

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
ORDER WQ 2013-0118-UST

**In the Matter of Underground Storage Tank Case Closure
Pursuant to Health and Safety Code Section 25296.40 and the
Low-Threat Underground Storage Tank Case Closure Policy**

BY THE EXECUTIVE DIRECTOR:¹

By this order, the Executive Director directs closure of the underground storage tank (UST) case at the site listed below, pursuant to subdivision (a) of section 25296.40 of the Health and Safety Code.² The name of the petitioner, the site name, the site address, the Underground Storage Tank Cleanup Fund (Fund) claim number if applicable, the lead agency, and case number are as follows:

Shell Oil Products US

Texaco

2640 Santiago Boulevard, Orange, Orange County

County of Orange Health Care Agency, Case No. 98UT083

I. STATUTORY AND PROCEDURAL BACKGROUND

Upon receipt of a petition from a UST owner, operator, or other responsible party, section 25296.40 authorizes the State Water Resources Control Board (State Water Board) to close or require closure of a UST case where an unauthorized release has occurred, if the State Water Board determines that corrective action at the site is in compliance with all of the requirements of subdivisions (a) and (b) of section 25296.10. The State Water Board, or in certain cases the State Water Board Executive Director, may close a case or require the closure of a UST case. Closure of a UST case is appropriate where the corrective action ensures the

¹ State Water Board Resolution No. 2012-0061 delegates to the Executive Director the authority to close or require the closure of any UST case if the case meets the criteria found in the State Water Board's Low-Threat Underground Storage Tank Case Closure Policy adopted by State Water Board Resolution No. 2012-0016.

² Unless otherwise noted, all references are to the California Health and Safety Code.

protection of human health, safety, and the environment and where the corrective action is consistent with: 1) Chapter 6.7 of division 20 of the Health and Safety Code and implementing regulations; 2) Any applicable waste discharge requirements or other orders issued pursuant to division 7 of the Water Code; 3) All applicable state policies for water quality control; and 4) All applicable water quality control plans.

State Water Board staff has completed a review of the UST case identified above, and recommends that this case be closed. The recommendation is based upon the facts and circumstances of this particular UST case. A UST Case Closure Summary has been prepared for the case identified above and the basis for determining compliance with the Water Quality Control Policy for Low-Threat Underground Storage Tank Case Closures (Low-Threat Closure Policy or Policy) are explained in the Case Closure Summary.

Low-Threat Closure Policy

In State Water Board Resolution No. 2012-0016, the State Water Board adopted the Low-Threat Closure Policy. The Policy became effective on August 17, 2012. The Policy establishes consistent statewide case closure criteria for certain low-threat petroleum UST sites. In the absence of unique attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents, cases that meet the general and media-specific criteria in the Low-Threat Closure Policy pose a low-threat to human health, safety, and the environment and are appropriate for closure under Health and Safety Code section 25296.10. The Policy provides that if a regulatory agency determines that a case meets the general and media-specific criteria of the Policy, then the regulatory agency shall notify responsible parties and other specified interested persons that the case is eligible for case closure. Unless the regulatory agency revises its determination based on comments received on the proposed case closure, the Policy provides that the agency shall issue a uniform closure letter as specified in Health and Safety Code section 25296.10. The uniform closure letter may only be issued after the expiration of the 60-day comment period, proper destruction or maintenance of monitoring wells or borings, and removal of waste associated with investigation and remediation of the site.

Health and Safety Code section 25299.57, subdivision (l)(1) provides that claims for reimbursement of corrective action costs that are received by the Fund more than 365 days after the date of a uniform closure letter or a letter of commitment, whichever occurs later, shall not be reimbursed unless specified conditions are satisfied.

II. FINDINGS

Based upon the UST Case Closure Summary prepared for the case attached hereto, the State Water Board finds that corrective action taken to address the unauthorized release of petroleum at the UST release site identified as:

Shell Oil Products US

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ensures protection of human health, safety, and the environment and is consistent with Chapter 6.7 of division 20 of the Health and Safety Code, and implementing regulations, the Low-Threat Closure Policy and other water quality control policies and applicable water quality control plans.

Pursuant to the Low-Threat Closure Policy, notification has been provided to all entities that are required to receive notice of the proposed case closure, a 60-day comment period has been provided to notified parties, and any comments received have been considered by the State Water Board in determining that the case should be closed.

