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State Water Resources Control Board

Division of Water Quality

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Edmund G. Brown Jr.
Governor

D R A F T

UST Case Closure Summary

Andersen Excavating

Robert Andersen (Petitioner)

1175 Cloverdale Boulevard, Cloverdale, California

Summary:

The site is located near the southern edge of Cloverdale, is about four acres in size, and has been used for earth-moving equipment maintenance and staging from 1965 to the present. Prior to 1965, a sawmill was located at the site. Land use in the vicinity of the site is industrial, commercial, and residential.

Petitioner contends that the site is not a threat to the public and there is no benefit to be gained by further corrective actions related to unauthorized petroleum releases that occurred at the site. Sonoma County Department of Health Services Division of Environmental Health (County) asserts that additional site characterization and remediation are needed. The County cites fuel hydrocarbon concentrations in a remedial excavation soil sample as a potential exposure hazard, concentrations in "grab" groundwater samples that exceed Basin Plan Water Quality Objectives (WQOs), the possibility of other sources of contamination, and incomplete groundwater contaminant plume definition as impediments to closure.

The petroleum release from the former USTs has been remediated and characterized and does not pose a threat to public health, safety or the environment. Soil boring and excavation confirmation soil samples indicate that remaining residual petroleum hydrocarbons are present in a clay-rich weathered bedrock environment¹ beneath the slab-on-grade foundation of the main site structure and that the hydrocarbons are in an advanced stage of natural attenuation. Analyses of groundwater from monitor wells located near the source area demonstrate that shallow site groundwater is unaffected by the unauthorized release. Elevated concentrations of petroleum hydrocarbons reported for several grab groundwater samples collected from borings drilled in 2006 are not representative of ambient groundwater quality but rather a consequence of cross-contamination from hydrocarbons adsorbed to shallow clayey soil and weathered bedrock.

Given the site's geology, hydrology, and source area characteristics, the residual petroleum hydrocarbons remaining adsorbed in the weathered shale pose a low risk to public health, safety and the environment and do not threaten current or anticipated beneficial uses of groundwater. Case closure is appropriate and is consistent with

¹ Bedrock is Cretaceous shale of the Franciscan assemblage. At the site the shale is deeply weathered. The layer of loose heterogeneous material overlying the bedrock (regolith) transitions from a gravelly sand and clay material to stiff silty clay with sand and merges with soil and fill material at four to five feet below ground surface (bgs).

[State Water Board Resolution No. 92-49](#), *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code section 13304.*

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 1175 Cloverdale Boulevard, Cloverdale. 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.

In December 2005, the County denied petitioner's request for case closure over concern that concentrations of petroleum hydrocarbons reported for an excavation sidewall sample (sample SW-14) collected along the edge of the foundation of the main site structure could impair indoor air quality.

In 2006, petitioner addressed the County's concerns, undertaking additional corrective actions to characterize the distribution of petroleum hydrocarbons, including the area near the location of sample SW-14. In April 2007, the County directed petitioner to further investigate the site and prepare a Feasibility Study and Corrective Action Plan. In September 2008, the County notified petitioner that he was not compliant with its directive and extended the compliance date to November 2008. Petitioner appealed to the State Water Board for case closure on June 15, 2009.

Case information

| | |
|---------------------------|---|
| Bob Andersen | Address: 1175 Cloverdale Boulevard, Cloverdale, CA 95425 |
| Global ID No: T0609700214 | Petition Date: June 15, 2009 |
| USTCUF Claim No: 15477 | USTCUF expenditures: \$136,697 |

Agency Information

| | |
|--|---|
| Sonoma County Environmental Health Division | Address: 475 Aviation Blvd. #220 Santa Rosa, 95403 |
| Agency Case No. 0001023 | |
| Number of years case has been open: 21 years | |

Release Information:

