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REVISED - D R A F T

UST Case Closure Summary

Tipple Motors

Jerry Lema (Petitioner)

Jack Tipple (Petitioner)

524 Main Street, Ferndale, California

Summary:

The site is located at 524 Main Street in the historic district of Ferndale in Humboldt County. Land use is commercial with residential use to the east. The site has operated as a gasoline service station since the 1930s.

Humboldt County Department of Health and Human Services (County) denied Petitioner's request for closure asserting, "...data to evaluate whether or not the site will reach water quality objectives in a reasonable amount of time has not been collected."¹ Petitioner contends that the money spent by the State for corrective actions at the site could be put to better use on sites that truly impact public health and safety.

In May 2010, groundwater samples from all site monitor wells were analyzed for gasoline constituents and geochemical compounds and elements.² The results demonstrate very active degradation of the residual petroleum soil contamination is occurring in shallow site groundwater via microbial metabolism.

Data obtained from site monitor wells demonstrate that the petroleum hydrocarbon plume within the source area is stable and that the remaining mass of residual gasoline in site soil will naturally diminish with time.

Considering the site's geology, hydrology, geochemistry, and the contaminant source and its characteristics, the residual gasoline constituents remaining in site soil do not and will not threaten public health and safety or the environment. A utility company provides the village with water and sewer services. The shallow groundwater is not presently used as a source of drinking water or other beneficial use and it is highly unlikely it will be used as such during the anticipated period of impairment. Closure is consistent with [State Water Board Resolution No. 92-49](#) and is consistent with the maximum benefit to the people of the state.

Background:

This UST Case Closure Summary has been prepared in support of a petition to the State Water Resources Control Board (State Water Board) for closure of the UST case at 524 Main Street, Ferndale, California. All record owners of fee title for this Site as

¹ February 20, 2009 County Response to Petition.

² Alkalinity, nitrate, sulfate, ferrous iron [Fe(II)], manganese [Mn(II)], and Total Dissolved Solids (TDS).

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 has operated as a vehicle fueling and repair facility since the 1930s. In September 1978, two 550-gallon USTs were abandoned in place and two 4,000-gallon USTs were installed. In June 1988, analyses of soil samples collected from the vicinity of the two 550 gallon USTs indicated an unauthorized release had occurred. In September 1997, after two phases of site investigation, the four USTs and approximately 590 cubic yards of contaminated soil were removed.

Site conditions were further assessed in October 2002, October 2004, and July 2005. Between June 2005 and July 2008, vapor extraction, air sparge, and high vacuum dual-phase extraction were employed and removed an estimated 3,000 pounds of petroleum hydrocarbons.

Case Information:

Jack Tipple	Address: PO Box 578, Ferndale, CA 95536
Facility Name: Tipple Motors	Facility Address: 524 Main Street Ferndale, CA 95536
Global ID No: T0602300046	Petition Date: January 8, 2009
USTCUF Claim No: 559	USTCUF expenditures: \$709,516

Agency Information:

Humboldt County Department of Health and Human Services	Address: 100 H Street, Suite 100 Eureka, CA 95501
Agency Case No. 12052	Years case open: 23

Release Information:

USTs:

Tank No.	Size	Contents	Status	Date
1	550 gallons	Gasoline	Removed ³	Sept 1997
2	550 gallons	Gasoline	Removed ³	Sept 1997
3	4,000 gallons	Gasoline	Removed	Sept 1997
4	4,000 gallons	Gasoline	Removed	Sept 1997

- Discovery Date: August 1, 1988
- Affected Media: Soil and shallow groundwater.
- Source: Residual gasoline in fine-grained soil.
- Corrective Actions:
 - November 1993: Soil and groundwater assessment.
 - August 1996: Soil and groundwater assessment.
 - September 1997: UST removal, over excavation.
 - October 2002: Soil and groundwater assessment.
 - October 2004: Soil and groundwater assessment.

³ Tank Abandoned in place in 1978.

- June through October 2005: Air sparge and soil vapor extraction.
- May through October 2007: High vacuum dual-phase extraction.
- March through July 2008: High vacuum dual-phase extraction.
- May 2010: Groundwater assessment.