Pursuant to section 21080.5 of the Public Resources Code, environmental impacts associated with the adoption of this Order were analyzed in the substitute environmental document (SED) the State Water Board approved on May 1, 2012. The SED concludes that all environmental effects of adopting and implementing the Low Threat Closure Policy are less than significant, and environmental impacts as a result of adopting this Order in compliance with the Policy are no different from the impacts that are reasonably foreseen as a result of the Policy itself. A Notice of Decision was filed August 17, 2012. No new environmental impacts or any additional reasonably foreseeable impacts beyond those that were addressed in the SED will result from adopting this Order.

The UST case identified above may be the subject of orders issued by the Regional Water Quality Control Board (Regional Water Board) pursuant to division 7 of the Water Code. Any orders that have been issued by the Regional Water Board pursuant to division 7 of the Water Code, or directives issued by a Local Oversight Program (LOP) agency for this case should be rescinded to the extent they are inconsistent with this Order.

III. ORDER

IT IS THEREFORE ORDERED that:

- A. The UST case identified in Section II of this Order, meeting the general and media-specific criteria established in the Low-Threat Closure Policy, be closed in accordance with the following conditions and after the following actions are complete. Prior to the issuance of a uniform closure letter, the Petitioner is ordered to:
1. Properly destroy monitoring wells and borings unless the owner of real property on which the well or boring is located certifies that the wells or borings will be maintained in accordance with local or state requirements;
 2. Properly remove from the site and manage all waste piles, drums, debris, and other investigation and remediation derived materials in accordance with local or state requirements; and
 3. Within six months of the date of this Order, submit documentation to the regulatory agency overseeing the UST case identified in Section II of this Order that the tasks in subparagraphs (1) and (2) have been completed.
- B. The tasks in subparagraphs (1) and (2) of Paragraph (A) are ordered pursuant to Health and Safety Code section 25296.10 and failure to comply with these requirements may result in the imposition of civil penalties pursuant to Health and Safety Code section 25299, subdivision (d)(1). Penalties may be imposed administratively by the State Water Board or Regional Water Board.
- C. Within 30 days of receipt of proper documentation from the Petitioner that requirements in subparagraphs (1) and (2) of Paragraph (A) are complete, the regulatory agency that is responsible for oversight of the UST case identified in Section II of this Order shall notify the State Water Board that the tasks have been satisfactorily completed.
- D. Within 30 days of notification from the regulatory agency that the tasks are complete pursuant to Paragraph (C), the Deputy Director of the Division of Water Quality shall issue a uniform closure letter consistent with Health and Safety Code section 25296.10, subdivision (g) and upload the uniform closure letter and UST Case Closure Summary to GeoTracker.

- E. Pursuant to section 25299.57, subdivision (l) (1), and except in specified circumstances, all claims for reimbursement of corrective action costs must be received by the Fund within 365 days of issuance of the uniform closure letter in order for the costs to be considered.
- F. Any Regional Water Board or LOP agency directive or order that directs corrective action or other action inconsistent with case closure for the UST case identified in Section II is rescinded, but only to the extent the Regional Water Board order or LOP agency directive is inconsistent with this Order.

Thomas Howard
Executive Director

11/21/13
Date



State Water Resources Control Board

UST CASE CLOSURE SUMMARY

Agency Information

Table with 2 columns: Agency Name, Address, Agency Caseworker, Case No.

Case Information

Table with 2 columns: USTCF Claim No., Global ID, Site Name, Site Address, Petitioner, Address, USTCF Expenditures to Date, Number of Years Case Open

URL: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0605901961

Summary

The Low-Threat Underground Storage Tank Case Closure Policy (Policy) contains general and media-specific criteria, and cases that meet those criteria are appropriate for closure pursuant to the Low-Threat Policy. This Case meets all of the required criteria of the Policy. A summary evaluation of compliance with the Policy is shown in Attachment 1: Compliance with State Water Board Policies and State Law. The Conceptual Site Model upon which the evaluation of the Case has been made is described in Attachment 2: Summary of Basic Site Information. Highlights of the Conceptual Site Model of the Case are as follows:

The release at the Site was discovered when the former underground storage tanks (UST), dispenser islands, and piping were removed and replaced in November 1995. During the 1995 UST removal, approximately 1,500 tons of impacted soil was excavated and disposed. Between 2003 and 2005, a soil vapor extraction (SVE) system was operated. Operation of the SVE system ceased due to decreasing influent concentrations and low to decreasing extraction rates. In 2010, a five-day SVE rebound test demonstrated increasing to stable trends in concentrations and extraction rates; however, the influent concentrations and extraction rates remained low.

