

State Water Resources Control Board

D R A F T

UST Case Closure Summary

Former Chevron Service Station #9-0667
Chevron Environmental Management Company (Petitioner)
412 Maple Lane, Garberville, California (Site)

Summary:

Petitioner contends that the unauthorized release of petroleum hydrocarbons poses no threat to public health or the environment. Humboldt County Department of Health and Human Services (County) denied the Petitioner's request for closure because concentrations of total petroleum hydrocarbons as gasoline (TPHg) remain above the Water Quality Objectives (WQOs) in the North Coast Regional Water Quality Control Board basin plan. The County would like additional remediation at the Site. The underground storage tank (UST) release has impacted shallow groundwater in the immediate vicinity of the Site. Natural attenuation is occurring and concentrations of petroleum constituents in monitoring wells are expected to reach WQOs in a reasonable amount of time. The nearest sensitive receptor is a gully approximately 350 feet northwest of the release location and down-gradient of the Site. The USTs and contaminated soil were removed in 1975. Land use is commercial bordered by residential and the Site is currently a commercial business. One back-up public supply well is located approximately 800 feet up-gradient from Site.

Residual petroleum constituents are limited to shallow soil and groundwater in the immediate vicinity of the Site. Residual petroleum constituents' concentrations in groundwater have decreased over time confirming the remaining residual petroleum mass is limited. The processes of dispersion, dilution, and degradation will continue, allowing the plume to naturally attenuate and meet WQOs for constituents of concerns in decades to hundreds of years. Based on facts in the record and the hydrologic and geologic conditions at the Site, the limited residual petroleum constituents, including TPHg, that remain in soil and groundwater does not represent a significant threat to human health, safety, or the environment. For these reasons, case closure is appropriate.

Background:

This UST Case Closure Summary has been prepared in support of a petition for closure. All record owners of fee title for this Site as well as adjacent property owners and other interested parties have been notified of the recommendation for closure and were given the opportunity to provide comments. The Site was used as a gas station and owned by Chevron Environmental Management Company. The Site is no longer a gas station and is now a commercial clothing store. Land use in the vicinity is commercial and residential. Water and sewer services in the vicinity are provided by the City of Garberville. The nearest public supply water well is back-up supply well located approximately 800 feet up gradient of the Site. Water quality results from the back-up supply well are non-detect for petroleum constituents. Groundwater at the Site is

not anticipated to be used as a source of municipal and domestic drinking water or for other beneficial uses.

The County denied Petitioner's request for UST case closure asserting that closure is inappropriate because no active remediation has been attempted at the Site. Petitioner contends that Site conditions do not threaten human health, safety, or the environment. Petitioner contends that the burden of corrective actions out-weighs the need for those actions. Based on the local geology, hydrology, and other factors, the unauthorized release presents a low risk to human health, safety, or the environment.

Case Information

Site Name: Chevron Environmental Management Company	Address: 6001 Bollinger Canyon Road San Ramon, CA 94838
Global ID: T0602300379	Petition Date: November 17, 2009
USTCUF Claim No: 17785	USTCUF Expenditures: \$0

Agency Information

Agency Name: Humboldt County Department of Health and Human Services	Address: 100 H Street, Suite 100 Eureka, CA 5501
Agency Case No: 12503	Number of Years Case Has Been Open: 18 years

Release Information:

- USTs: Three 10,000-gallon gasoline USTs were removed in January 1975
- Affected Media: Soil and shallow groundwater
- Free Product: None reported
- Corrective Actions:
 - January 1975 - UST system removed
 - January 2008 and January 2009 - Corrective Action Plan submitted

Site Description/Conditions:

- Groundwater Basin: Garberville 1-32, Garberville Town Area Groundwater Basin
- Beneficial Uses: Municipal, Agricultural , Industrial
- Land Use: Commercial
- Distance to Nearest Supply Wells: Back-up supply well 800 feet (up gradient)
- Distance to Nearest Sensitive Receptor: Perennial drainage located 350 feet down-gradient of the Site
- Flow Direction: West
- Surrounding area contains multiple cleanup sites
 - Depth to groundwater approximately 8 feet
 - Local Hydrology:
 - Lateral gradient of 0.04 ft/ft.
- Hydrogeology:
 - The Garberville Site is approximately 200 ft higher than adjacent Eel River on river terrace.
 - Groundwater flows in subsurface through native soil and enters fill material. The fill was used to level the gully where the 76 station and the hotel were constructed. Groundwater follows this traditional route and day-lights at the gully behind the hotel approximately 350 feet down-gradient from MW-7.

