Linda S. Adams
Secretary for
Environmental Protection

State Water Resources Control Board

Division of Water Quality

1001 I Street, Sacramento, California 95814 ♦ (916) 341-5851
Mailing Address: P.O. Box 2231, Sacramento, California 95812
FAX (916) 341-5808 ♦ Internet Address: http://www.waterboards.ca.gov

Arnold Schwarzenegger
Governor

UST Case Closure Summary
Bethel Island Municipal Improvement District (District)
3085 Stone Road, Bethel Island

Summary:
The District removed a 550-gallon underground storage tank (UST) from its maintenance yard on Bethel Island in 1999 along with contaminated soil. The remaining mass of petroleum hydrocarbons is small and limited to an estimated 10-foot radius around the location of the former UST. The Central Valley Regional Water Quality Control Board (Regional Board) staff denied the District's request for closure over the unknown environmental threat posed by the release to Delta waters and to a privately owned community (public) supply well. The supply well, which is 290 feet from the location of the former UST, has a 200 foot sanitary seal and multiple intervening clay strata.

Shallow groundwater (six feet below ground surface at this site) acts as a barrier to the migration of free product petroleum releases to greater depths because petroleum is less dense than water. Also, the highest concentrations from petroleum releases are usually found within the source area due to the high adsorption of petroleum to soil particles in the immediate vicinity of the release. Petroleum adsorbed to soil slowly dissolves yielding plumes in groundwater of dissolved petroleum compounds. At this site, groundwater samples from soil borings surrounding and within 20 feet of the former tank pit were either non-detect for petroleum compounds or showed very low concentrations indicating a low level of remaining mass and limited zone of impact. This information supports the conceptual model of a site whose remaining mass and limited extent of residual petroleum hydrocarbons pose a low risk to beneficial uses of groundwater and surface water including groundwater pumped by the supply well and nearby surface waters that surround the island and adjacent marina. Therefore, case closure is appropriate.

Background:
This UST Case Closure Summary has been prepared in response to a petition by the District to the State Water Resources Control Board (State Water Board) for closure of the District's UST case at 3085 Stone Road, Bethel Island (site). 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 an opportunity to provide comments.

The site is located on Bethel Island near the southwestern margin of the San Joaquin-Sacramento River Delta (Delta). Land use in the vicinity of the site is mixed residential and commercial. The District's office and maintenance yard, where gasoline, propane, and waste

oil aboveground storage tanks are present, are located at the site. The site elevation is approximately 6 feet below mean sea level (msl).

Regional Board staff denied the District's request for UST case closure asserting that closure is inappropriate because of the unknown environmental threat posed to Delta waters and to a privately owned public supply well. The District contends that site conditions do not threaten public health and safety and that the burden of additional corrective actions outweighs the need for those actions.

Based on the local geology, hydrology, and other factors, the site release does not threaten human health, safety or the environment or Delta waters or groundwater used or anticipated to be used as a source of municipal and domestic drinking water or for other beneficial uses.

Petitioner information

Bethel Island Municipal Improvement District	Address: 3085 Stone Rd. Bethel Island, Ca 94511
Global ID No: T0601300806	Petition Date: May 18, 2009
USTCUF Claim No: 19270	USTCUF expenditures: $0

Agency Information

Central Valley Regional Water Quality Control Board, Sacramento Office	Address: 11020 Sun Center Drive #200 Rancho Cordova, CA 95670-6114
Agency Case No. 070088	
Number of years case has been open: 15 years	

Release Information:

- UST: One 550-gallon gasoline UST removed in January 1999.
- Discovery Date: July, 1995
- Affected Media: Soil and shallow groundwater.
- Free Product: None reported.
- Corrective Actions:
    - January 1999 - UST removal and soil excavation (21 tons)
    - July 2007 - soil and groundwater assessment.
    - January 2008 - soil and groundwater assessment

Site Description/Conditions:

- Groundwater Basin: Central Valley
- Designated beneficial uses: MUN, AGR, IND, PRO
- Land Use: Mixed residential and commercial.
- Nearest wells: Domestic well 240 feet west of the release. Privately owned public supply well 290 feet south of the release.