Site Description/Conditions:

- Groundwater Basin: Eel River Valley (1-10).
- Surface Waters: Francis Creek 120 feet west, Salt River of 6,000 feet south.
- Site Geology: Alluvial fan sediments consisting of mixtures of fine sand, silt, and clay.
- Depth to Groundwater: Varies seasonally from one foot to six feet.
- Groundwater flow direction: Easterly
- Hydrology: Shallow site groundwater is recharged by Francis Creek stream flow and is discharged via evapotranspiration and subsurface out flow to the Eel River Basin.
- Land Use: Commercial with residential to the east.
- Nearest Well: Irrigation well 1,200 feet east southeast.
- Estimate of Remaining Mass: 3,000 pounds⁴.
- Designated Beneficial Uses: Municipal (MUN), Agricultural (AGR), Industrial (IND), and Industrial Process Supply (PRO).
- Time to meet Water Quality Objectives (WQOs): Decades to hundreds years.⁵

Site History:

Soil and groundwater analytical data indicate that the two 550 gallon USTs are the primary source of gasoline constituents, including dichloroethane (DCA), detected in site soil and groundwater. Gasoline oxygenates [MTBE (methyl-tertiary-butyl-ether), TBA (tertiary-butyl alcohol), TAME (tertiary-amyl methyl ether), and DIPE (di-isopropyl ether)] are present in site soil and groundwater and likely originated from the 4,000 gallon UST system. A substantial portion of the soil impacted by the unauthorized releases was excavated in 1997. Soil and shallow groundwater beneath the site and adjacent sidewalks, streets, and property⁶ contain detectable concentrations of gasoline constituents.

⁴ *Summary Report – Remedial Action Update*. Trans Tech Consultants, August 18, 2008.

⁵ Gasoline is a complex mixture of hundreds of hydrocarbon compounds that typically have between six and twelve carbon atoms in each molecule (C₆ – C₁₂). The rate at which these compounds degrade and attenuate in a specific environment is dependant on the chemical character and mass of the individual compounds and the physical environment at and near a site, i.e., hydrology, geology, and geochemistry.

The mass of gasoline hydrocarbon compounds remaining in shallow site soil will diminish and the composition of the mixture will change as the water soluble fraction, e.g., BTEX, alkylated benzenes, naphthalene, leaches out and is biodegraded. The less soluble fraction, e.g., C₆ – C₁₂ alkanes and alkenes, typically remain in a non-aqueous phase and adsorbed to soil particles. These compounds will remain in the environment and biodegrade over an extended period of time.

Analyses of groundwater samples from site monitor wells indicate that concentrations of toluene and xylene are presently less than WQOs. The remaining gasoline constituents, which biodegrade more slowly, will cause groundwater to exceed WQOs for decades to hundreds of years. During this time however, the affected groundwater will largely be confined to a 30 foot by 60 foot area extending from the sidewalk on Main Street to beneath the current site structure.

⁶ US Post Office, 550 Main Street. LOP Case #12925. An unauthorized release from two 500-gallon USTs. Analytical data indicate shallow soil and groundwater are contaminated with gasoline and diesel range hydrocarbons including BTEX. The plume from the Tipple Motors site does not appear to commingle with the Post Office plume.

Contaminant Concentrations:

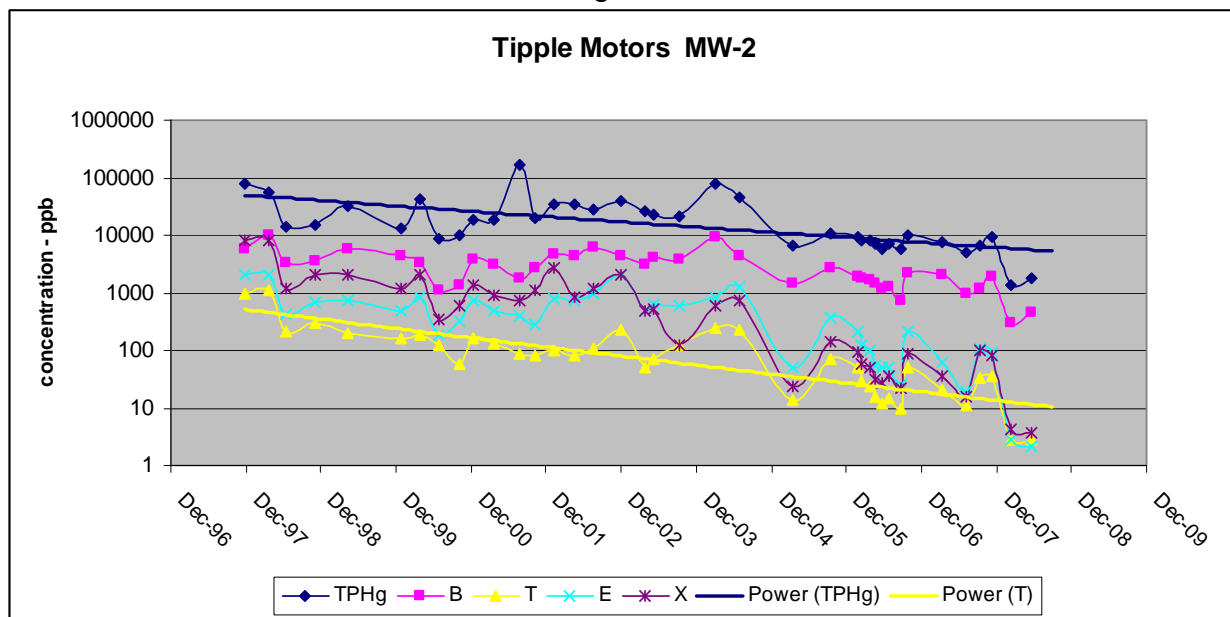
The highest concentrations of petroleum hydrocarbons detected in site groundwater are samples from source area monitor wells MW-2 and MW-8 (see table below and Figures 1 and 2). The plume is stable and concentrations of all constituents are declining via natural attenuation.