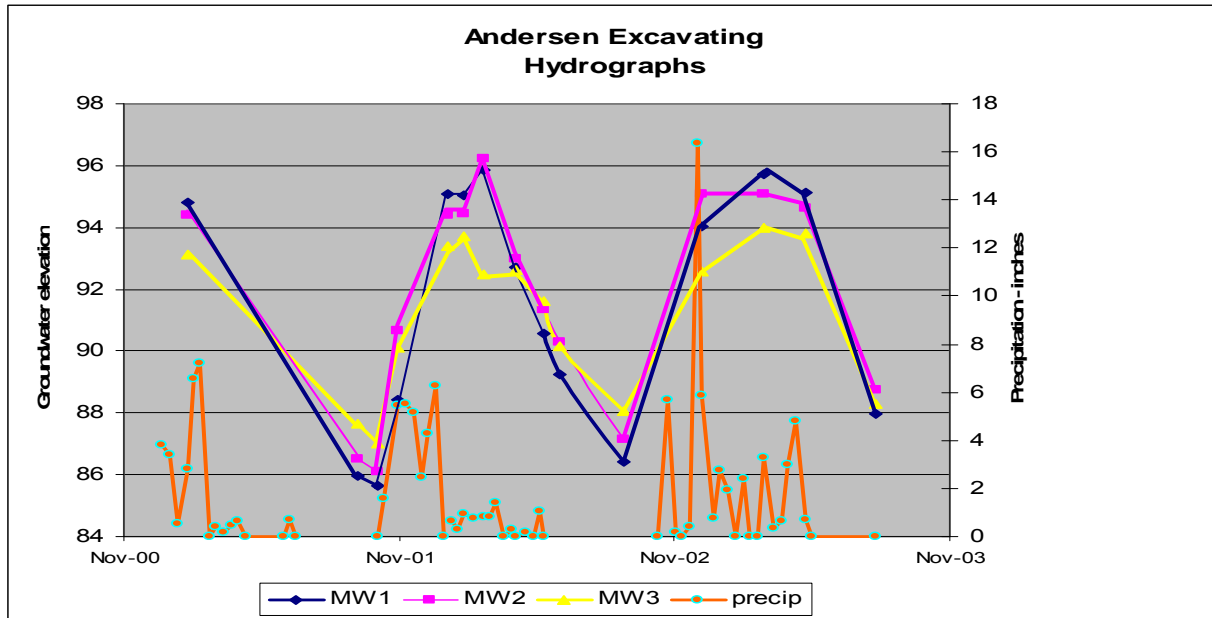
USTs:

| Tank No. | Size in Gallons | Contents | Status | Date |
|----------|-----------------|-----------|---------|-----------|
| 1 | 1,000 | Gasoline | Removed | July 1989 |
| 2 | 500 | Gasoline | Removed | July 1989 |
| 3 | 1,000 | Diesel | Removed | July 1989 |
| 4 | 350 | Waste Oil | Removed | July 1989 |

- Source of Release: UST system.
- Discovery Date: July 1989.
- Affected Media: Soil.
- Free Product: No.
- Corrective Actions
 - July 1989: UST removal
 - 1990: excavation
 - 1991: excavation
 - 1992: excavation
 - February 2001: Soil and groundwater assessment
 - February 2006: Soil and groundwater assessment.
 - August 2006: Soil and groundwater assessment.

Site Description/Conditions:

- Groundwater Basin: Alexander Valley, Cloverdale Area Subbasin (1-54.02).
- Designated Beneficial Uses: Municipal, Agricultural, Industrial, Industrial Process Supply.
- Land Use: Industrial.
- Nearest well: Domestic well \approx 1,000 feet south.
- Nearest Surface Water: Russian River \approx 4,800 feet east.
- Geology: Cretaceous shale of the Franciscan assemblage. The regolith extends to in-situ, weathered shale at a depth of about 10 feet. The regolith is weathered progressively upward to four to five feet bgs where it merges with a layer of soil and fill material.
- Occurrence of Groundwater: Groundwater under confined conditions occurs at about ten to thirteen feet bgs near the boundary between the regolith and the underlying, weathered shale bedrock.
- Hydrology: Winter rainfall on adjacent exposures of shale bedrock recharges the shallow confined groundwater-bearing zone at and in the vicinity of the site. Sub-surface inflow from the bedrock exposure at the eastern edge of the site seasonally counters the regional groundwater flow regime from the mountains west and southwest of the site. As the effect of this localized recharge ebbs in the absence of rainfall, the flow direction changes from southerly to northerly.



