STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

ORDER WQ 2013-0075-UST

In the Matter of Underground Storage Tank Case Closure

Pursuant to Health and Safety Code Section 25299.39.2 and the Low Threat Underground Storage Tank Case Closure Policy

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BY THE EXECUTIVE DIRECTOR[1]:

Pursuant to Health and Safety Code section 25299.39.2, the Manager of the Underground Storage Tank Cleanup Fund (Fund) recommends closure of the underground storage tank (UST) case at the site listed below.[2] The name of the Fund claimant, the Fund claim number, the site name and the applicable site address are as follows:

Richard Fontana
Claim No. 8802

Ledyard Company

1005 17th Avenue, Santa Cruz

Central Coast Regional Water Quality Control Board

I. STATUTORY AND PROCEDURAL BACKGROUND

Section 25299.39.2 directs the Fund manager to review the case history of claims that have been active for five years or more (five-year review), unless there is an objection from the UST owner or operator. This section further authorizes the Fund Manager to make recommendations to the State Water Resources Control Board (State Water Board) for closure of a five-year-review case if the UST owner or operator approves. In response to a recommendation by the Fund Manager, 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 protection of

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[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 Health and Safety Code.

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.

The Fund Manager has completed a five-year 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 Review Summary Report has been prepared for the case identified above and the bases 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 Review Summary Report.

A. 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 closure letter as specified in Health and Safety Code section 25296.10. The 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 closure letter or a Letter of Commitment, whichever occurs later, shall not be reimbursed unless specified conditions are satisfied. A Letter of Commitment has already been issued on the claim subject to this order and the respective Fund claimant, so the 365-day

timeframe for the submittal of claims for corrective action costs will start upon the issuance of the closure letter.

II. FINDINGS

Based upon the UST Case Closure Review Summary Report 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:

Claim No. 8802

Ledyard Company

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 Board in determining that the case should be closed.

The UST case identified above may be the subject of orders issued by the Regional Water Quality Control Water 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 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 closure letter, the Fund claimant 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 Fund claimant 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 Financial Assistance shall issue a closure letter consistent with Health and Safety Code section 25296.10, subdivision (g) and upload the closure letter and UST Case Closure Review Summary Report to GeoTracker.

E. As specified in Health and Safety Code section 25299.39.2, subdivision (a) (2), corrective action costs incurred after a recommendation of closure shall be limited to $10,000 per year unless the Board or its delegated representative agrees that corrective action in excess of that amount is necessary to meet closure requirements, or additional corrective actions are necessary pursuant to section 25296.10, subdivisions (a) and (b). 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 closure letter in order for the costs to be considered.

F. Any Regional Water Board or Local Oversight Program 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 Local Oversight Program Agency directive is inconsistent with this Order.

Thomas Howard

Executive Director

8/28/13

Date

State Water Resources Control Board

UST CASE CLOSURE REVIEW SUMMARY REPORT

Agency Information

Agency Name: Central Coast Regional Water Quality Control Board (Regional Water Board)	Address: 895 Aerovista Place Suite 101, San Luis Obispo, CA 93401
Agency Caseworker: Tom Sayles	Case No.: 2243

Case Information

USTCF Claim No.: 8802	Global ID: T0608700045
Site Name: Ledyard Company	Site Address: 1005 17th Avenue, Santa Cruz, CA 95061
Responsible Party: Ledyard Company Attn: Richard Fontana	Address: 1047 17th Avenue, Santa Cruz, CA 95062
USTCF Expenditures to Date: $705,382	Number of Years Case Open: 20

URL: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0608700045

Summary

The Low-Threat Underground Storage Tank (UST) Case Closure Policy (Policy) contains general and media-specific criteria, and cases that meet those criteria are appropriate for closure pursuant to the 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 Case Information (Conceptual Site Model).** Highlights of the case follow:

An unauthorized release was reported in April 1992 following the removal of two 10,000-gallon gasoline USTs in January 1992. Approximately 200 cubic yards of impacted soil were removed and disposed offsite in 1999. Soil excavation was conducted to a total depth of 13 feet. Soil vapor extraction was conducted between May 1997 and February 1998, which removed approximately 6,500 pounds of total petroleum hydrocarbons as gasoline (TPHg). In November 1999, approximately 950 pounds of Oxygen Release Compound were injected into the saturated zone. Oxygen diffusion was conducted between June 2008 and February 2009. In-situ chemical oxidation by hydrogen peroxide, sodium persulfate and calcium peroxide injections was conducted. Six active monitoring wells have been monitored since 1994. According to groundwater data, water quality objectives have been achieved or nearly achieved for all constituents except toluene, ethylbenzene, and xylenes.