- Estimate of Remaining Mass: Small – low levels of gasoline constituents likely remain in the soil (Petroleum constituents that are above WQOs remain beneath Redwood Drive and side walk immediately west of the Site.)
- Plume is degrading from natural attenuation
- Estimated Time to Meet WQOs for all constituents: Decades to hundreds of years

Site History:

The first set of USTs were removed and replaced in 1934. The Site was an operating gas station until 1974. The release from the subject Site was discovered during removal of USTs in 1975. The unauthorized release has affected shallow groundwater in the immediate vicinity of the Site. In 1993, the Site was opened as a UST cleanup case.

Contaminant Concentrations:

Monitoring well Residual petroleum constituents' concentrations levels have reached or are approaching WQOs (Table 1). MW-5 has a declining trend line, provided by Humboldt County, which estimates approximately 65 years to reach WQOs for TPHg [Appendix A]. Residual petroleum hydrocarbon concentrations in MW-7, which is down-gradient of MW-5, are measured at 140 ppb TPHd and 83 ppb TPHg, while other Residual petroleum constituents are at non-detect.¹ The processes of dispersion, dilution, and bio-degradation are occurring and will continue, allowing the plume to naturally attenuate beneath Redwood Drive without adversely affecting potential receptors. Concentrations of residual petroleum hydrocarbons have fluctuated in well MW-5 and are anticipated to behave in a similar pattern into the near future with an estimate to reach the WQO within a few decades to hundreds of years.

Table 1: April 26, 2011 Groundwater Assessment Sampling

Sample	TPHg (ppb)	TPHd (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	MTBE (ppb)
MW-1	Gauged Only, < Detection Limits						
MW-2	Gauged Only, < Detection Limits						
MW-3	82	170	<0.5	<0.5	<0.5	<0.5	<0.5
MW-5	2,800	1,400	6	1	3	1	<0.5
MW-6	62	180	<0.5	<0.5	<0.5	<0.5	<0.5
MW-7	83	140	<0.5	<0.5	<0.5	<0.5	<0.5
WQOs	50	50	1	42	29	17	5

Discussion:

Residual petroleum constituents remain in the soil and are localized within 150 feet of the Site. The Site has clear declining trends for residual petroleum hydrocarbons concentrations [Appendix A]. MW-7 is farthest down-gradient monitoring well from the original tank location (source), and is approaching WQOs [Appendix B]. Residual petroleum constituents are confined beneath Redwood Drive in the vadose zone and shallow groundwater (approximately 8 feet). Data and current site conditions indicate that the presence of the plume is a low risk to human health, safety, or the environment.

The ages of the release (35 years since source removal) has allowed the unauthorized release to biodegrade, weather from water solubilization, and chemically oxidize reducing petroleum

¹ Not detected above laboratory reporting limits.

constituents to current state. Remaining residual petroleum constituents will have low water solubility and low mobility. Residual petroleum constituents will continue to biodegrade, achieving WQOs in decades to hundreds of years.

Soil vapor extraction at the Site is likely to have limited effects due to the age/characteristics of the plume, amount still present (no free product), and the behavior of remaining residual petroleum constituents. Remaining concentration levels of residual petroleum constituents are already clearly declining further making such remediation unwarranted.

Objections to Case Closure and Response:

1. No active remediation has been attempted by Chevron at this Site.

Response: Concentration levels for residual petroleum constituents are low and have established a declining trend. If site cleanup were implemented, it would not remove all remaining mass and natural biodegradation would still be relied on to reach WQOs. The data shows that the degrading plume is confined to shallow groundwater that is not currently used as a drinking water source or for any other designated beneficial use and not likely to be used as a drinking water source or any other designated beneficial use in the foreseeable future. The probability of groundwater affected by residual petroleum constituents to travel the pathway to the nearest receptor above WQOs is very low because the plume is characterized in the shrinking phase of its life cycle. A corrective action plan was submitted in January 2008 proposing natural attenuation. Active remediation would not be cost effective.

2. Down-gradient gully is threatened by the plume.

Response: The town of Garberville has filled in the traditional gully and rerouted the storm water/run off that flowed through the gully to a storm drain (36 inch corrugated metal pipe). The storm drain discharges at approximately 350 feet down-gradient of the Site (head of gully). The plume is stable and decreasing in concentration. The plume stability, relative location to the gully, and the fact that the residual petroleum constituents are naturally attenuating makes it highly unlikely that the affected groundwater will impact the gully.

Closure:

Does corrective action performed ensure the protection of human health, safety, and the environment? Yes.

Are corrective actions and UST case closure are consistent with State Water Board Resolution 92-49? Yes.

Is achieving background water quality feasible? No.