The petroleum release is primarily limited to soil to a depth of approximately 140 feet below ground surface (bgs). The dispenser canopy and underground improvements limit access to soil beneath the dispensers. Groundwater, estimated between 175 to 205 feet bgs, has not been encountered to a maximum depth explored of 170 feet bgs. Post-remediation soil data beneath the source area indicate there are residual contaminants in soil between 120 to 140 feet bgs. The residual contaminants at this depth do not pose a significant risk for leaching to groundwater. Additionally, soil vapor data from two



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deep SVE wells (VW-7 [145 feet bgs] and VW-8 [170 feet bgs]) located approximately 10 to 20 feet from the center of the release show minimal concentrations in soil vapor between 135 to 170 feet bgs.

The Site is located along the boundary of the Coastal Plain of Orange County Groundwater Basin (Department of Water Resources Bulletin 118). This basin is a high use basin and is listed as "Hydrogeologically Vulnerable" per State Water Resources Control Board's (State Water Board) response to Executive Order D-5-99. The basin's designated beneficial uses of groundwater are not threatened and considering the Site setting, it is highly unlikely that they will be in the foreseeable future. Remaining petroleum constituents are limited, stable and declining. Remedial actions have been implemented and further remediation would be ineffective and expensive. Additional assessment/monitoring will not likely change the conceptual model. Any remaining petroleum constituents do not pose significant risk to human health, safety, or the environment.

Rationale for Closure under the Policy

- General Criteria – Site **MEETS ALL EIGHT GENERAL CRITERIA** under the Policy.
- Groundwater Media-Specific Criteria – Site meets the **EXCEPTION**. Based on an analysis of Site-specific conditions that under current and reasonably anticipated near-term future scenarios, the soil at the Site does not contain sufficient mobile constituents [leachate, vapors, or light non-aqueous-phase liquids (LNAPL)] to cause groundwater to exceed the groundwater criteria.
- Petroleum Vapor Intrusion to Indoor Air – Site meets the **EXCEPTION**. The Site is operated as an active commercial fueling facility and has no release characteristics that can be reasonably believed to pose an unacceptable health risk.
- Direct Contact and Outdoor Air Exposure – Site meets **CRITERIA (3) b**. A Site-specific risk assessment demonstrates that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health.

Objections to Closure

County staff objected to UST case closure because:

1. Further SVE will remove significant mass of soil contamination. The rebound test in 2010 showed increasing trends for extraction rate and vapor concentrations; asymptotic conditions not demonstrated.

RESPONSE: Between 2003 and 2005, SVE remediation was used to remove approximately 23,500 pounds of hydrocarbons from soil. Post-remediation soil samples show significantly decreased concentrations. The 2010 rebound test did show stable to increasing trends for extraction rates and vapor concentrations; however, the extraction rates and vapor concentrations were significantly lower than original concentrations. Extraction rates have reduced from approximately 7.96 pounds per hour (lbs/hr) to between 0.22 and 0.5 lbs/hr. Vapor concentrations at the end of the 2010 rebound test are approximately 98% lower than original values. Even with the 2010 rebound test results, asymptotic conditions are demonstrated.

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2. Vertical extent of hydrocarbons beneath dispenser island and canopy is not characterized near soil borings B-21 and B-28.

RESPONSE: The vertical extent of petroleum hydrocarbons beneath the canopy and dispensers island has been characterized to a depth of approximately 140 feet bgs. Slanted post-remediation boring, B-28, contained total petroleum hydrocarbons as gasoline (TPHg) and total xylenes at a depth of 140 feet bgs at concentrations that exceed San Francisco Bay Environmental Screening Levels (ESLs) for leaching to groundwater. There is no other soil sample beyond this depth near this location.

However, hydrocarbon concentrations in soil deeper than 140 feet bgs can be inferred using soil vapor data. Most recent soil vapor data from VW-7 (screened from 135 to 145 feet bgs and located approximately 10 feet from the soil contamination) and VW-8 (screened from 140 to 170 feet bgs and located approximately 20 feet from the deep soil contamination) show minimal vapor concentrations. This indicates that the residual contaminants in soil deeper than 140 feet bgs are minimal.

3. Site is within the Forebay Area of the Coastal Plain of Orange County Groundwater Basin which is designated as Hydrogeologically Vulnerable per Governor's Executive Order D-5-99.

