construction of OU-1 begins.
December 1994	Groundwater treatment system commissioned and begins operation.
July 1996	EPA issues Explanation of Significant Differences (ESD) for OU-2 remedy to revise design requirements.
1998	Chevron Environmental Management Company (Chevron) settles with other PRPs and becomes sole responsible party.
February 1998	Existing portions of the North Central Canal that abut the site were enclosed within a reinforced concrete pipe.
December 1998	Consent Decree entered.
February 2000	Construction of OU-2 remedy begins.
March 2001	EPA issues second ESD to temporarily relocate residents during construction of OU-2 remedy.

September 2001	EPA completes First FYR.
October 2001	Residents relocated from Tall Trees Mobile Home Park.
July 2002	Bench-scale testing to evaluate most effective solidification and neutralization reagents for treating acidic materials ends; Quicklime® deemed most effective.
December 2002	EPA confirms contamination from Purity property has impacted the following neighboring properties: Bruno's Iron and Metal, Tall Trees Mobile Home Park, Golden State Market (GSM), and Pick-A-Part Auto Wrecking.
June 2003	Pilot-scale testing of Quicklime® and calcium carbonate as neutralization agents ends; calcium carbonate deemed most effective.
October 2003	Chevron submits OU-1 improvement evaluation recommending monitored natural attenuation (MNA) as most effective OU-1 remedy.
December 2003	EPA approves MNA as part of the OU-1 remedy with the caveat that additional remedial action alternatives would be evaluated before selecting the final groundwater remedy.
April 2005	EPA releases OU-2 Proposed Plan for the OU-2 soils remedy.
June 2005	OU-1 extraction wells and treatment system are shut down to begin construction of the OU-2 soil cap.
September 2005	Chevron completes draft OU-2 Remedial Action Work Plan (RAWP).
January 2006	Chevron submits OU-2 RAWP.
March 2006	Chevron submits OU-1 focused feasibility study (FFS).
May 2006	Chevron submits the Test Pit Investigation Work Plan.
July 2006	EPA completes OU-2 soils remedy ROD amendment.
August 2006	Chevron submits Addenda to the RAWP for GSM.
September 2006	EPA completes Second FYR.
October 2006	Chevron submits for EPA approval revised RAWP and Sampling and Analysis Plan/ Quality Assurance Project Plan (SAP/QAPP) that reflects ROD amendment and GSM addenda.
May 2007	Chevron purchases GSM front and backyard properties.
September 2007	Chevron submits OU-1 Enhanced Reductive Dechlorination (ERD) Pilot Study Work Plan.
January 2008	Chevron submits Final Groundwater Monitoring Well Replacement Work Plan.
January 2008	Chevron submits Revised Work Plan for Soil Vapor Investigation.
March 2008	Chevron installs additional groundwater monitoring wells: eight in the shallow groundwater zone, four in the intermediate groundwater zone, and two in the deep groundwater zone.

May 2008	Chevron submits Soil Vapor Investigation Report.
May 2008	Chevron submits Work Plan for Soil Vapor Extraction (SVE) Pilot Test.
May 2008	Chevron submits Final SVE SAP.
October 2008	Chevron submits Final OU-2 (Soils) Completion Report.
March 2009	Chevron submits Final Operation and Maintenance (O&M) Manual for OU-2.
January 2010	Chevron submits Final SVE Pilot Test Results and Conceptual Soil SVE System Design.
March 2010	Chevron submits revised Final OU-2 Completion Report.
March 2010	Chevron begins construction of SVE system.
April 2010	Chevron submits Work Plan for SVE and Treatment System Operations and Maintenance.
July 2010	Chevron completes construction and starts SVE system.
November 2010	EPA approves reduction of OU-2 O&M cap inspections from quarterly to biannual.
February 2011	Chevron submits first Quarterly Operations Summary Report for SVE Treatment System.

3.0 SITE BACKGROUND

The Purity Oil site is located on a 7-acre parcel at 3281 South Maple Avenue (at Golden State Boulevard) approximately 0.5 miles south of the Fresno city limits in an unincorporated area of the Malaga township (Figure 1).

The site is located in a mixed-use area and is surrounded by agricultural and industrial land to the west, a metal recycling facility to the north (Bruno's Iron and Metal), a convenience market (GSM) (no longer in operation) and residential trailer park (Tall Trees Mobile Home Park) (now removed) to the northeast, a propane distributor to the east, and a used automobile parts business to the south (Pick-A-Part Auto Wrecking) (see Figure 1).

3.1 Physical Characteristics

The Purity Oil site is located in the San Joaquin River drainage basin approximately 12 miles south of the San Joaquin River. No natural watercourses exist in the vicinity of the Purity Oil site. The natural ground slope in the area is approximately 0.1 percent (5 feet per mile) to the west-southwest. The groundwater aquifer in the Fresno area is designated as a sole-source aquifer (SSA), which EPA defines as a sole or principal source aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend on the aquifer for drinking water. The SSA designation is one tool to protect drinking water supplies in areas where there are few or no alternative sources to the groundwater resource and where, if contamination occurred, using an alternative source would be prohibitively expensive. The SSA designation protects an area's groundwater resource by requiring EPA to review certain proposed projects within the designated area. All proposed projects receiving federal funds are subject to EPA review to ensure they do not endanger the water source.

The SSA protection program is authorized by section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et seq.).

The aquifer in the vicinity of the site is unconfined to depths of several hundred feet. The depth to groundwater at the site is approximately 55 to 75 feet below ground surface (bgs), varying with site topography, wet season recharge, and off-site withdrawal, with flow to the northwest.

The basement rock at the site is located at greater than 1,000 feet bgs and does not influence groundwater flow under the site. Unconsolidated flood plain deposits that overlay the basement rock consist of thick alluvial fans formed by the San Joaquin and King Rivers.

Soils at the site consist of sands and silty sands interspersed with layers of lower-permeability silt. The habitat on the Purity Oil Site and adjacent properties consists of ruderal grasses (plants commonly found in ecosystems disturbed by human activity) and ornamental trees and shrubs. This vegetation provides marginal habitat for species adapted to highly disturbed areas impacted by industrial activities.

Groundwater levels at Purity Oil have been steadily decreasing since 1984, based upon water levels measured from site monitoring wells. In 2009, groundwater elevations have decreased approximately 25 feet since monitoring began in 1984. The decrease in groundwater levels is the result of regional groundwater withdrawal without adequate recharge to the aquifer. Groundwater elevations measured since 2009 have been relatively stable. The City of Fresno, Malaga County Water District, and the Water Board have programs in place to increase recharge to the aquifer and reduce the amount of groundwater pumped for water supply.

3.2 Land and Resource Use

Under the Fresno County general plan, the Purity Oil site is located in a zone designated for heavy industrial use (Figure 2). Most land in the vicinity of the site is used for industrial or agricultural purposes. Exceptions were located immediately north and south of the eastern portion of the site, where a single-family residence with a horse enclosure and the Tall Trees Mobile Home Park border the property. By 2001, the single-family residence and horse enclosure were removed. In 2001, the residents of the Tall Trees Mobile Home Park were relocated in conjunction with the OU-2 soil remedial action.

Industrial activity in the area includes businesses such as agricultural support industries, heavy equipment rental facilities, repair shops, retail shops, a former cotton oil manufacturing facility (Producer's Cotton Oil), scrap yards, several trucking yards, and other miscellaneous light industries. Immediately bordering the Purity Oil site are an auto salvage yard (Pick-A-Part Auto Wrecking) and a scrap material business (Bruno's Iron and Metal); the Burlington Northern Santa Fe Railway Company right-of-way; the GSM, a former service station and convenience store; and a propane distributor.

The area is traversed by the North Central and Central Canals operated and maintained by the Fresno Irrigation district (FID). The North Central Canal flows west along the southern edge of the Purity Oil site and cuts across its southwestern corner. As part of EPA's remedy, the on-site portion of the North Central Canal was placed in a concrete pipe.

About 0.5 miles to the west and southwest of the site, fields of oats, cotton, fruit trees, and grapes are irrigated with water from the North Central Canal during summer.

3.3 History of Contamination

Purity Oil re-refined petroleum waste oils at the site between 1934 and 1975. These waste oils came from businesses including service stations, car dealers, truck stops, and electrical transformer yards, as well as municipalities, school districts, and military installations. Historically, the easternmost portion of the site included storage and processing facilities for re-refining and recycling operations. Purity Oil re-refined oil using treatment processes that included clarification, chemical addition, acidification, dehydration, distillation, and filtration. The westernmost portion of the site consisted of unlined sumps and storage tanks used for collection and storage of oil and by-products from the refining process. The oil and by-products were disposed of in approximately seven large on-site sludge pits.

In the 1960s, neighbors of the site noticed contaminant discharges from the site. Overflow from the site's unlined sumps and sludge pits flowed onto adjacent properties.

3.4 Initial Response

In 1973, Purity Oil Sales was ordered by the Superior Court to empty and backfill the on-site sludge pits. In 1975, the site owners were issued a Cleanup and Abatement Order under the enforcement authority of the Water Board. Purity Oil completely filled the sludge pits with construction debris. No available evidence indicates that the wastes in the pits were ever removed.

In 1976, a fire at the site destroyed the main warehouse building and adjacent equipment. After the fire, additional equipment was removed from the site and the area was partially regraded.

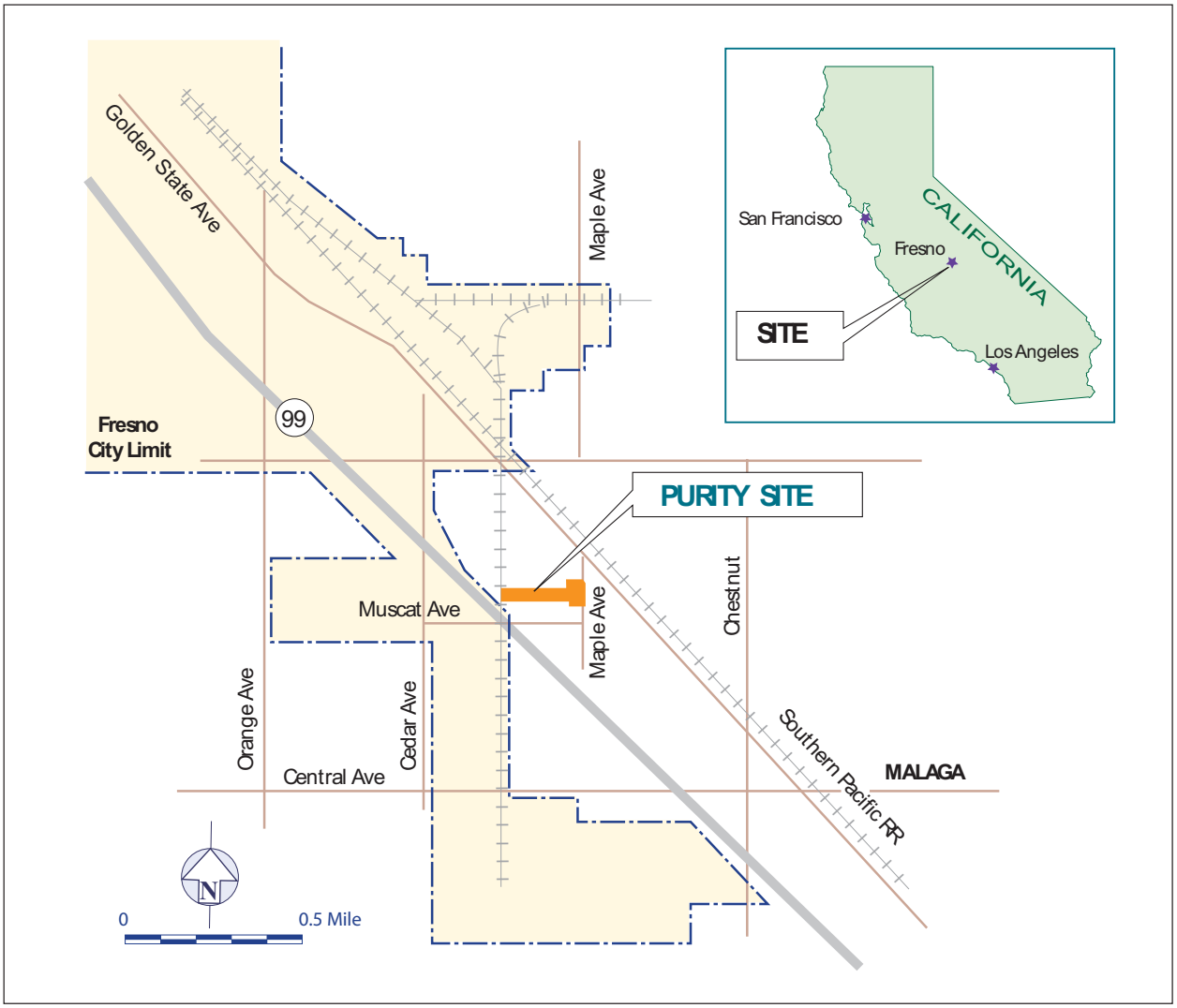
In 1985, EPA conducted a removal action to remove 1,800 cubic yards of hazardous oily/tarry materials from the site. In 1987, EPA's emergency response team removed approximately 33,000 gallons of oil and water from one of seven large steel aboveground tanks to eliminate the potential for a spill.

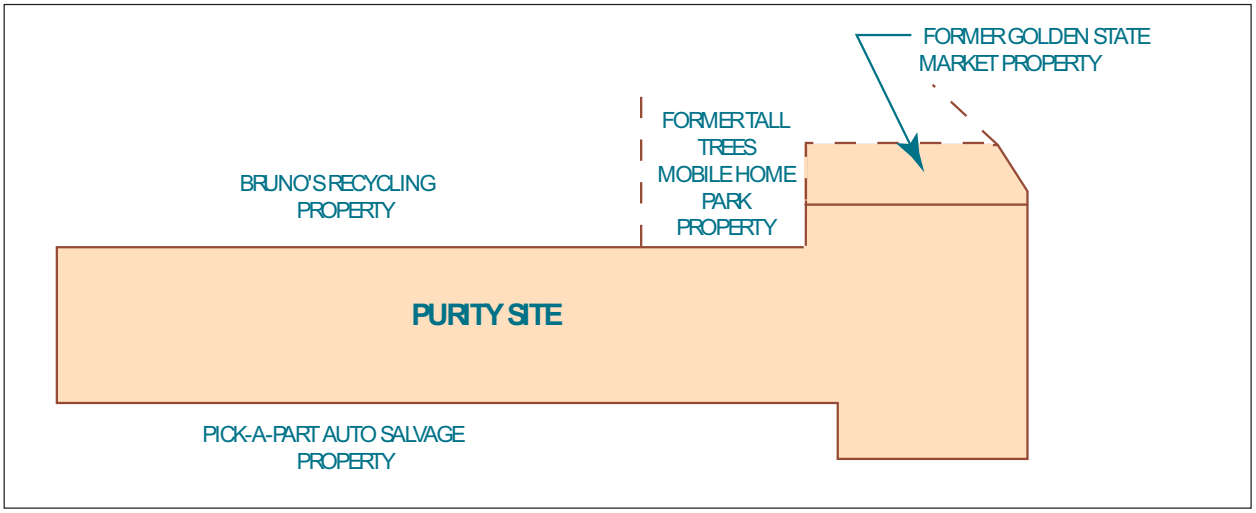
3.5 Basis for Taking Action

At the Purity Oil site, both the groundwater and soil present risks to human health that require remedial action. Table 1 lists contaminants of concern (COC) for the Purity Oil site (EPA 2006a).

Groundwater at the site is contaminated with volatile organic compounds (VOC), semivolatile organic compounds (SVOC), iron, and manganese that discharged from the sumps and unlined pits. The primary groundwater contaminant and VOC of most concern is 1,2-dichloroethane (DCA). Acute toxic effects of 1,2-DCA include central nervous system depression, lung irritation, and injury to liver, kidneys, and adrenals. Chronic exposure can cause liver degeneration and kidney damage in laboratory animals. Repeated exposures have been associated with anorexia, nausea, liver and kidney dysfunction, and neurological disorders in workers. The VOC 1,2-DCA is carcinogenic to mice and rats exposed orally, and mutagenic in some tests to bacteria, barley, and fruit flies.

Soils at the site contain high levels of lead, polycyclic aromatic hydrocarbons (PAH), and several organic compounds. Buried waste contains benzene, toluene, PAHs, methylene chloride, phthalates, acetone, other solvents, lead, and various other metals. Soil contamination extends from the surface to groundwater. Lead is the primary surface soil contaminant, and at depth, all other chemicals listed above are COCs. Acute toxic effects of lead include encephalopathy, abdominal pain, hemolysis, liver damage, seizures, coma, and respiratory arrest. Chronic exposure can affect the hematopoietic, nervous, and cardiovascular systems. Children appear to be especially sensitive to lead-induced nervous system injury.



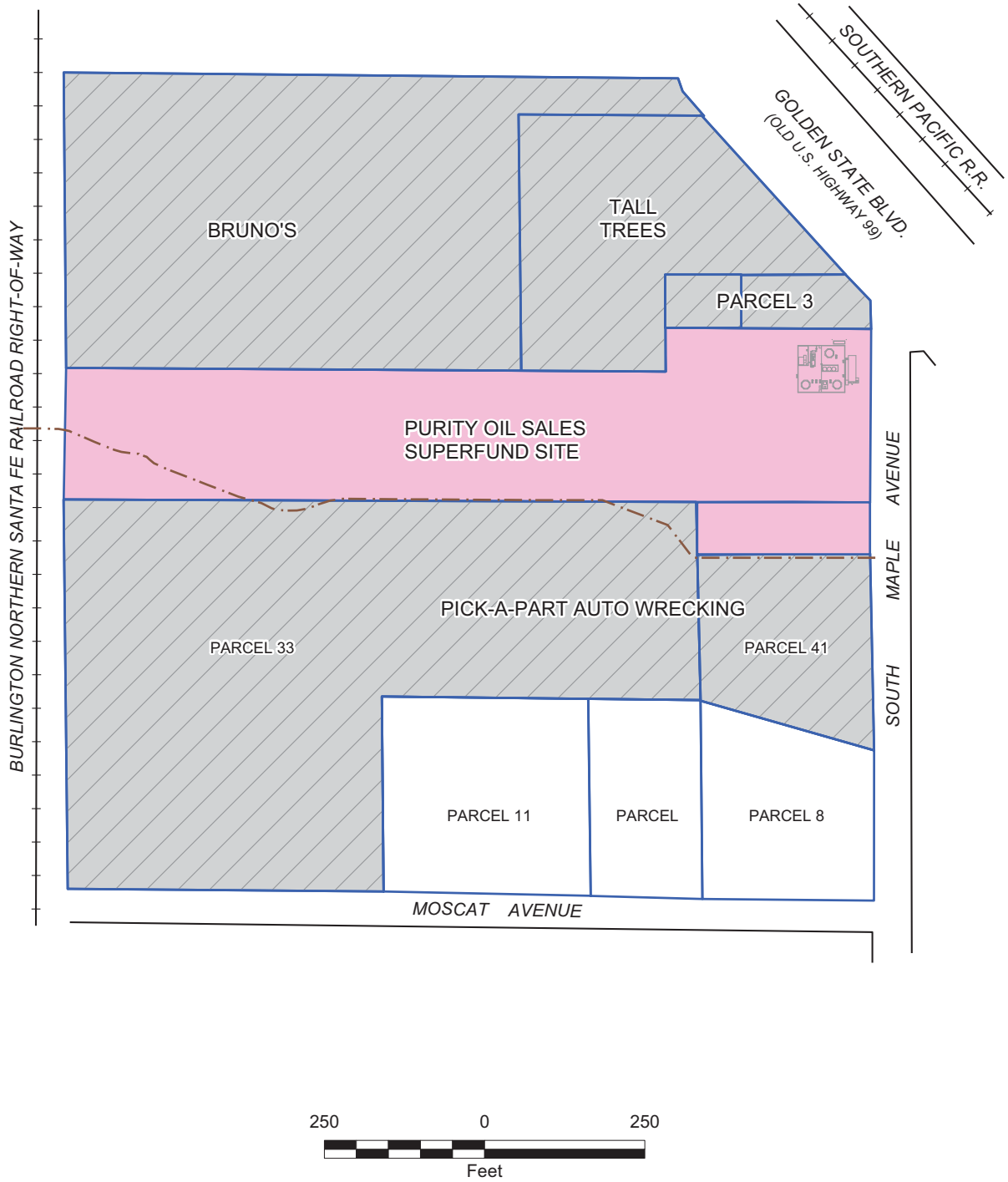


TETRA TECH EM INC.

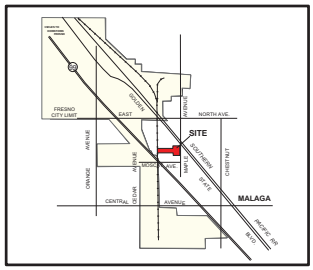
PURITY OIL SALES SUPERFUND SITE
FRESNO COUNTY, MALAGA, CALIFORNIA

FIGURE 1
SITE LOCATION MAP

THIRD 5-YEAR REVIEW REPORT
SEPTEMBER 2011



SITE LOCATION MAP



LAND USE

- Purity Oil Sales Superfund Site
- Industrial
- Other Property
- Fresno Irrigation District North Central Canal (Buried Undergound)

Reference:
Assessor's Map Bk.330 - Pg. 06, County Of Fresno, California

TETRA TECH EM INC.

PURITY OIL SALES SUPERFUND SITE
MALAGA, CALIFORNIA

FIGURE 2
LAND USE

THIRD 5-YEAR REVIEW REPORT
SEPTEMBER 2011

2011-04-15 V:\Misc_GIS\Purity_Oil\Projects\Purity Oil Phase II\Land_Use.mxd TtEMI-OAK CF

TABLE 1: CONTAMINANTS OF CONCERN AT THE PURITY OIL SITE

Acetone
Acenapthylene
Aldrin
Antimony
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Arsenic
Barium
Benzene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzoic Acid
Benzo(k)fluoranthene
Beryllium
Beta-BHC
Bis(2-ethylhexyl)phthalate
2-Butanone
Cadmium
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroform
Chrysene
Cyanide
4,4'-DDD
4,4'-DDE
4,4'-DDT
Di-n-butyl phthalate
Dibenz(a,h)anthracene
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
Dieldrin
Diethyl phthalate
Endosulfan
Ethylbenzene
Gamma-BHC (Lindane)
Heptachlor
Heptachlor epoxide
Indeno(1,2,-3-cd)pyrene
Lead
Methylene chloride
2-Methylnaphthalene
Mercury
4-Methyl-2-pentanone
2-Methyl-phenol
4-Methyl phenol
Naphthalene
N-nitrosodiphenylamine
Phenol
Selenium
Silver
Styrene
Tetrachloroethane
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vanadium
Vinyl chloride
Xylenes
Zinc

Note: **Bold** contaminants were added to the COC list since the 1992 ROD.

4.0 REMEDIAL ACTIONS

This section describes the remedial actions selected in the RODs and subsequent ROD Amendment and ESDs, implementation of the selected remedy, system operations, and O&M.

4.1 Remedy Selection

The following sections describe the remedy selected by EPA for OU-1, Groundwater and Tanks, and OU-2, Soils, as well as the OU-2 ESDs and ROD Amendment.

4.1.1 OU-1: Groundwater and Tanks

On September 26, 1989, the OU-1 ROD for the Purity Oil site was signed. The primary human health threats posed by contaminants addressed in the ROD for OU-1 included: (1) use of contaminated groundwater by down-gradient residents, and (2) direct contact with contaminated tarry sludge and soils present in rusting processing tanks. The primary groundwater contaminants of concern included VOCs.

Remedial action objectives (RAO) were developed as a result of data collected during the RI (EPA 1988). The RAOs for OU-1 were:

- Restore the sole-source drinking water aquifer as soon as possible to meet federal and state drinking water standards.
- Provide safe drinking water to down-gradient residents.
- Eliminate the direct exposure threat posed by hazardous wastes in the seven on-site steel tanks.

The major components of the remedy for the contaminated groundwater and wastes in the on-site tanks in the OU-1 ROD include:

- Removal and proper disposal of the seven remaining on-site tanks and their contents
- Provision of an alternate water supply to affected private well owners located northwest of the site, if required.
- Water treatment to remove VOCs, iron, and manganese from groundwater, including:
  - Extraction of contaminated groundwater to attain federal and state drinking water standards in the aquifer
  - Treatment of extracted contaminated groundwater using green sand filtration and air stripping to attain federal and state drinking water standards
  - Disposal of treated and tested water in the North Central Canal
  - Groundwater monitoring to verify contaminant cleanup
  - Creation of a groundwater management zone extending 1 to 2 miles from the cleanup target area to coordinate the remedy with other uses of the aquifer and to maintain groundwater levels at the desired level

As part of each FYR, EPA reviews applicable or relevant and appropriate requirements (ARAR) identified in the 1989 OU-1 ROD and compares them to current statutes, regulations, and policies. Table 2 summarizes the OU-1 cleanup levels for COCs selected in the OU-1 ROD. The cleanup levels were based on Federal and State Maximum Contaminant Levels (MCL). The changes in cleanup standards and implications are discussed in Section 7.2.

TABLE 2: OU-1 CLEANUP STANDARDS

Contaminant	Media	Cleanup Level (ppb)				
		Federal MCLs		State Action Levels		State MCLs
		Primary	Secondary	Toxicity	Taste & Odor	
1,1-DCA	Groundwater			5		
1,1-DCE	Groundwater	7				6
1,2-DCA	Groundwater	5				0.5
cis-1,2-DCE	Groundwater	70 (proposed)		6		
trans-1,2-DCE	Groundwater	100 (proposed)		10		
Benzene	Groundwater	5				1
Carbon tetrachloride	Groundwater	5				0.5
Iron	Groundwater		300			
Manganese	Groundwater		50			
Trichloroethylene	Groundwater	5				5
Vinyl chloride	Groundwater	2				0.5

Notes:

DCA	Dichloroethane	DCE	Dichloroethene
OU-1	Operable Unit 1, Groundwater and Tanks	ppb	Parts per billion

4.1.2 OU-2: Soils

On September 30, 1992, EPA and the PRPs signed the ROD for OU-2. The primary human health threats posed by contaminants addressed in the ROD for OU-2 included: (1) direct contact with contaminated site soils and wastes in the pits, (2) direct contact with contaminated North Central Canal water and sediments, and (3) inhalation of site-related dust. The primary surface soil contaminant of concern is lead. The primary contaminants of concern for the pits and vadose zone are numerous organic compounds.

RAOs were developed as a result of data collected during the RI (EPA 1988). The RAOs for OU-2 were:

- Prevent further contamination of groundwater by containing contaminated soil and wastes and by capturing and treating contaminants that discharge from the wastes.
- Prevent direct contact with contaminated surface soil and waste at the site.
- Prevent direct contact with sediments in the North Central Canal.

The major components of the remedy for contaminated soil and sludges in the OU-2 ROD include:

- Treatment of soil using SVE from 14 feet bgs to the water table
- Capping of the site in accordance with Resource Conservation and Recovery Act (RCRA) Subtitle C requirements, including a perimeter retaining wall and synthetic and geosynthetic clay liners
- Installation of a slurry wall around the site perimeter
- Environmental monitoring to ensure the effectiveness of the remedial action
- Enclosure within a reinforced concrete pipe of existing portions of the North Central Canal that abut the site

4.1.3 Explanations of Significant Differences for OU-2

After the OU-2 ROD was signed, EPA issued two ESDs to document differences in how the selected OU-2 remedial action was to be implemented. In July 1996, EPA issued the first ESD to change the design of the SVE and containment systems. EPA eliminated the requirement for a retaining wall with the change to a sloping cover design. The slurry wall was eliminated because no perched groundwater zones were found during pre-design efforts. The first ESD also approved a 2-year post-construction monitoring period to evaluate the need for the SVE system, and extended the boundaries of the site to include the rear of the GSM because of the discovery of soils contaminated by site-related wastes.

Between December 2000 and October 2002, EPA conducted investigations to assess whether contamination from the Purity Oil site had impacted neighboring properties and to address observations of sludge seepage. Sludge was observed seeping to the surface of the sludge pit slopes at approximately 20 locations. Seeps were observed at ambient temperatures ranging from 40 to 50 °F as well as at temperatures exceeding 70 °F. Several attempts to remedy the seeps were unsuccessful. EPA was concerned that the acidic sludge (with pH as low as <1) or other acidic liquids within the sludge pits would continue to seep out and either damage the closure cover system planned in the OU-2 ROD or migrate to adjacent properties. The synthetic liner component of the cover system is rated for a pH of 2 or greater, according to manufacturer specifications. The

contact of low-pH liquids with the geosynthetic clay liner was also a concern because this situation could adversely affect the liner's permeability and allow infiltration of water into the waste.