Site History:

Four USTs were removed in 1989 and about 2,400 cubic yards of soil and weathered bedrock were subsequently excavated. Monitor wells MW-1, MW-2, and MW-3 were constructed north, east, and south, respectively, of the location of the former USTs in 2001 and sampled eleven times between February 2001 and August 2003.

Contaminant Concentrations:

Groundwater: Evidence in the record indicates that the groundwater beneath petitioner's site has not been impacted by an unauthorized release. Groundwater samples from the three monitor wells have been collected eleven times and analyzed for petroleum hydrocarbons, fuel oxygenates, volatile organic compounds (VOCs) including chlorinated solvents, and/or heavy metals (cadmium, chromium, lead, nickel, and zinc). No VOCs, fuel oxygenates, or heavy metal analytes were detected in any of the samples. Low concentrations of petroleum hydrocarbons have been reported for groundwater samples on two occasions and high concentrations of Total Oil and Grease (TOG) on one occasion (Table 1). These detections however are spurious and are likely a consequence of faulty sample collection, handling, or analytical procedures rather than the presence of groundwater impacts. Oil and grease constituents are virtually insoluble indicating these detections were likely a consequence of constituents adsorbed to suspended sediment in the groundwater samples or cross contamination from another source. The detections of low concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX) in December 2001 and diesel (TPHd) and motor oil (TPHmo) in December 2002 were one-time occurrences and not reproducible either in prior or subsequent sampling events.

Table 1: Groundwater Monitor Well Sample Analyses – parts per billion (ppb)