RESPONSE: The Site is located along the border of the Coastal Plain of Orange County Groundwater Basin. The closest potential receptor for hydrocarbons in groundwater is City of Orange Well No. W-350 located approximately 2,200 feet to the northwest. The Site overlies the western flank of the Peralta Hills, an outcrop of the Fernando Formation. The Fernando Formation is composed of low permeable silty-sandstone to gravely-sandstone interbedded with micaceous clayey-siltstone or silty-claystone from approximately 40 feet bgs to a maximum depth explored of 170 feet bgs. Soil overlies the Fernando Formation from ground surface to approximately 40 feet bgs. Soil is composed of clay, silt, silty-sand and sand. Groundwater has not been encountered to a maximum depth explored of 170 feet bgs. It is unlikely that groundwater sources at this location will be used as a source of drinking water or for any other designated beneficial uses in the foreseeable future.

Recommendation for Closure

The corrective action performed at this Site ensures the protection of human health, safety, the environment and is consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations, applicable state policies for water quality control and the applicable water quality control plan, and case closure is recommended.

Prepared By: Steve McMasters
Steve McMasters, PG No. 8054
Engineering Geologist

7/3/2013
Date

Reviewed By: Benjamin Heningburg
Benjamin Heningburg, PG No. 8130
Senior Engineering Geologist

7/3/2013
Date

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ATTACHMENT 1: COMPLIANCE WITH STATE WATER BOARD POLICIES AND STATE LAW

The Site complies with State Water Resources Control Board policies and state law. Section 25296.10 of the Health and Safety Code requires that Sites be cleaned up to protect human health, safety, and the environment. Based on available information, any residual petroleum constituents at the Site do not pose significant risk to human health, safety, or the environment.

The Site complies with the requirements of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.¹

<p>Is corrective action consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations? The corrective action provisions contained in Chapter 6.7 of the Health and Safety Code and the implementing regulations govern the entire corrective action process at leaking UST sites. If it is determined, at any stage in the corrective action process, that UST case closure is appropriate, further compliance with corrective action requirements is not necessary. Corrective action at this Site has been consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations and, since this case meets applicable case-closure requirements, further corrective action is not necessary, unless the activity is necessary for case closure.</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>Have waste discharge requirements or any other orders issued pursuant to Division 7 of the Water Code been issued at this Site?</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>If so, was the corrective action performed consistent with any order?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>
<p><u>General Criteria</u> General criteria that must be satisfied by all candidate sites:</p> <p>Is the unauthorized release located within the service area of a public water system?</p> <p>Does the unauthorized release consist only of petroleum?</p> <p>Has the unauthorized ("primary") release from the UST system been stopped?</p> <p>Has free product been removed to the maximum extent practicable?</p> <p>Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>

¹ Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.

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<p>Has secondary source been removed to the extent practicable?</p> <p>Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code, Section 25296.15?</p> <p>Does nuisance as defined by Water Code, section 13050 exist at the Site?</p> <p>Are there unique Site attributes or Site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>Media-Specific Criteria Candidate sites must satisfy all three of these media-specific criteria:</p> <p>1. Groundwater: To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites:</p> <p>Is the contaminant plume that exceeds water quality objectives stable or decreasing in areal extent?</p> <p>Does the contaminant plume that exceeds water quality objectives meet all of the additional characteristics of one of the five classes of sites? If YES, check applicable class: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5</p> <p>For sites with releases that have not affected groundwater, do mobile constituents (leachate, vapors, or light non-aqueous phase liquids) contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA</p>
<p>2. Petroleum Vapor Intrusion to Indoor Air: The Site is considered low-threat for vapor intrusion to indoor air if Site-specific conditions satisfy all of the characteristics of one of the three classes of sites (a through c) or if the exception for active commercial fueling facilities applies.</p> <p>Is the Site an active commercial petroleum fueling facility? Exception: Satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk.</p> <p>a. Do Site-specific conditions at the release Site satisfy all of the applicable characteristics and criteria of scenarios 1 through 3 or all of the applicable characteristics and criteria of scenario 4? If YES, check applicable scenarios: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4</p> <p>b. Has a Site-specific risk assessment for the vapor intrusion pathway been conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>

<p>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>
<p>3. Direct Contact and Outdoor Air Exposure: The Site is considered low-threat for direct contact and outdoor air exposure if Site-specific conditions satisfy one of the three classes of sites (a through c).</p> <p>a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth below ground surface (bgs)?</p> <p>b. Are maximum concentrations of petroleum constituents in soil less than levels that a Site-specific risk assessment demonstrates will have no significant risk of adversely affecting human health?</p> <p>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>

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ATTACHMENT 2: SUMMARY OF BASIC INFORMATION (Conceptual Site Model)

