

State Water Resources Control Board

UST CASE CLOSURE REVIEW SUMMARY REPORT

Agency Information

Agency Name: Central Valley Regional Water Quality Control Board-Redding (Regional Water Board)	Address: 364 Knollcrest Drive, Suite 200 Redding, CA 96002
Agency Caseworker: Melissa Buciak	Case No.: 450197

Case Information

USTCF Claim No.: 12577	GeoTracker Global ID: T0608900192
Site Name: Digger Bay Marina	Site Address: 15090 Digger Bay Road Shasta Lake, CA 96019
Responsible Party: Seven Resorts, Inc. Attn: Bob Rollins	Address: 10300 Bridge Bay Road Redding, CA 96003
USTCF Expenditures to Date: \$320,509	Number of Years Case Open: 17

URL: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0608900192

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:

This case is a boat marina located on Shasta Lake. An unauthorized release was reported in March 1996 following the removal of nine USTs. Extensive excavation was performed removing an unspecified amount of contaminated soil. Pilot testing (ozone sparging) was conducted from September to November 2005 and in August 2006. Ozone sparging was again conducted from May 2008 to July 2008. Since 1999, seven groundwater monitoring wells have been installed and irregularly monitored along with three piezometers. According to groundwater data, water quality objectives have been achieved or nearly achieved for all constituents except methyl tert butyl ether (MTBE) in monitoring well MW-1, and total petroleum hydrocarbons as gasoline (TPHg), benzene and MTBE in piezometer P-1.

The petroleum release is limited to the soil and shallow groundwater. According to data available in GeoTracker, there is one public supply well (labeled as "domestic well" on Site map) regulated by the California Department of Public Health located approximately 100 feet south and upgradient of the defined plume boundary. Water quality data in GeoTracker show that the well has not been impacted by petroleum hydrocarbons. Shasta Lake is within approximately 20 feet of the defined plume boundary. No other water supply wells have been identified within 1,000 feet of the defined

plume boundary in files reviewed. Water is provided to water users near the Site by Digger Bay Marina. 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: Due to an existing water supply well and surface water body less than 250 feet of the defined plume boundary, this case does not meet Policy Criterion 1 by Class 1 through 4. However, this case meets Policy Criterion 1 by Class 5. Extensive excavation of contaminated soil has been conducted at the Site. Ozone injection also further reduced the groundwater plume. Water quality data for the upgradient public water supply well show that the well has not been impacted by the residual petroleum contamination and the residual benzene, and MTBE concentrations are below the water quality objectives for freshwater aquatic life and do not pose significant risk for recreational use. The regulatory agency determines, based on an analysis of site specific conditions, which under current and reasonably anticipated near-term future scenarios, the contaminant plume poses a low threat to human health and safety and to the environment, and water quality objectives will be achieved within a reasonable time frame.
- Vapor Intrusion to Indoor Air: 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.
- Direct Contact and Outdoor Air Exposure: This case meets Policy Criterion 3b. A professional assessment of site-specific risk from exposure shows that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health. Extensive excavation and removal of the contaminated soil in the source area have minimized the direct contact and outdoor air exposure risk.

Objections to Closure and Responses

In their January 2010 case review, the Regional Water Board objects to UST case closure because:

- Closure does not fulfill the requirement of protecting the beneficial uses of the waters of the State.
RESPONSE: The case meets all Policy criteria and does not pose a significant risk to human health and the environment.

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

Digger Bay Marina
15090 Digger Bay Road, Shasta Lake
Claim No: 12577

August 2013

Water Board is conducting public notification as required by the Policy. Shasta County has the regulatory responsibility to supervise the abandonment of monitoring wells.