May 2010 Groundwater Sample Analyses and Basin Plan Water Quality Objectives (WQOs)
Parts-per-billion (ppb)

	TPHg	benzene	toluene	ethylbenzene	xylene	MTBE	TBA	DIPE	DCA
MW-8	1,500	390	7.5	17	14	nd	95	130	9.7
MW-2	2,100	480	5.9	49	21	47	nd	18	5.6
WQO	5	0.15	42	17	29	5	12	0.8	0.5

nd – not detected

Figure 1



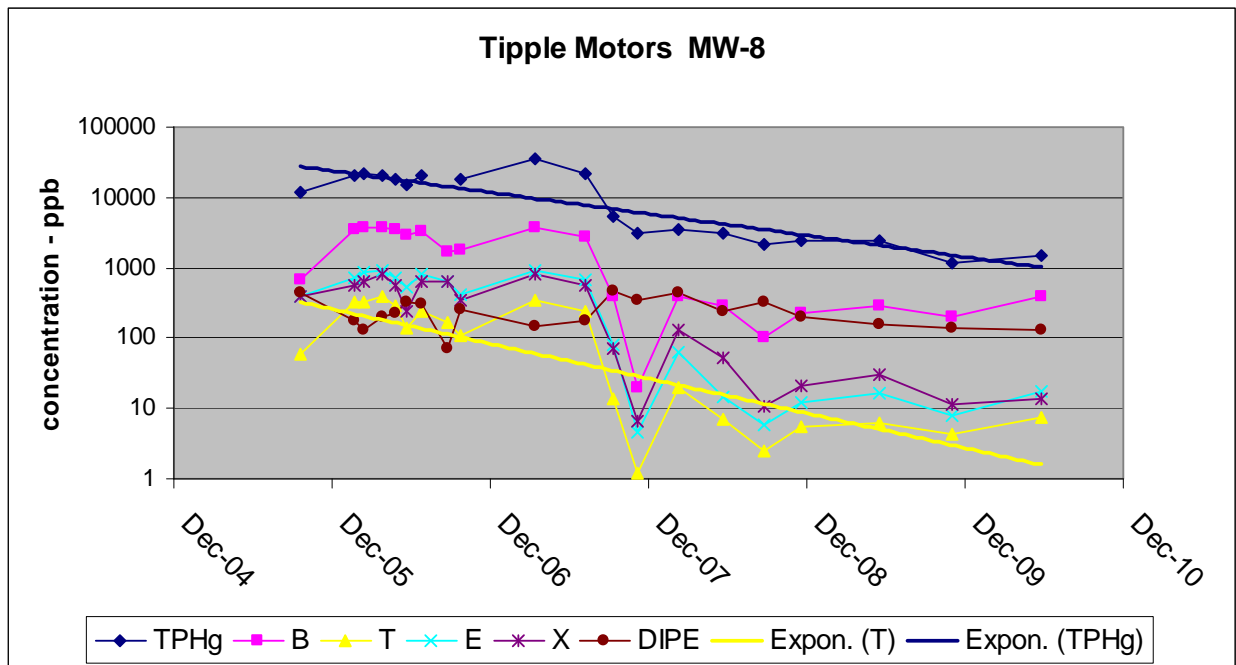
Discussion:

Site groundwater is recharged from flow in Francis Creek and discharged via evapotranspiration and subsurface outflow. The nearest potential receptor is an irrigation well located about 1,200 feet east of the site. Affected soil and groundwater do not present a threat to public health and safety and the environment as the dissolved-phase plume is stable, concentrations are declining, and the groundwater is not used, nor expected to be used, as a source of drinking water.