- Nearest Surface Water: ≈500 feet (marina)
- Depth to Groundwater: ~6 feet bgs (elevation ~ -12 feet msl)
- Flow Direction: North and northeast.
- Geology: Fine sand overlying thick, alternating strata of fine and coarse-grained alluvial sediments. The log of the privately owned public supply well describes four clay strata ranging in thickness from 15 to 39 feet at a depth of 30 to 190' bgs. The well is constructed with a 200-foot sanitary seal.
- Hydrology: The Delta (Dutch Slough) water level at Bethel Island ranges from -0.5 to +4 feet msl; the water table on the island is about -12 feet msl. This head differential is maintained by a system of drains that collects subsurface inflow from the Delta and rainfall runoff, and returns it to the Delta.
- Estimate of Remaining Mass: Small - shallow and limited to immediate vicinity of UST (less than~10 foot radius).
- Estimated time to meet Water Quality Objectives (WQOs): Decades to hundred of years.

Site History:
The 550-gallon gasoline UST was removed in January 1999. Soil samples collected from the site at that time verified that a release occurred. In July 2007, Regional Board staff investigated the release, collecting and analyzing samples of soil and groundwater at the UST location and collecting and analyzing a water sample from the nearby municipal supply well. In January 2008, the District assessed the lateral extent of affected soil and groundwater associated with the release, collecting and analyzing soil and groundwater samples from five borings (Table 1 presents a summary of the soil samples and Table 2 presents a summary of the groundwater samples).

In a letter dated February 22, 2008, the District's consultant requested case closure. In correspondence dated February 27, 2008, Regional Board staff denied the request and requested a monitoring well in the location of the removed UST pit. On May 18, 2009 the District petitioned the case to the State Water Board.

Contaminant Concentrations:

Table 1: UST Assessment Soil Samples

Sample ID	Sample Date	Depth (ft)	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MTBE (ppm)
SS#1	6/11/07	6.0	270	ND	0.053	2.3	8.5	ND
SS#2	6/11/07	7.5	510	0.094	0.65	4.9	18	ND<0.02
PB-8'	1/1/99	8.0	41	9.7	12	1.1	5.4	3.9
SS#3	6/11/07	9.0	6.8	0.100	0.1	0.42	1.8	0.011

Table 2: UST Assessment Groundwater Samples

Sample	Location	Sample Date	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	MTBE (ppb)

Muni#1	Muni well	6/11/07	ND<0.05	ND<0.5	ND<0.5	ND<0. 5	ND<0.1	ND<0.5
	Former tank	6/11/07	73,000	860	1,400	4,600	17,000	29
BI1	N of former tank	1/24/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0. 1	5.4
BI2	E of former tank	1/24/08	ND<50	0.7	ND<0.5	ND<0.5	ND<0. 1	ND<0. 5
BI3	SE of former tank	1/24/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0. 1	ND<0. 5
BI4	SW of former tank	1/24/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0. 1	ND<0.5
BI5	W of former tank	1/24/08	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0. 1	ND<0.5
WQO	--		5	0. 15	42	29	17	5

Objection to closure:

In a response to the petition dated June 22, 2009, Regional Board staff indicated that the contaminant delineation was incomplete and that the threat of the release to the aforementioned public supply well and Dutch Slough and beneath the nearby building could not be ascertained.