In March 2001, EPA issued the second ESD to relocate residents of the Tall Trees Mobile Home Park. EPA determined that it was necessary to: (1) temporarily relocate all residents during on-site construction activities because of potential adverse impacts of exposure to contaminated soils and VOCs, and (2) permanently relocate 17 families closest to the site property line.

4.1.4 OU-2 ROD Amendment

In April and July 2002, bench-scale tests were performed to evaluate the most effective solidification and neutralization reagents for treating the acidic sludge materials. Quicklime® was determined to be the best reagent with respect to strength and neutralization capacity.

In 2003, EPA investigated soils adjacent to the property to define the extent of the acidic sludge. Based on evidence and chemical data collected during this investigation, EPA determined contamination from the Purity Oil site to have impacted the following neighboring properties: Bruno's Iron and Metal, the Tall Trees Mobile Home Park, the GSM, and Pick-A-Part Auto Wrecking. Contaminants in soil at these four properties included VOCs, SVOCs, pesticides, petroleum hydrocarbons, and metals (EPA 2003).

Between April and June 2003, a pilot-scale neutralization study was conducted to field test the bench-scale test results. Calcium carbonate proved to be the best reagent for strength and neutralization capacity.

In April 2005, EPA published its proposed plan for the OU-2 soil remedy, which reflected the bench- and pilot-scale test results.

In June 2006, the EPA issued the OU-2 ROD amendment to address the presence of acidic sludge.

The OU-2 ROD amendment includes the following additional RAOs:

1. **<u>Purity Oil Property Objectives</u>**

   - Prevent contact of acidic sludge and acid liquids with the cap liner to increase the remedy's overall protection of human health and the environment.
   - Prevent human exposure (through direct contact) to contaminated soils containing COCs at concentrations exceeding ARARs and criteria to be considered (TBC) for soil.
   - Prevent or minimize further migration of contaminants from source material to groundwater.
   - Prevent migration of contaminated groundwater to local domestic or irrigation wells.

2. **<u>Adjacent Properties Objectives:</u>**

   - Prevent acidic sludge and other site-related contaminants from contacting industrial workers on properties adjacent to the Purity Oil property (Pick-A-Part Auto Wrecking, Bruno's Iron and Metal, and Tall Trees Mobile Home Park) and residents on the GSM property.
   - Remove acidic sludge and contaminated soil containing COCs at concentrations exceeding health-based action levels at properties adjacent to the Purity Oil property.

- Prevent or minimize further migration of contaminants from source material to groundwater.
- Prevent migration of contaminated groundwater to local domestic or irrigation wells.
- Remediate COCs in soil and groundwater to drinking water standards and other health-based action levels to reduce risks from potential exposure to indoor air contaminants whose source is site-related contamination.
- Prevent further migration of soil vapor containing COCs at concentrations exceeding ARARs and TBC criteria.

The OU-2 ROD amendment selected the following remedial actions:

- Neutralization – Neutralize the entire sludge pit area from the ground surface to an estimated depth of 15 feet bgs.
- Low Permeability Cap – Construct a low-permeability cap to eliminate the risk of human exposure and to reduce surface water infiltration through the waste material that could potentially mobilize contaminants in the vadose zone, causing a release to groundwater.
- Excavation of Contamination at Adjacent Properties – Excavate sludge and contaminated soil down to a depth of 7 feet bgs at the four adjacent properties. Neutralize excavated material (if pH is less than 4), and place under the low-permeability cap; backfill excavations with clean soil; and either demolish or purchase and rehabilitate GSM structure.
- Additional Soil and Gas Sampling – Determine extent of contamination left in place between bottom of excavations and top of water table.
- Groundwater Monitoring Program – Continue with the quarterly groundwater monitoring program currently in place to assess the effectiveness of both the groundwater and soil remedies.
- SVE and Vadose Zone Monitoring System – Install SVE wells to remove contaminants, and install vadose zone monitoring wells to monitor soil vapor concentrations and the vacuum created by the extraction wells.
- Institutional Controls – Apply institutional controls such as deed restrictions, to ensure sensitive uses do not occur at adjacent properties.

EPA reviewed the ARARs identified in the ROD and ROD Amendment and compared them to current statutes, regulations, and policies. Table 3 summarizes the OU-2 cleanup levels selected in the 2006 OU-2 ROD amendment. The cleanup levels were based on the EPA 2004 Preliminary Remediation Goals (PRG). The changes in cleanup standards and implications are discussed in Section 7.2.

TABLE 3: OU-2 CLEANUP STANDARDS

Contaminant	Media	Cleanup Level [mg/kg]			
		Residential PRG		Industrial PRG	
		Cancer	Noncanceer	Cancer	Noncancer
1,1,1-Trichloroethane	Soil	--	2.0E+03	--	6.9E+03
1,1,2,2,-Tetrachloroethane	Soil	4.1E-01	1.0E+03	9.3E-01	4.0E+03
1,2,4-Trichlorobenzene	Soil	--	6.2+01	--	2.2+02
1,2-Dichlorobenzene	Soil	--	1.1E+03	--	4.1+03
1,2-Dichloroethene	Soil	--	4.3E+01	--	1.5E+02
1,4-Dichlorobenzene	Soil	3.4E+00	1.6E+03	7.9E+00	1.0E+04
2-Butanone	Soil	--	2.2E+04	--	1.1E+05
2-Methylnaphthalene [a]	Soil	1.7E+00	5.6E+01	4.2E+00	1.9E+02
4,4'-DDD	Soil	2.4E+00	--	1.0E+01	--
4,4'-DDE	Soil	1.7E+00	--	7.0E+00	--
4,4'-DDT	Soil	1.7E+00	3.6E+01	7.0E+00	4.3E+02
4-Methyl-2-pentanone	Soil	--	5.3E+03	--	4.7E+04
Acenapthylene [a]	Soil	1.7E+00	5.6E+01	4.2E+00	1.9E+02
Acetone	Soil	--	1.4E+04	--	5.4E+04
Aldrin	Soil	2.9E-02	1.8E+00	1.0E-01	1.8E+01
Alpha-BHC	Soil	9.0E-02	3.5E+01	3.6E-01	4.0E+02
Alpha-Chlordane	Soil	1.6E+00	3.5E+01	6.5E+00	4.0E+02
Aluminum	Soil	--	7.6+04	--	9.2E+05
Anthracene	Soil	--	2.2E+04	--	2.4E+05
Antimony	Soil	--	3.1E+01	--	4.1E+02
Aroclor 1016	Soil	6.3E+00	3.9E+00	2.1E+01	3.7E+01
Aroclor 1242	Soil	2.2E-01	1.1E+00	7.4E-01	1.1E+01
Aroclor 1254	Soil	2.2E-01	1.1E+00	7.4E-01	1.1E+01
Aroclor 1260	Soil	2.2E-01	1.1E+00	7.4E-01	1.1E+01
Arsenic [a]	Soil	6.2E-02	--	2.5E-01	--
Barium	Soil	--	5.4E+03	--	6.7E+04
Benzene	Soil	6.4E-01	3.3E+01	1.4E+00	1.2E+02
Benzo(a)anthracene	Soil	6.2E-01	--	2.1E+00	--
Benzo(a)pyrene	Soil	6.2E-02	--	2.1E-01	--
Benzo(b)fluoranthene	Soil	6.2E-01	--	2.1E+00	--
Benzo(g,h,i)perylene	Soil	--	2.3E+03	--	2.9E+04
Benzo(k)fluoranthene [a]	Soil	3.8E-01	--	1.3E+00	--
Beryllium	Soil	1.1E+03	1.5E+02	2.2E+03	1.9E+03

TABLE 3: OU-2 CLEANUP STANDARDS (CONTINUED)

Contaminant	Media	Cleanup Level [mg/kg]			
		Residential PRG		Industrial PRG	
		Cancer	Noncanceer	Cancer	Noncancer
Beta-BHC	Soil	3.2E-01	1.4E+01	1.3E+00	1.6E+02
Bromomethane	Soil	--	3.9E+00	--	1.3E+01
Cadmium	Soil	1.4E+03	3.7E+01	3.0E+03	4.5E+02
Carbon disulfide	Soil	--	3.6E+02	--	1.2E+03
Chlorobenzene	Soil	--	1.5E+02	--	5.3E+02
Chromium	Soil	--	1.2E+05	--	1.5E+06
Chrysene [a]	Soil	3.8E+00	--	1.3E+01	--
cis-1,2-Dichloroethene	Soil	--	4.3E+01	--	1.5E+02
Cobalt	Soil	9.0E+02	1.4E+03	1.9E+03	1.3E+04
Copper	Soil	--	3.1E+03	--	4.1E+04
Cyanide	Soil	--	1.2E+03	--	1.2E+04
Dibenz(a,h)anthracene	Soil	6.2E-02	--	2.1E-01	--
Dibenzofuran	Soil	--	1.5E+02	--	1.6E+03
Dieldrin	Soil	3.0E-02	3.1E+00	1.1E-01	3.1E+01
Endosulfan I	Soil	--	3.7E+02	--	3.7E+03
Endosulfan II	Soil	--	3.7E+02	--	3.7E+03
Endosulfan sulfate	Soil	--	3.7E+02	--	3.7E+03
Endrin	Soil	--	1.8E+01	--	1.8E+02
Endrin aldehyde	Soil	--	1.8E+01	--	1.8E+02
Endrin keytone	Soil	--	1.8E+01	--	1.8E+02
Ethylbenzene	Soil	--	1.9E+03	--	7.4E+03
Fluoranthene	Soil	--	2.3E+03	--	2.2E+04
Fluorene	Soil	--	2.7E+03	--	2.6E+04
Gamma-BHC (Lindane)	Soil	4.4E-01	2.1E+01	1.7E+00	2.4E+02
Gamma-Chlordane	Soil	1.6E+00	3.5E+01	6.5E+00	4.0E+02
Heptachlor	Soil	1.1E-01	3.1E+01	3.8E-01	3.1E+02
Heptachlor epoxide	Soil	5.3E-02	7.9E-01	1.9E-01	8.0E+00
Indeno(1,2,-3-cd)pyrene	Soil	6.2E-01	--	2.1E+00	--
Iron	Soil	--	2.3E+04	--	3.1E+05
Lead	Soil	--	4.0E+02	--	8.0E+02
m,p-Xylene	Soil	--	2.7E+02	--	9.0E+02
Manganese	Soil	--	1.8E+03	--	1.9E+04
Mercury	Soil	--	2.3E+01	--	3.1E+02

TABLE 3: OU-2 CLEANUP STANDARDS (CONTINUED)

Contaminant	Media	Cleanup Level [mg/kg]			
		Residential PRG		Industrial PRG	
		Cancer	Noncanceer	Cancer	Noncancer
Methoxychlor	Soil	--	3.1E+02	--	3.0E+03
Methylene chloride	Soil	9.1E+00	2.0E+03	2.1E+01	9.3E+03
Molybdenum	Soil	--	3.9E+02	--	5.1E+03
Naphthalene [a]	Soil	1.7E+00	5.6E+01	4.2E+00	1.9E+02
Nickel	Soil	--	1.6E+03	--	2.0E+04
o-Xylene	Soil	--	2.7E+02	--	9.0E+02
Phenanthrene	Soil	--	2.2E+04	--	2.4E+05
Pyrene	Soil	--	2.3E+03	--	2.9E+04
Selenium	Soil	--	3.9E+02	--	5.1E+03
Silver	Soil	--	3.9E+02	--	5.1E+03
Tetrachloroethene	Soil	4.8E-01	3.8E+01	1.3E+00	1.3E+02
Thallium	Soil	--	5.2E+00	--	6.7E+01
Toluene	Soil	--	6.6E+02	--	2.2E+03
TPH	Soil	--	2.3E+03	--	1.0E+04
Trichloroethene	Soil	5.3E-02	1.6E+01	1.1E-01	1.1E+02
Vanadium	Soil	--	7.8E+01	--	1.0E+03
Xylenes	Soil	--	2.7E+02	--	9.0E+02
Zinc	Soil	--	2.3E+04	--	3.1E+05

Notes:

a Value shown for 2004 PRG is based on California-modified PRG

BHC	Hexachlorocyclohexane	DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene	DDT	Dichlorodiphenyltrichloroethylene
EPA	Environmental Protection Agency	mg/kg	Milligram per kilogram
OU-2	Operable Unit 2, Soils	PRG	Preliminary Remediation Goal
TPH	Total petroleum hydrocarbons		

4.2 Remedy Implementation, Including Operation and Maintenance

The OU-1 extraction and treatment system remedy stipulated in the ROD was constructed by Chevron, but has since been decommissioned, and the extraction wells have been removed. The treatment facility remains onsite, but unused. Chevron is currently evaluating alternative technologies for an OU-1 remedy. The OU-2 remedy component of soil neutralization and capping has been completed. The OU-2 SVE system started operation in July 2010 and continues to operate. The following sections discuss the remedy implementation and O&M.

4.2.1 OU-1 Remedy: Groundwater and Tanks

Implementation of the OU-1 remedy is summarized below:

- October 1990, seven large tanks and their contents were removed from the site.
- On September 30, 1991, EPA issued Unilateral Administrative Order 91-28 requiring nine PRPs to design and construct the groundwater extraction, treatment, and disposal system. The PRPs agreed implement the remedy. The PRPs formed a technical steering committee and conducted extensive pre-design studies to further characterize the geology and groundwater contamination at the site. The final design was completed on June 22, 1993.
- In March 1992, private well users down-gradient from the site were connected to either the Malaga County Water District or the City of Fresno water system. On July 13, 2006, EPA interviewed West Coast Waste and Bruno's Iron and Metal. These landowners are still using potable water supplied by the City of Malaga (see Appendix C). No problems were noted with this water.
- In January 1994, the remedial action to construct the extraction wells and treatment system started with the award of all contracts for the construction. Construction was substantially completed in August 1994. Start-up and shake-down operations continued through December 1994. The system began routine treatment of groundwater on December 28, 1994.
- In December 1994, two groundwater extraction wells, EW-1 and EW-2, were installed for the OU-1 remedy.
- In January 1995, routine O&M of the OU-1 remedy began.
- In October 2003, Chevron submitted the OU-1 improvement evaluation, which recommended MNA as the most effective OU-1 remedy
- In December 2003, EPA stated that it would like to evaluate additional remedial action alternatives before selecting a final groundwater remedy.
- In June 2005, extraction wells EW-1 and EW-2 were shut down.
- In March 2006, Chevron submitted a FFS to evaluate six remedial alternatives. Based on the conclusions of the report, EPA decided to proceed with a pilot test for ERD.
- In October 2006, extraction wells EW-1 and EW-2 were decommissioned along with six monitoring wells (MW-3, MW-5S, MW-5D, MW-6S, MW-7s, and MW-8) that were either no longer effective due to a lowered groundwater table (see Section 3.1), or were in the way of the OU-2 cap installation.

- In September 2007, Chevron submitted an ERD Pilot Study Work Plan to EPA which detailed plans for well installations and substrate injection, followed by 2 years of monitoring.
- In January 2008, Chevron submitted the Final Groundwater Monitoring Well Replacement Workplan, and in March 2008 Chevron installed additional groundwater monitoring wells: eight in the shallow groundwater zone, four in the intermediate groundwater zone, and two in the deep groundwater zone.
- In September 2008 Chevron began the ERD Pilot Study with the installation of one injection well (IW-1), one extraction well (EW-3), and four new monitoring wells, (PT-1, PT-2, PT-3, and PT-4) and injection of a sodium lactate substrate.
- In February 2011, Chevron presented preliminary results from the ERD pilot study to the EPA for discussion; specifically the pilot study data indicated (ARCADIS 2011):
    - Declining groundwater elevations and the OU-2 cap and SVE system installation decrease interaction between the source mass in the vadose zone and groundwater.
    - ERD was effective at reducing concentrations of VOCs in groundwater to levels approaching, or below cleanup goals.
    - Metals concentrations in groundwater, including arsenic, iron, and manganese, increased by orders of magnitude likely due to reducing conditions which enhanced the flux of metals from soils to groundwater.
    - Though ERD reduced VOC concentrations, the potential for metals concentrations to increase make ERD ineffective for aquifer restoration.

  As a result, Chevron is considering alternate remedies for OU-1 that address both VOCs and metals. Future remedies may rely on several remedial techniques including MNA, active treatment of the metals plume, the OU-2 SVE system, and a contingency plan for a return of groundwater levels to previous levels.

Groundwater Management Zone: The OU-1 ROD contained requirements for a groundwater management zone with the following objectives:

(a) To coordinate the remedy with other uses of the aquifer, and

(b) To control the influence of the remedy on groundwater levels in the regional aquifer.

Although the groundwater management zone strategy has not yet been developed, nearby groundwater pumping has not impacted the site. To date, information indicates both of these objectives are being achieved. Pre-design engineering studies and evaluation of subsequent quarterly groundwater monitoring efforts indicate the contaminant plume is not currently migrating, nor influenced by regional groundwater users of the aquifer. Because of the low hydraulic conductivity and the subsequent low pumping rates, groundwater extraction and treatment had little effect on groundwater levels in the vicinity of the site and has not impacted the regional groundwater regime. Although groundwater extraction ceased, monitoring well data show no change in the groundwater flow direction to the northwest and the gradient outside the immediate zone of influence of the groundwater extraction wells. Groundwater flow directions and gradients have remained stable and are likely the result of regional, rather than site-specific hydrogeologic conditions.

The second FYR in 2006 identified the need for additional groundwater monitoring wells to define the concentration gradients within the western portion of the plume, assess the vertical distribution of groundwater contaminants in deeper groundwater zones, and better define the performance of the groundwater remedy in the source area. In 2008, Chevron installed 14 groundwater monitoring wells to address these concerns. EPA is continuing to review groundwater COC levels on a quarterly basis to ensure this OU-1 ROD objective will be met.

Since June 2005, Chevron stopped groundwater pumping from the two extraction wells. The groundwater treatment (GWT) system is still in place, but currently decommissioned and groundwater is not being treated. The tanks from the GWT system are used to store purge water from monitoring wells from quarterly groundwater sampling events, development water and decontamination water from well installations, vapor condensate and other liquids entrained in the influent stream from the SVE system, and accumulated seasonal rainwater from the groundwater-treatment system secondary-containment system. GWT system O&M continues and includes the performance of all necessary inspections, operational tasks, maintenance, repair, monitoring, and reporting necessary to ensure proper discharge.

In February 2008, discharges from the GWT system to the FID canal system ceased. In April 2009, a Malaga County Water District (MCWD) Non–Residential Wastewater Permit was issued to allow discharge directly from the GWT tanks to the MCWD publically-owned treatment works (POTW). Currently, accumulated water is sampled prior to discharges to the POTW as required under the system's National Pollutant Discharge Elimination System (NPDES) permit number 1094 issued by the MCWD.

4.2.2 OU-2 Remedy: Soils

Implementation of the OU-2 remedy is summarized below.

- In March 1998, the FID enclosed flow from the original canal within a reinforced concrete pipeline in accordance with the approved design.
- In April 1998, a Consent Decree and a Statement of Work requiring implementation of the approved remedial design for OU-2 was lodged in Federal Court.
- In November 2000, Chevron began construction of the other portions of the OU-2 remedial action, and then ceased in December 2000 after discovery of acidic sludge on the Purity Oil property and adjacent properties.
- In July 2002, Chevron completed bench-scale testing that determined the most effective solidification and neutralization agents for the acidic acid was calcium carbonate.
- In 2003, Chevron performed pilot scale testing to determine the most effective procedures for neutralizing the sludge materials, backfilling and compacting the neutralized material, and segregating concrete and debris. Subsequently, Chevron excavated 21,000 cubic yards from the western portion of the site, and determined that mechanical screening was the most effective and efficient way to remove large pieces of debris and concrete prior to neutralization.
- In June 2006, Chevron excavated 18 test pits on the eastern portion of the Purity Oil property and the GSM backyard to determine extents of acidic sludges. Following the test pit investigation, Chevron began full scale excavation of overburden and sludge from the Purity Oil property, and began concrete and debris segregation. Excavation work on the Purity property was completed in October.

- In October 2006 neutralization of the sludge began following the methodology outlined in the Definable Features of Work (DFW) for Neutralization. The neutralized material was then placed in lifts along with concrete debris, where necessary, and compacted and graded to meet the design criteria. Confirmation samples were taken at the perimeter of the excavations to ensure all sludge material was excavated.
- In August 2006, an addendum was added to the RAWP to address potential reuse of GSM property as either residential or industrial. A soil boring investigation underneath the GSM indicated the impacted soils extended beneath the structures and demolition of the structures would be required (March 2007, the GSM Front Yard Investigation Report). Chevron purchased the properties in May 2007.
- In February 2007, Chevron began excavation at adjacent properties (Tall Trees, Pick-a-Part East, Pick-a Part West, Bruno's Recycling, GSM backyard, and along South Maple Avenue). The excavated sludges from the impacted upper 4 feet was neutralized and managed under the cap. Chevron completed the excavation and backfilling work at adjacent properties in July 2007.
- In October 2007, Chevron submitted the DFW Completion Report for Sludge Neutralization Activities and the DFW Completion Report for Off-Site Remediation Activities. OU-2 backfilling was completed and OU-2 cap construction began.
- In May 2008, Chevron completed the Soil Vapor Investigation Report concluding that trichloroethylene (TCE) concentrations decrease with depth and TCE is degrading to cis-1,2-DCE in the vadose zone. This report also evaluated potential screening intervals for the proposed SVE system. Based on this information, a Work Plan for SVE Pilot Test was submitted.
- In March 2008, stained soil near MW-5S was discovered and Chevron performed additional excavation.
- In June 2008, Chevron completed all OU-2 construction activities related to sludge neutralization and site restoration, including cap construction and revegetation.
- In October 2008, Chevron completed the Remedial Action Completion Report for OU-2.
- In January 2009, Chevron completed the SVE Pilot Test which included the installation of two closely spaced SVE wells, four SVE test piezometers discretely screened at four depth intervals, and three baseline monitoring points to assess the effectiveness of SVE in reducing VOCs in the vadose zone. Modeling of the pilot testing data showed a six SVE well system could induce a pore gas velocity high enough to cover the affected vadose zone of the Purity Oil and the GSM properties.
- In March 2010, Chevron began installation of the SVE System based on the Final SVE Pilot Test Results and Conceptual SVE System Design including five SVE wells, five vacuum monitoring points, and five soil vapor monitoring points.
- In July 2010, Chevron began operation of the SVE system using a granular activated carbon treatment system.
- In March 2010, Chevron submitted the Final OU-2 (Soils) Completion Report.

OU-2 Soils Closure Cover System: The closure cover system was designed to prevent direct contact with neutralized materials and limit infiltration of water. The closure cover system extends across the entire area of neutralized material and consists of a 6-inch cushion layer, a geosynthetic

clay layer (GCL), a geocomposite drainage layer (GDL), and a 2-foot imported vegetative cover layer.

In the area of the existing (but currently decommissioned) GWT system, the treatment system pad acts as a direct contact barrier. In the event the treatment system pad is removed, additional investigation may be conducted to evaluate soil contamination below the system pad.

The final surface of the closure system was graded to promote storm water run-off and to prevent erosion. Other mitigation measures include the vegetative cover layer which promotes transpiration and decreases surface water runoff. Drainage swales were constructed around the perimeter of the capped area to divert water runoff to an evapotranspiration basin at the southeast corner of the site and berms and curbs surround the site perimeter to keep water runoff on-site.

Quarterly inspections began in November 2008 in accordance with Title 22, Section 6624.310 of the California Code of Regulations (CCR). Inspections of the closure system are conducted to ensure the closure system remains effective. Inspections include observations of the vegetative cover, surface water features, site security, settlement markers, site irrigation, and cap integrity. Issues noted in the inspection are corrected and the inspections and repairs are summarized in annual reports. In November 2010, Chevron, with EPA approval, began semi-annual monitoring.

OU-2 SVE System: The second phase of the OU-2 remedy consists of installation and operation of an SVE system to address potential VOC impacts in the vadose zone soil from approximately 14 feet bgs to the groundwater level. SVE system operation began on July 13, 2010 in compliance with San Joaquin Valley Air Pollution Control District discharge requirements. In addition, design specifications for vapor flow rate and vacuum levels were met.

During the first stages of full-scale operation, the SVE system operated in "pulse-mode," during which a vacuum was applied on two to four sets of SVE wells at a time, and then cycled between the other SVE wells to gain additional vacuum response and mass recovery data. The full time operation began by using SVE wells SVE-1a and SVE-4, chosen because they bracket the area of highest observed baseline soil vapor concentrations, provide a balanced system influent (i.e., one higher and one lower concentration well), and are both located along the northern side of the cap. From the SVE wells, extracted soil vapors are filtered through four 3,000-pound granulated activated carbon (GAC) vessels arranged in series. The inlet and outlet port for each carbon vessel is equipped with sample ports to allow for monitoring of GAC system treatment efficiency and to monitor the system for breakthrough of vapor phase constituents. Final system discharge from the last carbon vessel is through a 15-foot-tall discharge stack.

To evaluate the performance of the SVE system, soil vapor samples are collected at the manifold for the individual wells as well as the combined influent to the treatment system. During initial operations (July through December 2010) TCE concentrations decreased, while cis-1,2-DCE concentrations typically did not increase or decrease. Total petroleum hydrocarbons (TPH) and total VOC concentrations exhibited a decreasing trend in the SVE system influent. The work plan states that extraction wells will be operated until soil vapor concentrations become asymptotic. As of April 2011, only two of the six extraction wells, SVE-1A and SVE-4 have been used and have yet to become asymptotic (SAIC Energy, Environment & Infrastructure, LLC. SAIC 2011).

5.0 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the third FYR for the site. The protectiveness statement from the second FYR (EPA 2006b) was:

> *"A protectiveness determination of the remedy at OU-1 cannot be made at this time until further information is obtained about the ability of the current remedy to restore the aquifer to beneficial use beneath the property within a reasonable timeframe. There is no current or potential exposure related to groundwater. Further information will be obtained by taking the following actions:*
>
> - *Completing OU-1 focused FS*
> - *Performing pilot tests demonstrating the preferred alternatives and presenting results in the focused FS report*
> - *Installing and operating additional monitoring wells within the core plume area*
>
> *It is expected that these actions will take approximately 3 years to complete, after which time a protectiveness determination will be made. In addition, the following actions will need to be taken to ensure long-term protectiveness:*
>
> - *Revise and implement OU-1 institutional controls strategy*
> - *Amend the OU-1 groundwater ROD to incorporate the revised institutional controls strategy and preferred alternative demonstrated with pilot studies*
>
> *The OU-2 remedy is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.*
>
> *The OU-2 ROD remedy should be implemented so that any excavation or cap area is backfilled with clean soil that meets all applicable human health and ecological risk standards. Except for access by intruders, exposure pathways that could result in unacceptable risks are being controlled. The OU-2 O&M plan should be revised as needed to consider repair of fences damaged by these intruders.*
>
> *The OU-2 remedy includes an SVE system to remove volatile organics in soil below the site and at BTPL properties to eliminate vapor intrusion from COCs in underlying contaminated soils and groundwater that may migrate into enclosed industrial areas."*

A Five-Year Review Addendum was not issued. Table 4 presents the actions taken since the last FYR.

