CASE CLOSURE SUMMARY
LEAKING UNDERGROUND FUEL STORAGE TANK PROGRAM

SITE NAME: Pine Cove Center SITE NO: 94962

I. Agency Information

Date: September 12, 2012

Agency Name: Riverside County Department of Environmental Health, Local Oversight Program (LOP)
Address: 3880 Lemon Street, Suite 200 Riverside CA 92501 (951) 955-8982
Contact: Sharon Boltinghouse – Associate Public Health Professional Geologist

II. Case Information

Site Name: Pine Cove Center
Site Address/City: 23235 Hwy. 243 Pine Cove
RB Case No: 083302568T **LOP/Local Case No**: 94962
URR Filing Date: 11/2/1994 **Global ID**: T0606500406

Responsible Parties	Address	Phone Number
Howard and Diane Friedman	8867 Diamondback Drive Santee CA 92071	

Tank #	Size	Contents	Removed/Closed In-Place?	Date
1-2	4000 gal	gasoline	removed	10/11/94

III. Release and Site Characterization Information

Cause & Type Of Release: gasoline release from tank
Site Characterization Complete? Yes [X] No [ ]
Date Approved By Oversight Agency: 8/6/2008

Monitoring Wells Installed? Yes [X] No [ ] **Number:** 7 groundwater monitoring wells, 1 vapor extraction well
Proper Screen Interval? Yes [X] No [ ] N/A [ ]
Historical Depth To GW: 6.95 to 39.90 ft bgs **Current Depth To GW:** 16.12 to 31.90 ft bgs
Flow Direction: east to southeast

Most Sensitive Current GW Use: domestic
Are Drinking Water Wells Affected? Yes [ ] No [X] **Nearest Water Well:** >1000 feet
Aquifer Name: San Jacinto Basin, Gilman Hot Springs Subunit

Surface Water Affected? Yes [ ] No [X]
Nearest/Affected SW Name: Logan Creek 2200 feet north of site Foster Lake 3600 feet east of site
Off-Site Beneficial Use Impacts (Address/Locations):

Reports On File? Yes [X] No [ ]
Location Of Reports: County of Riverside, Department of Environmental Health
4065 County Circle Dr, Rm 104 Riverside CA 92503
P.O. Box 7489 Riverside CA 92513
(951) 358-5055 / (951) 955-8982

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III. Release and Site Characterization Information (cont.)

Treatment & Disposal Of Affected Material

Material	Amount	Action (Treatment or disposal & destination)	Date
Tank	2	Removed to AMR	10/11/1994
Groundwater	158 gallons	Over-purged, taken to Cosby and Overton	8/3/ 2011
Vapors – TPH Ethylbenzene xylenes	7.5 lbs 0.015 lbs 0.135 lbs	Soil Vapor Extraction (SVE)	11/8-22/2010

Maximum Documented Contaminant Concentrations

Contaminant	Soil (mg/kg)		Groundwater (ug/kg)		Vapor (ppmV)	
	Maximum	Depth (feet)	Maximum	Recent (1/13/2012)	Maximum	Recent (11/22/10)
TPH (Gas)	4800 (#6 UST)	13	26000 (MW-2)	5000 (MW-2)	370 (MW-1)	8.8 (MW-1)
Benzene	<0.2	All to 40	970 (MW-2)	56 (MW-2)	0.21 (MW-1)	<0.025
Toluene	0.67 (HGA-2)	20	4900 (MW-2)	38 (MW-2)	0.85 (MW-1)	<0.025
Xylenes	11 (HGA-2)	20	3800 (MW-2)	170 (MW-2)	1.1 (MW-1)	0.35 (MW-1)
Ethyl benzene	2.8 (HGA-2)	20	1500 (MW-2)	400 (MW-2)	0.18 (MW-1)	<0.025
MTBE	<1	All to 40	360 (MW-3)	<1	<0.025	<0.025
TBA	<10	All to 40	100 (MW-3)	<10	<0.025	<0.025
DIPE	<5	All to 40	<2	<2	<0.050	<0.050
ETBE	<5	All to 40	<2	<2	<0.050	<0.050
TAME	<5	All to 40	<2	<2	<0.050	<0.050
1,2,4-TMB	N/A	N/A	950 (MW-2)	220 (MW-2)	<0.025	<0.025
1,3,5-TMB	N/A	N/A	55 (MW-2)	28 (MW-2)	<0.025	<0.025
Naphthalene	N/A	N/A	220 (MW-2)	54 (MW-2)	<0.025	<0.025
n-propylbenzene	N/A	N/A	100 (MW-2)	56 (MW-2)	<0.025	<0.025
Isopropylbenzene	N/A	N/A	50 (MW-2)	30 (MW-2)	<0.025	<0.025
4-isopropyltoluene	N/A	N/A	10 (MW-2)	<1	<0.025	<0.025
n-butylbenzene	N/A	N/A	15 (MW-2)	5.7 (MW-2)	<0.025	<0.025

N/A = Not Analyzed

Comments (soil types, depth of remediation, etc.): Bedrock of varying degrees of weathering from near surface to maximum depth explored (40 ft bgs). Limited SVE and groundwater purging. See Section VII for additional information.