Regional Board staff cites results from the1999 sampling and the 2007 follow-up sampling as evidence that petroleum hydrocarbons at a depth to 9 feet bgs are not undergoing significant natural degradation. To the contrary, the data show over an order of magnitude decrease in benzene and toluene concentrations between 1999 and 2007, evidence of robust natural degradation. Additionally, the data obtained by the Regional Board in 2007, show an order of magnitude decrease in concentrations from 7.5 feet to 9 feet bgs, i.e., TPHg from 510 ppm to 68 ppm, ethylbenzene from 4.9 ppm to 0.42 ppm, and xylene from 18 ppm to 1.8 ppm. These reductions in concentrations over a mere depth increment of 1.5 feet is credible evidence of significant natural degradation and attenuation. This type of attenuation is what would be expected in a biologically active environment such as a Delta island.

The Regional Board further contends that the January 2008 investigation did not produce soil and groundwater samples from depths where contamination was detected during previous assessment sampling. Soil samples below 4 feet bgs were not collected. However, the groundwater samples (from 6 to 9 feet bgs) from the peripheral borings (BI1 through BI5) are comparable. These water samples place a limit on the extent of soil contamination since if soil contamination were present at 6 to 9 feet bgs at the boring locations, concentrations in the water samples would reflect that presence. The samples were non-detect for all constituents except for 0.73 ppb of benzene in the groundwater sample from boring BI2 and 5.4 ppb MTBE in the groundwater sample from boring BI1, demonstrating that the release has had little impact on water quality beyond a 20 to 25 foot distance from the source area.

The limited residual petroleum hydrocarbons that remain in soil and groundwater do not present a significant threat to public health and safety. Given the hydrologic and geologic conditions at the site, neither surface water nor the groundwater that is the source of local drinking water supply wells are threatened. The supply well, which is 290 feet from the location of the former UST, has a 200 foot sanitary seal and multiple intervening clay strata. Although groundwater in the immediate vicinity of the location of

the former UST exceeds the Regional Board's Basin Plan WQOs for TPHg, BTEX[1], and MTBE, WQOs for these constituents will be achieved in a reasonable period of time. Shallow affected site groundwater is not 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. Case closure is appropriate.

Closure:

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

Is corrective action and UST case closure are consistent with State Water Board Resolution 92-49. Yes

Is achieving background water quality feasible? No.

To remove all traces of residual petroleum constituents at the site would require significant additional effort and cost. If complete removal of detectable traces of petroleum constituents becomes the standard for UST corrective actions, however, 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, is the alternative cleanup level 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 hydrocarbons 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, a level of water quality will be attained that is consistent with the maximum benefit to the people of the state.

Will the alternative cleanup level unreasonably affect present and anticipated beneficial uses of water? No.

Impacted groundwater is not used as a source of drinking water currently and it is highly unlikely that the impacted groundwater will be used as a source of drinking water in the foreseeable future.

Will the alternative level of water quality exceed water quality prescribed in applicable Basin Plans? No.

[1] Benzene, Toluene, Ethylbenzene, and Xylene.

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 alternate 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 is 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 limited extent of the release, 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 the surface water quality of nearby Delta waters, 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 affected groundwater, and the proximity of residual petroleum to surface waters.