| | | TPHg | TPHd | TPHmo | TOG | Benzene | Toluene | Ethylbenzene | Xylene |
|------------|------|------------|-----------|------------|--------------|------------|------------|--------------|------------|
| 2/15/2001 | MW-1 | <50 | <50 | NA | <1000 | <0.5 | <0.5 | <0.5 | <1.5 |
| | MW-2 | <50 | <50 | NA | <1000 | <0.5 | <0.5 | <0.5 | <1.5 |
| | MW-3 | <50 | <50 | NA | <1000 | <0.5 | <0.5 | <0.5 | <1.5 |
| 9/25/2001 | MW-1 | <50 | <50 | NA | <1000 | <1 | <1 | <1 | <1 |
| | MW-2 | <50 | <50 | NA | <1000 | <1 | <1 | <1 | <1 |
| | MW-3 | <50 | <50 | NA | <1000 | <1 | <1 | <1 | <1 |
| 12/14/2001 | MW-1 | 100 | <50 | <100 | <5000 | 4.2 | 15 | 0.98 | 3.4 |
| | MW-2 | <50 | <50 | <100 | <5000 | 1.3 | 5.7 | 0.54 | 1.3 |
| | MW-3 | <50 | <50 | <100 | <5000 | <0.3 | <0.3 | <0.5 | <0.5 |
| 3/13/2002 | MW-1 | <50 | <50 | <100 | NA | <0.3 | <0.3 | <0.5 | <0.5 |
| | MW-2 | <50 | <50 | <100 | NA | <0.3 | <0.3 | <0.5 | <0.5 |
| | MW-3 | <50 | <50 | <100 | NA | <0.3 | <0.3 | <0.5 | <0.5 |
| 6/21/2002 | MW-1 | <50 | <50 | <100 | 8,700 | <0.3 | <0.3 | <0.5 | <0.5 |
| | MW-2 | <50 | <50 | <100 | 5,900 | <0.3 | <0.3 | <0.5 | <0.5 |
| | MW-3 | <50 | <50 | <100 | <5000 | <0.3 | <0.3 | <0.5 | <0.5 |
| 9/13/2002 | MW-1 | <50 | <50 | <200 | NA | <1 | <1 | <1 | <1 |
| | MW-2 | <50 | <50 | <200 | NA | <1 | <1 | <1 | <1 |
| | MW-3 | <50 | <50 | <200 | NA | <1 | <1 | <1 | <1 |
| 12/27/2002 | MW-1 | <50 | 66 | 560 | <5000 | <0.3 | <0.3 | <0.5 | <0.5 |
| | MW-2 | <50 | 71 | 100 | <5000 | <0.3 | <0.3 | <0.5 | <0.5 |
| | MW-3 | <50 | 62 | 100 | <5000 | <0.3 | <0.3 | <0.5 | <0.5 |
| 3/18/2003 | MW-1 | <50 | <50 | <200 | <1000 | <1 | <1 | <1 | <1 |
| | MW-2 | <50 | <50 | <200 | <1000 | <1 | <1 | <1 | <1 |
| | MW-3 | <50 | <50 | <200 | <1000 | <1 | <1 | <1 | <1 |
| 5/14/2003 | MW-1 | <50 | NA | NA | <1000 | <1 | <1 | <1 | <1 |
| | MW-2 | <50 | NA | NA | <1000 | <1 | <1 | <1 | <1 |
| | MW-3 | <50 | NA | NA | <1000 | <1 | <1 | <1 | <1 |
| 6/4/2003 | MW-1 | NA | <50 | <200 | NA | NA | NA | NA | NA |
| | MW-2 | NA | <50 | <200 | NA | NA | NA | NA | NA |
| | MW-3 | NA | <50 | <200 | NA | NA | NA | NA | NA |
| 8/13/2003 | MW-1 | <50 | <50 | <200 | <1000 | <1 | <1 | <1 | <1 |
| | MW-2 | <50 | <50 | <200 | <1000 | <1 | <1 | <1 | <1 |
| | MW-3 | <50 | <50 | <200 | <1000 | <1 | <1 | <1 | <1 |
| | WQO | 5 | 100 | | | 0.15 | 42 | 29 | 17 |

NA = not analyzed

< = less then

The reported concentrations of petroleum hydrocarbons in grab groundwater samples (Table 2) are a consequence of cross-contamination that often occurs when borings are drilled through shallow contaminated soil into a deeper water-bearing zone. Because these samples were “grabbed” from the highly disturbed, suspended-sediment-rich environment of an augured bore hole, they cannot be relied upon as quantitative indicators of ambient groundwater quality. At best, such “grab” samples can provide evidence of the absence of constituents (either dissolved or adsorbed to suspended

sediments) or a qualitative indication that constituents are present in the sample, although not necessarily dissolved in ambient groundwater.

Table 2: UST Assessment Grab Groundwater Samples

| Sample ID | Sample Date | TPHg (ppb) | TPHd (ppb) | Benzene (ppb) | Toluene (ppb) | Ethylbenzene (ppb) | Xylene (ppb) |
|-----------|-------------|------------|------------|---------------|---------------|--------------------|--------------|
| B-1 | 2/17/06 | 340 | <50 | 10 | <0.5 | 6.4 | 20 |
| B-2 | 2/17/06 | <50 | <50 | <0.5 | <0.5 | <0.5 | <1.5 |
| B-3 | 2/17/06 | 1400 | 230 | 40 | 19 | 33 | 120 |
| B-4 | 8/9/06 | 120 | <200 | 0.71 | <0.5 | <0.5 | 4.1 |
| B-6 | 8/10/06 | 680 | <80 | 61 | <0.5 | 5.3 | 5.9 |
| B-7 | 8/10/06 | <50 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| B-8 | 8/10/06 | <50 | <50 | <0.5 | <0.5 | <0.5 | <0.5 |
| WQO | -- | 5 | 100 | 0.15 | 42 | 29 | 17 |