The data show that low levels of residual petroleum constituents are likely to remain in the soil west of the Site beneath Redwood Drive. To remove all traces of residual petroleum constituents at the Site would require significant effort and cost. If complete removal of detectable traces of residual petroleum hydrocarbons becomes the standard for UST corrective actions, the statewide technical and economic implications will be enormous. For example, disposal of soils from comparable areas of excavation throughout the state would greatly impact already limited landfill space. In light of the precedent that would be set by requiring additional excavation at this Site and the fact that beneficial uses are not threatened, attaining background water quality at this Site is not feasible.

If achieving background water quality is not feasible, then will alternate cleanup level:

- **Be consistent with the maximum benefit to the people of the State?** Yes.
It is impossible to determine the precise level of water quality that will be attained given the limited residual petroleum constituents that remain at the Site, but in light of all the factors discussed above, and the fact that the residual petroleum constituents will not unreasonably affect present and anticipated beneficial uses of groundwater beyond the immediate vicinity of the Site of the UST excavation, a level of water quality will be attained that is consistent with the maximum benefit to the people of the state and between the background level and the applicable water quality objective.
- **Unreasonably affect present and anticipated beneficial uses of water?** No.
Impacted groundwater is not used as a source of drinking water or for any other beneficial use currently and it is highly unlikely that the impacted groundwater will be used as a source of drinking water or for any other beneficial use in the foreseeable future.
- **Exceed water quality prescribed in applicable Basin Plan?** No.
The final step in determining whether cleanup to a level of water quality less stringent than background is appropriate for this Site requires a determination that the alternative level of water quality will not result in water quality less than that prescribed in the relevant basin plan. Pursuant to State Water Board Resolution 92-49, a site may be closed if the basin plan requirements will be met within a reasonable time frame.

Have factors contained in Title 23 of the California Code of Regulations, Section 2550.4 been considered? Yes.

In approving an alternative level of water quality less stringent than background, the State Water Board has also considered the factors contained in California Code of Regulations, title 23, section 2550.4, subdivision (d). As discussed earlier, the adverse effect on shallow groundwater will be minimal and localized, and there will be no adverse effect on the groundwater contained in deeper aquifers, given the physical and chemical characteristics of petroleum constituents, the hydrogeological characteristics of the Site and surrounding land, and the quantity of the groundwater and direction of the groundwater flow. In addition, the potential for adverse effects on beneficial uses of groundwater is low, in light of the proximity of the groundwater supply wells, the current and potential future uses of groundwater in the area, the existing quality of groundwater, the potential for health risks caused by human exposure, the potential damage to wildlife, crops, vegetation, and physical structures, and the persistence and permanence of potential effects. Finally, a level of water quality less stringent than background is unlikely to have any impact on surface water quality, in light of the volume and physical and chemical characteristics of petroleum constituents; the hydrogeological characteristics of the Site and surrounding land; the quantity and quality of groundwater and direction of groundwater flow, the patterns of precipitation in the region, and the proximity of residual petroleum to surface waters.

Has the requisite level of water quality been met? No.

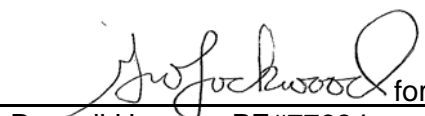
If no, the approximate time period in which the requisite level of water quality will be met:

The approximate time period in which the requisite level of water quality will be met for dissolved petroleum constituents is a few decades to hundreds of years, and for TPHg and


TPHd decades to hundreds of years. This is a reasonable period in which to meet the requisite level of water quality because 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 future. Other designated beneficial uses of water are not adversely impacted and it is highly unlikely that they will be. The record indicates that the source was removed in 1975; an unauthorized release resulted in a small petroleum plume that is attenuating; none of the petroleum constituents have impacted existing wells; and all petroleum constituents of concern will likely meet WQOs within decades to hundreds of years.

Summary and Conclusions:

Although shallow groundwater affected by the release from the former USTs exceeds the North Coast Regional Water Quality Control Board's Basin Plan WQOs for TPHg, TPHd and Benzene in a localized area, the WQOs will be achieved in a reasonable period of time. Shallow affected groundwater is not currently being used as a source of drinking water or for any other designated beneficial use and it is highly unlikely that the affected groundwater will be used as a source of drinking water or for some other beneficial use in the foreseeable future. The impacted groundwater does not threaten the back-up water supply well that is located 800 feet up-gradient from the Site. It is highly unlikely that the plume will impact the down-gradient gully for all of the reasons discussed earlier. Closure of the UST case is appropriate.