The petroleum release is limited to the shallow soil and groundwater. According to data available in GeoTracker, there are no California Department of Public Health regulated supply wells or surface water bodies within 250 feet of the defined plume boundary. No other water supply wells have been identified within 250 feet of the defined plume boundary in files reviewed. Water is provided to water users near the Site by the City Santa Cruz Water Department. The affected groundwater is not currently being used as a source of drinking water, and it is highly unlikely that the affected

groundwater will be used as a source of drinking water in the foreseeable future. Other designated beneficial uses of impacted groundwater are not threatened and it is highly unlikely that they will be considering these factors in the context of the site setting. Remaining petroleum hydrocarbon constituents are limited and stable, and concentrations are decreasing. Corrective actions have been implemented and additional corrective actions are not necessary. Any remaining petroleum hydrocarbon constituents do not pose a significant risk to human health, safety or the environment.

Rationale for Closure under the Policy

- General Criteria: The case meets all eight Policy general criteria.
- Groundwater Specific Criteria: The case meets Policy Criterion 1 by Class 1. The contaminant plume that exceeds water quality objectives is less than 100 feet in length. There is no free product. The nearest water supply well or surface water body is greater than 250 feet from the defined plume boundary.
- Vapor Intrusion to Indoor Air: This case meets Policy Criterion 2b. Although no document titled "Risk Assessment" was found in the files reviewed, a professional assessment of site-specific risk from potential exposure to petroleum constituents as a result of vapor intrusion found there to be no significant risk of petroleum vapors adversely affecting human health. Approximately 200 cubic yards of impacted soil were removed and disposed offsite in 1999. Soil excavation was conducted to a total depth of 13 feet. Soil vapor extraction further removed approximately 6,500 pounds of total petroleum hydrocarbon vapor from beneath the site. In addition, as a commercial warehouse, there would be adequate air exchange provided by the building's ventilation system required to control vehicle exhaust generated by operation of truck and forklifts.
- Direct Contact and Outdoor Air Exposure: This case meets Policy Criterion 3b. Although no document titled "Risk Assessment" was found in the files reviewed, a professional assessment of site-specific risk from potential exposure to residual soil contamination found that maximum concentrations of petroleum constituents remaining in soil will have no significant risk of adversely affecting human health. Affected soil was removed to a depth of 13 feet bgs and replaced with clean fill along with soil vapor extraction removing 6,500 pounds of total petroleum hydrocarbon vapor. The Site is paved and accidental exposure to site soils is prevented.

Objections to Closure and Responses

The Regional Water Board objected to UST case closure because soil and soil vapor issues have not been evaluated (April 8, 2013 personal communications [email]). The Regional Water Board cites a December 4, 2012 letter from the County of Santa Cruz Health Services Agency (County) as evidence the Site is not ready for closure. The County has determined the case does not meet the Policy because:

- "Current soil analytical data collected from MW-2 at 10 feet below ground surface (bgs) indicate benzene at a concentration of 3.084 mg/kg, which exceeds the Policy's residential soil screening level of 2.8 mg/kg for concentrations of petroleum constituents in soil that will have no significant risk of adversely affecting human health. Historical groundwater analytical data indicates the average depth to water in MW-2 is approximately 16 feet bgs, indicating and soil contamination at depth of 10 feet bgs in the vicinity of MW-2 is within the unsaturated zone. Although the site's current land use is commercial/industrial, leaving contamination in soil at concentrations exceeding residential soil screening levels could restrict land use options for the property owner in the future. (sic)"
  <u>RESPONSE</u>: The case meets all Policy criteria for Direct Contact and Outdoor Air Exposure for Commercial/Industrial use. The sample refrenced above was actually collected at 10.5 feet bgs

in 1994. Significant remedial actions have been implemented at the site which renders this sample invalid. This Site is an active commercial warehouse serviced by diesel trucks and fork lifts.