TABLE 4: ACTIONS TAKEN SINCE THE LAST FIVE-YEAR REVIEW

Issue from Second FYR	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action(s) Taken and Outcome	Date of Action
The current pump-and-treat system specified in the OU-1 ROD is neither hydraulically controlling nor reducing concentrations of COCs that may be acting as a continuing source of groundwater contamination. In addition, continued decreases in the level of the groundwater table affects the ability of extraction wells to remove water and contaminants. However, the plume appears to be stable due to natural attenuation mechanisms. Re-examination of the current OU-1 ROD remedy is required to establish hydraulic control of the contaminant plume and achieve water quality goals as soon as possible.	EPA recommends that either the extraction well system be fully implemented as indicated in the OU-1 ROD or that other remediation approaches, such as nutrient-enhanced bioremediation, be further evaluated and a remedy change pursued. The next stage in a remedy change would be to proceed with pilot-scale studies to further evaluate remedies for nutrient-enhanced bioremediation.	Chevron	12 / 2008	As an outcome of the 2006 OU-1 FFS, ERD was selected as the recommended alternative for groundwater remediation. A pilot study began in 2007 to test the effectiveness of sodium lactate. The pilot study was completed in 2010 and preliminary results indicate that ERD was effective in remediating the VOC plume, but ineffective in treating the metals plume. A FFS Addendum will examine remedial alternatives that address both VOCs and metals. Upon evaluation, EPA will prepare a ROD Amendment to document the adoption of a new groundwater remedy.	2008-2011

TABLE 4: ACTIONS TAKEN SINCE THE LAST FIVE-YEAR REVIEW (CONTINUED)

Issue from Second FYR	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action(s) Taken and Outcome	Date of Action
OU-1: The current groundwater monitoring well network does not define the concentration gradients within the western portion of the plume. Also, deeper monitoring wells are needed to assess the vertical distribution of groundwater contaminants. Although the plume is stable and the extent of the plume is defined, monitoring wells are required within the source area to better define the performance of the groundwater remedy.	Additional groundwater monitoring wells are required and the existing groundwater monitoring program needs improvement within the source area to allow better evaluation of the performance of the groundwater remedy. A formal work plan should be prepared that presents well construction details, procedures, and locations for the recommended wells to address data gaps.	Chevron	12 / 2007	A new groundwater monitoring program was initiated in 2008 including the installation of eight shallow wells (screened from 55 to 70 feet bgs), four intermediate wells (screened from 90 to 100 feet bgs), and two deep wells (screened from 110 to 120 feet bgs) to close data gaps. In 2009, five additional monitoring wells were installed to replace wells that had gone dry due to the declining water table.	2008-2009
The current OU-1 groundwater management zone institutional control strategy extending 1 to 2 miles from the cleanup target area to coordinate the remedy with other uses of the aquifer and to maintain groundwater levels is impracticable.	An institutional control strategy should be developed to replace the existing groundwater management zone strategy.	Chevron	12 / 2009	A groundwater management zone has not been established to date. There have been no interferences with the OU-1 remedy by off-site aquifer use.	Moving forward as an issue related to this FYR (see Section 8)

Notes:

bgs Below ground surface, ERD Enhanced reductive dechlorination FFS Focused Feasibility study ROD Record of Decision
FYR Five Year Review OU-1 Operable Unit 1, Groundwater and Tanks VOC Volatile organic compound

6.0 FIVE-YEAR REVIEW PROCESS

Lily Tavassoli, EPA Remedial Project Manager for the Purity Oil Site led the completion of the third FYR. The following team members assisted in the FYR: Vicki Rosen, Community Involvement Coordinator, EPA Region 9; Pacific Western Technologies, Ltd. of Lakewood, Colorado; and Tetra Tech of Oakland, California, under Remedial Action Contract No. EP-W-06-006, Work Assignment 019-FRFE-0921. This review was performed between January 2011 and September 2011.

Potentially interested parties were notified at the initiation of the FYR. Parties notified included the PRP, Chevron and Project Navigator, Ltd., as well as the Department of Toxic Substance Control (DTSC).

This FYR consisted of a review of relevant documents and data (Appendix A), a site inspection (Appendix B), site interviews (Appendix C), a review of ARARs (Appendix D), a review of the status of institutional controls, an evaluation of human health risk and ecological risk (Appendices E and F), and community involvement activities (Appendix G).

6.1 Community Involvement

EPA placed a notice announcing the FYR in the Fresno Bee on March 14, 2011. The text of the public notice is included in Appendix G. No community inquiries have been received by EPA as a result of this notice. Upon completion of the FYR, a notice will be provided to the local community summarizing the findings.

6.2 Document Review

This FYR consisted of a review of relevant documents including remedial action reports, remedial action workplans, monitoring and closeout reports, and O&M plans and reports (Appendix A has a list of documents). Below is a summary of the information from the OU-1 quarterly groundwater data. Information from reports reviewed for OU-2 has been incorporated into the FYR.

6.3 Data Summary

OU-1: Groundwater and Tanks

Based on the quarterly OU-1 groundwater data since the last FYR in 2006, compounds that exceed the cleanup goals include: benzene, 1,1-DCA, 1,2-DCA, cis-1,2-DCE, vinyl chloride, iron, manganese, and arsenic. The quarterly data also indicate that the groundwater plume is not migrating. The VOC concentrations appear to have been diminishing over the last 5 years, and the plume appears to be stable ("stable" defined as the highest concentrations of VOC and metal contaminants along the plume center line remaining constant). Figures 4 and 5 show groundwater data collected from key wells defining the plume and its movement since the last FYR.

Data Gaps: Potential data gaps identified in the second FYR have been addressed through the installation and quarterly sampling of monitoring wells MW-24I, MW-25I, MW-42, MW-43, MW-44S, MW-44I, MW-44D, MW-45, MW-46, MW-47, MW-48, MW-48I, MW-48D, MW-49, MW-50, MW-51, MW-52, MW-53, and MW-54. The regional water table has declined by at least 10 feet in the past 5 years (resulting from groundwater pumping by the City of Fresno), thus

increasing the difficulty of collecting groundwater samples from wells screened above the current water table level.

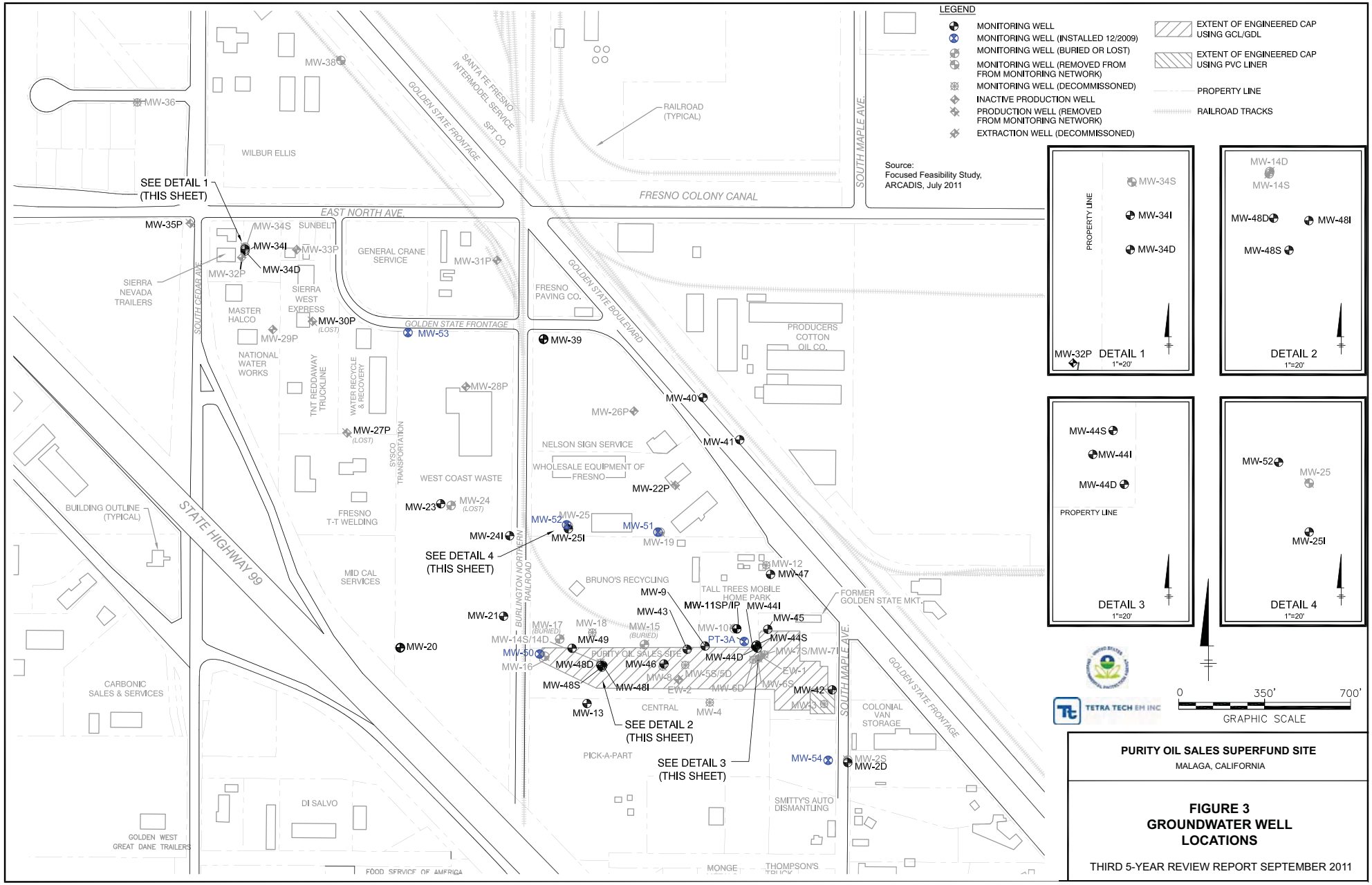
Contaminants Distribution within the Plume: Based on available monitoring data, chemical contaminants in the groundwater plume include a dense nonaqueous-phase liquid (DNAPL) layer in the deepest part of the vadose zone; previously, the DNAPL layer was below the water table in a residual and immobile state, but with the drop in groundwater levels is in the vadose zone. The thickness of the vadose zone has steadily increased due to the declining water table resulting from groundwater withdraw by the City of Fresno. A significant decrease in the dissolved VOC concentrations coincided with the more recent decline in the water table, indicating the source of the dissolved VOCs is likely exposed in the vadose zone. However, based on current groundwater conditions, the DNAPL layer is not affecting the remedy and the SVE treatment system is removing mass VOCs in this location.

The quarterly groundwater monitoring data also indicate that some degree of biodegradation of the chlorinated compounds is occurring.

OU-2: Soils

The SVE treatment system was installed on July 13, 2010 to address potential VOC impacts in the vadose zone soil from approximately 14 feet bgs to the groundwater level. During the first stages of full-scale operation, the SVE treatment system is operating in "pulse-mode," where a vacuum is applied on two to four sets of SVE wells at a time, and then cycled between the other SVE wells to gain additional vacuum response and mass recovery data. The initial SVE wells used, SVE-1a and SVE-4, were chosen because they bracket the area of highest observed baseline soil vapor concentrations, provide a balanced system influent (i.e., one higher and one lower concentration well), and are both located along the northern side of the cap (See Figure 6).

To evaluate the effectiveness of the SVE treatment system in reducing OU-2 VOCs, soil vapor samples are collected at the manifold for the individual wells as well as the combined influent to the treatment system. During the first year (July 2010 through June 2011), TCE concentrations decreased, while cis-1,2-DCE concentrations typically did not increase or decrease (see Figures 7 and 8 and Table 6). Total petroleum hydrocarbons (TPH) and total VOC concentrations exhibited a decreasing trend in the SVE system influent. The work plan states that extraction wells will be operated until soil vapor concentrations become asymptotic. As of June 2011, only two of the six extraction wells, SVE-1A and SVE-4 have been used for soil vapor extraction and influent contaminant levels are not yet asymptotic (SAIC Energy, Environment & Infrastructure, LLC. [SAIC 2011]).


LEGEND
MONITORING WELL
MONITORING WELL (INSTALLED 12/2009)
MONITORING WELL (BURIED OR LOST)
MONITORING WELL (REMOVED FROM FROM MONITORING NETWORK)
MONITORING WELL (DECOMMISSONED)
INACTIVE PRODUCTION WELL
PRODUCTION WELL (REMOVED FROM MONITORING NETWORK)
EXTRACTION WELL (DECOMMISSONED)
EXTENT OF ENGINEERED CAP USING GCL/GDL
EXTENT OF ENGINEERED CAP USING PVC LINER
PROPERTY LINE
RAILROAD TRACKS
Source:
Focused Feasibility Study,
ARCADIS, July 2011
DETAIL 1
1"=20'
DETAIL 2
1"=20'
DETAIL 3
1"=20'
DETAIL 4
1"=20'
0
350'
700'
GRAPHIC SCALE
TETRA TECH EM INC
PURITY OIL SALES SUPERFUND SITE
MALAGA, CALIFORNIA
FIGURE 3
GROUNDWATER WELL LOCATIONS
THIRD 5-YEAR REVIEW REPORT SEPTEMBER 2011
EAST NORTH AVE.
GOLDEN STATE FRONTAGE
GOLDEN STATE BOULEVARD
SOUTH MAPLE AVE.
SOUTH CEDAR AVE.
STATE HIGHWAY 99
FRESNO COLONY CANAL
SANTA FE FRESNO INTERMODEL SERVICE SPT CO.
BURLINGTON NORTHERN RAILROAD
RAILROAD (TYPICAL)
SEE DETAIL 1 (THIS SHEET)
SEE DETAIL 2 (THIS SHEET)
SEE DETAIL 3 (THIS SHEET)
SEE DETAIL 4 (THIS SHEET)
PURITY OIL SALES SITE
WILBUR ELLIS
SUNBELT
GENERAL CRANE SERVICE
SIERRA NEVADA TRAILERS
MASTER HALCO
SIERRA WEST EXPRESS
NATIONAL WATER WORKS
TNT REDDAWAY TRUCKLINE
WATER RECYCLE & RECOVERY
SYSCO TRANSPORTATION
WEST COAST WASTE
FRESNO T-T WELDING
MID CAL SERVICES
BUILDING OUTLINE (TYPICAL)
CARBONIC SALES & SERVICES
DI SALVO
GOLDEN WEST GREAT DANE TRAILERS
FOOD SERVICE OF AMERICA
FRESNO PAVING CO.
PRODUCERS COTTON OIL CO.
NELSON SIGN SERVICE
WHOLESALE EQUIPMENT OF FRESNO
BRUNO'S RECYCLING
TALL TREES MOBILE HOME PARK
FORMER GOLDEN STATE MKT.
CENTRAL
PICK-A-PART
COLONIAL VAN STORAGE
SMITTY'S AUTO DISMANTLING
MONGE
THOMPSON'S
MW-36
MW-38
MW-35P
MW-34S
MW-34I
MW-34D
MW-33P
MW-32P
MW-30P (LOST)
MW-29P
MW-31P
MW-53
MW-39
MW-28P
MW-27P (LOST)
MW-26P
MW-40
MW-41
MW-22P
MW-23
MW-24 (LOST)
MW-52
MW-25
MW-25I
MW-24I
MW-51
MW-19
MW-12
MW-47
MW-9
MW-11SP/IP
MW-44I
MW-43
MW-45
MW-21
MW-17 (BURIED)
MW-18
MW-15 (BURIED)
MW-10
PT-3A
MW-44S
MW-14S/14D
MW-49
MW-44D
MW-7S/MW-7I
MW-20
MW-50
MW-16
MW-48D
MW-46
MW-8
MW-5S/5D
EW-1
MW-48S
MW-48I
EW-2
MW-6D
MW-6S
MW-42
MW-3
MW-13
MW-4
MW-54
MW-2S
MW-2D
MW-44S
MW-44I
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MW-14D
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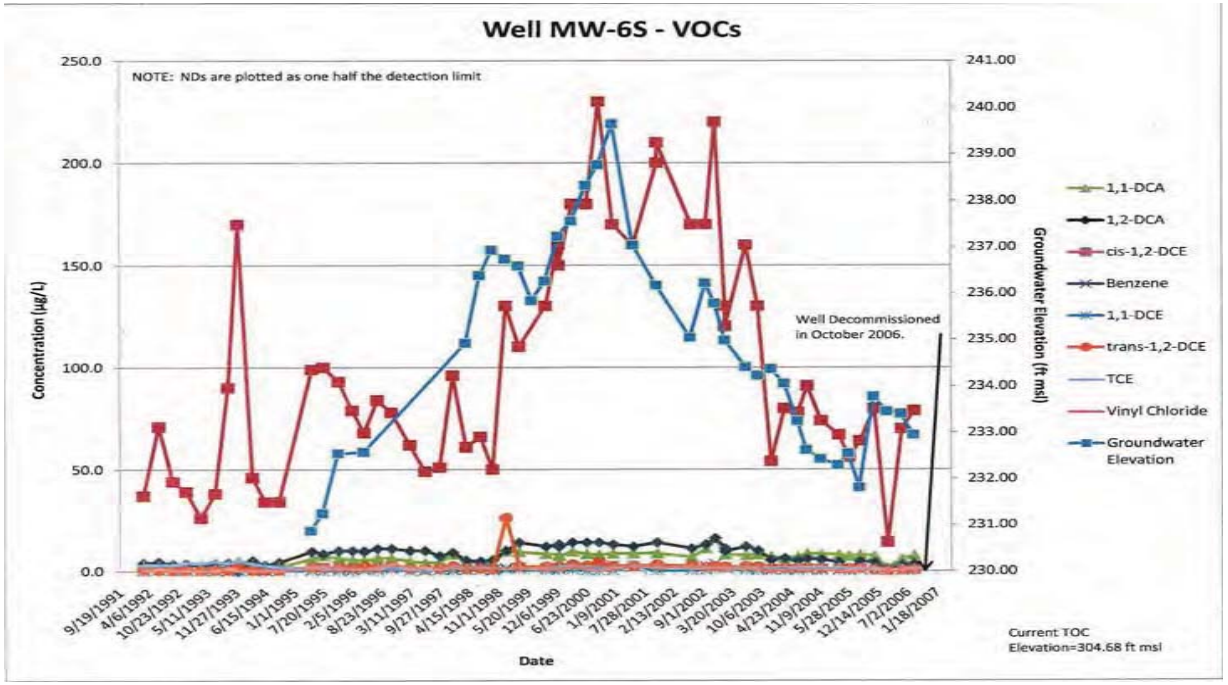
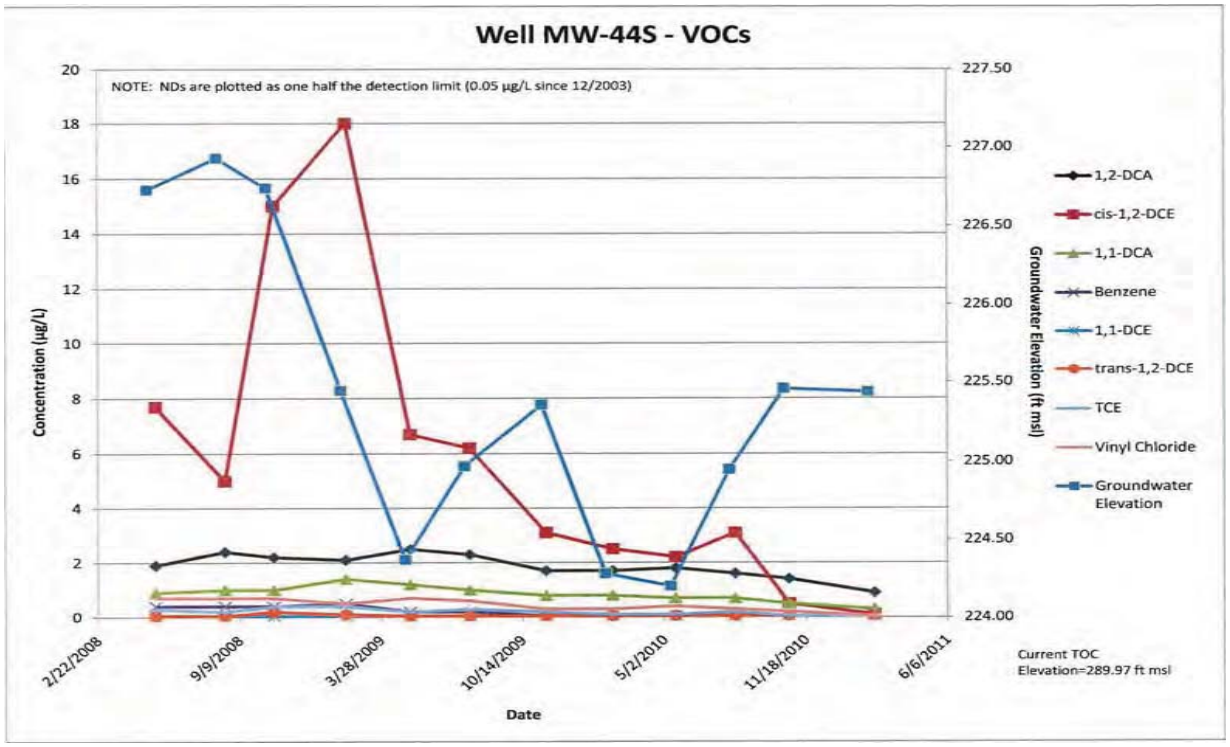
MW-48D
MW-48I
MW-48S
MW-52
MW-25
MW-25I





Source:
Focused Feasibility Study,
ARCADIS, July 2011

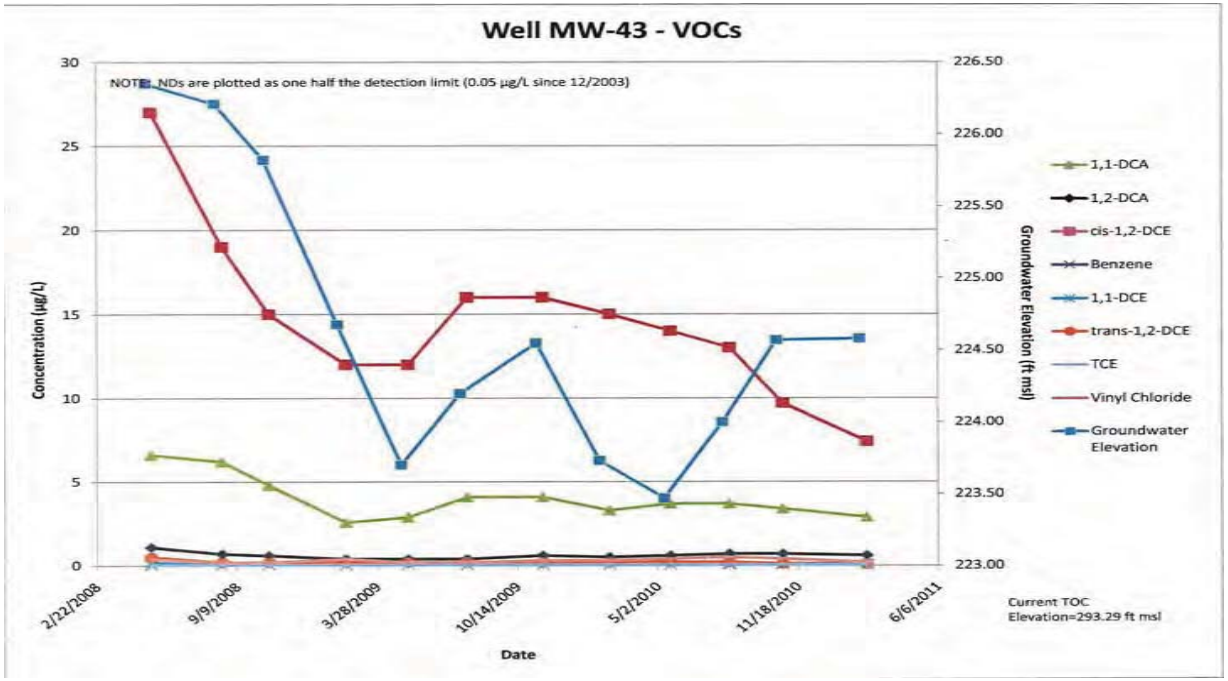
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethylene
1,2-DCA	1,2-Dichloroethane
cis-1,2-DCE	cis-1,2-Dichloroethylene
COC	Chemical of Concern
ft msl	feet mean sea level
MW	Monitoring Well
ND	Not Detected
trans,1-2-DCE	trans-1,2-Dichloroethylene
TCE	Trichloroethylene
TOC	Top of Casing
VOC	Volatile Organic Compound
µg/L	Micrograms per liter

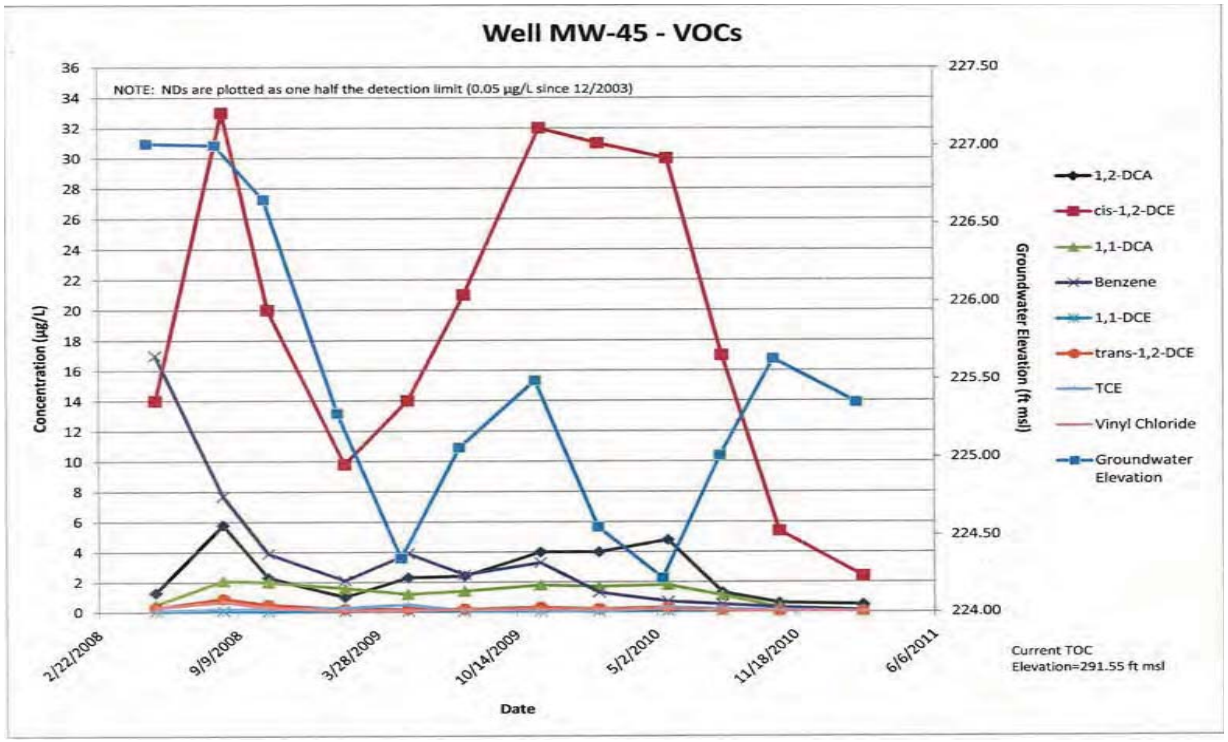
TETRA TECH EM INC.