IV. Closure

Does Completed Corrective Action Protect Existing Beneficial Uses As Per The Regional Board Basin Plan? Yes [X] No [ ]

Does Completed Corrective Action Protect Potential Beneficial Uses Per The Regional Board Basin Plan? Yes [X] No [ ]

Does The Corrective Action Protect Public Health For Current Land Use? Yes[X] No [ ]

Site Management Requirements: None

Should Corrective Action Be Reviewed If Land Use Changes? Yes [X] No [ ]

Monitoring Wells Decommissioned? Yes [8*] No [ ] None Installed [ ] *Prior to issuance of NFA letter.

Number Decommissioned: 8 * **Number Retained**: 0

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SITE NAME: Pine Cove Center SITE NO: 94962

V. Local Agency Representative

Staff Assigned To Case: Linda D. Shurlow
Reviewed By: Sharon Boltinghouse **Title**: Associate Public Health Professional Geologist
Signature: **Date**:

VI. RWQCB Notification

Date Submitted To RWQCB: **Date Signed By RWQCB**:
RWQCB Staff Assigned To Case: Valerie Jahn-Bull
RWQCB Response:

Signature: **Title**:

VII. Additional Comments, Data, Etc.

Site History/Release Information:

October 11, 1994 -- Two 4,000-gallon USTs and associated piping were removed. Six soil samples were collected from the UST excavation area, two soil samples were collected below the fuel dispenser island and two soil samples were collected from stockpiled soils. TPHg was detected in all soil samples collected. The highest TPH concentrations (4,800 and 3,900 ppm) were detected in soil samples number 6 and number 7 collected from the east side of the UST excavation. The site was placed into LOP November 2, 1994.

Assessment:

March 2000 -- Four soil borings (HGA-1through HGA-4) were advanced to 40 feet below ground surface (bgs) in the vicinity of the UST excavation and to the east of the dispenser islands. The borings were completed as groundwater monitoring wells MW1 through MW4 and were screened from 10 to 40 feet bgs. Concentrations of TPHg were detected at 280 ppm in soil sample collected at 20 feet bgs from boring HGA-1, and in soil samples collected at 15 and 20 feet bgs from boring HGA-2 at 1.6 and 250 ppm, respectively. Benzene, MTBE and TBA were not detected in any soil samples. Groundwater was encountered at 19 to 26 feet. Soils consisted of medium to coarse grained sands, giving way to weathered or degraded granite at depths ranging from 5 to 20 feet bgs.

April 2008 – Monitoring wells MW5 through MW7 and soil vapor extraction well VE1 were installed on- and off-site to the north, east and west of the UST excavation to further assess the groundwater plume. Although groundwater was not observed in the boreholes during drilling activities, the well screens for MW5 and MW6 were set at approximately 20 to 45 feet bgs. Groundwater was later observed during well development at depths of approximately 17 and 26 feet bgs. During the drilling of MW7, water with strong sewage odors was observed at a depth of approximately 5 feet. It was determined that the borehole was situated in close proximity to one of the two on-site septic system leach fields. MW7 was relocated south of its proposed location where it met refusal at approximately 22 feet bgs. MW7 was relocated a second time to its third and final location. Boring MW7 met with refusal in the third boring at a final depth of 26.5 feet bgs. Although groundwater was also not observed during the drilling of MW7, it was completed with screen from approximately 11 to 26 feet bgs. Groundwater was later observed in MW7 at 8 feet bgs during development activities. (MW7 has consistently had a shallower water table than the other wells however; bedrock was also hit at a shallower depth.) Soil samples were not analyzed from the monitoring wells; however, all soil samples from vapor well VE1 were analyzed. All soil samples from VE1 were below the detection limits (non-detect) for all constituents tested (TPHg and VOCs). Vapor extraction well VE1 was screened from approximately 10 to 20 feet bgs. TPHg, BTEX and oxygenates were not detected

in the groundwater of the monitoring wells. VE1 had 1100 ppb TPHg, 88 ppb benzene, 35 ppb toluene, 180 ppb ethylbenzene, 222 ppb xylenes, and 2.3 ppb MTBE in the groundwater. The soil and groundwater plumes were delineated.

Groundwater Monitoring:

Groundwater monitoring was initiated in April 2000. Wells MW1 through MW4 went dry in 2002 due to a drop in the water table. Prior to the wells going dry, the highest impacts were found in MW1 and MW2 near the tank pit with concentrations up to 26000 ppb TPHg, 970 ppb benzene, 4900 ppb toluene, 3800 xylenes, 1500 ppb ethylbenzene, 360 ppb MTBE, 100 ppb TBA, 950 ppb 1,2,4-TMB, and 220 ppb naphthalene. The wells remained dry from 2002 until 2005 when the water table rose above the top of the well screens. Wells MW5 through MW7 and VE-1 were installed in 2008. The depth to groundwater has since fluctuated between 9 and 34 feet bgs with the flow to the east to southeast. The wells are screened at varying depths between 10 and 45 feet bgs. Since July 2010, MW-2 has been the only well with detections of TPHg and BTEX. During the most recent sampling event in January 2012, well MW-2 had concentrations of 5000 ppb TPHg, 56 ppb benzene, 38 ppb toluene, 170 ppb xylenes, 400 ppb ethylbenzene, 220 ppb 1,2,4-TMB, and 54 ppb naphthalene. All other wells were non-detect TPHg, BTEX, oxygenates and VOCs.