- "It should be additionally noted that naphthalene has not been evaluated in the soil at the site. The SWRCB's Policy includes naphthalene in its short list of volatile organic chemicals (VOCs) to evaluate in soil at underground storage tank (UST) leak sites. Naphthalene testing may be especially appropriate in light of the elevated benzene concentration."
  RESPONSE: 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 percent benzene and 0.25 percent naphthalene. Therefore, benzene can be directly substituted for naphthalene concentrations with a safety factor of eight. Benzene concentrations from the Site are below the naphthalene thresholds in Policy Table 1. 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 the soil, if any, exceed the threshold.
- "This site is not an active commercial petroleum fueling facility. According to the SWRCB's Policy, Total TPH (TPHg and TPHd combine) concentrations greater than or equal to 100 mg/kg within the bioattenuation zone (unsaturated zone), extending at least 30 feet both laterally and vertically from a building and/or potential building's foundation, indicates the potential for a petroleum vapor intrusion to indoor air risk at the site. Four locations at this site exceed these screening criteria for vapor intrusion in borings B-2, B-3, V-3, and V-4 with Total TPH concentrations ranging from 110 mg/kg to 366 mg/kg."
  RESPONSE: The soil sample results to which the County refers were collected at depths between 15 and 18 feet. The bioattenuation zone, above which groundwater has varied in site history, is located above five feet bgs. The case meets Policy Criterion 2a by Scenario 3a. The maximum benzene concentration in groundwater is less than 100 µg/L. The minimum depth to groundwater is greater than 5 feet, overlain by soil containing less than 100 mg/kg of TPH.
- "Chemical concentrations in soil gas have not been evaluated for the soil vapor emissions to indoor air pathway at the site. Since the remedial soil excavation was conducted at the site, the current building foundation footprint has been expanded and now extends over the former UST excavation, groundwater plume, and elevated Total TPH area."
  RESPONSE: Based on soil and groundwater data, the case meets indoor vapor criteria. In addition, the newly constructed warehouse has a thick concrete foundation and a ventilation system designed to protect employees from diesel truck and forklift exhaust, which will similarly prevent any hydrocarbon vapors from concentrating in the facility.

Determination

Based on the review performed in accordance with Health & Safety Code Section 25299.39.2 subdivision (a), the Fund Manager has determined that closure of the case is appropriate.

Recommendation for Closure

Based on available information, residual petroleum hydrocarbons at the Site do not pose a significant risk to human health, safety, or the environment, and the case meets the requirements of the Policy. Accordingly, the Fund Manager recommends that the case be closed. The State Water Board is conducting public notification as required by the Policy. Santa Cruz County has the regulatory responsibility to supervise the abandonment of monitoring wells.

Lisa Babcock 6/13/13

Lisa Babcock, P.G. 3939, C.E.G. 1235 **Date**

Prepared by: Bruce Locken

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

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

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 site 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.	☒ Yes ☐ No
Have waste discharge requirements or any other orders issued pursuant to Division 7 of the Water Code been issued at this case?	☐ Yes ☒ No
If so, was the corrective action performed consistent with any order?	☐ Yes ☐ No ☒ NA
General Criteria General criteria that must be satisfied by all candidate sites:	
Is the unauthorized release located within the service area of a public water system?	☒ Yes ☐ No
Does the unauthorized release consist only of petroleum?	☒ Yes ☐ No
Has the unauthorized ("primary") release from the UST system been stopped?	☒ Yes ☐ No
Has free product been removed to the maximum extent practicable?	☒ Yes ☐ No ☐ NA
Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?	☒ Yes ☐ No

[1] Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.
http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2012/rs2012_0016atta.pdf