Objections to Case Closure and Response:

The County contends that data required to determine whether WQOs will be achieved in a reasonable period of time have not been collected.

Figure 2



B= Benzene T= Toluene E= Ethylbenzene X = Xylene DIPE= Di-isopropyl Ether
TPHg= Total Gasoline Range Petroleum Hydrocarbons

Response: Although concentrations of gasoline constituents will exceed WQOs in groundwater within the source area for a considerable period of time, data in the record show that dissolution of the residual gasoline mass is occurring, that dissolved-phase constituents are attenuating via biological metabolism, and that concentrations rapidly decline in groundwater down-gradient of the source area. Based on these facts and the current and anticipated future land use, site conditions do not represent a threat to public health and safety or the environment.

Minimal benefit will be gained by expending additional money in efforts to extract the diminishing mass of residual petroleum hydrocarbons and routinely monitor and report on the status of the stable and well-defined dissolved-phase plume. Shallow groundwater in the source area will exceed WQOs for decades to hundreds of years. Though the time to attain WQOs is lengthy, this extended period is reasonable because the groundwater is not currently used as a source of drinking water, nearby irrigation wells will not be impacted by the release, and it is unlikely that the shallow groundwater in the vicinity of the petroleum plume will be used as a source of drinking water in the foreseeable future.

Closure:

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

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

Though the requisite level of water quality has not been met, background water quality will be achieved via natural attenuation in decades to hundreds of years. In this case, this is a reasonable period in which to meet the requisite level of water quality because groundwater is not currently being used as a source of drinking water and it is highly unlikely that the affected water will be used as a source of drinking water in the foreseeable future.

Is achieving background water quality feasible? No.

Achieving background water quality is infeasible. Although the alternative cleanup level exceeds water quality prescribed in the applicable Basin Plan, closure is consistent with the maximum benefit to the people of the state and will not unreasonably affect present and anticipated beneficial uses of water.

To remove all traces of residual petroleum constituents at the site would require significant effort and cost; over half of the site, from the curbs along Main Street and Washington Street to near the northerly property boundary would require soil excavation to a depth of about ten feet. While technologically feasible, the resulting action would require the removal of the existing site structure and disruption of auto and pedestrian traffic for a substantial period of time. If complete removal of detectable traces of petroleum constituents 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 addition, continued operation of the vapor extraction system and associated groundwater monitoring and reporting would be costly and generate a substantial carbon footprint. Thus, requiring additional corrective actions at this site would involve substantial costs and would result in additional environmental impacts. Given the fact that beneficial uses are not threatened, nor will they be threatened in the foreseeable future attaining background water quality at this site is not feasible.

If achieving background water quality is not feasible, then will the alternative 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 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 beyond the immediate vicinity of the Site, 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 determining the level of corrective action at the site that is consistent with the maximum benefit to people of the State with regard to potential adverse effects on groundwater quality and beneficial uses, the following have been considered:

- Physical and chemical characteristics of the waste;
- Hydrogeologic characteristics of the site and surrounding area;
- Quantity of ground water and the direction of ground water flow;
- Proximity and withdrawal rates of groundwater;
- Current and potential future uses of groundwater in the area;
- Existing quality of ground water, including other sources of contamination or pollution and their cumulative impact on the groundwater quality;
- Potential for health risks caused by human exposure to waste constituents;
- Potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- Persistence and permanence of the potential adverse effects.

Considering the above-mentioned factors, minimal benefit will be achieved by performing additional corrective actions. Site conditions do not and will not represent a significant threat to public health, safety or the environment.

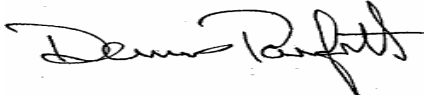
MTBE Testing:

Site soil and groundwater has been tested for MTBE pursuant to reporting requirements of Health and Safety Code section 25296.15.

Summary and Conclusion:

Based on the hydrology, geology, and other factors present at, and in the vicinity of the site, shallow affected groundwater does not represent a threat to public health, safety, or to future beneficial uses. Shallow groundwater is not presently used as a source of drinking water or for other beneficial uses and it is unlikely it will be used as such in the

foreseeable future. Given the site specific factors, Basin Plan Water Quality Objectives will be achieved in a reasonable period of time. Case closure is appropriate.



Dennis Parfitt, CEG #1223
Senior Engineering Geologist

June 14, 2011

Date