PURITY OIL SALES SUPERFUND SITE
MALAGA, CALIFORNIA

FIGURE 4
GROUNDWATER COC LEVELS - WELLS 6S AND 44S

THIRD 5-YEAR REVIEW REPORT SEPTEMBER 2011





Source:
Focused Feasibility Study,
ARCADIS, July 2011

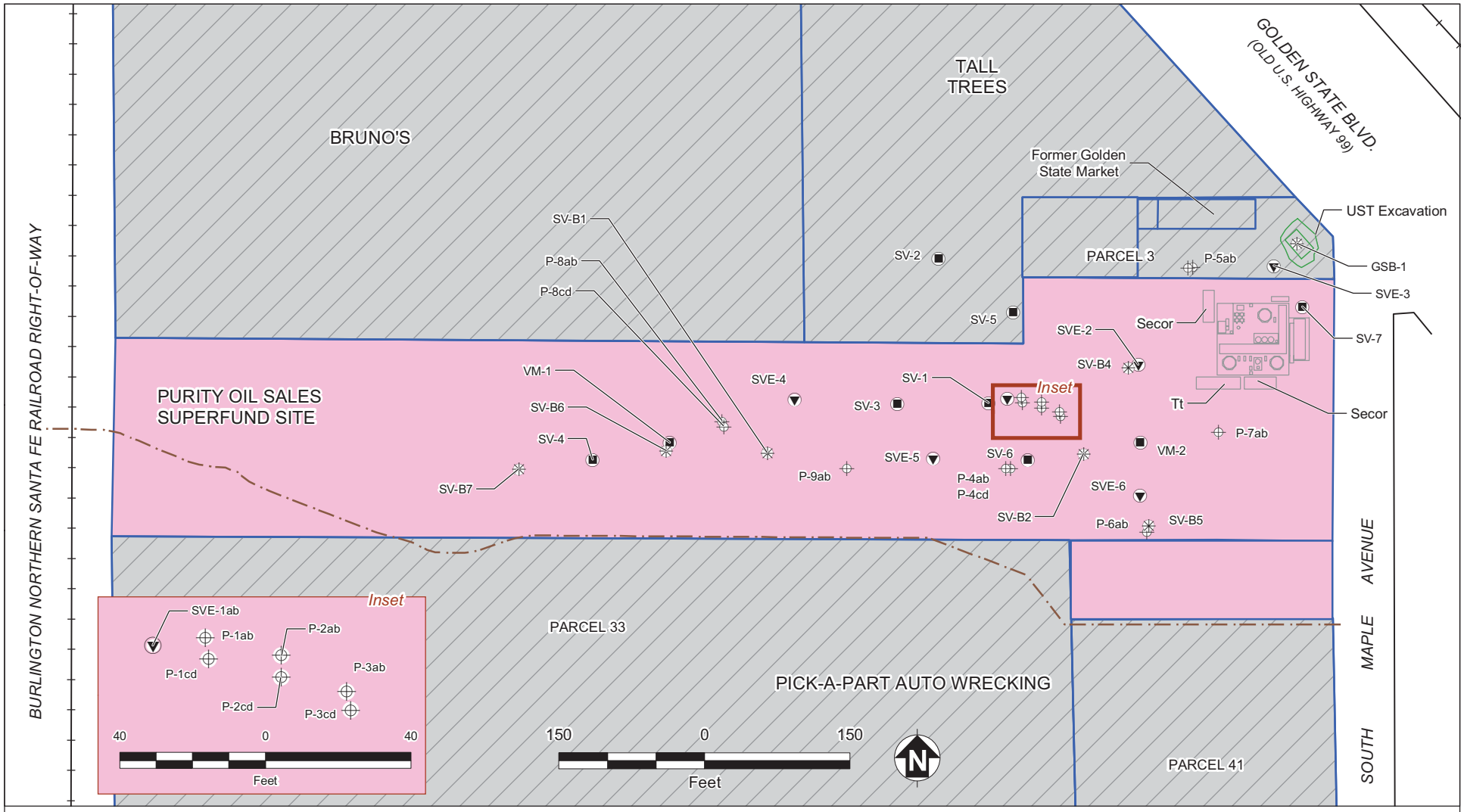
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethylene
1,2-DCA	1,2-Dichloroethane
cis-1,2-DCE	cis-1,2-Dichloroethylene
COC	Chemical of Concern
ft msl	feet mean sea level
MW	Monitoring Well
ND	Not Detected
trans,1-2-DCE	trans-1,2-Dichloroethylene
TCE	Trichloroethylene
TOC	Top of Casing
VOC	Volatile Organic Compound
µg/L	Micrograms per liter

TETRA TECH EM INC.

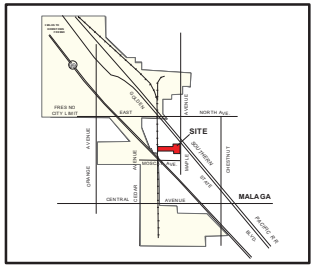
PURITY OIL SALES SUPERFUND SITE
MALAGA, CALIFORNIA

FIGURE 5
GROUNDWATER COC LEVELS - WELLS 43 AND 45

THIRD 5-YEAR REVIEW REPORT SEPTEMBER 2011



SITE LOCATION MAP



- Soil Vapor Extraction Well
- Soil Vapor Monitoring Point
- Vacuum Monitoring (Piezometer) Well
- Previous Soil Vapor Boring

LAND USE

- Purity Oil Sales Superfund Site
- Industrial
- Other Property
- Fresno Irrigation District North Central Canal (Buried Undergound)

Notes:
Figure modified from Figure 3-7 in the OU-1 Focused Feasibility Study, Arcadis, 2011

SV	Soil Vapor
SVE	Soil Vapor Extraction
Tt	Tetra Tech
UST	Underground Storage Tank

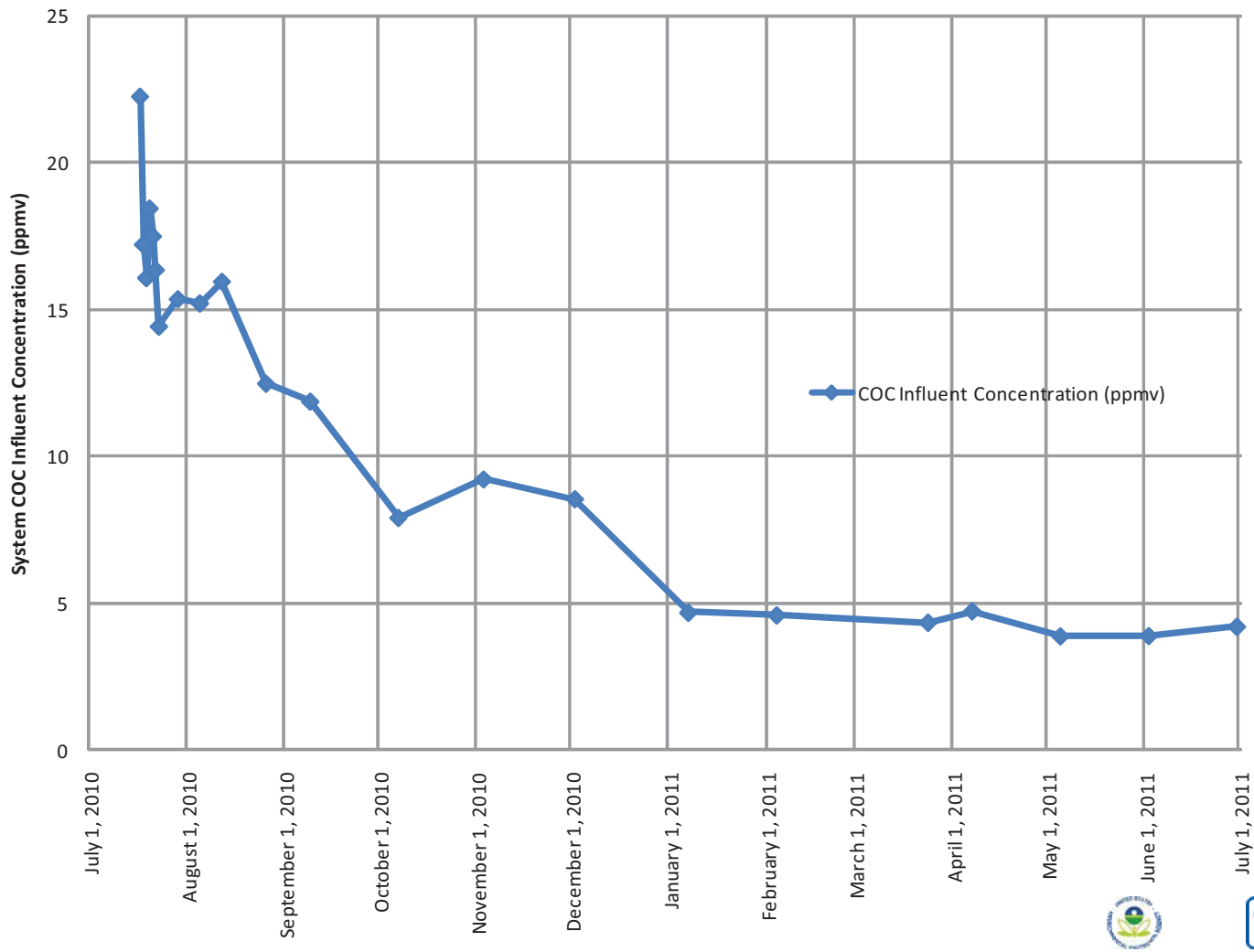
TETRA TECH EM INC.

PURITY OIL SALES SUPERFUND SITE
MALAGA, CALIFORNIA

FIGURE 6
SOIL VAPOR EXTRACTION MONITORING WELL LOCATIONS

THIRD 5-YEAR REVIEW REPORT
SEPTEMBER 2011

2011-08-09 V:\Misc_GIS\Purity_Oil\Projects\Purity Oil Phase II\SVE_MW_Locs.mxd TtEMI-OAK colin.lee



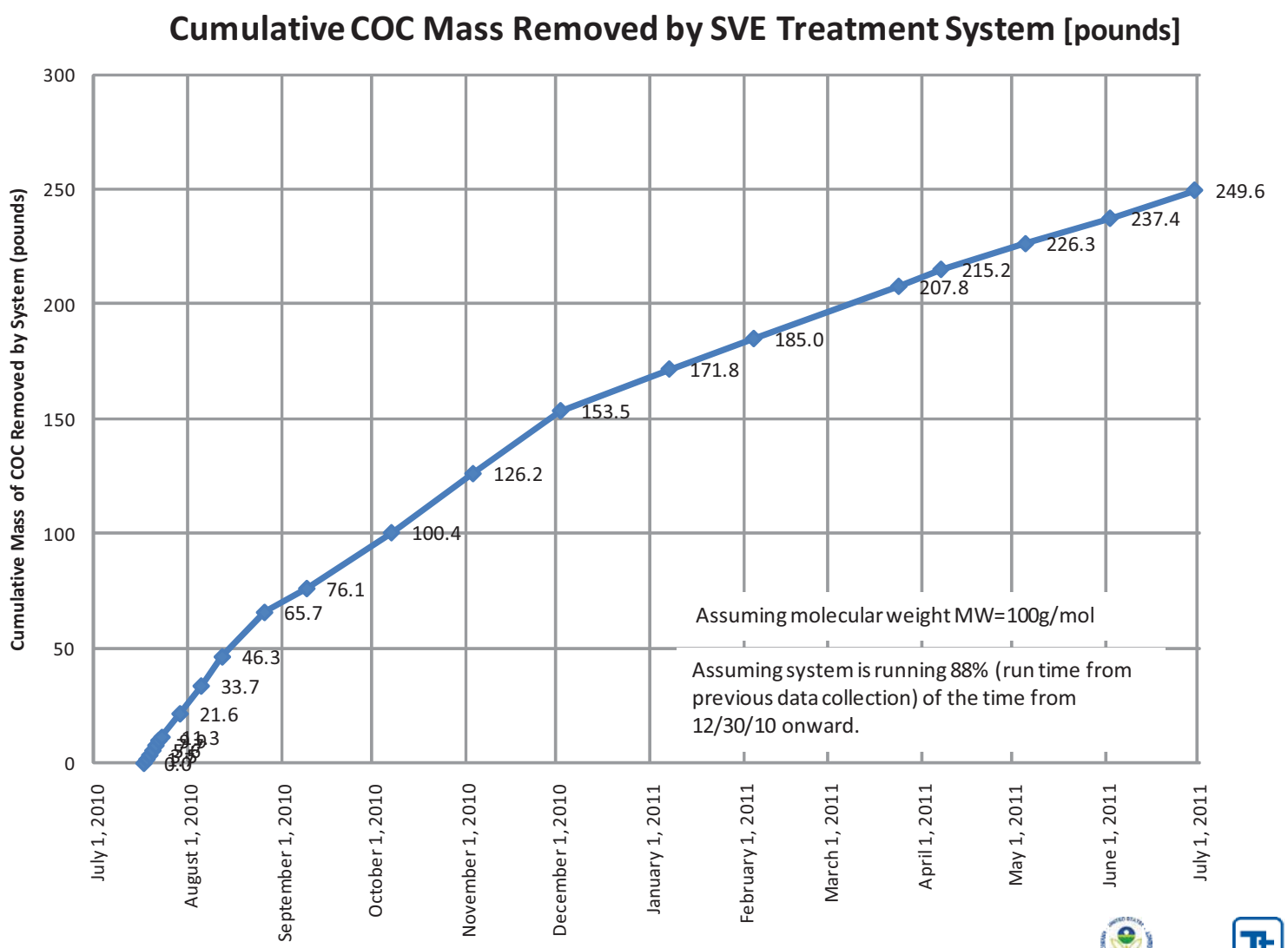
TETRA TECH EM INC.

PURITY OIL SALES SUPERFUND SITE
MALAGA, CALIFORNIA

FIGURE 7
SVE COCS INFLUENT LEVELS:
JULY 2010 – JUNE 2011
THIRD 5-YEAR REVIEW REPORT
SEPTEMBER 2011

Notes:
COC Chemical of Concern
g/mol Grams per mole
SVE Soil Vapor Extraction

2011-08-11 V:\Misc_GIS\Purity_Oil\Projects\FYR\coc_influent.mxd TtEMI-OAK colin.lee



TETRA TECH EM INC.

Notes:
COC Chemical of Concern
g/mol Grams per mole
SVE Soil Vapor Extraction

PURITY OIL SALES SUPERFUND SITE
MALAGA, CALIFORNIA

FIGURE 8
SVE COCS REMOVED:
JULY 2010 – JUNE 2011
THIRD 5-YEAR REVIEW REPORT
SEPTEMBER 2011

2011-08-11 V:\Misc_GIS\Purity_Oil\Projects\FYR\coc_removed.mxd TtEMI-OAK colin.lee

TABLE 5: SVE CONCENTRATIONS FROM WELLS 1A AND 4: JULY 2010 - JUNE 2011

SVE-1A					SVE-4				
Sampling Date	TCE	PCE	Benzene	Vinyl Chloride	Sampling Date	TCE	PCE	Benzene	Vinyl Chloride
	[ppmv]					[ppmv]			
7/13/2010	2,100	460	3,600	160	7/15/2010	77	0	1,000	0
7/13/2010	1,700	380	3,100	140	7/15/2010	130	20	860	27
7/13/2010	1,700	390	3,100	130	7/15/2010	130	23	760	29
7/17/2010	1,700	360	2,800	110	7/17/2010	130	22	730	23
7/18/2010	1,200	290	1,900	130	7/18/2010	200	46	600	21
7/19/2010	1,100	270	1,800	170	7/19/2010	220	52	580	20
7/20/2010	1,000	250	1,600	160	7/20/2010	240	60	580	22
7/21/2010	810	160	1,200	74	7/21/2010	290	58	620	16
7/22/2010	1,000	280	1,800	95	7/22/2010	240	60	500	11
7/23/2010	1,000	290	1700	83	7/23/2010	220	58	460	10
7/29/2010	880	250	1,500	67	7/29/2010	220	61	420	9.2
8/5/2010	1,600	420	2,300	62	8/5/2010	400	110	560	0
8/12/2010	1,300	280	1,800	38	8/12/2010	270	78	360	0
9/9/2010	1,200	280	1,300	0	9/9/2010	290	120	320	0
10/7/2010	1,000	200	1,100	0	10/7/2010	300	100	300	0
11/3/2010	1,300	260	1,100	0	11/3/2010	230	84	200	0
12/2/2010	1,000	240	880	0	12/2/2010	170	56	160	0
1/7/2011	810	180	530	0	1/7/2011	230	91	150	0
2/4/2011	740	190	490	0	2/4/2011	180	82	130	0
3/10/2011	590	< 260	430	0	3/10/2011	170	69	100	0
4/7/2011	700	160	430	0	4/7/2011	170	71	100	0
5/5/2011	710	220	390	0	5/5/2011	150	70	85	0
6/2/2011	660	220	370	0	6/2/2011	160	71	88	0
6/30/2011	640	220	300	0	6/30/2011	150	70	77	0

Notes:

PCE tetrachloroethylene ppmv parts per million volume TCE trichloroethylene

6.4 Site Inspection

Representatives from EPA, Tetra Tech, and Stantec (contractor to Chevron) conducted a site inspection of the Purity Oil site on March 1, 2011; Appendix B contains a completed site inspection form. The site inspection included evaluation of the OU-2 remedy including both the soil cap and SVE system.

The soil cap is complete and only ongoing maintenance is currently required including gopher management, mowing, and vegetation maintenance. The SVE system has been operating since July 2010, and all components including soil vapor extraction wells, conveyance piping, and the SVE treatment system were found in good condition with no concerns noted.

The records review at the site included the O&M Manual, O&M training records, Health and Safety Plan (HASP), settlement monument records, permits (air discharge and water disposal), discharge compliance reports, groundwater monitoring, and daily access/security reports. With the exception of the HASP and POTW permit, which were with a sampling team, all records were available for review and up-to-date.

The security at the site is effective at deterring trespassers. There has been minor fence damage and other small acts of vandalism which have been reported in the quarterly and now bi-annual site inspections. Damage has been repaired quickly. The site is monitored 24/7 through a combination of subcontracted security personnel that visit site regularly; a remote security system with multiple detection modes; and keyed and locked security access gates. 'No Trespassing,' 'Hazardous Site,' and Proposition 65 signs in English and Spanish are posted at regular intervals around entire perimeter.

The cap cover appears to be in good condition. The site inspection found no evidence of settlement, cracks, erosion, slope instability, holes, bulges, or water damage. The vegetative cover is properly established and shows no signs of stress. The surface water collection system shows minimal siltation at the end of the rainy season. However, erosion is not evident and the system is in good condition. Additionally, the SVE collection and treatment system are in good condition. These findings are consistent with the O&M inspection reports.

The groundwater monitoring wells and SVE wells were inspected on January 4 through January 7, 2011. Most of the wells are in good condition, but require minor maintenance, as outlined in the inspection notes in Appendix B. Groundwater continues to be sampled quarterly. Purge water from the sampling events is collected in the GWT system tanks and discharged to the Malaga POTW along with other collected water. The treatment plant remains on site, but is currently not operational. The collected water is sampled to ensure it meets permit requirements before discharging, and discharge reports are submitted on time.

6.5 Site Interviews

On March 1, 2011, EPA conducted an on-site interview with Mr. Ralph Carson, Senior Geologist for Stantec, one of Chevron's contractors. On May 25, 2011, EPA conducted an interview with Mr. Michael Hurd, a senior environmental project manager with Benham, an SAIC company, also one of Chevron's contractors. Appendix C contains a record of these interviews, which are summarized below.

Mr. Carson's overall impression of the site is good, and he reports that within the last 5 years, much work—including starting and completing the cap—has significantly reduced dangers to the environment and the people of the community. Mr. Carson offered the following comments about the site:

- Levels of COCs in groundwater are declining, most likely as a result of natural attenuation.
- The OU-2 cap is working as designed with no erosion, no leachate, no areas of moisture or damage to the cap, no settlement, and 90-95% vegetative cover.
- Pick-a-Part has done a good job repairing fence damage and reducing the number of incidents of people throwing things over the fence and coming onto the Purity Property to retrieve them. This has cut down on site vandalism.

Mr. Hurd's overall impression of the project is that it is moving forward toward cleanup goals, and that the SVE system is operating better than expected, with good extraction well influence both laterally and vertically. Mr. Hurd had some additional comments about the site:

- The SVE system is performing well; however, it is using more carbon than originally anticipated, and the carbon changeouts have been more frequent.
- The SVE system power usage has been lower than anticipated, likely due to less resistance from the subsurface matrix.
- The monitoring data show decreasing concentrations of cis-DCE and TCE.
- The past trespassing and security issues at other parts of the site have not affected the SVE system.

In addition, EPA visited several owners of properties adjacent to the Purity Oil site to inform them of the ongoing FYR and inquire about any concerns or questions. Adjacent properties visited included: Pick-a-Part Auto Wrecking, West Coast Waste, Bruno's Iron and Metal, and Wholesale Equipment. Of these businesses visited, the only individual available to speak with EPA was the owner of Wholesale Equipment. He did not have any concerns or comments about the site or the FYR.

7.0 TECHNICAL ASSESSMENT

The technical assessment of the OU-1 and OU-2 remedies was evaluated by asking the following three questions:

- Question A: Is the remedy functioning as intended by the decision documents?
- Question B: Are the assumptions used at the time of remedy selection still valid?
- Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The answers to each question are provided below.

7.1 Question A: Is the Remedy Functioning As Intended by the Decision Documents?

OU-1: Groundwater and Tanks

Remedial Action Performance

The remedy selected for OU-1 is not operating. However, monitoring results show the VOC plume is diminishing through a combination of a decline in the water table level and natural attenuation mechanisms based on regular groundwater monitoring conducted over the FYR period (Stantec 2011). Some components of the remedy selected for OU-1 for the Purity Oil site are functioning effectively; the alternate source for drinking water provided under the OU-1 ROD to down-gradient residents who historically relied on private wells for drinking water has effectively removed the threats posed by the contaminated sole-source aquifer. The OU-1 ROD tank removal has effectively removed the threat of direct exposure to contaminants in the tanks. However, the extraction system for the groundwater pump-and-treat remedy was not effective and was decommissioned; therefore, no O&M is currently being performed for OU-1.

Preliminary findings from the ERD pilot study indicate that ERD could be an acceptable remedy for the VOC plume. However, the metals plume could increase in magnitude if ERD is chosen as a remedy for the VOC plume. During the ERD pilot study, when electron donors were added to the groundwater to stimulate reductive dechlorination, an increase in dissolved-phase concentrations of iron, manganese, and arsenic in groundwater occurred.

Opportunities for Optimization

Opportunities for optimization exist for addressing OU-1 and Chevron is currently investigating alternative technologies to address OU-1 conditions.

Early Indicators of Potential Issues

There are no indications of potential issues; down-gradient residents have alternative sources for drinking water and groundwater monitoring data show the VOC plume diminishing. The current groundwater monitoring well network is sufficient to characterize the extent of the VOC plume, and the plume appears to be stable.

Implementation of Institutional Controls and Other Measures

The groundwater management zone strategy called for in the OU-1 ROD was intended to coordinate uses of the aquifer with nearby groundwater users, in order to prevent impact to the groundwater level (and indirectly, the plume and functionality of the associated treatment system).

Although the groundwater management zone has not yet been developed, nearby groundwater pumping has not impacted the site.

The groundwater management zone strategy for OU-1 should be re-evaluated and updated to outline proper steps to reach the goal of preventing off-site aquifer users from impacting the groundwater plume at the Site.

OU-2: Soils

Remedial Action Performance

The OU-2 ROD remedy construction began in 1998, when existing portions of the North Central Canal that abut the site were enclosed within a reinforced concrete pipe. The pipe effectively eliminated the exposure pathway for site contaminants to impact irrigation water in the supply canal.

From November 2000 to June 2008, work to cap the site was completed. Previous concerns from the appearance of acidic sludge seepage from the waste area and contamination extending onto adjacent properties were addressed through ESDs and the OU-2 ROD Amendment. Based on a review of documents, ARARs, risk assumptions, and the site inspection results, the remedy is functioning as intended in the ROD, and modified by the ESDs and ROD Amendment. The completion of the soils neutralization and cap installation has effectively removed the threat of direct exposure to contaminants and the cap continues to operate and function as designed.

The SVE system is operating as intended in the work plan, with system vapor flow rates and vacuum consistent with design values. Preliminary soil vapor sampling data obtained after 6 months of operation indicate decreases in most COCs. Continued operation and monitoring of system performance is necessary to fully evaluate system effectiveness and compliance with the ROD.

System Operations/O&M

O&M of the cap and drainage system has been effective. Chevron completed quarterly O&M inspections including observations of vegetative cover, surface water features, site security, settlement markers, site irrigation, and cap integrity. No major issues have been reported, and issues noted in the inspections were documented and corrected. As of November 2010, Chevron began semi-annual monitoring with concurrence from EPA.

Opportunities for Optimization

There were no opportunities for system optimization observed during this review. The cap is effective in removing the threat of direct exposure to contaminants and no issues have been reported from O&M inspections. There may be opportunities for optimization of the SVE system; however continued operation and maintenance of the system including soil vapor extraction from more wells than just the initial two wells will provide more data to support optimization opportunities.

Early Indicators of Potential Issues

There are no indications of potential issues. The SVE system has been functioning without breakdowns, or changes that indicate a potential issue and no issues have been identified during O&M inspections of the cap and drainage systems.

Implementation of Institutional Controls and Other Measures

As part the OU-2 ROD Amendment, institutional controls to protect the components of the remedy and allow for O&M are required, including a Land Use Covenant to protect the cap and other remedy components, and to prevent exposure to neutralized sludge. Land Use Covenants will also be required for the adjacent properties to ensure that sensitive uses (such as residential, school, or daycare facilities) do not occur. The GSM property was remediated to industrial cleanup levels, and a Land Use Covenant will be required. To date, the Final OU-2 O&M Manual has not been updated to reflect an explanation of how institutional controls (IC) will be addressed.

7.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of Remedy Selection Still Valid?

OU-1: Groundwater and Tanks

Changes in Standards and TBCs

EPA reviewed the ARARs for the OU-1 ROD for this FYR and determined that there are no changes that impact the protectiveness of the remedy (see Appendix D). Additionally, there are no newly promulgated, or changes in, standards or site considerations in selecting cleanup levels which affect the protectiveness of the remedy.

There were no changes in action-specific or location-specific ARARs.

EPA reviewed the ARARs identified in the 1989 OU-1 ROD, 1992 OU-2 ROD, and the 2006 OU-2 ROD amendment, and compared them to current statutes, regulations, and policies. In the second FYR, EPA identified several changes to federal and state MCLs; however, those changes did not impact the protectiveness of the remedy. California has published new MCLs, and as Table 6 indicates, these new MCLs are the same as the cleanup levels in the OU-1 ROD (EPA 1989), with the exception of arsenic (discussed below). The reduction of concentrations of VOC COCs in groundwater to the OU-1 ROD cleanup standards meet federal and state MCLs and is considered protective of drinking water.

Arsenic was not identified as a COC in the OU-1 ROD, because concentrations in groundwater at the time were below the MCL. However, since the second FYR in 2006, the MCL for arsenic changed from 50 ppb to 10 ppb. The MCL for arsenic is included in Table 6, Changes in OU-1 Cleanup Standards because the ROD specified the remedial action objective for groundwater is to restore groundwater to drinking water standards. Although arsenic has been detected above the new MCL of 10 ppb, the remedy is considered protective because there is no complete exposure pathway and down-gradient residents are provided with alternate safe drinking water. Additionally, because of elevated local background levels of arsenic, local municipalities treat the water accordingly before discharge. An evaluation of the arsenic MCL will be part of the OU-1 remedy decision document, to be completed after the FFS Addendum.

TABLE 6: CHANGES IN OU-1 CLEANUP STANDARDS

Contaminant	Media	Standard [ppb]		Citation/Year
Arsenic	Groundwater	Previous	50	Chemical was not identified as a COC for groundwater in ROD
		Current	10	California MCL, 2008
cis-1,2-DCE	Groundwater	Previous	6	California DHS Action Level adopted as cleanup level in ROD
		Current	6	California MCL, 2006
1,1 DCA	Groundwater	Previous	5	DHS Action Level adopted in ROD
		Current	5	California MCL, 2006
trans-1,2-DCE	Groundwater	Previous	10	DHS Action Level adopted in ROD
		Current	10	California MCL, 2006

Notes:

DCA	Dichloroethane	OU-1	Operable Unit 1, Groundwater and Tanks
DCE	Dichloroethene	ppb	Parts per billion
DHS	Department of Health Services	ROD	Record of Decision
MCL	Maximum contaminant level		

Changes in Exposure Pathways

Since the time of remedy selection documented in the OU-1 ROD, there have not been any significant changes in exposure pathways that would impact RAOs. Current and expected future land use as commercial/industrial has not changed.

A baseline ecological risk assessment was performed for the entire site. It can be found in Appendix F of this document.

EPA's general understanding of contaminant migration from the subsurface into buildings at cleanup sites has changed since the OU-1 ROD was completed. As a result, vapor intrusion may have a greater potential for posing risk to human health than originally assumed at the time the OU-1 ROD was prepared. In September 2002 (after the ROD for OU-1 had been issued), EPA released an external review draft version of its vapor intrusion guidance titled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (EPA 2002). The migration of contaminants from the subsurface into buildings is a relatively new consideration at sites where groundwater has been impacted by volatile chemicals. Vapor intrusion is a potential concern if a complete exposure pathway exists. Tables 2a through 2c of the draft vapor intrusion guidance list target groundwater concentrations for the groundwater-to-indoor air migration pathway equivalent to a cancer risk range of 10E-4 to 10E-6 or hazard quotient of 1 (EPA 2002).

At the Purity Oil site, the most recent groundwater data from February 2011 indicate that concentrations of volatile COCs in groundwater are below the draft Table 2a target groundwater concentrations for an occupational exposure scenario. In addition, there are no buildings over the area where VOC contamination currently exists. Vapor intrusion is therefore not a potential issue for this FYR. On-site construction of buildings is not a reasonably anticipated future use due to the

presence of the cap. However, adjacent properties should continue to be monitored during future Five-Year Reviews to ensure any changes in land use do not create a vapor intrusion pathway.