Has secondary source been removed to the extent practicable?	☒ Yes ☐ No
Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15?	☒ Yes ☐ No
Nuisance as defined by Water Code section 13050 does not exist at the site?	☒ Yes ☐ No
Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?	☐ Yes ☒ No
Media-Specific Criteria Candidate sites must satisfy all three of these media-specific criteria: **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:	
Is the contaminant plume that exceeds water quality objectives stable or decreasing in areal extent?	☒ Yes ☐ No ☐ NA
Does the contaminant plume that exceeds water quality objectives meet all of the additional characteristics of one of the five classes of sites?	☒ Yes ☐ No ☐ NA
If YES, check applicable class: ☒ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5**	
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?	☐ Yes ☐ No ☒ NA
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.	
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.	☐ Yes ☒ No
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?	☐Yes ☐ No ☒ NA

If YES, check applicable scenarios: ☐ 1 ☐ 2 ☐ 3 ☐ 4	
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?	☒ Yes ☐ No ☐ NA
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?	☐ Yes ☐ No ☒ NA
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).	
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)?	☐ Yes ☐ No ☒ NA
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?	☒ Yes ☐ No ☐ NA
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?	☐ Yes ☐ No ☒ NA

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

Site Location/History

- This Site in Santa Cruz is occupied by a commercial warehouse and is bounded by businesses across 17th Avenue to the East, businesses across Atran-17th Avenue to the north, an empty field across railroad tracks to the south, and a large residential parcel to the west.
- The Site was originally developed as a distribution warehouse with petroleum UST's to supply the company vehicles.
- A Site map showing the location of the former USTs, monitoring wells, and groundwater level contours is provided at the end of this closure review summary (Weber, Hayes, & Associates, 2012).
- Nature of Contaminants of Concern: Petroleum hydrocarbons only.
- Source: UST system.
- Date reported: April 1992.
- Status of Release: USTs removed.
- Free Product: None noted after 1997.

Tank Information

Tank No.	Size in Gallons	Contents	Closed in Place/ Removed/Active	Date
1	10,000	Gasoline	Removed	December 1992
2	10,000	Gasoline	Removed	December 1992

Receptors

- GW Basin: West Santa Cruz Terrace.
- Beneficial Uses: Municipal and Domestic Supply (GeoTracker).
- Land Use Designation: Commercial.
- Public Water System: City of Santa Cruz Water Department.
- Distance to Nearest Supply Well: According to data available in GeoTracker, there are no public supply wells regulated by California Department of Public Health within 250 feet of the defined plume boundary. No other water supply wells were identified within 250 feet of the defined plume boundary in the files reviewed.
- Distance to Nearest Surface Water: No Surface water within 250 feet of the defined plume boundary.

Geology/ Hydrogeology

- Stratigraphy: The Site is underlain by four to eight feet of fine-grained sand, silt, and clay mixtures.
- Maximum Sample Depth: 25 feet bgs.
- Minimum Groundwater Depth: 11.95 feet bgs at monitoring well MW-8.
- Maximum Groundwater Depth: 18.91 feet bgs at monitoring well MW-9.
- Current Average Depth to Groundwater: Approximately 18 feet bgs.
- Saturated Zones(s) Studied: Approximately 9 - 36 feet bgs.
- Groundwater Flow Direction: Southwest with an average gradient of 0.0056 feet/foot.

Monitoring Well Information

Well Designation	Date Installed	Screen Interval (feet bgs)	Depth to Water (feet bgs) (9/27/12)
MW-1	1/07/94	10 - 24	15.86
MW-2	3/22/94	Unknown	Destroyed prior to 1991
MW-3	3/23/94	11 - 36	16.01
MW-4	3/23/94	9 - 24	19.61
MW-6	03/08/95	13 - 30	19.75
MW-7	03/08/95	13 - 30	18.09
MW-8	02/10/95	13 - 28	17.25
MW-9	08/02/95	15 - 28	19.69
MW-10	05/09/02	15 - 26	17.23

Remediation Summary

- Free Product: None reported since April 1997.
- Soil Excavation: Approximately 200 cubic yards of impacted soil were removed and disposed offsite in 1999. Soil excavation was conducted to a total depth of 13 feet.
- In-Situ Soil Remediation: Soil vapor extraction was conducted between May 1997 and February 1998, which removed approximately 6,500 pounds of TPHg..
- Groundwater Remediation: In November 1999 approximately 950 pounds of Oxygen Release Compound were injected into the saturated zone. Oxygen diffusion was conducted between June 2008 and February 2009. In-situ chemical oxidation by hydrogen peroxide, sodium persulfate and calcium injections was conducted.