Lisa Babcock

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

11/14/13

Date

Prepared by: Mark Owens, P.E. C66804

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

<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 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.</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 case?</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.
http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2012/rs2012_0016atta.pdf

<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>Nuisance as defined by Water Code section 13050 does not 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p><u>Media-Specific Criteria</u> 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?</p> <p>If YES, check applicable class: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" 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 checked="" type="checkbox"/> Yes <input 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>
<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 checked="" type="checkbox"/> 3 <input type="checkbox"/> 4</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</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>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><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 type="checkbox"/> No <input checked="" 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>

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

Site Location/History

- This case is a boat marina located on Shasta Lake at 15090 Digger Bay Road, approximately three miles north of Shasta Lake City.
- The Site has used nine USTs since operation began in the 1950's. The USTs were located in a lower parking lot above the existing boat docks.
- Site map showing the location of the former USTs, excavation areas, monitoring wells, piezometers, and MTBE concentrations is provided at the end of this closure review summary (Lawrence & Associates, May 2012).
- Nature of Contaminants of Concern: Petroleum hydrocarbons only.
- Source: UST system.
- Date reported: March 1996.
- Status of Release: USTs removed.
- Free Product: None reported.

Tank Information

Tank No.	Size in Gallons	Contents	Closed in Place/Removed/Active	Date
1,2	10,000	NA	Removed	03/1996
3,4	6,000	NA	Removed	06/1999
5	3,000	NA	Removed	03/1996
6,7,8	2,000	NA	Removed	03/1996
9	500	NA	Removed	03/1996

NA: Data not available

Receptors

- GW Basin: Sacramento River.
- Beneficial Uses: The Regional Water Board Basin Plan lists Industrial, Agricultural, Municipal and Domestic Supply.
- Land Use Designation: Aerial photograph available on GeoTracker indicates recreational land use in the vicinity of the Site.
- Public Water System: Digger Bay Marina.
- Distance to Nearest Supply Well: According to data available in GeoTracker, there is one public supply well regulated by the California Department of Public Health located approximately 100 feet south and upgradient 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: Shasta Lake is within approximately 20 feet of the defined plume boundary.

Geology/Hydrogeology

- Stratigraphy: The Site is underlain by fractured metavolcanic bedrock.
- Maximum Sample Depth: 92 feet below ground surface (bgs).
- Minimum Groundwater Depth: 13.64 feet bgs at monitoring well MW-3.
- Maximum Groundwater Depth: 91.95 feet bgs at monitoring well MW-5.
- Current Average Depth to Groundwater: Approximately 16 feet bgs in the shallow zone.
- Saturated Zones(s) Studied: 16 feet bgs to 100 feet bgs.
- Appropriate Screen Interval: Submerged well screens.

- Groundwater Flow Direction: Towards Shasta Lake with a gradient of 0.0051 feet/foot to 0.016 feet/foot (May 2012).

Monitoring Well Information

Well Designation	Date Installed	Screen Interval (feet bgs)	Depth to Water (feet bgs) (5/8/2012)
MW-1	May 1999	57-72	41.09
MW-2	November 2001	100-140	39.85
MW-3	November 2001	60-100	15.18
MW-4	November 2001	80-120	38.24
MW-5	November 2001	95-135	39.98
P-1	May 1999	35-50	17.00
P-2	May 1999	55-70	38.43
P-3	May 1999	58-78	40.82

Remediation Summary

- Free Product: None reported.
- Soil Excavation: Extensive excavation of contaminated soil in the source areas, quantity unknown.
- In-Situ Soil Remediation: None reported.
- Groundwater Remediation: Pilot testing (ozone sparging) was conducted from September to November 2005 and in August 2006. Ozone sparging was conducted from May 2008 to July 2008.

Most Recent Concentrations of Petroleum Constituents in Soil *

Constituent	Maximum 0-5 feet bgs [mg/kg and (date)]	Maximum 5-10 feet bgs [mg/kg and (date)]
Benzene	NA	NA
Ethylbenzene	NA	NA
Naphthalene	NA	NA
PAHs	NA	NA

NA: Not Analyzed, Not Applicable or Data Not Available

mg/kg: Milligrams per kilogram, parts per million

PAHs: Polycyclic aromatic hydrocarbons

*: Extensive excavation and removal of contaminated soil occurred at the Site.