There are no newly identified contaminants or contaminant sources, nor unanticipated toxic byproducts of the OU-1 remedy not previously addressed by the decision documents. Physical changes at the site include the neutralization and capping of sludge material. The completion of the cap has not altered the site in a way that affects the protectiveness of the OU-1 remedy.

Changes in Toxicity and Other Contaminant Characteristics

There have been no changes in toxicity factors for COCs at the site or contaminant characteristics that affect the protectiveness of the OU-1 remedy.

Expected Progress Towards Meeting RAOs

Of the three RAOs in the OU-1 ROD, two have been completed: (1) provide safe drinking water to down-gradient residents, and (2) eliminate the direct exposure threat posed by the hazardous wastes present in the seven on-site steel tanks. The status of achieving the third RAO—restore the sole-source drinking water aquifer as soon as possible to meet federal and state drinking water standards—is uncertain at this time. Currently, the OU-1 ROD lists a pump-and-treat remedy to comply with this third RAO; however, this system is no longer in use and Chevron is considering alternative technologies for remediation. EPA will ultimately choose a new remedy in an appropriate decision document.

OU-2: Soils

Changes in Standards and TBCs

EPA reviewed the chemical-specific, action-specific, and location-specific ARARs for the OU-2 ROD and OU-2 ROD Amendment in this FYR, and found no changes that impact the protectiveness of the remedy.

Since the OU-2 ROD Amendment (EPA 2006a) and subsequent remedies were completed, numerous toxicity criteria have been revised, and EPA released a revised methodology for calculating risks via the inhalation exposure pathway (EPA 2009). These revisions have resulted in changes to the EPA Region 9 soil PRGs, now referred to as the EPA Regional Screening Levels (RSL) (EPA 2011), used as soil cleanup levels for the adjacent properties during completion of the OU-2 remedy. Table E-1 in Appendix E presents the current list of COCs, the 2004 industrial soil PRGs presented in the ROD Amendment and used as a basis for cleanup, and compares them to the recent 2011 industrial soil RSLs. Several chemicals (including 1,1-dichloroethane, beryllium, cadmium, and ethylbenzene) have been revised such that the 2011 RSL is significantly more conservative than the 2004 PRG. Of these chemicals, 1,1-dichloroethane was not detected in soil, and beryllium, cadmium, and ethylbenzene were detected either below the RSL or were detected in samples that were removed during the OU-2 remedy. Thus, use of revised RSL soil cleanup levels would not result in a significant change to the protectiveness of the remedy for the adjacent properties.

TABLE 7: CHANGES IN OU-2 CLEANUP STANDARDS

Contaminant	Media	Standard [mg/kg]		Citation/Year
1,1,1-Trichloroethane	Soil	Previous	6.9E+03	US EPA Region 9 PRG, 2004
		Current	3.8E+04	US EPA RSL, 2011
1,1,2-Trichloroethane	Soil	Previous	1.6E+00	US EPA Region 9 PRG, 2004
		Current	5.3E+00	US EPA RSL, 2011
1,1-Dichloroethane	Soil	Previous	1.7E+03	US EPA Region 9 PRG, 2004
		Current	1.7E+01	US EPA RSL, 2011
1,1-Dichloroethene	Soil	Previous	4.1E+02	US EPA Region 9 PRG, 2004
		Current	1.1E+03	US EPA RSL, 2011
1,2-Dichloroethane	Soil	Previous	6.0E-01	US EPA Region 9 PRG, 2004
		Current	2.2E+00	US EPA RSL, 2011
2-Butanone	Soil	Previous	1.1E+05	US EPA Region 9 PRG, 2004
		Current	2.0E+05	US EPA RSL, 2011
2-Methylnaphthalene	Soil	Previous	4.2E+00	US EPA Region 9 PRG, 2004
		Current	4.1E+03	US EPA RSL, 2011
4,4'-DDD	Soil	Previous	1.0E+01	US EPA Region 9 PRG, 2004
		Current	7.2E+00	US EPA RSL, 2011
4,4'-DDE	Soil	Previous	7.0E+00	US EPA Region 9 PRG, 2004
		Current	5.1E+00	US EPA RSL, 2011
4-Methyl-2-pentanone	Soil	Previous	4.7E+04	US EPA Region 9 PRG, 2004
		Current	5.3E+04	US EPA RSL, 2011
Acenapthylene	Soil	Previous	4.2E+00	US EPA Region 9 PRG, 2004
		Current	3.3E+04	US EPA RSL, 2011
Acetone	Soil	Previous	5.4E+04	US EPA Region 9 PRG, 2004
		Current	6.3E+05	US EPA RSL, 2011
Barium	Soil	Previous	6.7E+04	US EPA Region 9 PRG, 2004
		Current	1.9E+05	US EPA RSL, 2011
Benzene	Soil	Previous	1.4E+00	US EPA Region 9 PRG, 2004
		Current	5.4E+00	US EPA RSL, 2011
Beryllium	Soil	Previous	1.9E+03	US EPA Region 9 PRG, 2004
		Current	1.9E+02	US EPA RSL, 2011
Beta-BHC	Soil	Previous	1.3E+00	US EPA Region 9 PRG, 2004
		Current	9.6E-01	US EPA RSL, 2011

TABLE 7: CHANGES IN OU-2 CLEANUP STANDARDS (CONTINUED)

Contaminant	Media	Standard [mg/kg]		Citation/Year
Cadmium	Soil	Previous	4.5E+02	US EPA Region 9 PRG, 2004
		Current	7.5E+00	US EPA RSL, 2011
Carbon disulfide	Soil	Previous	1.2E+03	US EPA Region 9 PRG, 2004
		Current	3.7E+03	US EPA RSL, 2011
Chlorobenzene	Soil	Previous	5.3E+02	US EPA Region 9 PRG, 2004
		Current	1.4E+03	US EPA RSL, 2011
Chloroform	Soil	Previous	4.7E-01	US EPA Region 9 PRG, 2004
		Current	1.5E+00	US EPA RSL, 2011
Cyanide	Soil	Previous	1.2E+04	US EPA Region 9 PRG, 2004
		Current	2.0E+04	US EPA RSL, 2011
Ethylbenzene	Soil	Previous	7.4E+03	US EPA Region 9 PRG, 2004
		Current	2.7E+01	US EPA RSL, 2011
Gamma-BHC (Lindane)	Soil	Previous	1.7E+00	US EPA Region 9 PRG, 2004
		Current	2.1E+00	US EPA RSL, 2011
Methylene chloride	Soil	Previous	2.1E+01	US EPA Region 9 PRG, 2004
		Current	5.3E+01	US EPA RSL, 2011
Napthalene	Soil	Previous	4.2E+00	US EPA Region 9 PRG, 2004
		Current	1.8E+01	US EPA RSL, 2011
Styrene	Soil	Previous	1.8E+04	US EPA Region 9 PRG, 2004
		Current	3.6E+04	US EPA RSL, 2011
Tetrachloroethene	Soil	Previous	1.3E+00	US EPA Region 9 PRG, 2004
		Current	2.6E+00	US EPA RSL, 2011
Toluene	Soil	Previous	2.2E+03	US EPA Region 9 PRG, 2004
		Current	4.5E+04	US EPA RSL, 2011
Trichloroethene	Soil	Previous	1.1E-01	US EPA Region 9 PRG, 2004
		Current	1.4E+01	US EPA RSL, 2011
Vinyl chloride	Soil	Previous	7.5E-01	US EPA Region 9 PRG, 2004
		Current	1.7E+00	US EPA RSL, 2011
Xylenes	Soil	Previous	9.0E+02	US EPA Region 9 PRG, 2004
		Current	2.7E+03	US EPA RSL, 2011

Notes:

BHC	Hexachlorocyclohexane	DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene	EPA	Environmental Protection Agency
OU-2	Operable Unit 2, Soils	PRG	Preliminary Remediation Goals
RSL	Regional Screening Levels		

Changes in Exposure Pathways

For OU-2, a qualitative assessment of risk to ecological receptors at the Purity Oil Site and at the adjacent properties was performed, and is included in this document as Appendix F. The qualitative risk assessment found that the selected remedy in the OU-2 ROD Amendment eliminated exposure pathways by which contaminants in soil can be taken up by ecological receptors on the Purity Oil Property Site and the adjacent properties.

The OU-2 remedy was designed to be protective upon completion, which occurred in July 2010. The OU-2 remedy included neutralization of the sludge, capping the Purity Oil property, and installing a SVE system to address potential VOC impacts in the soil from approximately 14 feet bgs to the groundwater level. The closure cover system was designed to prevent direct contact with neutralized materials and limit infiltration of water.

The OU-2 ROD Amendment (EPA 2006a) specified post-excavation soil and soil gas sampling on adjacent properties to evaluate the potential for vapor intrusion from residual VOC-contaminated soils left in-place between the bottoms of the excavations to the water table. Confirmation soil samples were collected during the excavation of areas and compared with 2004 industrial PRGs to guide the extent of excavation. Soil and soil gas sampling has not yet been conducted as required in the ROD Amendment for the purposes of determining the potential for vapor intrusion effects from residual VOCs in the subsurface. This sampling will be performed upon completion of the SVE system operation.

There are no newly identified contaminants or contaminant sources, nor are there unanticipated toxic byproducts of the OU-2 remedy not previously addressed by the decision documents. Physical changes at the site include the neutralization and capping of sludge material. The completion of the cap and continued O&M ensure the protectiveness of the OU-2 remedy.

Changes in Toxicity and Other Contaminant Characteristics

There have been no changes in toxicity factors for COCs at the site or contaminant characteristics that could affect the protectiveness of the OU-2 remedy.

Expected Progress Towards Meeting RAOs

All four of the RAOs listed in the OU-2 ROD Amendment for the Purity Oil Site and adjacent properties have been completed, or are underway:

1. Prevent contact of acidic sludge with cap components.
2. Prevent human exposure through direct contact to contaminated soils.
3. Prevent or minimize further migration of contaminants from source material to groundwater.
4. Prevent migration of contaminated groundwater to local domestic or irrigation wells.

The cap was completed and the material under the cap neutralized so that no acidic sludge compromises the continued function of the cap. Additionally, the source to groundwater was removed and the SVE system is reducing levels of the VOC source in the vadose zone.

The status of the two RAOs listed for the adjacent properties are also progressing towards completion:

1. Remediate COCs in groundwater to drinking water standards and other health-based action levels.

2. Prevent further migration of soil vapor containing COCs at concentrations exceeding ARAR criteria and TBC criteria

Although groundwater conditions exceed the MCLs, down-gradient residents are provided with safe drinking water. The SVE continues to operate, and soil vapor concentrations are expected to diminish.

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

OU-1: Groundwater and Tanks

No newly identified ecological risks have been found, no natural disasters have impacted the site, and no additional information for OU-1 calls into question the protectiveness of the remedy.

OU-2: Soils

No newly identified ecological risks have been found, no natural disasters have impacted the site, and no additional information for OU-2 calls into question the protectiveness of the remedy.

8.0 ISSUES

Issues relating to current site conditions that may prevent the remedies of the OU-1 and OU-2 RODs from being protective are summarized in Table 8.

TABLE 8: ISSUES

OU	Issue	Affects Current Protectiveness	Affects Future Protectiveness
1	The selected remedy for OU-1 (groundwater and tanks) is not operating.	No	Yes
1	The groundwater management zone strategy called for in the OU-1 ROD has not been developed.	No	Yes
2	The OU-2 remedy requirement for ICs to prevent damage to the remedy, as well as the requirement for off-property ICs to prevent exposure to contaminated soils, has not yet been addressed.	No	Yes

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 9 summarizes recommendations and follow-up actions for each OU.

TABLE 9: RECOMMENDATIONS AND FOLLOW-UP ACTIONS

OU	Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness	
						Current	Future
1	The selected remedy for OU-1 (groundwater and tanks) is not operating.	Chevron will prepare a Focused Feasibility Study Addendum as a follow-up to the completion of a two year, in-situ Enhanced Reductive Dechlorination pilot study performed between 2008 and 2010. The Focused Feasibility Study Addendum will examine remedial alternatives for OU-1 based on data collected during the pilot study as well as data from current site conditions (i.e. operation of the soil vapor extraction system). A final remedy decision for the groundwater operable unit will be made in a decision document by EPA.	Chevron	EPA	December 2012	No	Yes
1	The groundwater management zone strategy called for in the OU-1 ROD has not been developed.	An OU-1 groundwater management zone strategy needs to be developed to outline proper steps to reach the goal of preventing off-site aquifer users from impacting the groundwater plume at the Purity Oil site.	Chevron	EPA	December 2012	No	Yes
2	The OU-2 remedy requirement for ICs to prevent damage to the remedy, as well as the requirement for off-property ICs to prevent exposure to contaminated soils, has not yet been addressed.	An institutional controls strategy for OU-2 needs to be developed. This strategy will be included in the OU-2 O&M Manual for EPA approval.	Chevron	EPA	December 2012	No	Yes

10.0 PROTECTIVENESS STATEMENTS

The remedy at OU-1 protects human health and the environment in the short term because there are no exposures to groundwater. However, to ensure long-term protection, the following actions need to be taken:

- Completion of a Focused Feasibility Study Addendum to examine remedial options for contaminated groundwater and implementation of a final remedy as specified in a decision document by EPA.
- Development of an OU-1 groundwater management zone strategy to outline proper steps to reach the goal of preventing off-site aquifer users from impacting the groundwater plume at the Purity Oil site.

The remedy at OU-2 currently protects human health and the environment because the cap closure system eliminated the direct contact exposure pathway to contaminants. Additionally, the OU-2 remedy includes an SVE system to remove VOCs in the vadose zone soil and at adjacent properties to reduce the potential for vapor intrusion from COCs in underlying contaminated soils into buildings. However, to ensure long-term protection, the following actions need to be taken:

- Development of an implementable institutional controls strategy

Since the remedial actions at OU-1 (groundwater and tanks) and OU-2 (soils) are protective in the short-term, the Purity Oil Sales, Inc. Superfund Site is currently protective of human health and the environment.

11.0 NEXT REVIEW

The next FYR for the Purity Oil site will be conducted within 5 years of the completion of this review. The next FYR has a projected date of September 2016.

12.0 REFERENCES

ARCADIS. 2011. "ERD Pilot Test Summary Discussion and Proposed Path Forward." February 9.

SAIC Energy, Environment & Infrastructure, LLC (SAIC). 2011. "Quarterly Operations Summary Report Soil Vapor Extraction System, Purity Oil Sales Superfund Site." February.

Stantec. 2011. "Groundwater Monitoring Report, Fourth Quarter 2010." January.

U.S. Environmental Protection Agency (EPA). 1988. "Final Remedial Investigation Report, Purity Oil Sales Superfund Site, Fresno, California." Region 9. October.

EPA. 1989. "Record of Decision for the Purity Oil Sales Superfund Site, Groundwater and Tanks Operable Unit." Region 9. San Francisco, California. September.

EPA. 2002. "Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)." Draft Federal Register. November 29. Available on-line at: <http://www.epa.gov/waste/hazard/correctiveaction/eis/vapor.htm>

EPA. 2003. "Technical Memorandum. Beyond the Property Line Investigations, Purity Oil Sales Superfund Site, Fresno, California." April.

EPA. 2009. *RAGS Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment).* Final. OSWER Directive 9285.7-82. January. Available on-line at: <http://www.epa.gov/oswer/riskassessment/ragsf/pdf/partf_200901_final.pdf>

EPA. 2011. "Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update." November. Available on-line at: <http://www.epa.gov/region9/superfund/prg/index.html>

EPA. 2006a. "Record of Decision Amendment, Purity Oil Sales Superfund Site, Soils Operable Unit No. 2, Malaga, California." Region 9. San Francisco. June 30.

EPA. 2006b. "Second 5-Year Review Report for Purity Oil Sales, Fresno County, California." Region 9. San Francisco. September.

APPENDICES

APPENDIX A

DOCUMENT REVIEW

APPENDIX A
DOCUMENT REVIEW

For this third Five-Year Report (FYR) for the Purity Oil Sales Superfund (Purity Oil) site, some of the documents reviewed are listed in Section 12.0, References, of the third FYR report. As discussed in the third FYR report, the site remedies have been divided into two operable units (OU): Operable Unit 1 (OU-1), Groundwater and Tanks, and Operable Unit 2 (OU-2), Soils. All documents reviewed for the third FYR report in order to assess the OU-1 and OU-2 remedies are discussed below.

OU-1, Groundwater and Tanks

OU-1's current status was evaluated by reviewing analytical data from quarterly groundwater monitoring reports not listed in Section 12.0 of the third FYR report related to trends, data gaps, and conclusions that could influence the protectiveness of the OU-1 remedy. The reports were prepared by Chevron's various consultants. The following available quarterly groundwater monitoring reports from 2006 through 2010 were reviewed:

- SECOR. 2007. Groundwater Monitoring Report for Fourth Quarter 2006. Purity Oil Site. January.
- SECOR. 2007. Groundwater Monitoring Report for First Quarter 2007. Purity Oil Site. April.
- SECOR. 2007. Groundwater Monitoring Report for Second Quarter 2007. Purity Oil Site. July.
- SECOR. 2007. Groundwater Monitoring Report for Third Quarter 2007. Purity Oil Site. October.
- SECOR. 2008. Groundwater Monitoring Report for Fourth Quarter 2007. Purity Oil Site. January.
- SECOR. 2008. Groundwater Monitoring Report for First Quarter 2008. Purity Oil Site. April.
- SECOR. 2008. Groundwater Monitoring Report for First Quarter 2008. Purity Oil Site. April.
- Stantec. 2008. Groundwater Monitoring Report for Second Quarter 2008. Purity Oil Sales Superfund Site. July.
- Stantec. 2008. Groundwater Monitoring Report for Third Quarter 2008. Purity Oil Sales Superfund Site. October.
- Stantec. 2009. Groundwater Monitoring Report for Fourth Quarter 2008. Purity Oil Sales Superfund Site. January.
- Stantec. 2009. Groundwater Monitoring Report for First Quarter 2009. Purity Oil Sales Superfund Site. April.

- Stantec. 2009. Groundwater Monitoring Report for Second Quarter 2009. Purity Oil Sales Superfund Site. July.
- Stantec. 2009. Groundwater Monitoring Report for Third Quarter 2009. Purity Oil Sales Superfund Site. October.
- Stantec. 2010. Groundwater Monitoring Report for Fourth Quarter 2009. Purity Oil Sales Superfund Site. January.
- Stantec. 2010. Groundwater Monitoring Report for First Quarter 2010. Purity Oil Sales Superfund Site. April.
- Stantec. 2010. Groundwater Monitoring Report for Second Quarter 2010. Purity Oil Sales Superfund Site. July.
- Stantec. 2010. Groundwater Monitoring Report for Third Quarter 2010. Purity Oil Sales Superfund Site. October.
- Stantec. 2011. Groundwater Monitoring Report for Fourth Quarter 2010. Purity Oil Sales Superfund Site. January.

Based on the quarterly groundwater data from OU-1 since the last FYR, the compounds that exceed the cleanup goals include; benzene, 1,1-dichloroethane, 1,2-dichloroethane, cis-1,2-dichloroethene, vinyl chloride, iron, manganese, and arsenic. The quarterly data also indicate that the groundwater plume is not migrating. The VOC concentrations appear to be diminishing over the last 5 years, and the plume appears to be stable ("stable" defined as the highest concentrations of VOC and metal contaminants along the center line of the plume remaining constant).

Potential data gaps identified in the last Five-Year Review have been addressed through the installation and quarterly sampling of monitoring wells MW24I, MW-25I, MW-42, MW-43, MW-44S, MW-44I, MW-44D, MW-45, MW-46, MW-47, MW-48, MW-48I, MW-48D, MW-49, MW-50, MW-51, MW-52, MW-53, and MW-54.

Additionally, reports issued by Chevron and their consultants were reviewed concerning the destruction and reinstallation of monitoring wells and the plans for and results of the ERD pilot study. The following reports were reviewed:

- SECOR International Inc. (SECOR). 2006. "OU-1Focused Feasibility Study". March.
- SECOR. 2006. "Well Destruction Work Plan". July.
- SECOR. 2007. "OU-1 Enhanced Reductive Dechlorination Pilot Study Work Plan." September 27.
- SECOR. 2008. "Final Groundwater Monitoring Well Replacement Work Plan." January.
- Stantec. 2009. "6-Month ERD Pilot Study Progress Summary." June.
- Stantec. 2010. "12-Month ERD Pilot Study Progress Summary." February.
- Stantec. 2010. "18-Month ERD Pilot Study Progress Summary." April.

- Stantec. 2010. "24-Month ERD Pilot Study Progress Summary." December.
- ARCADIS. 2011. "ERD Pilot Test Summary Discussion and Proposed Path Forward." February 9.

OU-2, Soils

OU-2's current status was evaluated by reviewing workplan and completion reports not listed in Section 12.0 of the third FYR report. These reports were reviewed for technical specifications and deviations that could influence the protectiveness of the OU-1 remedy. Additionally, pilot studies were reviewed for their implementation and conclusions. The reports were prepared by Chevron's various consultants. The following available reports from 2006 through 2010 were reviewed:

- SECOR. 2006. "Summary of Test Pit Investigation Letter Report." August.
- SECOR. 2006. "Operable Unit 2 – Sampling and Analysis Plan and Quality Assurance Project Plan." October.
- SECOR. 2006. "Operable Unit 2 – Remedial Action Work Plan." October.
- SECOR. 2007. "Addendum to Operable Unit 2 – Remedial Action Work Plan for Alternative #3 to Address the Golden State Market Front Yard. " February.
- SECOR. 2007. "Addendum to Operable Unit 2 – Remedial Action Work Plan for Alternative #4 to Address the Golden State Market Front Yard. " April.
- SECOR. 2007. "Definable Features of Work Completion Report for Off-site Remediation Activities, Purity Oil Sales Superfund Site." October.
- SECOR. 2007. "Definable Features of Work Completion Report for Sludge Neutralization Activities, Purity Oil Sales Superfund Site." October.
- Science Applications International Corporation (SAIC). 2008. "Revised Work Plan for Soil Vapor Investigation, Purity Oil Sales Superfund Site." January.
- SAIC. 2008. "Soil Vapor Investigation Report, Purity Oil Sales Superfund Site." April.
- SAIC. 2008. "Sampling and Analysis Plan, Purity Oil Sales Superfund Site." May.
- SAIC. 2008. "Work Plan for Soil Vapor Extraction Pilot-Study, Purity Oil Sales Superfund Site." October.
- SAIC. 2010. "Soil Vapor Extraction Pilot Test Results and Conceptual Soil Vapor Extraction System Design, Purity Oil Sales Superfund Site." January.
- SAIC. 2010. "Work Plan for Soil Vapor Extraction and Treatment System Operation and Maintenance, Purity Oil Sales Superfund Site." April.
- SAIC. 2011. "Quarterly Operations Summary Report Soil Vapor Extraction System, Purity Oil Sales Superfund Site." February.
- Stantec. 2009. "Final Operation and Maintenance Manual, Operable Unit 2." March.
- Stantec. 2010. "2009 Annual OU-2 O&M Report." January.

- Stantec. 2010. "Final Operable Unit No. 2 (Soils) Completion Report, Purity Oil Sales Superfund Site." March.
- Stantec. 2011. "2010 Annual OU-2 O&M Report." January.
- U.S. Environmental Protection Agency (EPA). 2006. "Record of Decision Amendment, Purity Oil Sales Superfund Site, Soils Operable Unit No. 2, Malaga, California." Region 9. San Francisco. June 30.
- EPA. 2006. "Five-Year Review Report for Purity Oil Sales, Fresno County, California." Region 9. San Francisco. September.

APPENDIX B

SITE INSPECTION

- **Comprehensive Five-Year Review Guidance, Appendix D: Five-Year Review Site Inspection Checklist**
- **Site Inspection Figure**
- **Vapor and Monitoring Well Inspection – January 2011**
- **Well Location Map, Stantec 2010**

APPENDIX B
SITE INSPECTION

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Purity Oil	**Date of inspection: March 1, 2011 (08:30 – 13:00)**
Location and Region: Fresno, CA (EPA Region 9)	**EPA ID: CAD980736151**
Agency, office, or company leading the five-year review: US EPA Region 9 (with assistance from Tetra Tech EM Inc.)	**Weather/temperature:** **Sunny, high overcast, 45-50 degrees F**

Remedy Includes: (Check all that apply)

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

Attachments: ☒ Well Inspection Summary ☒ Site map

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Ralph Carson (Stantec) (Name) Senior Geologist (Title) March 1, 2011 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 559.271.2650
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** N/A (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

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

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

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

Several adjacent properties were visited to inform people that EPA was conducting its third Five Year Review. EPA answered any questions, and provided contact information, but didn't conduct formal interview. Adjacent businesses contacted included: Bruno's, Wholesale Equipment, Pick-A-Part, West Coast Waste.

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

1. **O&M Documents (Sampling and Analysis Plan [SAP])**
   ☒ O&M manual ☒ Readily available (brought to the site during sampling) ☒ Up to date
   ☐ As-built drawings ☐ Readily available ☐ Up to date ☐ N/A
   ☐ Maintenance logs ☐ Readily available ☐ Up to date ☐ N/A
   Remarks: _____

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: Kept at corporate office; sampling teams bring the HASP with them during sampling events; could not determine if HASP is up to date.

3. **O&M and OSHA Training Records** ☒ Readily available ☐ Up to date ☐ N/A
   Remarks: Sampling teams bring the HASP with them during sampling events.

4. **Permits and Service Agreements**
   ☒ Air discharge permit (SVE) ☐ Readily available ☐ Up to date ☐ N/A
   ☒ Effluent discharge (POTW) ☐ Readily available ☐ Up to date ☐ N/A
   ☐ Waste disposal ☐ Readily available ☐ Up to date ☐ N/A
   ☐ Other permits_____ ☐ Readily available ☐ Up to date ☐ N/A
   Remarks: _____

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

6. **Settlement Monument Records** ☒ Readily available ☒ Up to date ☐ N/A
   Remarks: Checked annually in May; maintained in the office; information included in quarterly/biannual inspection reports.

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A
   Remarks: Checked quarterly; maintained in the office.

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

9. **Discharge Compliance Records**
   ☐ Air (SVE) ☐ Readily available ☐ Up to date ☐ N/A
   ☒ Water (effluent) ☒ Readily available ☒ Up to date ☐ N/A
   Remarks: SVE exhaust covered under an air district permit, and analytical data collected regularly as part of the SVE system operation, but not required to be submitted to air board under permit.

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A
    Remarks: Maintained with H&S Records; Securitas Inc. visits once/day at random times to inspect.

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_____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: _____
_____None noted._____

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

A. Fencing

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

Remarks_____Minor damage to fencing on Bruno's side, but not significant to protection; also vandalism at various locations and at different times, but PRP does a good job of repairing any damage so that would impair protectiveness from trespassers and workers at the site or adjacent properties._____

B. Other Access Restrictions

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

Remarks_____Entire site has 24/7 security through a combination of (a) subcontracted security personnel that visit site regularly, (b) a remote security system with multiple detection modes, and (c) keyed and locked security access gates. No trespassing, hazardous site, and Prop. 65 signs in English/Spanish at regular intervals around entire perimeter. EPA Superfund sign at site entrance._____

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: G Report attached

_____
_____
_____
_____

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

Remarks_____
_____
_____

D. General

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

Remarks__The site has experienced various instances of vandalism and trespassing that has all been regularly documented in the quarterly/biannual site inspections. The PRP has acted promptly to rectify each instance including both working with adjacent property managers (e.g., Pick-A-Part improved its fence and security to prevent customers from throwing parts over the fence onto the Purity Oil property, and the fence at the west end of the Purity site has been replaced with no-cut metal fence)._____
_____

2. **Land use changes on site** ☒ N/A

Remarks_____
_____

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

Remarks_____
_____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

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

Remarks_____Dirt/gravel road on top of the cap is in good condition and not affected by any gopher activity or erosion/deterioration/vegetation.

B. Other Site Conditions

Remarks ____During drilling activities, the drill rig damaged the top soil (but not the cap) and subsequently repaired and reseeded the area.