Most Recent Concentrations of Petroleum Hydrocarbon Constituents in Soil

Constituent	Maximum 0-5 feet bgs [mg/kg (date)]	Maximum 5-10 feet bgs [mg/kg (date)]
Benzene	NA	3.1 @10.5 in MW-2 1994[a]
Ethylbenzene	NA	3.2 @10.5 in MW-2 1994[a]
Naphthalene	NA	NA
PAHs	NA	NA

NA: Not Analyzed, Not Applicable or Data Not Available
ND: Not detected/reported
mg/kg: Milligrams per kilogram, parts per million
<: Not detected at or above stated reporting limit
PAHs: Polycyclic aromatic hydrocarbons
a: Weber, Hayes and Associates, CAP March 2008, Table 1

Most Recent Concentrations of Petroleum Constituents in Groundwater

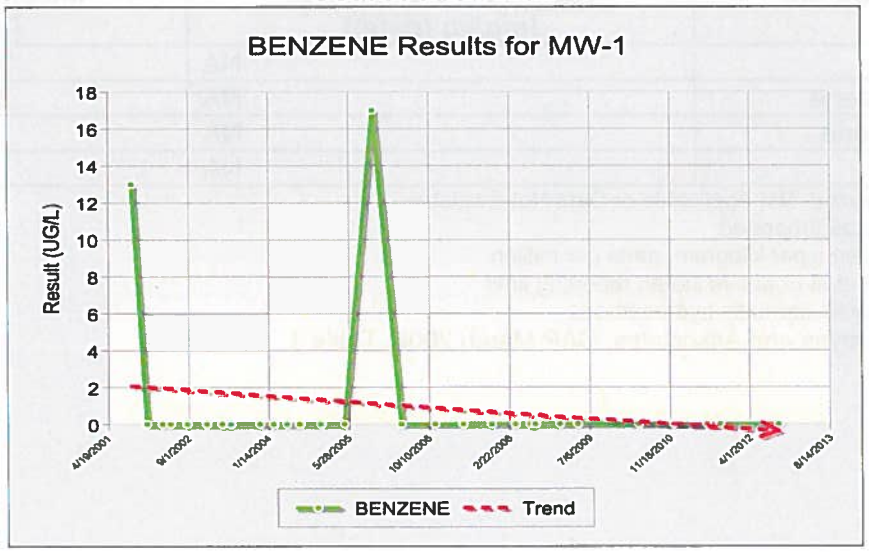
Sample	Sample Date	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)
MW-1	09/27/12	6,800*	<0.5	<0.5	9.9	24.5	<0.5	<5
MW-3	09/27/12	950**	<0.5	<0.5	79	158.6	<0.5	<5
MW-4	09/27/12	7,100**	<0.5	30	**630**	1,160	<0.5	<5
MW-6	09/27/12	20,000**	**<5.5**	**740**	**1,100**	**4,900**	<1.9	<5
MW-7	09/27/12	<50	<0.5	<0.5	<0.5	<1.5	<0.5	<5
MW-8	09/27/12	<50	<0.5	<0.5	<0.5	<1.5	<0.5	<5
WQOs	**-**	**--**	**1**	**150**	**680**	**1,750**	**5**	**1,200[a]**

NA: Not Analyzed, Not Applicable or Data Not Available
µg/L: Micrograms per liter, parts per billion
<: Not detected at or above stated reporting limit
TPHg: Total petroleum hydrocarbons as gasoline
MTBE: Methyl tert-butyl ether
TBA: Tert-butyl alcohol
WQOs: Water Quality Objectives, Regional Water Board Basin Plan
-: Regional Water Board Basin Plan has no numeric water quality objectives for TPHg
[a]: California Department of Public Health, Response Level
* Does not match pattern of reference gasoline standard. Reported value due to contribution from non-target heavy hydrocarbons into range of C5-C12 quantified as gasoline.
** Although TPHg constituents are present, sample chromatogram does not resemble pattern of reference gasoline standard