Prepared By:  for
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Water Resource Control Engineer

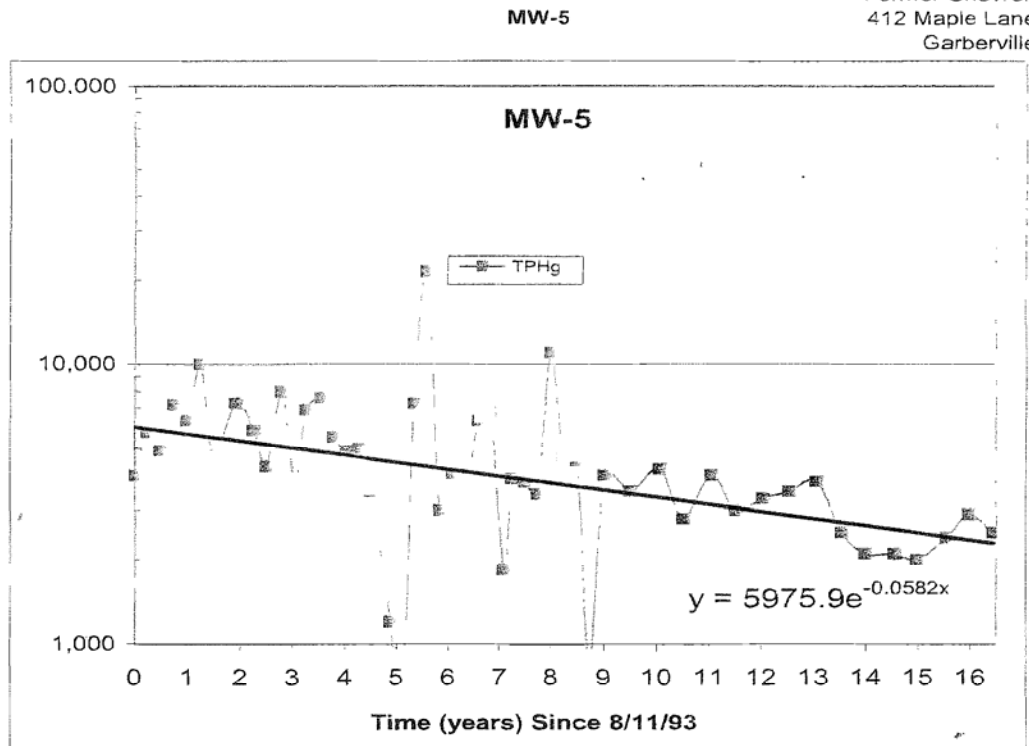
August 8, 2011
Date

Reviewed By: 
George Lockwood, PE#59556
Senior Water Resource Control Engineer

August 8, 2011
Date

Former Chevron
412 Maple Lane
Garberville

Date	Time since 8/11/1993 (years)	TPHg
8/11/93	0.001	4,000
11/9/93	0.25	5,700
2/3/94	0.48	4,900
5/9/94	0.74	7,200
8/10/94	1.00	6,300
11/9/94	1.25	10,000
2/7/95	1.49	4,700
7/11/95	1.92	7,300
11/13/95	2.26	5,800
2/13/96	2.51	4,300
5/28/96	2.80	8,000
8/29/96	3.05	3,700
11/14/96	3.26	6,900
2/27/97	3.55	7,600
5/26/97	3.79	5,500
8/25/97	4.04	4,900
11/19/97	4.28	5,000
2/17/98	4.52	3,500
6/30/98	4.89	1,200
9/15/98	5.10	450
12/15/98	5.35	7,270
3/16/99	5.60	21,500
6/15/99	5.85	3,000
9/15/99	6.10	4,000
12/16/99	6.35	3,550
3/15/00	6.60	6,320
6/14/00	6.85	6,750
9/13/00	7.10	1,840
11/9/00	7.25	3,900
2/5/01	7.49	3,790
5/7/01	7.74	3,420
8/7/01	7.99	11,000
11/5/01	8.24	4,700
2/5/02	8.49	4,500
5/6/02	8.74	850
8/13/02	9.01	4,000
2/10/03	9.51	3,500
9/2/03	10.07	4,200
2/4/04	10.49	2,800
8/25/04	11.05	4,000
2/8/05	11.50	3,000
8/23/05	12.04	3,300
2/23/06	12.55	3,500
8/29/06	13.06	3,800
2/19/07	13.53	2,500
8/7/07	14.00	2,100
2/26/08	14.55	2,100
7/29/08	14.98	2,000
2/26/09	15.56	2,400
7/30/09	15.98	2,900
1/14/10	16.44	2,500



WQO	y-int	exp	
50	5,975	0.058	82

approx. time (years since beginning of monitoring) to reach water quality objective of 50 ppb TPHg

Time: years since 8/11/93 = $-\ln(\text{WQO}) / \text{Y intercept} / \text{exponent}$

The WQO for TPHg is estimated to be achieved in the year 2075, or approximately 65 years from present