Site Location/ History

- The Site is an active commercial fueling facility and is located approximately 1,000 feet south of the intersection of Lincoln Avenue and Santiago Boulevard.
- The Site is bounded by commercial properties to the north and south, by Highway 55 to the west, and Santiago Boulevard and residential properties to the east.
- Nature of Contaminants of Concern: Petroleum hydrocarbons only.
- Primary Source of Release: UST System
- Discovery Date: 1995
- Release Type: Petroleum²
- No groundwater monitoring wells have been installed; soil only case.
- Free Product: None reported

Table A. USTs:

Tank No.	Size	Contents	Status	Date
1	Unknown	Gasoline	Removed	1995
2	Unknown	Gasoline	Removed	1995
3	Unknown	Gasoline	Removed	1995

Receptors

- Groundwater Basin: Lower Santa Ana River Hydrologic Area; East Coastal Plain Hydrologic Subarea (also Coastal Plain of Orange County Groundwater Basin)
- Groundwater Beneficial Uses: Municipal and domestic supply (MUN), industrial service supply (IND), industrial process supply (PROC), and agricultural supply (AGR).
- Designated Land Use: General commercial (GC)
- Public Water System: City of Orange
- Distance to Nearest Surface Waters: Eisenhower Park Lake is greater than 1,000 feet northwest; Santa Ana River is greater than 1,000 feet to the northwest; Orange County Water District groundwater recharge basins are greater than 1,000 feet to the north and west.
- Distance to Nearest Supply Wells: Supply well is greater than 1,000 feet northwest

Geology/ Hydrogeology

- Average Groundwater Depth: Groundwater not encountered to a maximum depth explored of 170 feet bgs. Groundwater estimated between 175 and 205 feet bgs.
- Minimum Groundwater Depth: Groundwater not encountered to a maximum depth explored of 170 feet bgs.
- Groundwater Flow Direction: Regional groundwater flow in adjacent basin is south to southwest.
- Geology: Site overlies the western flank of Peralta Hills, an outcrop of the Fernando Formation. Soil encountered from surface to a depth of approximately 40 feet bgs and includes clay, silt, silty-sand and sand. Fernando Formation, from approximately 40 feet bgs to maximum depth explored

² "Petroleum" means crude oil, or any fraction thereof, which is liquid at standard conditions of temperature and pressure, which means at 60 degrees Fahrenheit and 14.7 pounds per square inch absolute. (Health & Saf. Code, § 25299.2.)

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of 170 feet, includes silty-sandstone to gravely-sandstone interbedded with micaceous clayey-siltstone or silty-claystone.

- Hydrogeology: Groundwater not encountered to a maximum depth explored of 170 feet bgs.

Corrective Actions

- Three USTs, dispenser islands, and piping were removed and replaced in 1995.
- During 1995, approximately 1,500 tons of impacted soil were removed and disposed offsite.
- Between 2003 and 2005, SVE was successfully implemented and operated. Approximately 23,500 pounds of hydrocarbons removed from soil.
- The SVE system was shut down during 2005 because of diminishing influent concentrations and extraction rates.

Table B. Concentrations of Petroleum Constituents in Soil

Constituent	Maximum 0-5 feet bgs (mg/kg)	Maximum 5-10 feet bgs (mg/kg)	San Francisco Bay Regional Water Quality Control Board's ¹ Construction/Trench Worker Direct Exposure Screening Levels (mg/kg)
Benzene	<0.130	0.028	12
Ethylbenzene	0.52	0.099	210
Naphthalene	Not Analyzed	Not Analyzed	130
PAHs ²	Not Analyzed	Not Analyzed	-

1. San Francisco Bay Regional Water Board

2. Poly-aromatic hydrocarbons as benzo(a)pyrene toxicity equivalent

Petroleum constituents in soil are from post-remediation soil samples only.

Evaluation of Risk Criteria

- Maximum Petroleum Constituent Plume Length above WQOs: not applicable.
- Petroleum Constituent Plume Determined Stable or Decreasing: not applicable
- Soil/Groundwater Sampled for MTBE: Yes, see Table C above
- Residual Petroleum Constituents Pose Significant Risk to the Environment: No
- Residual Petroleum Constituents Pose Significant Vapor Intrusion Risk to Human Health: No – Petroleum constituents most likely to pose a threat for vapor intrusion were removed during soil excavation and over-excavation. Site conditions demonstrate that the residual petroleum constituents in soil and groundwater are protective of human health.
- Residual Petroleum Constituents Pose a Nuisance³ at the Site: No
- Residual Petroleum Constituents in Soil Pose Significant Risk of Adversely Affecting Human Health: No – A site-specific risk assessment from exposure shows that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting the human health, because the Site is paved and accidental access to soils at the Site is prevented. As an active gasoline service station, any construction worker working at the Site or adjacent to the Site will be prepared for exposure in their normal daily work.
- Residual Petroleum Constituents Pose Significant Direct Contact and Outdoor Air Exposure to Human Health: No – Concentrations of soil samples that exceed Table 1 of the Policy were collected in 1997 (B-5 and B-11) and in 2004 (B-21) prior to or during remediation. Post