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent_____ Depth_____
Remarks_____
_____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
Areal extent_____ Depth_____
Remarks_____
_____

5. **Vegetative Cover** ☐ Grass ☒ Cover properly established ☒ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks_____
_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
Remarks_____
_____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent_____ Height_____
Remarks_____
_____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____
_____

9.	**Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability Areal extent_____ Remarks_____ _____	
B. Benches ☐ Applicable ☒ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	**Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay Remarks_____ _____	
2.	**Bench Breached** ☐ Location shown on site map ☐ N/A or okay Remarks_____ _____	
3.	**Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay Remarks_____ _____	
C. Letdown Channels ☐ Applicable ☒ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	**Settlement** ☐ Location shown on site map ☐ No evidence of settlement Areal extent_____ Depth_____ Remarks_____ _____	
2.	**Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation Material type_____ Areal extent_____ Remarks_____ _____	
3.	**Erosion** ☐ Location shown on site map ☐ No evidence of erosion Areal extent_____ Depth_____ Remarks_____ _____	

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☒ Needs Maintenance ☐ N/A
Remarks____See summary of well inspection data._____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☒ Needs Maintenance ☐ N/A
Remarks_____See summary of well inspection data._____
_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☒ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☒ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☒ Good condition ☐ Needs Maintenance
Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
☒ Good condition ☐ Needs Maintenance
Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☒ N/A
Remarks_____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks_____

G. Detention/Sedimentation Ponds ☒ Applicable ☐ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
☐ Siltation not evident
Remarks____Minimal siltation evident as the rainy season ends._____

2. **Erosion** Areal extent_____ Depth_____
☒ Erosion not evident
Remarks_____

3. **Outlet Works** ☐ Functioning ☒ N/A
Remarks_____

4. **Dam** ☐ Functioning ☒ N/A
Remarks_____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____
_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks_____
_____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☒ Siltation not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☒ Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** ☐ Functioning ☒ N/A
Remarks_____
_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring** Type of monitoring_____
☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____
_____

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_____
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks_____
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks_____
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A	
1.	**Collection Structures, Pumps, and Electrical** ☐ Good condition ☐ Needs Maintenance Remarks_____
2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks_____
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks_____

C. Treatment System ☐ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐ Quantity of surface water treated annually_____
   Remarks_____
   _____

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

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

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

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

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

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

D. Monitored Natural Attenuation

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

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☒ Needs Maintenance ☐ N/A

Remarks__See summary of well inspection data._____

12.1 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.

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.).

OU-2: Soil neutralization and cover w/impermeable cap – in good condition and working as designed.
OU-1: See Five Year Review document – Groundwater pump and treat system is currently not operating.

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.

_O&M on the OU-2 remedial system is adequate for continued protectiveness and the SVE system operation and maintenance is adequate.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. __None currently._____
12.1.1	**D. Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. ___None currently._____

Damage to chain link fence in this area due to operations at Bruno's. Fence still provides protectiveness and security, though should be repaired.

Some damage to the topsoil cover (but not the cap) occurred from drill rigs in this area during 2010 well instalation. The damage was repaired and the are monitored for revegetation. No further problems were encountered.

During 2010, existing fence was damaged and trespassers accessed the Purity Site to get parts and access from Pick-A-Part. Fence was replaced with more secure (no-cut) fence and problems have decreased, though ongoing maintenance is required.

The fence on the Pick-A-Part boundary has been improved to prevent access to the Purity Oil property and prevent damage and trespassing.

CALIFORNIA LOCATION MAP

N

0 75 150

Feet

VICINITY MAP

Purity Oil Sales Superfund Site
3281 Maple Avenue
Malaga, Fresno County, California

DATE: 11/29/07 | ANALYST: SOBIERAJJ | FIGURE: 1

SAIC From Science to Solutions

File: Y:\Chevron\Purity\Figures\Fig 1 Purity Vicinity_1.dwg Layout: Layout2

PURITY OIL SALES, SUPERFUND SITE

THIRD FIVE YEAR REVIEW

VAPOR AND GROUNDWATER WELL INSPECTION - JANUARY 2011

Jan 2011 Inspection Completed	Inspection Date	Well ID	Well Type	# of wells	Inactive Well	Offsite Well	Flush Mount	No Bolts/ Poor Condition	No O-ring	Stick Up	Missing Stickup Lock	Vault	Photo(s) Taken	Stickup Needs Paint	Bollards Needs Paint	Missing Sample Port Caps	Missing Well ID	Missing Vapor Line ID	Water in Annular Space	Excessive Vegetation Growth	Odors Present at Surface	Maintenance Required	Skirt Notes	Maintenance Notes	Other Notes
x	January 4, 2011	MW-2D	MW	1		x		x	x			x	x				x						No skirt, set in dirt	Dirt around well and inside, no O-ring	Well vault lid not designed to secure contents
x	January 4, 2011	MW-9	MW	1		x				x			x	faded	faded	x			x			x	Covered	Water in vault high enough to enter well	
x	January 4, 2011	MW-11 IP/SP	MW	2		x				x			x		faded	x			x			x	Covered	Water up to casing top	Nested well (2 depths)/1 boring
x	January 4, 2011	MW-13	MW	1		x				x			x			x							Covered by mud	Annular space too low	
x	January 4, 2011	MW-21	MW	1		x				x			x	faded		x				x			Dirt only	Stick up vault only ~1 foot high. Trip hazard and may not be seen by offsite heavy equipment; grass encroaching top of vault. Annular space is too low	
x	January 4, 2011	MW-23	MW	1		x				x			x			x									Adjacent to water main
x		MW-24I	MW	1		x	x						x			x								Poor identification, 2 faded painted stakes near fence line	Entire well covered with mud
x	January 4, 2011	MW-25I	MW	1		x				x			x	faded	faded	x									
x	January 4, 2011	MW-28P	PW	1		x											x						In large concrete pad associated with building and located behind shed walls	Unprotected production well in disrepair	Only PW-well sampled
x	January 4, 2011	MW-2D	MW																						
x	January 4, 2011	MW-34D	MW	1		x				x			x	faded		x			x			x	No skirt, set in dirt	Stick up vault only about 6-inches off ground. Trip hazard and ergo issue for sampling.	Sheen noted on water in annular space
x	January 4, 2011	MW-34I	MW	1		x				x			x	faded		x			x			x		Stick up vault only about 6-inches off ground. Trip hazard and ergo issue for sampling.	
x	January 4, 2011	MW-39	MW	1		x				x			x	faded	faded	x							Soil eroding near one edge	Annular space a little low	
x	January 4, 2011	MW-40	MW	1		x				x			x	faded		x							Minor cracks, grass covering		A lot of trash near well (adjacent to RR track)
x	January 4, 2011	MW-41	MW	1		x				x			x	faded									Covered		
x	January 6, 2011	MW-42	MW	1			x						x			x							Little to no skirt		
x	January 6, 2011	MW-43	MW	1						x			x	faded		x							Covered by grass if present		
x	January 4, 2011	MW-44D	MW	1		x	x						x			x									
x	January 4, 2011	MW-44I	MW	1		x	x						x			x									
x	January 4, 2011	MW-44S	MW	1		x	x						x			x									
x	January 6, 2011	MW-45	MW	1						x			x			x			x			x		Annular space too high and water present near well top	
x	January 6, 2011	MW-46	MW	1			x	x					x			x						x	Covered by grass	Bolts, threaded openings, o-ring need cleaning	
x	January 4, 2011	MW-47	MW	1		x	x	x					x		faded	x			x	x		x	Mud and grass covering, small seal around well vault	Annular space too high, and O-ring and bolts etc need cleaning	
x	January 6, 2011	MW-48D	MW	1			x	x					x			x			x	x		x	Small and covered by grass	Inner locks not applied due to vault space too small for lock to be accessed, O-ring and bolts etc need cleaning	
x	January 6, 2011	MW-48I	MW	1			x	x					x			x				x			Small and covered by grass	Inner locks not applied due to vault space too small for lock to be accessed, O-ring and bolts etc need cleaning	
x	January 6, 2011	MW-48S	MW	1			x	x					x			x				x			Small and covered by grass	Inner locks not applied due to vault space too small for lock to be accessed, O-ring and bolts etc need cleaning	
x	January 6, 2011	MW-49	MW	1						x			x	faded		x							Covered by grass		
x	January 6, 2011	MW-50	MW	1			x	x					x			x			x			x		Bolts difficult to tighten down, see water present in annular space	
x	January 4, 2011	MW-51	MW	1		x				x			x	faded		x									Replaced MW-19
x	January 4, 2011	MW-52	MW	1		x				x			x	faded	faded	x									Replaced MW-25
x	January 4, 2011	MW-53	MW	1		x				x			x	faded	faded	x						x			Located near main street adjacent to fence that has been cut allowing access to pedestrians, Replaced MW-34S

PURITY OIL SALES, SUPERFUND SITE

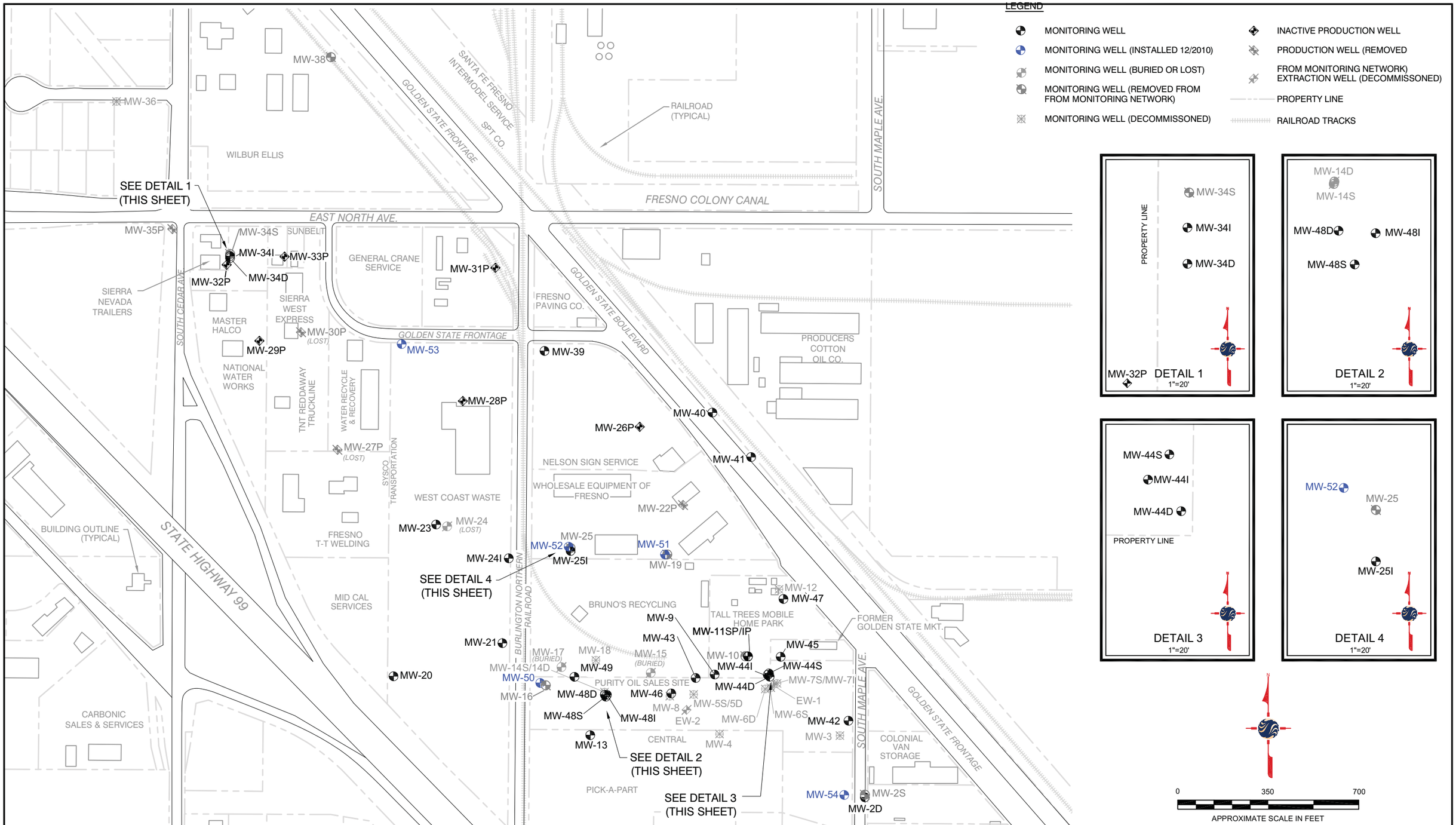
THIRD FIVE YEAR REVIEW

VAPOR AND GROUNDWATER WELL INSPECTION - JANUARY 2011

Jan 2011 Inspection Completed	Inspection Date	Well ID	Well Type	# of wells	Inactive Well	Offsite Well	Flush Mount	No Bolts/ Poor Condition	No O-ring	Stick Up	Missing Stickup Lock	Vault	Photo(s) Taken	Stickup Needs Paint	Bollards Needs Paint	Missing Sample Port Caps	Missing Well ID	Missing Vapor Line ID	Water in Annular Space	Excessive Vegetation Growth	Odors Present at Surface	Maintenance Required	Skirt Notes	Maintenance Notes	Other Notes
x	January 4, 2011	MW-54	MW	1		x	x	x					x									x	Elevated around edge, potential trip hazard in parking lot	O-ring, bolts, etc. need cleaning	Replaced MW-2S
x	January 5, 2011	SV-1	SG	1								x	x				x		x			x		Missing bolts in vault lid, well ID not present, vapor lines need better and duplicate labeling, water noted surrounding vapor lines as they exit soil	Many cockroaches living in vault
x	February 4, 2011	SV-2	SG	1		x		x				x	x				x	x				x	Partly undermined	Well and vapor lines need better and duplicate labeling for lines, bolts not replaced, inside vault seal needs cleaning, glove covers replaced, vault lid needs paint	No bollards to protect from heavy equipment
x	January 6, 2011	SV-3	SG	1						x			x				x	x				x		Well and vapor lines need duplicate labeling for lines	
x	January 6, 2011	SV-4	SG	1						x			x				x	x				x		Well and vapor lines need duplicate labeling for lines	Vapor lines exit concrete poured around lines, where as some older ones exit dirt
x	January 7, 2011	SV-5	SG	1						x			x				x	x				x		Well and vapor lines need duplicate labeling for lines	
x	January 6, 2011	SV-6	SG	1						x			x				x	x				x		Well and vapor lines need better labeling and duplicate for lines	
x	February 4, 2011	SV-7	SG	1			x		x				x				x	x						Well and vapor lines need duplicate labeling for lines	Well vault is too small making lines stiff and difficult to remove and poses risk of vapor line damage over time
x	January 5, 2011	VM-1	SG	1						x			x				x					x		Annular space too low, well ID not present, vapor lines need better and duplicate labeling	Many red ants present in vault
x	January 7, 2011	VM-2	SG	1						x			x				x	x				x		Well and vapor lines need better labeling and duplicate for lines	

Notes:

MW	Monitoring well	S	Shallow
SG	Soil gas well	I	Intermediate
	Not applicable	D	Deep



Stantec
3475 WEST SHAW AVENUE, SUITE 104
FRESNO, CALIFORNIA
PHONE: (559) 271-2650/271-5108 (FAX)

FOR:			FIGURE:
PURITY OIL SALES SUPERFUND SITE 3281 SOUTH MAPLE AVENUE MALAGA, CALIFORNIA		WELL LOCATION MAP	1
JOB NUMBER: 213201077	DRAWN BY: JBL	CHECKED BY: RC	APPROVED BY: SS	DATE: 03/10/2010

FILEPATH:M:\PURITY OIL\2010\DWG\1st-QTR-2010.dwg|jlieberman|Apr 07, 2010 at 11:07|Layout: FIG-1-A

APPENDIX C

SITE INTERVIEWS

APPENDIX C
SITE INTERVIEWS

INTERVIEW DOCUMENTATION FORM			
The following is a list of individual interviewed for the Purity Oil FYR. See the attached contact record(s) for a detailed summary of the interviews. Interviews were conducted by Ms. Lily Tavassoli of Region 9 EPA with assistance from Mr. Patrick Wooliever of Tetra Tech EM Inc.			
Ralph Carson	Senior Geologist	Stantec	3/1/2011
Name	Title/Position	Organization	Date
Mr. Michael Hurd	Senior Environmental Project Manager	Benham, an SAIC Co.	5/25/2011
Name	Title/Position	Organization	Date

INTERVIEW RECORD

Site Name: Purity Oil Sales, Inc, Superfund Site	**EPA ID No.: CAD980736151**	
Subject: Third Five-Year Review	**Time:**	**Date: 3/1/2011**
Type: ☐ Telephone ☒ Visit ☐ Other **Location of Visit: On-site**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Lily Tavassoli **Patrick Wooliever**	**Title: Remedial Project Manager** **Project Manager**	**Organization: US EPA Region 9** **Tetra Tech EM Inc.**

Individual Contacted:

Name: Mr. Ralph Carson	**Title: Senior Engineer**	**Organization: Stantec**

Telephone No: 559.904.1344 **Fax No: 559.271.5108** **E-Mail Address: Ralph.Carson@stantec.com**	**Street Address:** **3475 W Shaw Ave # 104** **Fresno, CA 93711-3237**

Summary of Conversation

1. What is your overall impression of the project?

   This site has been ongoing for a long period, since the late '70s or early '80s. In the last 5 years, lots have activities have been started and completed the cap and have moved the site forward significantly reducing dangers to the environment and the people of the community. GW concentrations have dropped possibly due to the soil remediation. The site has come a long way in the past 5 years.

2. Is the remedy functioning as expected? How well are the various components of the remedy performing?

   The SVE system from what I've been told has removed a large amount of volatiles. The groundwater itself has been affected by the natural attenuation of the VOC continuing. VOC levels in three wells are above the ROD levels, but have been dropping. Before there were something like 15 wells with levels above ROD levels.

   For OU-2, the cap is working as designed with no erosion, no leachate coming from it, no areas of moisture or damage to the cap, no settlement. As far as vegetation, the cap is 90-95% vegetated over the majority of the cap. Storm water is retained on site and gets transferred into the two basins, the evapotranspiration and infiltration basins. The system is working as intended.

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

   For OU-1, VOC contaminant levels in GW are decreasing in 3 wells having levels above ROD levels. There are also a few more wells that have higher levels of manganese and iron; some is background and some is from an off-site source for MW-40 and MW-41.

4. Describe on-site presence, staff and frequency of site inspections and activities.

   SAIC is on site 1-2 times per week monitoring the SVE system.

   Stantec is on site daily for about 2 weeks during quarterly monitoring. During the rainy season, Stantec personnel are on site performing rain inspections depending on rain events (during and after rain events). Additionally, Stantec conducts biweekly or monthly inspections to maintain security depending on activities including storm events, pest control monitoring.

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

   Since OU-2 cap completion, only issues have been maintaining vegetative cover including irrigation and repair after hydroseeding. Erosion monitoring has decreased as vegetative cover gets established.

   OU-1 O&M includes quarterly GW monitoring. Only other activities were the ERD pilot study activities.

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

   No, none come to mind.

   Regarding vandalism and site access, the current situation is effective. Pick-A-Part has done a lot to reduce fence damage and people throwing parts over the fence and then trespassing on the Purity Oil site to get the parts. We have signs (haz waste site, no trespassing, etc.) on all the fences and that has kept the majority of people off the site.

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

   Yes. Stantec has tied in sampling efforts with other activities such as timing sampling efforts, GW monitoring checks, and site inspections at the same time as pest control visits. This minimizes trips to the site. Additionally, proactive maintenance of the vegetative cover has prevented any problems.

8. Do you have any comments, suggestions, or recommendations regarding the project?

   No.

INTERVIEW RECORD

Site Name: Purity Oil Sales, Inc, Superfund Site	**EPA ID No.:**	
Subject: Third Five-Year Review	**Time:**	**Date: 5/24/2011**
Type: ☒ Telephone ☐ Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Lily Tavassoli **Patrick Wooliever**	**Title: Remedial Project Manager** **Project Manager**	**Organization: EPA Region 9** **Tetra Tech EM**

Individual Contacted:

Name: Mr. Michael Hurd	**Title: Senior Enviro. Proj. Mgr.**	**Organization: Benham, an SAIC Company**

Telephone No: 510.466.7161 **Fax No:** **E-Mail Address: MICHAEL.T.HURD@saic.com**	**Street Address:** **1000 Broadway, Suite 675** **Oakland, CA 94607**

Summary of Conversation

1. What is your overall impression of the project?

   Overall, the project as a whole is moving forward and towards cleanup. In terms of the SVE system, the system is working well and in some ways better than anticipated given the vacuum readings in off-site wells indicating good extraction well influence both laterally and vertically.

2. Is the remedy functioning as expected? How well are the various components of the remedy performing?

   The remedy is functioning well in that we're seeing influence farther out than the model predicted even with only two wells instead of the four wells modeled. There has been a reduction of hydrocarbons in the subsurface soil and an increase in oxygen that is beneficial in the conversion of TCE to DCE.

   The SVE system has used more carbon than originally expected, likely because there is a higher residual source below the stabilized soil. The result has been more frequent carbon changeout, but the changeout interval is also increasing.

   The SVE blower has proven large enough to induce the needed vacuum for extracting sufficient flow rates of soil vapor.

3. What do the monitoring data show? Are there any trends that show contaminant levels are decreasing?

   There has been a downward trend in the overall hydrocarbon concentration from the current selection of extraction wells. There has been a sharp decrease in cis-DCE, probably attributable to TCE being a source in soil and cis-DCE being a residual source in the soil vapor. There has also been a decrease in TCE, but not as sharp as with cis-DCE.

4. Describe on-site presence, staff and frequency of site inspections and activities.

   There are no full-time, on-site staff. For OU-2, SAIC staff go to the site once/week for 6-8 hours for collection of samples for laboratory analysis and/or to take field measurements. Other on-site activities are occasionally required for reasons like system restarts and carbon changeouts.

5. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last 5 years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

   The O&M requirements have remained unchanged since the beginning of SVE remedy. Minor modifications have occurred like the change of using Summa canisters instead of Tedlar bags for sampling, but these haven't changed the remedy effectiveness.

6. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last 5 years? If so, please give details.

   There haven't been any significant issues. The SVE system power use has been a bit lower than anticipated because of less "resistance" in the subsurface soil matrix. The only issue that has arisen is water drawn into the liquid knockout tanks and causing occasional shutdowns or alarms. The issue has been resolved by having the tanks drain automatically.

   The past trespassing and security issues at other parts of the site have not affected the SVE system.

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

   No changes in O&M have occurred yet, but based on the large amount of data collected to date, SAIC may propose less frequent SVE system sampling.

8. Do you have any comments, suggestions, or recommendations regarding the project?

   No.

APPENDIX D

ARARs ANALYSIS

APPENDIX D
ARARs ANALYSIS

The U.S. Environmental Protection Agency (EPA) has reviewed the applicable or relevant and appropriate requirements (ARAR) identified in the 1989 and 1992 Records of Decision (ROD) and the 2006 ROD Amendment for OU-2, and has compared them to current statutes, regulations and policies. At the time of the second FYR, several changes had been made to the federal and state maximum contaminant levels (MCL) and these changes were reviewed to determine if they impacted the protectiveness of the remedy. In addition, there were some citation changes to the statutory and regulatory framework. For example, Fresno County Ordinance 470-A-39 was repealed and replaced with Chapter 14.08 of the Fresno County Ordinance Code. These changes were not found to have a substantive impact on the implementation of the remedy.

No changes have been made to the ARARs since the second FYR. The third FYR included review of both the ARARs identified in the 1989 ROD for OU-1 and the 1992 ROD and 2006 ROD Amendment for OU 2 in Table D-1 below.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Action-Specific ARARs						
Treatment Groundwater Extraction	Reporting requirements for well construction, alteration or abandonment under the Water Code are relevant and appropriate for extraction wells due to the technical value of the report information. Reports are filed with the Department of Water Resources.	CA Water Code §§ 13750-13755 (I)	ROD	Applicable	No change	CA Water Code Sections 13750.5 - 13755 still contains requirements for well construction and reporting.
Treatment Groundwater Extraction	This Ordinance governs well construction in Fresno County, and is applicable to extraction well construction.	Fresno County Well Construction Ordinance 470-A-39	ROD	Applicable	Ordinance was amended after the ROD, but no changes since the second FYR	Chapter 14.08 of the current Fresno County Ordinance Code governs well construction, pump installation and well destruction standards. The original requirement was adopted in 1974 and repealed by Ordinance 584. Any new well construction should be governed by the current regulations (Chapter 14.08).
Treatment Air Stripping	The proposed standard for VOC emissions from "product accumulator vessels" and leak detection programs, if finalized, will be relevant and appropriate to certain air stripping processes. This proposed standard is currently "to be considered."	Resource Conservation and Recovery Act (RCRA) as amended • 42 U.S.C. § 9601 et seq. • 52 FR 3748 (Feb. 5, 1987)	ROD	Applicable	Regulations were promulgated on June 21. 1990.	These standards are still in effect. 52 FR 3748 proposed numerous changes to the CFR and was promulgated on June 21, 1990 (55 FR 25454). Because these standards were promulgated, they are no longer "to be considered" criteria.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Treatment Air Stripping	The substantive provisions of these regulations may be applicable to the air-stripping tower. These regulations cover design standards, permitting requirements, modeling, control technology, air quality standards and hazardous constituents.	Clean Air Act (CAA) • 42 U.S.C. §§ 7401-7642 • 40 CFR §§ 50-99 CAA § 101	ROD	Applicable	No change	These standards are still in effect.
Treatment Air Stripping	Mulford-Carrell Air Resources Act (CARA) CARA meets the requirements of the federal CAA for state primacy. CARA is regulated by the Air Resources Board and enforced by the Fresno APCD. In addition, CARA establishes specific requirements, some of which are more stringent than the federal standards for a number of pollutant sources including toxic air contaminants. These regulations may be applicable to the air-stripping tower.	• CA Health & Safety Code §§ 3900-44563 • Fresno County Air Pollution Control District (APCD), Regulation IV Prohibitory Rules	ROD	Applicable	Regulations were amended but no change since second FYR	The California air statute at California Health & Safety Code § 39000 et seq. is still in effect. The Fresno County APCD no longer exists and Fresno is now covered by the San Joaquin Valley Unified APCD. Regulation IV governs prohibitions.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Treatment Carbon Adsorption and Greensand	If carbon or greensand wastes are taken off site or managed on site, RCRA requirements would be applicable if these wastes are designated as RCRA hazardous wastes. These regulations govern identification, generation, transport and disposal of hazardous waste.	RCRA • 42 U.S.C. § 6901 et seq. • 40 CFR §§ 261, 263, 264	ROD	Applicable	California became authorized to implement RCRA	These standards are still in effect. However, since 1989, California became authorized to implement RCRA which is now implemented through *California Code of Regulations*, Title 22.
Treatment Carbon Adsorption and Greensand	• CA Admin. Code, Title 22, Chapter 30 • The HWCA defines and controls hazardous wastes from generation to disposal. More stringent state regulations would be applicable to carbon or greensand wastes if they are state hazardous wastes.	California Hazardous Waste Control Act (HWCA) • CA Health & Safety Code §§ 25100-25395 • CA Admin. Code, Title 22, Chapter 30	ROD	Applicable	Statute has been amended but no changes since second FYR.	The HWCA is still in effect but has been amended since 1989. The HWCA regulations are now found at *California Code of Regulations*, Title 22, Chapter 4.5 § 66000 et seq.
Treatment Carbon Adsorption and Greensand	• The water quality objectives in the Basin Plan may be applicable to discharges (e.g., backwash water) from the greensand treatment process. Subchapter 15 requirements of Title 23 are to be considered.	California Porter-Cologne Water Quality Control Act • CA Water Code § 13240 • CA Admin. Code, Title 23, § 2520	ROD	Applicable	No change	Section 13240 sets forth the authority for establishing water quality control plans for the Regional Water Quality Control Boards (Water Board). Standards for current discharges would be established by existing permits or the current Water Quality Control Plan (Basin Plan).