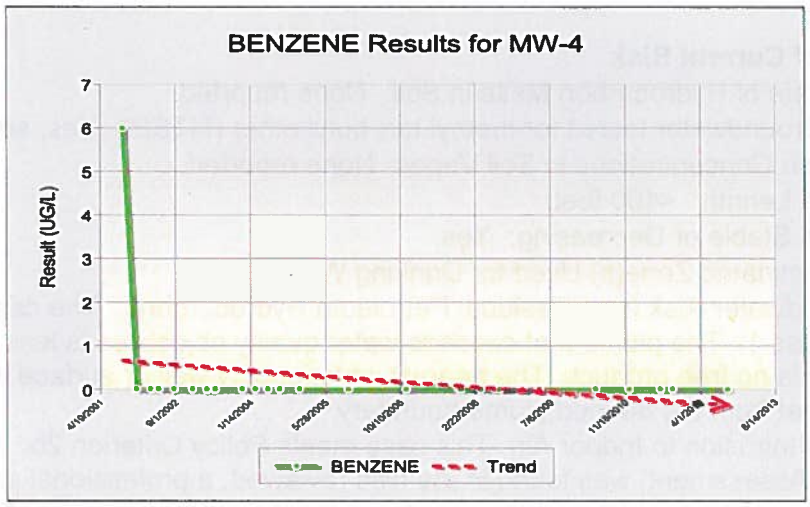
Groundwater Trends:

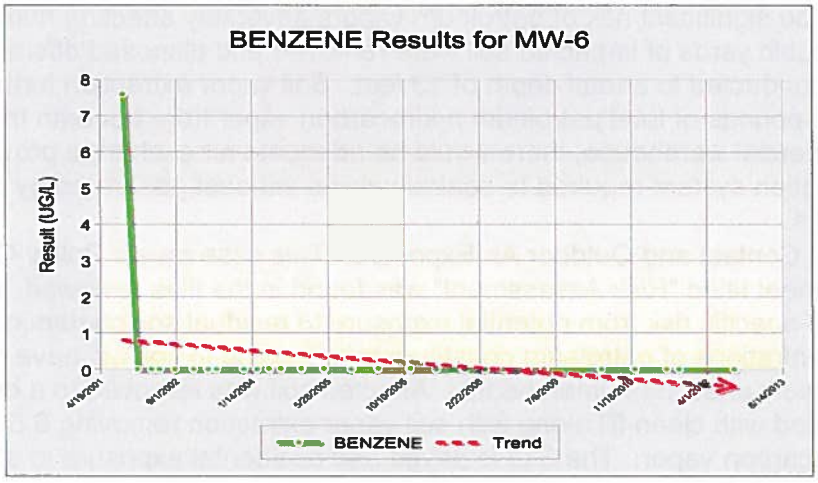
- There are 18 years of regular groundwater monitoring data for this case. Benzene trends are shown below: Source Area (MW-1, MW-4, and MW-6) and Downgradient (MW-8).