³ Nuisance as defined in California Water Code, section 13050, subdivision (m).

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remediation soil samples (post 2005) collected at depths less than 10 feet are all below Residential pathway concentrations shown in Table 1 of the Policy. There are no soil sample results in the case record for naphthalene. However, the relative concentration of naphthalene in soil can be conservatively estimated using the published relative concentrations of naphthalene and benzene in gasoline. Taken from Potter and Simmons (1998), gasoline mixtures contain approximately 2% benzene and 0.25% naphthalene. Therefore, benzene can be directly substituted for naphthalene concentrations with a safety factor of eight. Post remediation benzene concentrations from the Site are below the naphthalene thresholds in Table 1 of the Policy. Therefore, the estimated naphthalene concentrations meet the thresholds in Table 1 and the Policy criteria for direct contact by a factor of eight. It is highly unlikely that naphthalene concentrations in soil, if any, exceed the threshold

Figure 1

HYDROCARBON EXTRACTION RATE AND CUMULATIVE POUNDS OF HYDROCARBONS RECOVERED VS. TOTAL HOURS

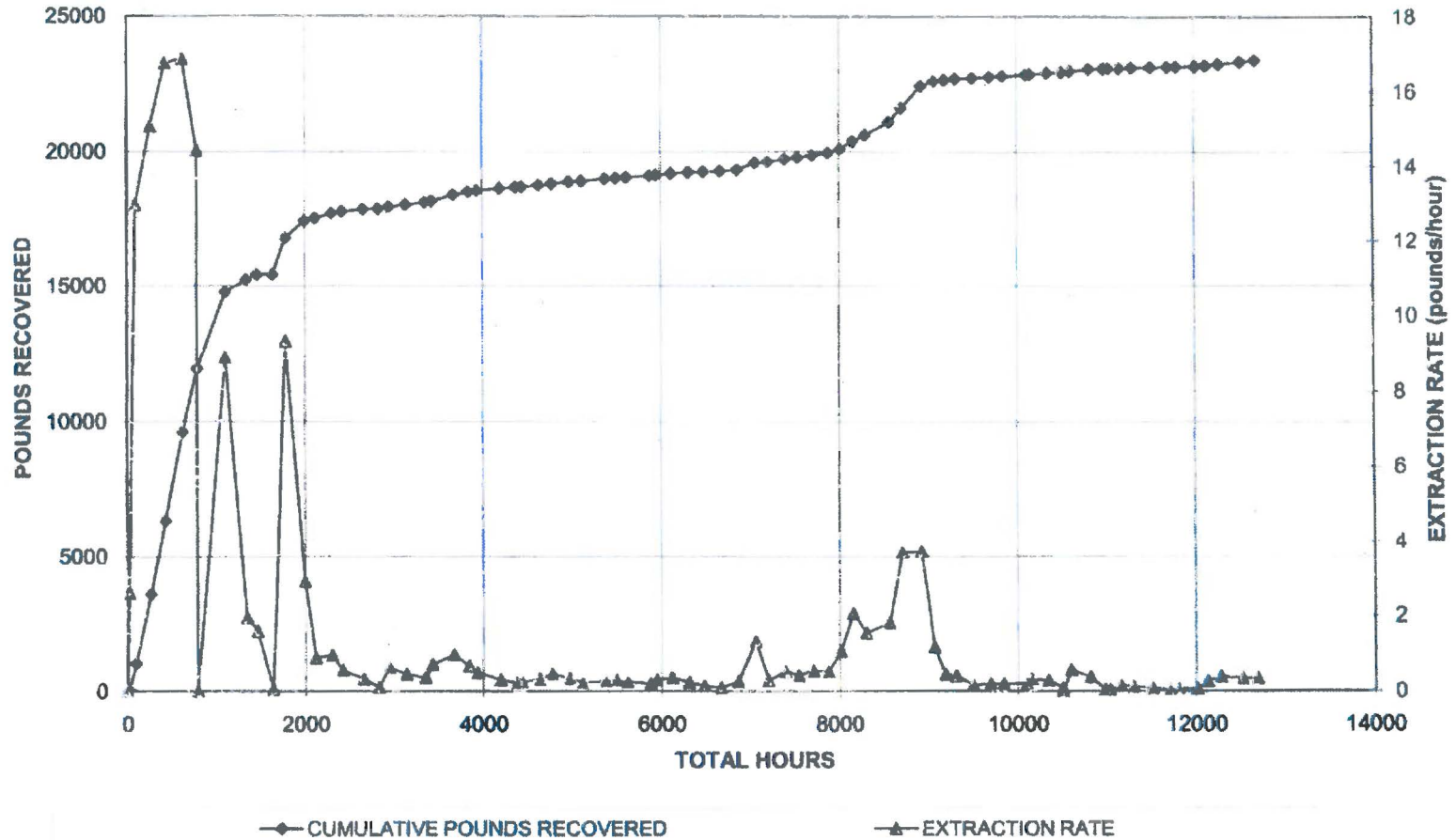


Figure 2

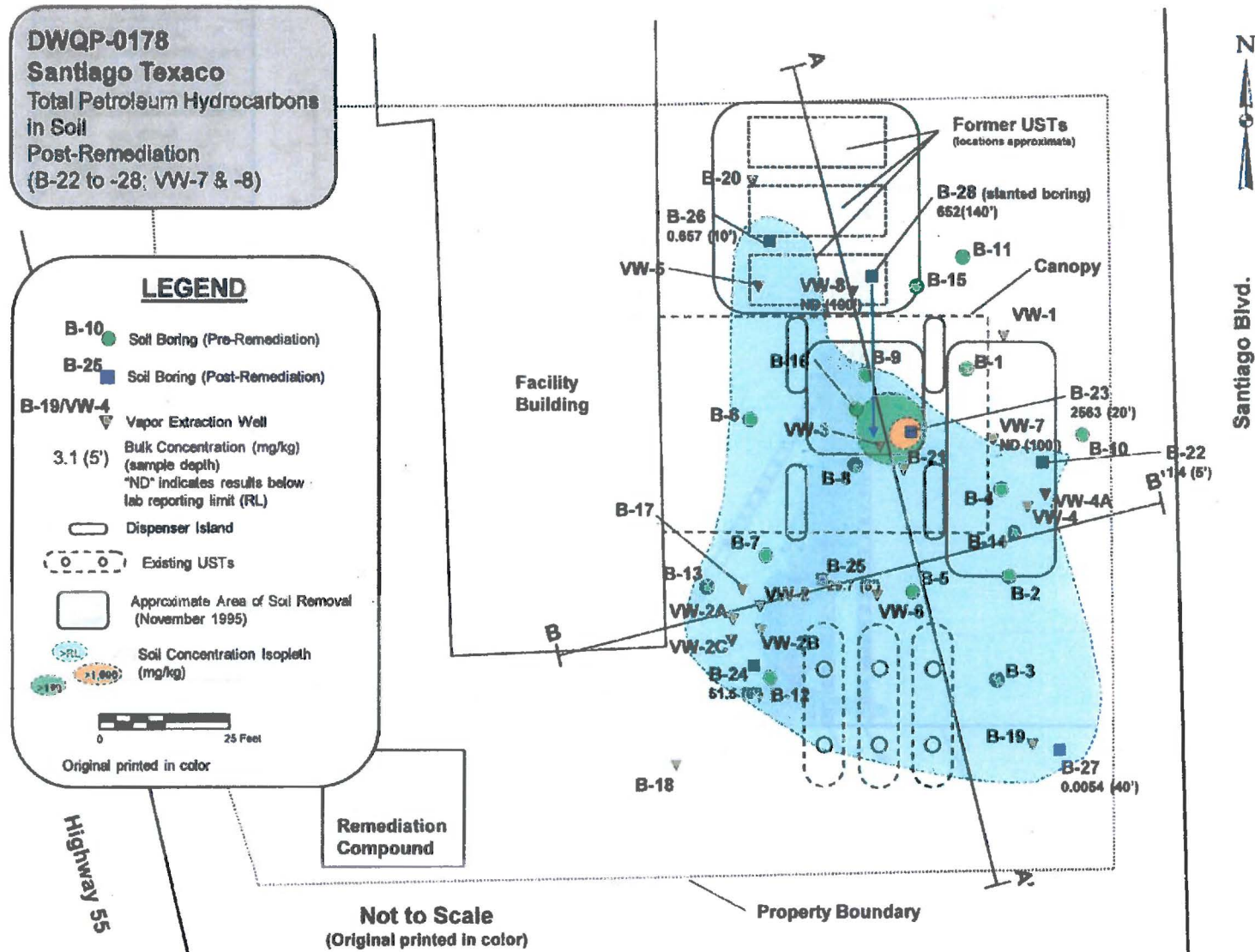
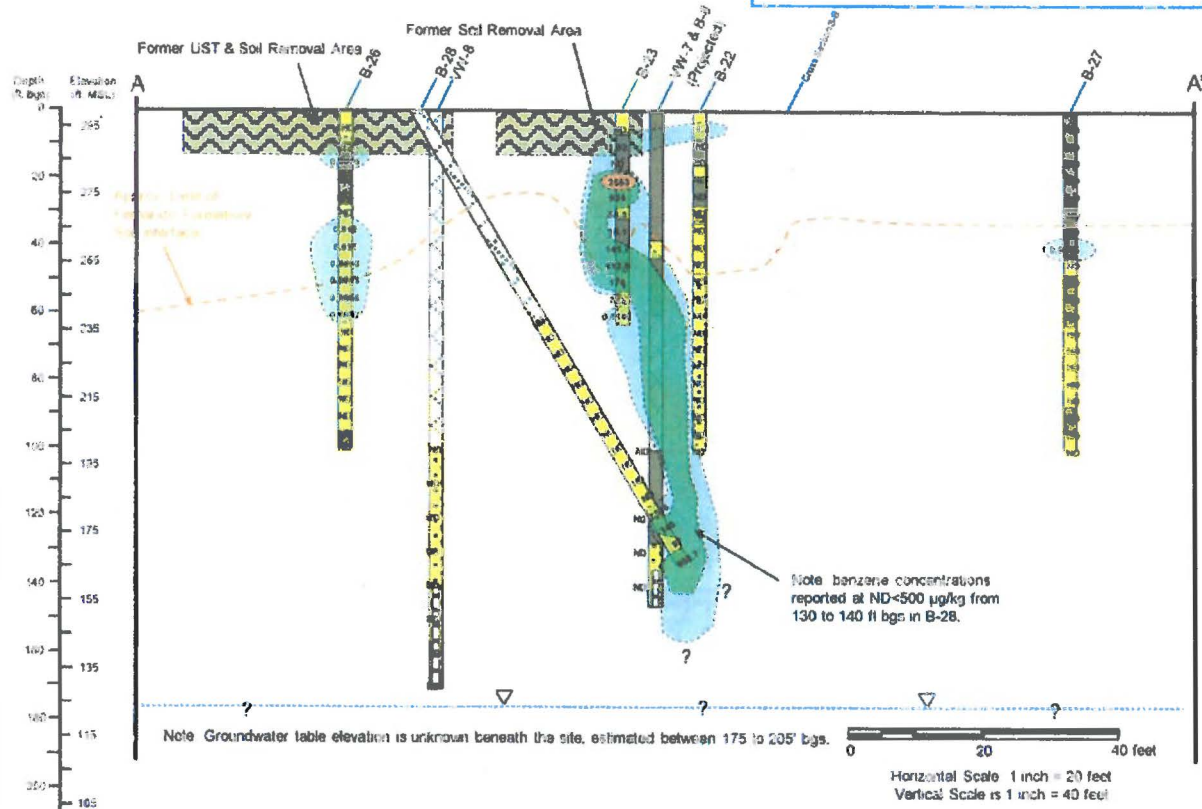


Figure 3

Cross-Section A-A'
 Total Petroleum Hydrocarbons in Soil
 Post-Remediation Borings
 Santiago Texaco, DWQP-0178

Legend

- Clay & silt
- Gravel & sand
- Sandstone
- Siltstone claystone
- No Sample
- Screen interval (vapor extraction)
- Groundwater Table (unknown elevation)
- *** Bulk concentration in soil (mg/kg)**
 ND indicates results are less than laboratory reporting limit (RL)
- Concentration in Soil greater than Laboratory RL
- Concentration in Soil greater than 100 mg/kg
- Concentration in Soil greater than 1000 mg/kg
- Concentration in Soil greater than 10,000 mg/kg



Not to Scale
 (Original printed in color)

Figure 4

Cross-Section B-B'
 Total Petroleum Hydrocarbons in Soil
 Post-Remediation Borings Only
 Santiago Texaco, DWQP-0178