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Treatment Carbon Adsorption and Greensand	For disposal to a POTW, the NPDES pretreatment requirements of the CWA may apply. NPDES requirements are administered under the Porter-Cologne Act. The POTW would issue a permit for this discharge.	CWA • 33 U.S.C. §§ 1251-1376 • 40 CFR § 403	ROD.	Applicable	No change	These CWA provisions are still in effect.
Treatment Groundwater extraction	The California Environmental Protection Agency administers the program for Class I, III, IV, and V wells in California. Reinjection at the Purity site would constitute a Class V well, which currently is not covered under the UIC permitting program but is subject to the inventory provision of the UIC program. The inventory requirement is relevant and appropriate due to the technical value of the report information. The construction, operation, and maintenance requirements for UIC wells are to be considered.	SDWA • 42 U.S.C. § 300 (f) et seq. • 40 CFR §§ 144, 146	ROD	Applicable	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
General Actions	OSHA requirements are applicable to worker exposures during response actions at CERCLA sites, except in states that enforce equivalent or more stringent requirements. California no longer has such a program for non-government employee workplace exposures.	Occupational Safety and Health Administration (OSHA) 29 CFR § 1910	ROD	Not ARARs	No substantive changes	These standards are still in effect. However, although OSHA requirements were considered ARARs in the 1985 National Contingency Plan, they are no longer considered ARARs. Compliance with OSHA requirements is mandatory at CERCLA sites.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Disposal of waste	RCRA Subtitle C requirements provide action-specific ARARs for CERCLA actions if the CERCLA hazardous substance is also a RCRA hazardous waste, and the CERCLA action constitutes waste treatment, storage, or disposal as defined by RCRA. RCRA treatment requirements are applicable to any method, technique, or process, including neutralization, to change the character or composition of hazardous waste to render it less hazardous. RCRA disposal includes placement of waste into a landfill. Requirements for RCRA-permitted facilities are generally applicable to CERCLA activities that consist of treatment, storage, or disposal (TSD) of hazardous waste.	Permitted Hazardous Waste Facilities, 22 CCR 66264.10.66264.15, 66264.19, 66264.25	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Groundwater monitoring	RCRA specifies three types of groundwater monitoring for TSDs: detection monitoring (22 CCR 66264.98), compliance monitoring (66264.99), and corrective action monitoring (66264.100). The groundwater monitoring program must be designed and operated to verify that hazardous constituents have not migrated beyond the outer containment layer prior to the end of post-closure care. The regulations are applicable to "regulated units" which include landfills that received hazardous waste after July 26,1982.	Groundwater Protection, 22 OCR 66264.90 to 66264.101	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Groundwater monitoring	The regulation requires monitoring of the unsaturated zone at regulated units to monitor performance of the unit. The remedy involves the excavation and neutralization of acidic sludge, followed by placement under a low-permeability cap. Vadose zone monitoring requirements (66264.97) that require monitoring of soil and soil-pore liquids (as feasible) to determine whether hazardous constituents are migrating are relevant and appropriate because some contamination may remain within the vadose zone between the treated sludge and the water table	Land Treatment Unsaturated Zone Monitoring Requirements, 22 CCR 66264.90 to 66264.101	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.
Closure and post-closure requirements	RCRA closure of a "regulated unit" requires minimization of the need for further maintenance or control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products.	Closure and Post-Closure 22 CCR 66264.110 to 66264.120	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Closure and post-closure requirements	Closure of a landfill requires a final cover designed and constructed to prevent the downward entry of water into the landfill for a period of at least 100 years; function with minimum maintenance; promote drainage and minimize erosion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of natural subsoils present. After final closure, all post-closure requirements contained in 22 CCR 66264.117 through 66264.120, including maintenance and monitoring, must be complied with throughout the post-closure period.	Landfill Closure and Post-Closure Care 22 CCR 66264.310	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Disposal of waste	Waste management units standards include design, construction, operation, and closure requirements for surface impoundments. Section 2511(d) exempts actions taken at the direction of public agencies to abate conditions of pollution from unauthorized releases of waste. Although alternative designs may be allowed if they are equally protective of water quality, specific applicable requirements for Class I (hazardous waste management units) include the following: -New and existing waste management unit landfills must be operated to ensure that wastes will be a minimum of five feet above the highest anticipated elevation of groundwater.	Construction and Operation Requirements for Waste Management Units, 23 CCR 2510-2601	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Disposal of waste (cont)	-New and existing unites must be closed with a cover consisting of 2 feet of foundation material, 1 foot of compacted top soil (permeability equal to the bottom liner), and the final cover must be graded to prevent ponding or erosion -Post-closure care including monitoring, leachate collection, and cover maintenance must continue as long as wastes present a threat to water quality.	Construction and Operation Requirements for Waste Management Units, 23 CCR 2510-2601	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Groundwater monitoring	Section 2511 (d) exempts actions taken at the direction of public agencies to abate conditions of pollution from unauthorized releases of waste. Monitoring is required to detect leaks from waste management units and a corrective action program is required if leaks are detected. A waste management unit is broadly defined as an area of land where hazardous, designated, or non-hazardous waste is discharged. Owners and operators of new or existing landfills and surface impoundments shall monitor groundwater, surface water, and the unsaturated zone as feasible.	Water Quality Monitoring for Classified Waste Management Units 23 CCR 2550.0 to 2550.12	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.
Discharge of water	Both onsite and offsite discharges from CERCLA sites to surface waters are required to meet the substantive CWA NPDES requirements, and best management practices.	Clean Water Act/Porter Cologne Water Quality Control Act - NPDES/Pretreatment Requirements 40 CFR 122 and 403; California Water Code §13370	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Emissions from SVE system	Requires Best Available Control Technology (BACT) and/or offsets for new or modified stationary sources of air pollutants including VOCs, NOx, SOx, PM-10, lead, and reduced sulfur compounds. These requirements are applicable for the SVE system.	San Joaquin Valley Air Pollution Control District Rules and Regulations, Rule 2201 - New and Modified Stationary Source Review	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect
Emissions from SVE system	Prohibits the emissions of visible air contaminants to the atmosphere from any emission source. Applicable for aspects of the remedy (e.g., soil excavation, SVE) that may release visible air contaminants.	San Joaquin Valley Air Pollution Control District Rules and Regulations, Regulation IV, Rule 4101,	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect
Emissions from SVE system	Prohibits the discharge of air contaminants in quantities that cause injury, detriment, or nuisance. Applicable to discharges of air contaminants from the site during remedial actions, including excavation and neutralization of acidic sludge.	San Joaquin Valley Air Pollution Control District Rules and Regulation IV, Rule 4102	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect
Emissions from SVE system	Limits permissible discharges of particulate matter. Applicable to construction activities that generate dust.	San Joaquin Valley Air Pollution Control District Rules and Regulation IV, Rules 4210 and 4202	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Land use controls	Requires imposition of appropriate limitations on land use by recorded land use covenant when hazardous substances remain on the property at levels that are not suitable for unrestricted use of land. Substantive portions applicable to the remedial action for those properties not cleaned up to allow unrestricted use.	DTSC Land Use Covenant 22 CCR 67391.1(a)	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect and will apply to any institutional controls for OU 1 and OU 2.
Land use controls	Requires that the cleanup decision document contain an implementation and enforcement plan for land use limitations. Substantive portions applicable to the remedial action for those properties not cleaned up to allow unrestricted use. Specific requirements for implementation and enforcement of the land use covenant will be described in the remedial design.	DTSC Land Use Covenant 22 CCR 67391.1(b)	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect and will apply to any institutional controls for OU 1 and OU 2.
Land use controls	Specific requirements for land use covenants to apply to successors in title to the land.	California Civil Code 1471(a) & (b)	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect and will apply to any institutional controls for OU 1 and OU 2.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Land use controls	Requires that land use covenant be recorded where the land is located. Substantive provisions applicable to the remedial action for those properties not cleanup up to allow unrestricted use.	DTSC Land Use Covenant 22 CCR 67391.1(d)	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect and will apply to any institutional controls for OU 1 and OU 2.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Chemical-specific ARARs						
Contaminants of concern for groundwater	• The primary maximum contaminant levels (MCL) of the SDWA are relevant and appropriate requirements as aquifer cleanup goals since the groundwater is a potential source of drinking water, whether or not it is considered a "community" supply.	Safe Drinking Water Act (SDWA) • 42 U.S. § 300 (f) et seq. • 40 CFR § 142	ROD	Relevant and Appropriate	Regulations were amended in 1996 but no change since second FYR	These citations are still valid, but the SDWA was amended in 1996. The federal MCLs are found in 40 CFR § 141.61. There has not been any change to the federal secondary MCL for iron and manganese. There has been no change to the primary federal MCL for TCE, 1,2 DCA, 1,1-DCE, benzene, vinyl chloride, and carbon tetrachloride. At the time of the ROD, the MCLs for cis-1,2-DCE and trans-1,2-DCE were proposed. They are now final and are the same as the proposed levels in the ROD.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Contaminants of concern for groundwater	This Act provides for primacy of California with federal SDWA and requires California to set MCLs equal to or more stringent than federal. California MCLs are relevant and appropriate requirements as aquifer cleanup goals.	California Safe Drinking Water Act • CA Health and Safety Code § 4010-4037 • CA Admin. Code. Title 22 §§ 64401 et seq.	ROD	Relevant and Appropriate	Regulations have been amended but no change since second FYR	The California Safe Drinking Water Act has been amended several times since 1989 and is now found at California Health and Safety Code §§ 116270-116751. The "CA Admin. Code" is now the *California Code of Regulations*. The California MCLs for organic compounds are found in *California Code of Regulations*, Title 22, §64444 as follows: • 1,2 DCA, benzene, vinyl chloride, and carbon tetrachloride: CA MCLs are the same as the levels identified in the ROD • 1,1 DCA: no California MCL was identified in the ROD, but the current CA MCL is 5 ppb • 1,1 DCE: the ROD states the California MCL is 7 ppb, but the CA MCL is 6 ppb • cis-1,2-DCE: no California MCL was identified in the ROD, but the current level is 6 ppb • trans -1,2-DCE: no California MCL was identified in the ROD, but California MCL is 10 ppb

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Contaminants of concern for groundwater	Health-based numeric guidelines set by DHS for the protection of public drinking water supplies through non-promulgated standards are the levels at which DHS requires water purveyors to take corrective action. These guidelines are to be considered as cleanup goals for the aquifer.	Department of Health Services (DHS) Action levels for Public Drinking Water Supplies (January 1987)	ROD	To be considered	These guidelines have been changed but no change since second FYR	Since 2004, DHS "action levels" are now referred to as "notification levels." They have been used to provide information to public water systems about certain non-regulated chemicals in drinking water that lack MCLs. The 2004 DHS "notification levels" will continue to be "to be considered" criteria. "To Be Considered Criteria" adopted in a ROD are legally enforceable cleanup standards.
Contaminants of concern	Requirements of the Water Board Basin Plan 5(d) are applicable to reinjected water. Substantive and/or administrative requirements may apply depending on whether the wells are on or off- site.	California Porter-Cologne Water Quality Control Act • CA Water Code § 13240	ROD	Applicable	No change	Section 13240 sets forth the authority for the establishing of water quality control plans for the Water Boards. Current discharges would be established by existing permits or the current Water Quality Control Plan (Basin Plan).
Contaminants of concern for groundwater	The North Central Canal is located in the Central Valley Water Board Basin Planning Area 5(D). Requirements of that Water Quality Control Plan are applicable to discharges from the treatment system and would be regulated by the Water Board through Waste Discharge Requirements.	California Porter-Cologne Water Quality Control Act • CA Water Code § 13260	ROD	Applicable	No change	Water Code § 13260 contains waste discharge requirements.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Waste Characterization for soil	Regulations set forth under California's hazardous waste program (RCRA authorized state) are generally applicable to CERCLA cleanup actions when the following requirements are met: 1. The waste meets the RCRA criteria for a listed or characteristic hazardous waste and 2. The waste is treated, stored, or disposed (as defined in 40 CFR 260.10) after the effective date of the RCRA requirement.	Hazardous Waste Identification 22 OCR 66261.1 to 66261.126	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect.
Cleanup goals for soil and groundwater	PRGs are tools for evaluating and cleaning up contaminated sites. They are risk-based concentrations combining exposure information and EPA toxicity data.	United States Environmental Protection Agency (USEPA) Region IX Preliminary Remediation Goals (PRGs) as revised December 28, 2004.	2006 Amended ROD for OU 2	Applicable	The USEPA updated the PRGs in 2011 and renamed the cleanup goals the Regional Screening Levels (RSL)	These provisions are still in effect.

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

Medium of Concern	Requirement	Citation	Origin	Determination	Status	Comments
Requirements for discharge of treated SVE system condensate to surface water	Under the Antidegradation Policy as set forth in State Board Resolution No. 68-16, whenever the existing quality of water is better than that needed to protect present and potential beneficial uses, such existing quality will be maintained.	SWRCB Resolution 68-16 Statement of Policy with Respect to Maintaining High Quality of Waters in California Water Code §13140	2006 Amended ROD for OU 2	Applicable	No change	These provisions are still in effect.
Location-specific ARAR						
Location	**Requirement**	**Citation**	**Origin**	**Determination**	**Status**	**Comments**
Location of new facilities	Specifies that portions of new facilities where transfer, treatment, storage, or disposal of hazardous waste will be conducted shall not be located within 200 feet (61 meters) of a fault that has had displacement in Holocene period.	Location Standards for Hazardous Waste Facilities Seismic Considerations, 22 CCR 66264.18	2006 Amended ROD for OU 2	Relevant and Appropriate	No change	These provisions are still in effect.

Notes:

§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
CAA	Clean Air Act
CA	California
CARA	Mulford-Carrell Air Resources Act

TABLE D-1: ARARs ANALYSIS – GROUNDWATER ALTERNATIVES AND TANK REMOVAL (Continued)

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCA	Dichloroethane
DCE	Dichloroethene
DHS	Department of Health Services
DTSC	California Department of Toxic Substances Control
et seq.	And as follows
FR	Federal Register
HWCA	Hazardous Waste Control Act
NPDES	National Pollutant Discharge and Elimination System
OSHA	Occupational Safety and Health Administration
ppb	Part per billion
POTW	Publicly-owned treatment works
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SWRCB	State Water Resources Control Board
SDWA	Safe Drinking Water Act
TCE	Trichloroethene
UIC	Underground injection control
USC	United States Code
Water Board	Regional Water Quality Control Board

APPENDIX E

HUMAN HEALTH RISK ASSESSMENT EVALUATION AND TOXICITY CRITERIA REVIEW

APPENDIX E
HUMAN HEALTH RISK ASSESSMENT EVALUATION AND TOXICITY CRITERIA REVIEW

Tetra Tech EM Inc. (Tetra Tech) reviewed the Focused Feasibility Study (FFS) Addendum for Operable Unit #1 (OU-1), Groundwater (ARCADIS 2011), Operable Unit 2 (OU-2) Remedial Action Work Plan (SECOR 2007), and the Final Operable Unit No. 2 (Soils) Completion Report (Stantec 2010) as part of the third Five-Year Review (FYR) Report for the Purity Oil Sales Superfund (Purity Oil) site in Fresno, California.

Groundwater and Tanks Operable Unit (OU-1)

Federal and State Maximum Contaminant Levels (MCL) are the remedial action goals for contaminants of concern (COC) in groundwater at OU-1. MCLs represent the allowable concentration of a chemical in a drinking water supply. Current Federal and State MCLs were reviewed to determine if any MCLs for groundwater COCs had been updated since the issuance of the Record of Decision (ROD) for OU-1 (EPA 1989a). As noted in Table 3 in Section 7.2 of the main text, four chemicals (arsenic, cis-1,2-dichloroethene, trans-1,2-dichloroethene, and 1,1-dichloroethane) had updated MCLs since the ROD for OU-1 was finalized.

The migration of contaminants from groundwater into buildings (groundwater vapor intrusion) is a relatively new consideration at sites where groundwater has been impacted by volatile chemicals. In September 2002 (after the ROD for OU-1 was issued), EPA released an external review draft version of its vapor intrusion guidance titled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (EPA 2002). Groundwater vapor intrusion is a potential concern if a complete exposure pathway exists. Factors to consider include identification of chemicals in groundwater of sufficient volatility and toxicity, and the presence of inhabited buildings (or the potential for future buildings) near subsurface contamination (in general, within 100 feet). Volatile organic chemicals (VOCs) have been detected in groundwater at the Purity Oil site at concentrations exceeding federal and state MCLs. Groundwater at the site is generally present at 55 to 65 feet below ground surface (bgs), and occupied buildings are present over the groundwater plume; therefore, a potentially complete exposure pathway for groundwater vapor intrusion may exist. Tables 2a through 2c of the draft vapor intrusion guidance list target groundwater concentrations for the groundwater-to-indoor air migration pathway that are equivalent to a 10-4 to 10-6 cancer risk or hazard quotient of 1 (EPA 2002). For those chemicals with a Federal MCL, the target groundwater concentration is equivalent to the MCL if its corresponding risk-based concentration is below the MCL. The most recent groundwater data from February 2011 indicate that concentrations of volatile COCs in groundwater are below the draft Table 2a target groundwater concentrations.

The long-term protectiveness of the remedy with respect to vapor intrusion from groundwater may require reconsideration should health-based levels replace the Federal MCLs as target groundwater concentrations for this pathway in the future.

The goal of the selected remedy for groundwater (extraction, air stripping, and filtration) was to cleanup the affected aquifer to achieve Federal and State drinking water standards (EPA 1989a). The ROD also stipulated that users of private wells installed within the affected aquifer will be provided an alternate water supply. As an alternate water supply has been provided to prevent

exposure to contaminated groundwater until the remedial action goals are achieved, the remedy is protective with regards to direct contact with groundwater in the short term.

During the last 5 years, the long-term effectiveness of the OU-1 remedy has been further studied. The extraction and treatment system outlined in the OU-1 ROD was decommissioned; the treatment facility remains on site, but is no longer in use, and the extraction wells have been removed. The installation of additional groundwater monitoring wells and an enhanced reductive dechlorination (ERD) pilot study helped to further characterize groundwater conditions at the site. Preliminary results from the ERD pilot study indicated ERD was effective at reducing concentrations of VOCs in groundwater to levels approaching, or below cleanup goals; however, metals concentrations in groundwater, including arsenic, iron, and manganese, increased likely due liberation in reducing conditions. Thus, Chevron is currently considering alternate remedies for OU-1 that addresses both VOC and metals COCs. Future remedies may rely on several remedial techniques including monitored natural attenuation (MNA), active treatment of the metals plume, the OU-2 SVE system, and a contingency plan for a return of groundwater levels to previous levels. The OU-1 remedy will be complete when EPA publishes a decision document based on a FFS Addendum provided by Chevron.

While no remedy is in place, the current reliance on MNA and use of the SVE system for VOC remediation while other remedies are explored is appropriate because these are protective of human health and the environment, given absences of current or potential exposures related to groundwater. The reduction of concentrations of volatile and inorganic chemicals in groundwater to Federal and State MCLs will be considered protective of drinking water.

Soils Operable Unit (OU-2)

The soils operable unit is comprised of contaminated soils and sludges located on site and soils and sludges that have migrated to adjacent properties.

On-site Remedy

The remedy will be protective in the long-term as acidic sludges and contaminated soil were excavated to approximately 15 feet bgs, neutralized, and then placed back into the excavation and under an engineered cap. A soil vapor extraction system was also installed as part of the remedy to treat volatile chemicals in soil below the limits of the excavation to minimize the threat of leaching to groundwater. The cap serves as a barrier to prevent future direct contact with contaminated materials. In order to prevent future direct contact with contaminated materials left in place under the cap, the remedy includes deed restrictions to prevent future excavation (EPA 1992). The on-site remedy was designed to prevent human exposure (via direct contact with soil) to soils containing COCs at concentrations that exceed applicable or relevant and appropriate (ARAR) and "to be considered" (TBC) criteria for soil.

The remedy for the on-site soils area is protective in the short term. The site is fenced and access is restricted to authorized personnel, which prevents direct contact with contaminated soil.

If the site is used for light industrial activities that involve construction or use of buildings in the future, collection of soil gas samples may be needed to determine if volatile chemicals that are

associated with residual contamination beneath the cap present a risk via the vapor intrusion pathway if a complete exposure pathway is present.

Adjacent Properties

As presented in the OU-2 ROD Amendment (EPA 2006), the remedial action objectives for the contaminated areas located outside the Purity Property boundaries included the removal of acidic sludge and contaminated soils containing COCs at concentrations exceeding health-based action levels (2004 EPA preliminary remediation goals [PRG]) at properties adjacent to the site and the reduction of COC concentrations in soils and groundwater to reduce risks from potential exposure to indoor air contaminants whose source is site-related contamination.

Chevron excavated soil at the adjacent properties (Tall Trees, Pick-a-Part East, Pick-a Part West, Bruno's Recycling, Golden State Market, and along South Maple Avenue). The excavated sludges from the impacted upper 4 feet (on average) at surrounding properties were neutralized and then consolidated under the engineered cap on the Purity Property. Confirmation samples were collected during the excavation and compared against cleanup goals specified in the OU-2 ROD Amendment (EPA 2006), including risk-based EPA Region 9 PRGs for industrial use and where total petroleum hydrocarbon (TPH) concentrations exceed 10,000 milligrams per kilogram (mg/kg). All previously identified impacted areas at adjacent properties were remediated to industrial cleanup levels.

The remedy for the adjacent properties areas is protective in the short term because the removal of surface contamination (to depths of 4 feet bgs, on average) from areas outside the Purity Oil Site, and the cap for contamination, will prevent direct contact with contaminated soil at concentrations exceeding health-based levels. In addition, all former residents of the Tall Trees Mobile Home Park have been relocated.

The long-term protectiveness of the remedy for the areas located outside the Purity Property boundaries cannot be determined at this time. However, it should be protective with the implementation of the SVE system as part of the OU-2 soils remedy and because an Environmental Restriction Covenant will be required for adjacent properties since they were remediated only to industrial cleanup levels. The removal of surface contamination to depths of 4 feet bgs at adjacent properties will not prevent vapor intrusion of volatile chemicals associated with subsurface contaminated soil or sludge, which will be left in place in these areas at depths below 4 feet bgs. Volatile chemicals associated with the subsurface contamination left in place may migrate to buildings located near the site; vapor intrusion of these chemicals to indoor air may be of concern if the buildings are inhabited and the chemicals are of sufficient toxicity and volatility. The ROD Amendment (EPA 2006) specified that soil and soil gas samples would be collected to determine the extent of contamination left in place between the bottom of the excavation and the top of the water table in contaminated areas adjacent to the Purity Property. However, it is unclear whether soil and soil gas samples have been collected to make a determination of the potential extent of contamination in the subsurface in this third FYR. Results of the soil and soil gas sampling can be used to determine if remaining contamination presents a threat to groundwater (via leaching) or indoor air (via vapor intrusion) and if additional remedial action is warranted (EPA 2006). It is preferred that soil gas samples used for risk assessment purposes be collected

from beneath an existing slab, if possible; if no buildings remain, then samples should be collected above the waste layer (at a depth greater than 5 feet bgs).

Review of Toxicity Criteria and Regional Screening Levels (Formerly Preliminary Remediation Goals)

The previous HHRA for the adjacent properties (Tetra Tech 2005) was conducted using toxicity criteria and risk assessment methodologies current at the time the report was completed. However, since the previous HHRA for adjacent properties (Tetra Tech 2005) and OU-2 ROD Amendment (EPA 2006) and subsequent remedies were completed, numerous toxicity criteria have been revised, and EPA released a revised methodology for calculating risks via the inhalation exposure pathway (EPA 2009). These revisions have resulted in changes to the EPA Region 9 soil PRGs, now referred to as EPA regional screening levels (RSL) (EPA 2011), used as soil cleanup levels during the OU-2 remedy. Table F-1 presents the current list of COCs (see Table F-1), the 2004 industrial soil PRGs presented in the ROD Amendment and used as a basis for cleanup, and compares them to the recent 2011 industrial soil RSLs. Several chemicals (including 1,1-dichloroethane, beryllium, cadmium, and ethylbenzene) have been revised such that the 2011 RSL is significantly more conservative than the 2004 PRG. Of these chemicals, 1,1-dichloroethane was not detected in soil, and beryllium, cadmium, and ethylbenzene were detected either below the RSL or were detected in samples that were removed during the OU-2 remedy. Thus, use of revised RSL soil cleanup levels would not result in a significant change to the protectiveness of the remedy.

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TABLE E-1
REGIONAL SCREENING LEVEL UPDATES FOR SOIL
PURITY OIL SALES SUPERFUND SITE, FRESNO, CALIFORNIA

	Industrial					
	2004 PRG			2011 RSL		
Chemical	**Cancer**	**Noncancer**	**Lowest PRG**	**Cancer**	**Noncancer**	**Lowest RSL**
1,1,1-Trichloroethane	--	6.9E+03	6.9E+03	--	3.8E+04	**3.8E+04**
1,1,2-Trichloroethane	1.6E+00	1.3E+02	1.6E+00	5.3E+00	6.8E+00	**5.3E+00**
1,1-Dichloroethane	--	1.7E+03	1.7E+03	1.7E+01	2.0E+05	**1.7E+01**
1,1-Dichloroethene	--	4.1E+02	4.1E+02	--	1.1E+03	**1.1E+03**
1,2-Dichloroethane	6.0E-01	2.8E+01	6.0E-01	2.2E+00	1.5E+02	**2.2E+00**
2-Butanone	--	1.1E+05	1.1E+05	--	2.0E+05	**2.0E+05**
2-Methylnaphthalene [a]	4.2E+00	1.9E+02	4.2E+00	--	4.1E+03	**4.1E+03**
2-Methyl-phenol	--	3.1E+04	3.1E+04	--	3.1E+04	3.1E+04
4,4'-DDD	1.0E+01	--	1.0E+01	7.2E+00	--	**7.2E+00**
4,4'-DDE	7.0E+00	--	7.0E+00	5.1E+00	--	**5.1E+00**
4,4'-DDT	7.0E+00	4.3E+02	7.0E+00	7.0E+00	4.3E+02	7.0E+00
4-Methyl phenol	--	3.1E+03	3.1E+03	--	3.1E+03	3.1E+03
4-Methyl-2-pentanone	--	4.7E+04	4.7E+04	--	5.3E+04	**5.3E+04**
Acenapthylene [a,b]	4.2E+00	1.9E+02	4.2E+00	--	3.3E+04	**3.3E+04**
Acetone	--	5.4E+04	5.4E+04	--	6.3E+05	**6.3E+05**
Aldrin	1.0E-01	1.8E+01	1.0E-01	1.0E-01	1.8E+01	1.0E-01
Antimony	--	4.1E+02	4.1E+02	--	4.1E+02	4.1E+02
Aroclor 1242	7.4E-01	1.1E+01	7.4E-01	7.4E-01	--	7.4E-01
Aroclor 1248	7.4E-01	1.1E+01	7.4E-01	7.4E-01	--	7.4E-01
Aroclor 1254	7.4E-01	1.1E+01	7.4E-01	7.4E-01	1.1E+01	7.4E-01
Aroclor 1260	7.4E-01	1.1E+01	7.4E-01	7.4E-01	--	7.4E-01
Arsenic [a]	2.5E-01	--	2.5E-01	1.6E+00	2.6E+02	1.6E+00
Barium	--	6.7E+04	6.7E+04	--	1.9E+05	**1.9E+05**
Benzene	1.4E+00	1.2E+02	1.4E+00	5.4E+00	4.5E+02	**5.4E+00**
Benzo(a)anthracene	2.1E+00	--	2.1E+00	2.1E+00	--	2.1E+00
Benzo(a)pyrene	2.1E-01	--	2.1E-01	2.1E-01	--	2.1E-01
Benzo(b)fluoranthene	2.1E+00	--	2.1E+00	2.1E+00	--	2.1E+00
Benzo(k)fluoranthene [a]	1.3E+00	--	1.3E+00	1.3E+00	--	1.3E+00
Benzoic Acid	--	2.5E+06	2.5E+06	--	2.5E+06	2.5E+06
Beryllium [c]	2.2E+03	1.9E+03	1.9E+03	2.2E+03	1.9E+02	**1.9E+02**
Beta-BHC	1.3E+00	1.6E+02	1.3E+00	9.6E-01	--	**9.6E-01**
Bis(2-ethylhexyl)phthalate	1.2E+02	1.2E+04	1.2E+02	1.2E+02	1.2E+04	1.2E+02
Cadmium [c]	3.0E+03	4.5E+02	4.5E+02	7.5E+00	8.0E+02	**7.5E+00**
Carbon disulfide	--	1.2E+03	1.2E+03	--	3.7E+03	**3.7E+03**
Carbon tetrachloride	5.5E-01	7.3E+00	5.5E-01	5.5E-01	6.0E+02	5.5E-01
Chlorobenzene	--	5.3E+02	5.3E+02	--	1.4E+03	**1.4E+03**
Chloroform	4.7E-01	1.9E+02	4.7E-01	1.5E+00	1.1E+03	**1.5E+00**
Chrysene [a]	1.3E+01	--	1.3E+01	1.3E+01	--	1.3E+01
Cyanide	--	1.2E+04	1.2E+04	--	2.0E+04	**2.0E+04**
Dibenz(a,h)anthracene	2.1E-01	--	2.1E-01	2.1E-01	--	2.1E-01
Dieldrin	1.1E-01	3.1E+01	1.1E-01	1.1E-01	3.1E+01	1.1E-01
Diethyl phthalate	--	4.9E+05	4.9E+05	--	4.9E+05	4.9E+05
Di-n-butyl phthalate	--	6.2E+04	6.2E+04	--	6.2E+04	6.2E+04
Endosulfan	--	3.7E+03	3.7E+03	--	3.7E+03	3.7E+03
Ethylbenzene [c]	--	7.4E+03	7.4E+03	2.7E+01	2.1E+04	**2.7E+01**
Gamma-BHC (Lindane)	1.7E+00	2.4E+02	1.7E+00	2.1E+00	2.4E+02	**2.1E+00**
Heptachlor	3.8E-01	3.1E+02	3.8E-01	3.8E-01	3.1E+02	3.8E-01
Heptachlor epoxide	1.9E-01	8.0E+00	1.9E-01	1.9E-01	8.0E+00	1.9E-01
Indeno(1,2,-3-cd)pyrene	2.1E+00	--	2.1E+00	2.1E+00	--	2.1E+00
Lead	8.0E+02	--	8.0E+02	8.0E+02	--	8.0E+02
Mercury	--	3.1E+02	3.1E+02	--	3.1E+02	3.1E+02
Methylene chloride	2.1E+01	9.3E+03	2.1E+01	5.3E+01	9.2E+03	**5.3E+01**
Naphthalene [a]	4.2E+00	1.9E+02	4.2E+00	1.8E+01	6.2E+02	**1.8E+01**

TABLE E-1
REGIONAL SCREENING LEVEL UPDATES FOR SOIL
PURITY OIL SALES SUPERFUND SITE, FRESNO, CALIFORNIA

Chemical	Industrial					
	2004 PRG			2011 RSL		
	Cancer	Noncancer	Lowest PRG	Cancer	Noncancer	Lowest RSL
N-nitrosodiphenylamine	3.5E+02	1.2E+04	3.5E+02	3.5E+02	--	3.5E+02
Phenol	--	1.8E+05	1.8E+05	--	1.8E+05	1.8E+05
Selenium	--	5.1E+03	5.1E+03	--	5.1E+03	5.1E+03
Silver	--	5.1E+03	5.1E+03	--	5.1E+03	5.1E+03
Styrene	--	1.8E+04	1.8E+04	--	3.6E+04	**3.6E+04**
Tetrachloroethene	1.3E+00	1.3E+02	1.3E+00	2.6E+00	2.3E+03	**2.6E+00**
Toluene	--	2.2E+03	2.2E+03	--	4.5E+04	**4.5E+04**
Trichloroethene	1.1E-01	1.1E+02	1.1E-01	1.4E+01	1.0E+02	**1.4E+01**
Vanadium	--	1.0E+03	1.0E+03	--	1.0E+03	1.0E+03
Vinyl chloride	7.5E-01	1.4E+02	7.5E-01	1.7E+00	3.9E+02	**1.7E+00**
Xylenes	--	9.0E+02	9.0E+02	--	2.7E+03	**2.7E+03**
Zinc	--	3.1E+05	3.1E+05	--	3.1E+05	3.1E+05

Notes:

Bold values indicate 2011 RSL has changed since 2004 PRG.