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

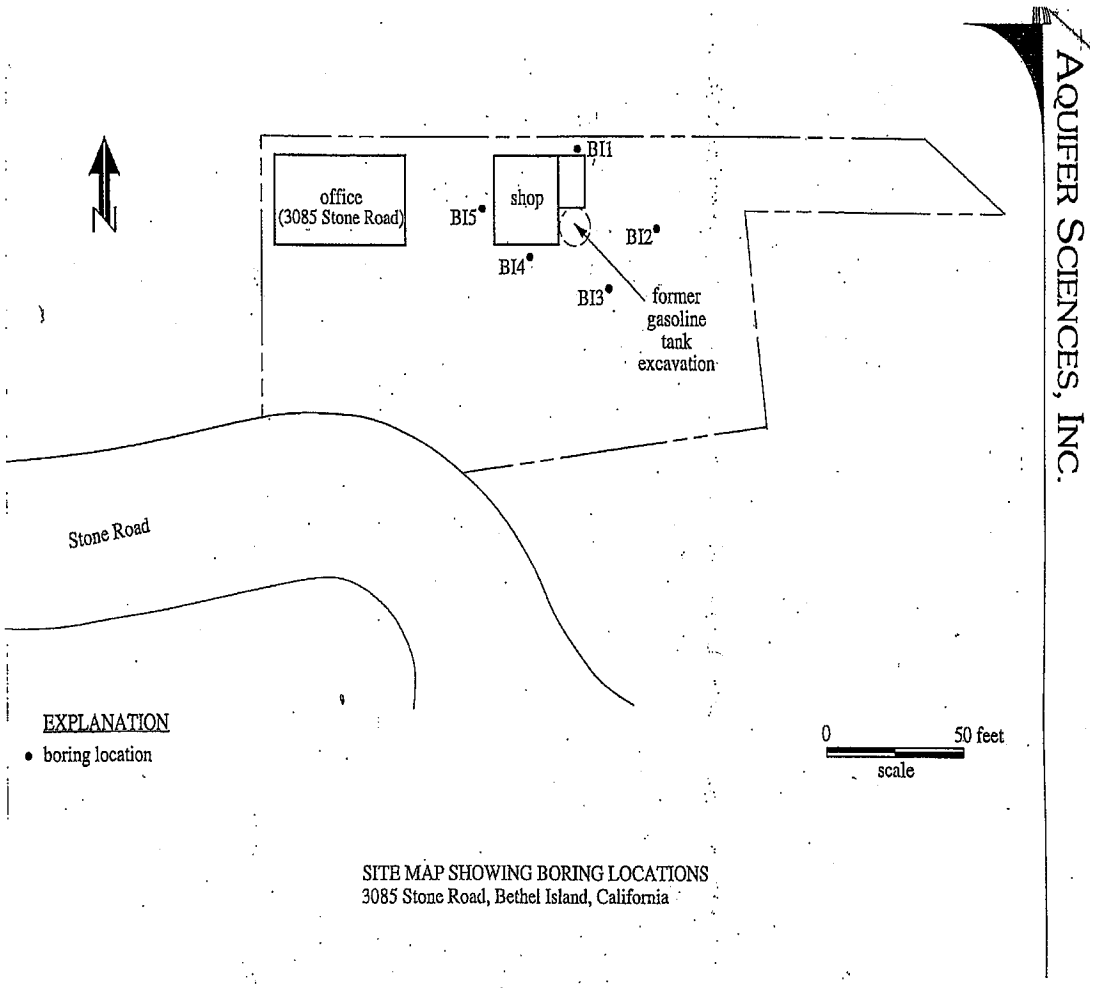
The approximate time period in which the requisite level of water quality will be met is estimated to be decades to hundreds of years.

Though the requisite level of water quality has not been met, water quality objectives will be achieved via natural attenuation in 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.

Summary and Conclusions:
Based on the hydrology, geology, and other factors at and in the vicinity of the site, remaining petroleum hydrocarbons at the site do not present a threat to public health and safety, or the environment and or to current and anticipated beneficial uses of water. The remaining mass of residual petroleum hydrocarbons is limited to the immediate vicinity of the former UST. site stratigraphy and well construction standards preclude any pathway to local water production zones, and the affected groundwater is not currently used as a source of drinking water or for any other designated beneficial use and there is little likelihood it will be used as such the foreseeable future. Case closure is appropriate.

Dennis Parfitt, CEG #1223
Senior Engineering Geologist

4/20/10
Date



SITE MAP SHOWING BORING LOCATIONS
3085 Stone Road, Bethel Island, California


Pump House
Pump House
Pump House
BIMID Well
Former UST Location
Municipal Well
Pump House
KEY
Drainage Canal
Drainage Conduit
Surface Water and
Groundwater Drains
Scale
1800 ft
Dutch Slough