Source Area Well

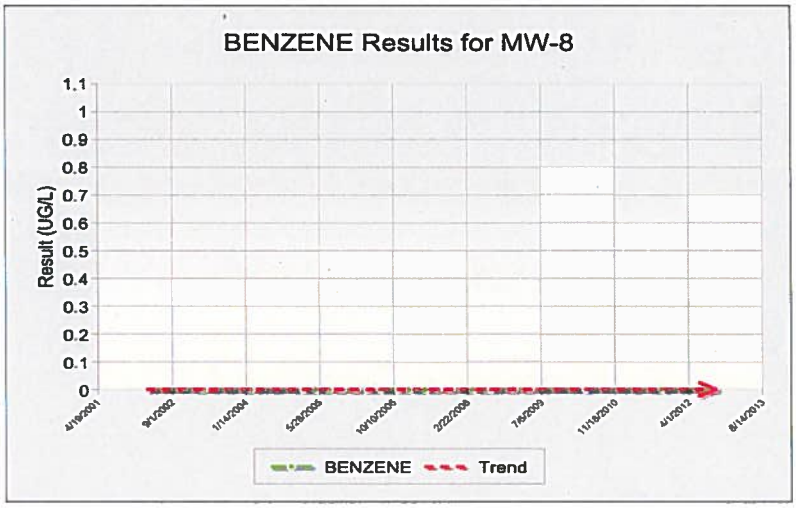


Source Area Wells



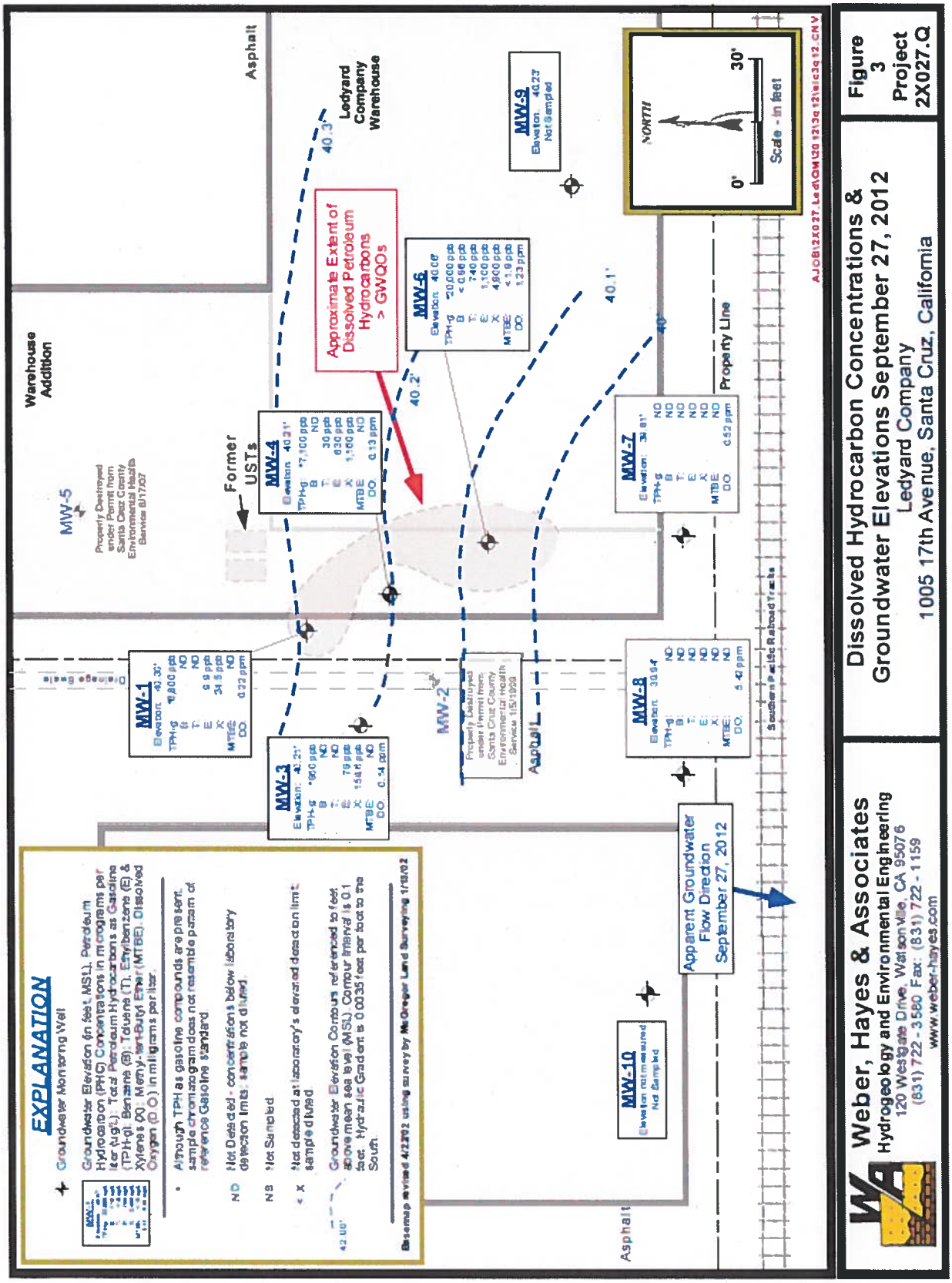


Downgradient Well



Evaluation of Current Risk

- Estimate of Hydrocarbon Mass in Soil: None reported.
- Soil/Groundwater tested for methyl tert-butyl ether (MTBE): Yes, see table above.
- Oxygen Concentrations in Soil Vapor: None reported.
- Plume Length: <100 feet.
- Plume Stable or Decreasing: Yes.
- Contaminated Zone(s) Used for Drinking Water: No.
- Groundwater Risk from Residual Petroleum Hydrocarbons: The case meets Policy Criterion 1 by Class 1. The plume that exceeds water quality objectives is less than 100 feet in length. There is no free product. The nearest water supply well or surface water body is greater than 250 feet from the defined plume boundary.
- Vapor Intrusion to Indoor Air: This case meets Policy Criterion 2b. Although no document titled "Risk Assessment" was found in the files reviewed, a professional assessment of site-specific risk from potential exposure to petroleum constituents as a result of vapor intrusion found there to be no significant risk of petroleum vapors adversely affecting human health. Approximately 200 cubic yards of impacted soil were removed and disposed offsite in 1999. Soil excavation was conducted to a total depth of 13 feet. Soil vapor extraction further removed approximately 6,500 pounds of total petroleum hydrocarbon vapor from beneath the site. In addition, as a commercial warehouse, there would be adequate air exchange provided by the building's ventilation system required to control vehicle exhaust generated by operation of truck and forklifts.