Yellow shading	2011 RSL is more conservative (decreased) compared to the 2004 PRG
Gray shading	2011 RSL decreased by more than a magnitude of order compared to the 2004 PRG
a	Value shown for 2004 PRG is based on Cal-modified PRG (EPA 2004)
b	Acenaphthene used as a surrogate.
c	Value shown for 2011 RSL is based on Cal-modified PRG (DTSC 2011)

PRG	Preliminary remediation goal
RSL	Regional screening level

U.S. Environmental Protection Agency (EPA). 2004. "Region 9 Preliminary Remediation Goals." Available on-line at: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>

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APPENDIX F

SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT,AND TOXICITY CRITERIA REVIEW

APPENDIX F
SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT AND TOXICITY CRITERIA REVIEW

This qualitative ecological risk assessment was conducted as part of the third Five-Year Review (FYR) Report for the Purity Oil Sales Superfund (Purity Oil) site in Fresno, California. This assessment includes:

- Ecological Evaluation: Presents the site location and history
- Ecological Characterization: Describes the environmental setting
- Qualitative Assessment of Ecological Risk: Identifies the chemicals of concern (COC) and exposure pathways
- Conclusion and Recommendations

Ecological Evaluation

The 7-acre Purity Oil site is located at 3281 South Maple Avenue, Fresno, California, approximately 0.5 mile south of the Fresno city limits in the township of Malaga. The site is identified as CAD980736151 in the U.S. Environmental Protection Agency's (EPA) Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) database. Under the Fresno County General Plan, the Purity Oil site is in a zone designated for heavy industrial use.

The site is located in a mixed-use area and is surrounded by a metal recycling facility to the north (Bruno's Iron and Metal), a convenience market (Golden State Market) and former residential trailer park to the northeast (Tall Trees Mobile Home Park), a propane distributor to the east, a used auto parts business to the south (Pick-A-Part Auto Wrecking), and agricultural and industrial land to the west (see Figure G-1). All of these adjacent properties are included in this evaluation.

Purity Oil re-refined petroleum waste oils at the site between 1934 and 1975. These waste oils came from businesses (such as service stations, car dealers, truck stops, and electrical transformer yards), municipalities, school districts, and the military. The oil was re-refined using a number of treatment processes including clarification, chemical addition, acidification, dehydration, distillation, and filtration. The oil and byproducts from the refining process were collected and stored in sumps and storage tanks, and were disposed of on site in sludge pits. The easternmost portion of the site included storage and processing facilities for re-refining and recycling the oil. The westernmost portion of the site consisted of unlined sumps and sludge pits used for collection and storage.

Ecological Characterization

The Purity Oil site is located in the San Joaquin River drainage basin approximately 12 miles south of the San Joaquin River. No natural watercourses exist in the vicinity of the Purity Oil site. The groundwater aquifer in the Fresno area is designated as a sole-source aquifer. The aquifer in the vicinity of the site is unconfined to depths of several hundred feet. Depth to groundwater at the site is 55 to 75 feet, with flow in a northwesterly direction. The area surrounding the site is largely industrial.

The habitat on the Purity Oil Site and adjacent properties consists of ruderal grasses (plants commonly found in ecosystems disturbed by human activity) and ornamental trees and shrubs. This vegetation provides marginal habitat for species adapted to highly disturbed areas impacted by industrial activities. Vegetation also includes species identified by the California Invasive Pest Council (www.cal-ipc.org/ip/inventory/index.php) such as the yellow star thistle (Centaurea solstitialis) and brome grasses (Bromus spp). Yellow star thistle is known to preclude native species and provides limited forage habitat for herbivores, which reduces prey species for carnivores at the site. An ecological survey to identify species present at the site and on adjacent properties has not been conducted.

Table G-1 lists the special status species occurring in the township of Malaga in Fresno County and their habitat requirements, as presented in the California Natural Diversity Database (CNDDB) (California Department of Fish and Game [CDFG] 2011). Special status species that may occur in Malaga township include the California tiger salamander (Ambystoma californiense), the western yellow-billed cuckoo (Coccyzus americanus occidentalis), and the California jewel-flower (Caulanthus californicus). Based on the habitat requirements for these species (CDFG 2011), potential is low for them to occur at the Purity Oil site and adjacent properties.

Qualitative Assessment of Ecological Risk

The following sections provide a qualitative assessment of risk to ecological receptors at the Purity Oil Site and the adjacent properties.

Chemicals of Concern

The 1989 Feasibility Study Report listed the sources of contamination on the Purity Property as acidic tarry sludges that had been placed into several pits and buried with soil (CH2M Hill 1989). The sludge-contaminated surface soil extended vertically to a depth of up to 14 feet in the eastern 2.5 acres of the site where the former surface impoundments were located. This surface soil was contaminated with metals and organic constituents including pesticides, oil, and grease. The soil contamination has contributed to groundwater contamination that includes volatile organic compounds (VOC), mainly dichloroethene and dichloroethane; semivolatile organic compounds; and iron and manganese.

The 2003 BTPL Technical Memorandum (EPA 2003) reported the following chemicals in soil on the adjacent properties at concentrations exceeding the industrial preliminary remediation goals (PRG):

- Metals: arsenic and lead
- Pesticides: dieldrin and beta-benzene hexachloride (BHC)
- Polycyclic aromatic hydrocarbons (PAH): benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-cd) pyrene
- Polychlorinated biphenyls: Aroclor-1242, Aroclor 1254, and Aroclor-1260
- VOCs: Trichloroethene

For this third FYR assessment, chemical concentrations in soil left in place were compared with available ecological soil screening levels (Eco-SSL) (see Table G-2). Chemical concentrations in

soils that had been capped or excavated were not screened against ecological benchmarks. Confirmation samples meeting the acceptance criteria for the excavation were also not screened against ecological benchmarks (Stantec 2008).

Eco-SSLs are risk-based concentrations of chemicals in soil that are protective of ecological receptors likely to come into contact with soil, either directly or via ingestion of biota that live in or on soil (EPA 2005). Eco-SSLs are used to screen chemical concentrations in soil. Eco-SSLs for plants apply to soils with a pH between 4.0 and 8.5, and with organic matter content less than or equal to 10 percent (EPA 2005). Eco-SSLs are available for a number of metals, but for only a few organic chemicals (EPA 2011). At the time the second FYR report was completed, Eco-SSLs were only available for a few metals; this assessment uses the latest available Eco-SSLs (EPA 2011) (Table G-2). Eco-SSLs were determined from a literature review of available toxicity data on plants, soil invertebrates, birds, and mammals.

Table G-3 lists samples collected outside the excavation area and containing one or more chemicals that exceeded their Eco-SSLs. The only contaminants exceeding Eco-SSLs are:

- Boundary of Purity Oil and Pick-A-Part Auto Wrecking: Lead, manganese, and nickel
- Boundary of Purity Oil and Bruno's Recycling excavation area: Manganese.

Exposure Pathways

Although exposure is a simple concept, accurately describing the fate and transport of chemicals from their source to a site of toxic action in living organisms can be complicated. In general, for an adverse exposure to occur, a chemical must leave the environmental matrix, move across several biological membranes, and concentrate in a tissue to the extent that its toxic action is exerted. A chemical that can move from the environmental matrix to the tissue of a receptor is said to be "bioavailable." Toxic effects observed during laboratory testing of field samples can result from a number of causes, including exposure to bioavailable chemicals.

The fate and transport of chemicals associated with the Purity Oil and adjacent properties determine the extent to which these stressors may affect various ecological receptors at the sites. Concentrations of chemicals in soil at various depths may affect surface-dwelling and burrowing receptors such as plants, invertebrates, birds, and mammals. VOCs may volatilize from soil and become concentrated in the air of burrows where burrowing mammals may be exposed via inhalation. Ecological receptors would not be affected by groundwater contamination because the depth to groundwater (55 to 75 feet) precludes a complete exposure pathway.

At the Purity Oil Site, the OU-2 remedy eliminated the exposure pathway by which contaminants in the soil can be taken up by ecological receptors. The OU-2 remedy (EPA 2006) included excavating the entire waste pit disposal area to a depth of 13 feet below ground surface, neutralizing the excavated material, placing the treated soil back in the excavation, and installing a low-permeability cap over the excavated material.

At the adjacent properties, the OU-2 remedy also eliminated the exposure pathway by which contaminants in the soil can be taken up by ecological receptors. The OU-2 remedy included excavating contaminated soil where chemicals of concern exceeded the EPA Region 9 health-based cleanup levels for industrial use or total petroleum hydrocarbon (TPH) levels of 10,000 milligrams per kilogram (mg/kg). Excavated soil from the adjacent properties was treated with the contaminated soil from the Purity Oil site. Excavations at all of the adjacent properties were

backfilled with clean soil. Figure G-1 shows the excavation boundaries for the adjacent properties. Outside the areas remediated, concentrations of lead, manganese, and nickel exceeded ECO-SSLs within the area along border between the Purity Oil and Pick-A-Part Auto Wrecking properties; near the Bruno's Recycling excavation area, concentrations of manganese exceeded Eco-SSLs (see Figure G-1 and Table G-3). However, minimal exposure to ecological receptors is expected because: (1) the site is industrial and does not support quality habitat for ecological receptors, and (2) the overall unremediated area is very small. Therefore, no additional action is recommended.

Conclusions and Recommendations

At both the Purity Oil site and adjacent properties, the OU-2 remedy eliminated the exposure pathway by which contaminants in the soil can be taken up by ecological receptors.

Outside the remediated areas, the site is industrial and does not support quality habitat for ecological receptors, and therefore minimal exposure is expected. No additional action is recommended for these areas.

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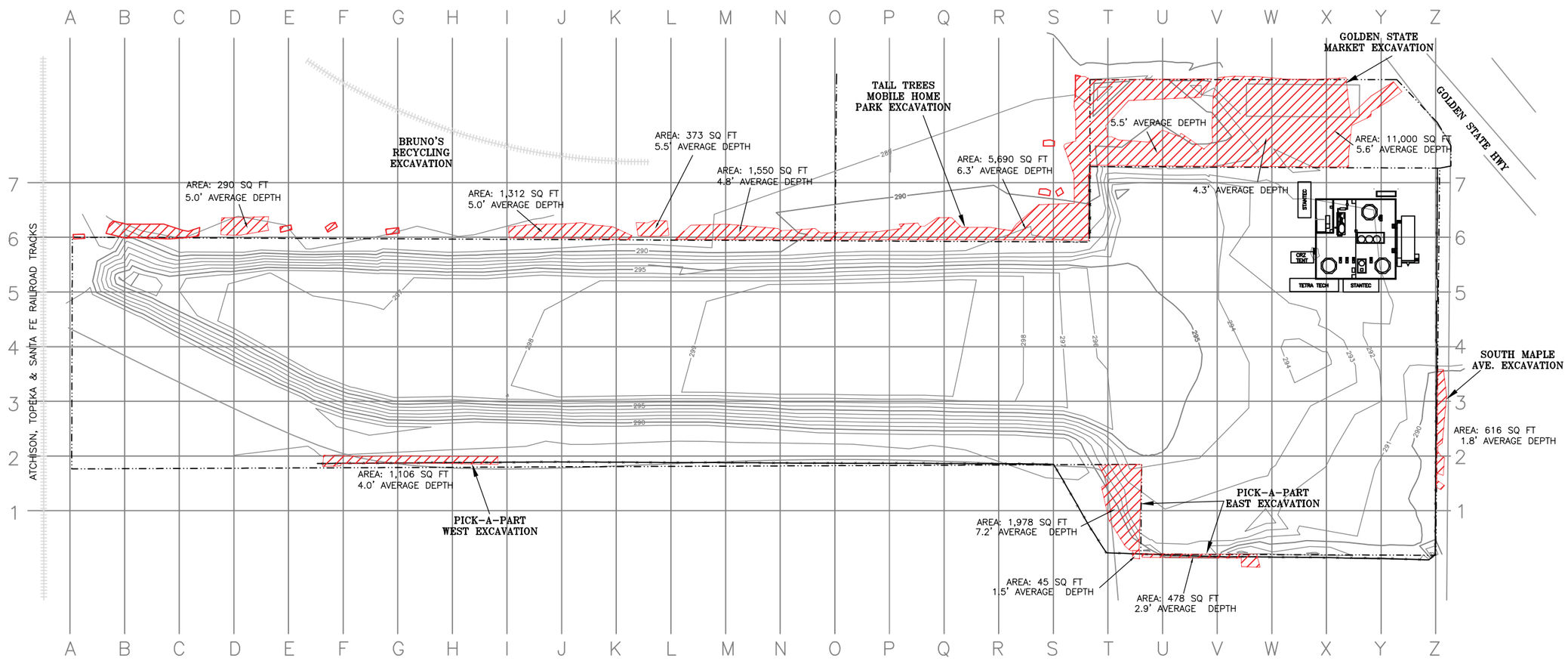

LEGEND

- PROPERTY LINE
- RAILROAD TRACK
- FENCE
- OFF-SITE EXCAVATION LIMITS
- 290 SURFACE CONTOUR

0 50 100
SCALE: 1"=50'

REV	DATE	DESCRIPTION	DSN	CHK	A
A		ISSUED FOR REVIEW			
B		ISSUED FOR REVIEW			
0		ISSUED FOR CONSTRUCTION			
1		ISSUED FOR CONSTRUCTION			

PREPARED BY:

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FOR:

CHEVRON
PURITY OIL SALES SUPERFUND SITE
3281 SOUTH MAPLE AVENUE
MALAGA, CALIFORNIA

TITLE:

OFF-SITE EXCAVATION LIMITS

REGISTERED PROFESSIONAL ENGINEER
JEREMY M. RASMUSSEN
C61494
6/30/09
CIVIL
STATE OF CALIFORNIA
10/10/08

DRAWN BY: SRW	DESIGNED BY: DR
CHECKED BY: DRM	APPROVED BY: JN
PROJECT NUMBER: 24CH.67006.03	SCALE: PLOT SCALE: 1" =
DATE: 10/14/08	FILE PATH: Basemap OU2.dw

FIGURE: **3-11**

Figure F-1

Source: Remedial Action Completion report for OU-2 (Stantec. 2008. Remedial Action Completion Report for Operable Unit 2, Purity Oil Sales Superfund Site. October 14.)

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	46277	**EO Index:**	46277
Key Quad:	Fresno North (3611977)	**Element Code:**	AAAAA01180
Occurrence Number:	583	**Occurrence Last Updated:**	2002-08-20

Scientific Name: *Ambystoma californiense*

Common Name: California tiger salamander

Listing Status: **Federal:** Threatened
State: Threatened

CNDDB Element Ranks: **Global:** G2G3
State: S2S3

Rare Plant Rank:

Other Lists: DFG_SSC-Species of Special Concern
IUCN_VU-Vulnerable

General Habitat:

CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro Habitat:

NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Last Date Observed:	1936-05-16	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1936-05-16	**Occurrence Rank:**	None
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Extirpated		

Location:

FRESNO.

Detailed Location:

Ecological:

Threats:

General:

1879 RECORD FROM THE USNM (#11794), NO OTHER INFORMATION GIVEN. CORNELL UNIVERSITY MUSEUM OF VERTEBRATES # 3017 (2 SPECIMENS) COLLECTED 16 MAY 1936 BY L.F. HADSELL. JENNINGS CONSIDERS THIS SITE EXTIRPATED.

PLSS:	T13S, R20E, Sec. 27 (M)	**Accuracy:**	5 miles	**Area (acres):**	0
UTM:	Zone-11 N4073392 E251931	**Latitude/Longitude:**	36.77388 / -119.77951	**Elevation (feet):**	300

County Summary:	**Quad Summary:**
Fresno	Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

Sources:

COR02S0001	CORNELL UNIVERSITY MUSEUM OF VERTEBRATES - COLLECTION RECORD FOR AMBYSTOMA CALIFORNIENSE 2002-07-01
JEN01U0001	JENNINGS, MARK (RANA RESOURCES) - LOCALITY RECORDS FOR AMBYSTOMA CALIFORNIENSE IN CALIFORNIA 1992 JENNINGS & HAYES SPECIAL CONCERN HERP DATABASE WITH LOCATIONS MARKED AS PRESENT OR EXTIRPATED. 2001-11-07
JEN94U0001	JENNINGS, M. & M. HAYES - COMPUTER PRINT-OUT OF ALL OF THE POINT DATA FOR TIGER SALAMANDER USED IN THE REPORT "REPTILE AND AMPHIBIAN SPECIES OF SPECIAL CONCERN IN CALIFORNIA" 1994-XX-XX

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	14944	**EO Index:**	25589
Key Quad:	Clovis (3611976)	**Element Code:**	ABNRB02022
Occurrence Number:	87	**Occurrence Last Updated:**	1989-08-10

Scientific Name: *Coccyzus americanus occidentalis*

Common Name: western yellow-billed cuckoo

Listing Status: **Federal:** Candidate
State: Endangered

CNDDB Element Ranks: **Global:** G5T3Q
State: S1

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
USFS_S-Sensitive
USFWS_BCC-Birds of Conservation Concern

General Habitat:

RIPARIAN FOREST NESTER, ALONG THE BROAD, LOWER FLOOD-BOTTOMS OF LARGER RIVER SYSTEMS.

Micro Habitat:

NESTS IN RIPARIAN JUNGLES OF WILLOW, OFTEN MIXED WITH COTTONWOODS, W/ LOWER STORY OF BLACKBERRY, NETTLES, OR WILD GRAPE.

Last Date Observed:	1902-07-10	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1902-07-10	**Occurrence Rank:**	None
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Extirpated		

Location:

FANCHER CREEK, 6 MI NE OF FRESNO.

Detailed Location:

Ecological:

Threats:

General:

REPORTED AS UNCOMMON BUT NESTING BY TYLER (1913).

PLSS:	T13S, R21E, Sec. 36 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-11 N4070690 E264333	**Latitude/Longitude:**	36.75271 / -119.63986	**Elevation (feet):**	345

County Summary:	**Quad Summary:**
Fresno	Sanger (3611965), Malaga (3611966), Round Mountain (3611975), Clovis (3611976)

Sources:

GAI77R0001 GAINES, DAVID - CURRENT STATUS AND HABITAT REQUIREMENTS OF THE YELLOW-BILLED CUCKOO IN CALIFORNIA. ENDANGERED WILDLIFE PROJECT. E-1-1. CALIFORNIA DEPARTMENT OF FISH AND GAME. 1977-XX-XX

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	46277	**EO Index:**	63230
Key Quad:	Fresno North (3611977)	**Element Code:**	PDBRA31010
Occurrence Number:	38	**Occurrence Last Updated:**	2005-11-09

Scientific Name: *Caulanthus californicus*

Common Name: California jewel-flower

Listing Status: **Federal:** Endangered

State: Endangered

Rare Plant Rank: 1B.1

Other Lists: USFS_S-Sensitive

CNDDB Element Ranks: **Global:** G1

State: S1.1

General Habitat:

CHENOPOD SCRUB, VALLEY AND FOOTHILL GRASSLAND, PINYON-JUNIPER WOODLAND.

Micro Habitat:

HISTORICAL FROM VARIOUS VALLEY HABITATS IN BOTH THE CENTRAL VALLEY AND CARRIZO PLAIN. 65-900M.

Last Date Observed:	XXXX-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1986-03-XX	**Occurrence Rank:**	None
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Extirpated		

Location:

FRESNO.

Detailed Location:

Ecological:

Threats:

General:

NO HABITAT REMAINS IN VICINITY OF FRESNO. UNKNOWN WHEN ORIGINALLY COLLECTED BY DAVIDSON (SN NO DATE LAN).

PLSS:	T13S, R20E, Sec. 27 (M)	**Accuracy:**	5 miles	**Area (acres):**	0
UTM:	Zone-11 N4073392 E251931	**Latitude/Longitude:**	36.77388 / -119.77951	**Elevation (feet):**	

County Summary:	**Quad Summary:**
Fresno	Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

Sources:

TAY86R0001 TAYLOR, D. & W. DAVILLA - STATUS SURVEY OF THREE PLANTS ENDEMIC TO THE SAN JOAQUIN VALLEY AND ADJACENT AREAS, INCLUDING CAULANTHUS CALIFORNICA, EREMALCHE KERNENSIS & ERIASTRUM HOOVERI. 1986-XX-XX

TABLE F-2 - PURITY OIL SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT BENCHMARKS

Analyte	Eco-SSL for Plants[a]	Eco-SSL Invertebrates[a]	Eco-SSL for Birds[a]	Eco-SSL for Mammals[a]
Antimony		78		0.27
Arsenic	18		43	46
Barium		330		2,000
Beryllium		40		21
Cadmium	32	140	0.77	0.36
Chromium			26	34
Cobalt	13		120	230
Copper	70	80	28	48
Lead	120	1,700	11	56
Manganese	220	450	4,300	4,000
Nickel	38	280	210	130
Silver	560		4.2	14
Vanadium			7.8	280
Zinc	160	120	46	79
Total DDTs			0.093	0.021
Total HMW PAHs		29		100
Total LMW PAHs		18		1.1

Notes:

All values are concentrations in units of milligrams per kilogram.

DDTs	Dichlorodiphenyltrichloroethane and metabolites
Eco-SSL	Ecological soil screening level
HMW	High molecular weight
LMW	Low molecular weight
mg/kg	Milligrams per kilogram
PAH	Polycyclic aromatic hydrocarbons

a Eco-SSLs are from the EPA's (2005) Interim Final Ecological Soil-Screening Level documents for individual chemicals. Online address: http://www.epa.gov/ecotox/ecossl/

References:

EPA. 2011. Interim Ecological Screening Levels. June. http://www.epa.gov/ecotox/ecossl/

TABLE F-3 - CHEMICAL/LOCATION OUTSIDE OF REMEDIATED AREA WHERE ECO-SSLS ARE EXCEEDED

Analyte	Site Location	Sample Location	Top Depth	Bottom Depth	Eco-SSL Plant	Eco-SSL Invertebrate	Eco-SSL Bird	Eco-SSL Mammal	Sample Result (mg/kg)	Result Above Most Conservative Eco-SSL	Result Above Least Conservative Eco-SSL
Lead	Pick-A-Part Auto Wrecking	PPSB01	1.5	3	120	1700	11	56	20	Y	N
Manganese	Purity Oil Site	PC-W-04	4	4.5	220	450	4300	4000	502	Y	N
	Bruno's Recycling	BTP11	2	4	220	450	4300	4000	191	Y	N
Nickel	Purity Oil Site	PC-W-05	3	3.5	38	280	210	130	56.3	Y	N

Notes:

Eco-SSL	Ecological soil screening level	NA	Not available
mg/kg	Milligrams per kilogram	Y	Yes
N	No		

APPENDIX G

COMMUNITY INVOLVEMENT ACTIVITIES

APPENDIX G
COMMUNITY INVOLEMENT ACTIVITES

PURITY OIL SALES SUPERFUND SITE FIVE-YEAR REVIEW

The United States Environmental Protection Agency (US EPA) is conducting a Five-Year Review at the Purity Oil Sales Superfund site located at 3281 South Maple Avenue in Magala, CA. This review will summarize cleanup activities that have taken place over the last five years and will evaluate whether the selected remedy remains protective of human health and the environment. According to the Superfund law, Five-Year Reviews are a statutory requirement for sites where the cleanup may leave any amount of hazardous waste onsite. These reviews must occur every five years in perpetuity. This is the Purity site's third Five-Year Review. The final report is due September 30, 2011 and will be available to the public at the Information Repositories listed below.

The seven-acre Purity Oil Sales site was formerly used to refine petroleum waste oils between 1934 and 1975. These waste oils came from businesses (such as service stations, car dealers, truck stops and electrical transformer yards), municipalities, school districts and the military. The oil and by-products were disposed of in approximately seven large on-site sludge pits. Contaminated soils were neutralized and capped. Groundwater at the site is contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), iron and manganese that discharged from the sumps and unlined pits.

During the review, U.S. EPA will study the site and document its methods, findings and conclusions in the Five-Year Review Report. The report will state whether the cleanup continues to be effective and recommend improvements, if necessary. A copy of the final report will be placed in the Information Repositories listed below, and a notice will be placed in a local newspaper.

The U.S. EPA invites the community to learn more about this review process and get involved. Please feel free to contact Lily Tavassoli, Remedial Project Manager, at (415) 972-3146 or at tavassoli.lily@epa.gov with any questions about the site that you may have.

Information Repositories where more site information can be found are located at:

Fresno County Central Library 2420 Mariposa Street Fresno, CA 93721 (559) 488-3195	EPA Region 9 Superfund Records Center 95 Hawthorne St., Suite 403S San Francisco, CA 94105 (415) 820-4700

Site information is on-line at: www.epa.gov/region09/PurityOil

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