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	5/8/12	<50	<0.5	<0.5	<0.5	<1	390	<10
MW-2	5/8/12	<50	<0.5	<0.5	<0.5	<1	<5	<10
MW-3	5/8/12	<50	<0.5	<0.5	<0.5	<1	<5	<10
MW-4	5/8/12	<50	<0.5	<0.5	<0.5	<1	<5	<10
MW-5	5/8/12	<50	<0.5	<0.5	<0.5	<1	<5	<10
P-1	5/8/12	2,000	43	<2.5	26	11	180	110
P-2	5/8/12	<50	<0.5	<0.5	<0.5	<1	<5	<10
P-3	5/8/12	<50	<0.5	<0.5	<0.5	<1	<5	<10
WQOs		5	0.15	42	29	17	5^a	1,200^b

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

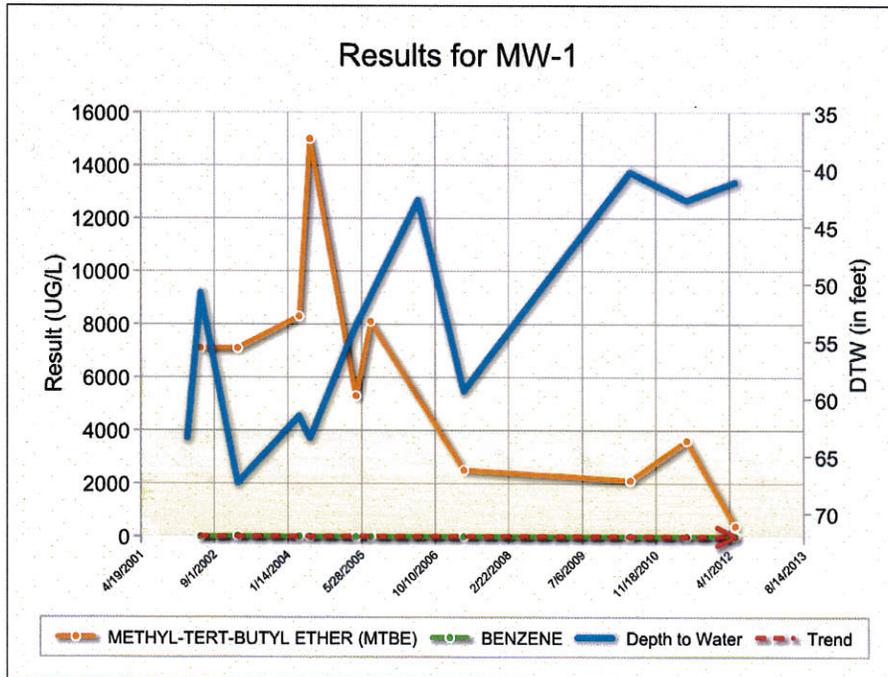
^a: Secondary maximum contaminant level (MCL)