Soil Remediation:

April 2009 – A one-day soil vapor extraction (SVE) test was conducted on groundwater monitoring wells MW1, MW2, MW4 and vapor extraction well VE1. Each well was tested individually. The wells were submerged or partially submerged during the test and, although the high water table reduced the amount of exposed well screen, the radius of influence (ROI) ranged from 10 to 53 feet in the wells. FREY Environmental concluded that the relatively low vapor concentrations were not considered to be representative of conditions expected during times of lower groundwater levels. FREY Environmental further concluded that SVE is not a feasible remedial alternative for this site during times of elevated groundwater elevations.

December 2009 – Further SVE testing was conducted on VE1 and MW1 to more accurately evaluate the mass of petroleum hydrocarbons in the soil and determine if SVE is feasible when groundwater was at seasonally low elevations. ROI was calculated to be up to 45 feet in VE1 and 50 feet in MW1. TPHg concentrations increased during the tests from 68 ppmV to 190 ppmV in VE1 and from 260 to 370 ppmV in MW1. FREY Environmental concluded that SVE is a feasible remedial technology for this site during times of lowered groundwater elevations. A total of 0.5 lbs of hydrocarbon were recovered with an average removal rate of 0.1 to 0.6 lbs/hr.

November 8 - 22, 2010 – Limited vapor extraction was conducted at the site. The VES operated for approximately 274 hours (~12 days total) extracting from wells MW1, MW2 and VE1 at flow rates up to 97 scfm. All samples collected from well VE1 were non-detect for all constituents tested. The highest concentrations were detected on the second day of SVE operations: 62 ppmv in MW-1 and 0.081 ppmv benzene in MW-2. MTBE was not detected in any of the vapor samples collected. An estimated 7 pounds (~1 gallon) of petroleum hydrocarbons, 0.015 pounds (0.002 gallons) ethylbenzene, and 0.135 pounds (0.018 gallons) xylenes were removed during the ~12-day vapor extraction remediation event.

Groundwater Remediation:

August 3, 2011— a groundwater overpurge event was conducted for approximately six hours on well MW-2 using a vacuum truck. Approximately 158 gallons of groundwater was extracted at an average rate of 0.44 gallons per minute. MW2 was sampled prior to and after overpurging. Before- and after-purge samples were non-detect for TPHg, MTBE, TBA and VOCs other than B,T,E. Benzene, toluene and ethylbenzene were not detected in the before sample, however, the concentrations increased to 14 ppb, 5.9 and 1.3 ppb, respectively, after the overpurge event.

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FREY Environmental conclusions and recommendation for closure:

The source of the petroleum release, the former USTs, were removed and replaced in 1994. The lateral and vertical extent of soil impacts have been fully assessed and are highest near the southern end of the former UST cavity. The groundwater petroleum plume has been fully assessed and impacts are located in the immediate vicinity of MW1 and MW2 near the USTs, and have not migrated off site. GW flow has been consistently toward the east and southeast. No groundwater supply wells, deeper drinking water aquifers, surface water or other sensitive receptors are likely to be impacted. [Two wells are located within 2000 feet of the site and 54 are within 1 mile of the site. The majority of the wells are located northeast of the site (20 wells) and at least 3600 feet southeast of the site in the vicinity of Foster Lake (27 wells).] Based on SVE operations, hydrocarbons in soil vapor limited to immediate vicinity of wells MW-1 and MW-2. Vapor and groundwater sampling show a major reduction of hydrocarbons in the soil and groundwater beneath the site. The estimated hydrocarbon mass remaining in the groundwater beneath the site is one pound (0.2 gallons).

Subsurface Soil types: medium to coarse grained sands, giving way to weathered or degraded granite at depths ranging from 5 to 20 feet bgs.
Remediation: 2 week SVE and one day groundwater overpurge
Sensitive Receptors: 2 wells are located between 1000 and 2000 feet from the site. Logan Creek is located 2200 feet north of the site. Foster Lake is located 3600 ft east of the site.
Other information: The existing UST system was installed in 1994 and is currently operating at the site.

NOTE: This closure summary does not include all of the data for this cleanup. It was prepared by the Riverside County DEH for the purpose of providing a brief summary for case closure evaluation. The *Site Conceptual Model and Request for No Further Action* (FREY Environmental, Inc., June 4, 2012) and all other environmental documents pertaining to this cleanup site as well as the RCDEH Local Oversight Program case file should be reviewed in their entirety to obtain further details regarding this cleanup.