- Direct Contact and Outdoor Air Exposure: This case meets Policy Criterion 3b. Although no document titled "Risk Assessment" was found in the files reviewed, a professional assessment of site-specific risk from potential exposure to residual soil contamination found that maximum concentrations of petroleum constituents remaining in soil will have no significant risk of adversely affecting human health. Affected soil was removed to a depth of 13 feet bgs and replaced with clean fill along with soil vapor extraction removing 6,500 pounds of total petroleum hydrocarbon vapor. The Site is paved and accidental exposure to site soils is prevented.


Dissolved Hydrocarbon Concentrations &
Groundwater Elevations September 27, 2012
Ledyard Company
1005 17th Avenue, Santa Cruz, California
Figure 3
Project 2X027.Q
Weber, Hayes & Associates
Hydrogeology and Environmental Engineering
120 Westgate Drive, Watsonville, CA 95076
(831) 722-3580 Fax: (831) 722-1159
www.weber-hayes.com
EXPLANATION
Groundwater Monitoring Well
Groundwater Elevation (in feet, MSL), Petroleum Hydrocarbon (PHC) Concentrations in micrograms per liter (ug/L): Total Petroleum Hydrocarbons as Gasoline (TPH-g), Benzene (B), Toluene (T), Ethylbenzene (E) & Xylenes (X), Methyl-tert-Butyl Ether (MTBE), Dissolved Oxygen (D.O.) in milligrams per liter.
Although TPH as gasoline compounds are present, sample chromatogram does not resemble pattern of reference Gasoline standard.
ND Not Detected - concentrations below laboratory detection limits; sample not diluted.
NS Not Sampled
< X Not detected at laboratory's elevated detection limit; sample diluted
Groundwater Elevation Contours referenced to feet above mean sea level (MSL). Contour interval is 0.1 feet. Hydraulic Gradient is 0.0035 feet per foot to the South.
Basemap revised 4/22/02 using survey by McGregor Land Surveying 1/18/02
Approximate Extent of Dissolved Petroleum Hydrocarbons > GWQOs
Apparent Groundwater Flow Direction September 27, 2012
Former USTs
Property Line
Ledyard Company Warehouse
Warehouse Addition
Asphalt
Drainage Swale
Southern Pacific Railroad Tracks
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
NORTH
Scale - in feet
0'
30'
40.1'
40.2'
40.3'
40'