^b: California Department of Public Health, Response Level

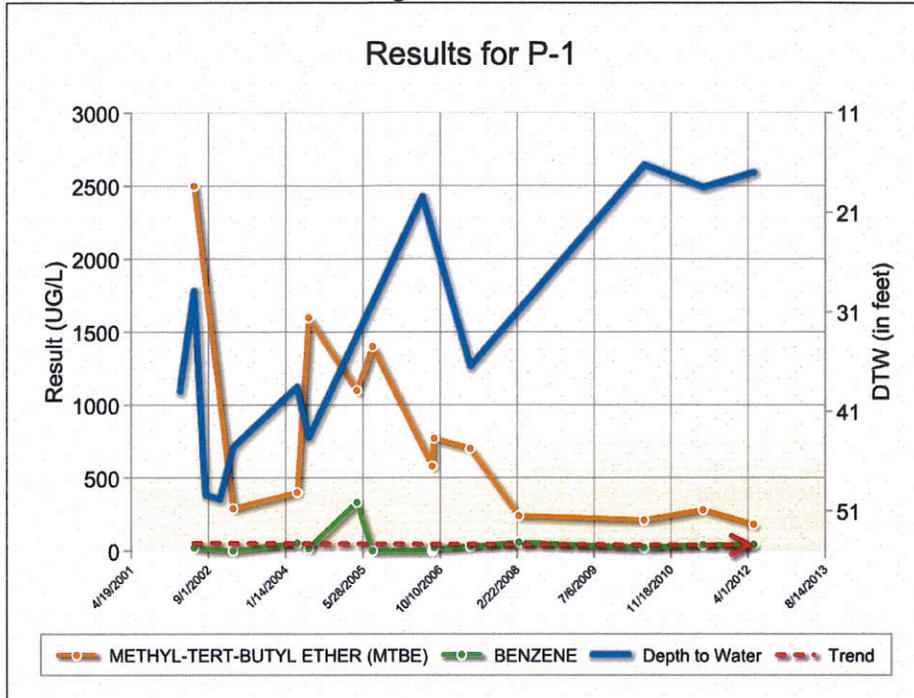
Groundwater Trends

- Since 1999, five groundwater monitoring wells (along with three piezometers) have been installed and irregularly monitored. Groundwater level exhibits large seasonal variations due to varying lake levels and has been above the monitoring well screened intervals. Benzene and MTBE trends are shown below in the source area well MW-1 and downgradient well MW-3:

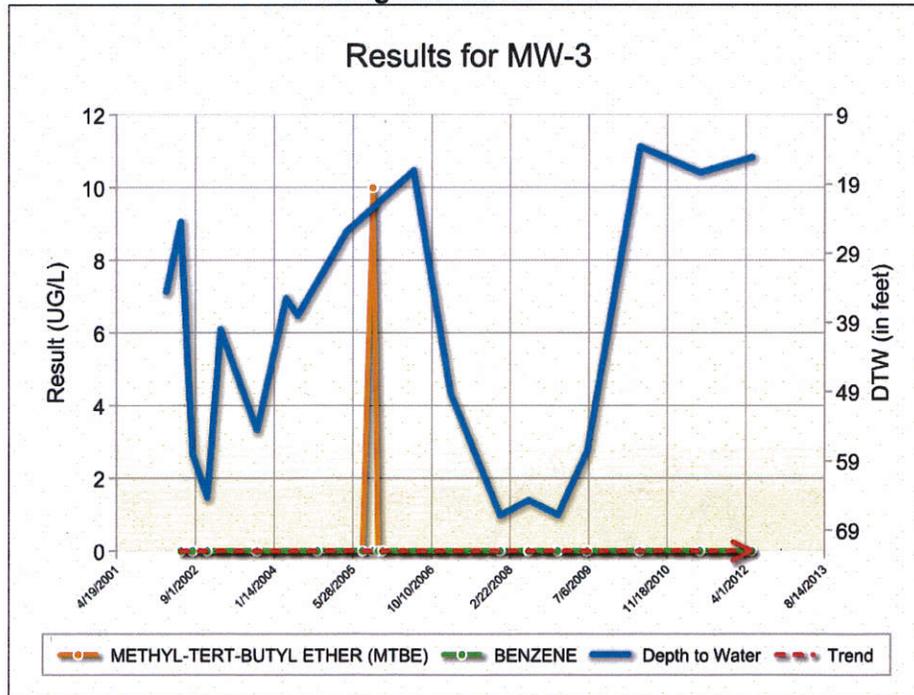
Source Area Well MW-1



Downgradient Well P-1



Downgradient Well MW-3



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: < 250 feet long.
- Plume Stable or Decreasing: Yes.
- Contaminated Zone(s) Used for Drinking Water: No.
- Groundwater Specific Criteria: Due to an existing water supply well and surface water body less than 250 feet of the defined plume boundary, this case does not meet Policy Criterion 1 by Class 1 through 4. However, this case meets Policy Criterion 1 by Class 5. Extensive excavation of contaminated soil has been conducted at the Site. Ozone injection also further reduced the groundwater plume. Water quality data for the upgradient public water supply well show that the well has not been impacted by the residual petroleum contamination and the residual benzene and MTBE concentrations in groundwater are below the water quality objectives for freshwater aquatic life and do not pose significant risk for recreational use. The regulatory agency determines, based on an analysis of site specific conditions, which under current and reasonably anticipated near-term future scenarios, the contaminant plume poses a low threat to human health and safety and to the environment, and water quality objectives will be achieved within a reasonable time frame.
- Indoor Vapor Risk from Residual Petroleum Hydrocarbons: 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.
- Direct Contact Risk from Residual Petroleum Hydrocarbons: This case meets Policy Criterion 3b. A professional assessment of site-specific risk from exposure shows that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health. Extensive excavation and removal of the contaminated soil in the source area have minimized the direct contact and outdoor air exposure risk.