< = less than

Soil: In February 1992 the remedial excavation was extended about 65 feet along the eastern edge of the structure foundation and removed about 480 cubic yards of soil and weathered shale contaminated with petroleum hydrocarbons. Relatively high concentrations of petroleum hydrocarbons were reported for excavation confirmation sample SW-14. In 2006, borings B-1 and B-2 were drilled through the foundation less than ten feet from the SW-14 sample location. Analyses of soil samples from these borings had reported concentrations of fuel constituents generally one to three orders of magnitude less than those reported for the sample collected fourteen years earlier. These data indicate that regardless of the origin of the fuel hydrocarbons, concentrations rapidly attenuate with time and/or distance.

Discussion:

Evidence in the record indicates that the UST release at the site has not affected the shallow confined groundwater with detectable concentrations of petroleum hydrocarbons, fuel oxygenates, VOCs, or metals. Additional investigation and cleanup of the site is not warranted in this case. The residual petroleum hydrocarbons that remain do not pose a threat to human health, safety, or the environment and will not adversely affect the beneficial use of groundwater in the area. Given the hydrologic and geologic conditions at the site, neither surface water nor the beneficial uses of groundwater are, or will be threatened during the period of impairment. Given the site-specific characteristics, and petitioner's remedial actions, the State Water Board finds that consistent with Resolution 92-49, water quality objectives will be met in a reasonable period of time.

The remedial actions undertaken by petitioner, including the excavation and remediation of about 2,400 cubic yards of soil and weathered bedrock, have mitigated any threat to public health, safety or the environment that may have existed. Further, cleanup

activities are consistent with the requirements of Resolution 92-49. So long as permanent cleanup goals are achieved, Resolution 92-49 allows for cleanup approaches to be tailored to address the circumstances of a particular case. Resolution 92-49 does not require a discharger to engage in further cleanup and abatement activities if it is determined that a discharger's cleanup proposal and implementation of the proposal will meet cleanup goals and objectives that implement water quality control plans for the affected site. (See Resolution 92-49 section III. A.)

Objection to Closure and Response:

In its July 31, 2009 response to the petition, the County asserts that site characterization is incomplete; additional monitor wells are needed to define "multiple plumes" and ascertain their stability and concentration trends, and that concentrations of petroleum hydrocarbons in soil are a continuing source of groundwater contamination and a potential threat to public health and safety.

Response: The release associated with the former USTs has been sufficiently characterized and affected soil has been removed and remediated to the extent practicable. Boring logs and soil analytical data show that remaining residual hydrocarbons are sequestered within the clay-rich soil and weathered bedrock beneath the foundation of the main site structure. Water quality data from site monitor wells indicate an absence of groundwater impacts associated with the UST release or other potential sources.

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.

Resolution 92-49 does not contemplate additional monitoring or cleanup and abatement activities if the State Water Board finds that the proposal submitted by the discharger has a substantial likelihood of achieving compliance with cleanup goals and objectives. Resolution 92-49 section III. A. states that the State Water Board, "shall concur with any investigative and cleanup and abatement proposal[s] which... implement permanent cleanup and abatement solutions which do not require ongoing maintenance..." Petitioner excavated approximately 2,400 cubic yards of contaminated soil in the UST release area. Groundwater monitoring conducted from 2001 to 2003 in three groundwater wells near the source area show that the release is contained and has not impacted groundwater beneath the site. Petitioner's remedial actions have implemented a permanent cleanup solution.

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

Summary and Conclusions:

The remaining mass of residual petroleum hydrocarbons is sequestered in weathering, clay rich, soil and bedrock. Shallow confined site groundwater is derived from subsurface inflow from the bedrock outcropping east of the site during the winter and spring and from the bedrock uplands west and south of the site in the summer and fall. Evidence in the record indicates that UST release at the site has not affected the shallow confined groundwater with detectable concentrations of petroleum hydrocarbons, fuel oxygenates, VOCs, or metals. Given the site's hydrology, geology, and source characteristics, the remaining petroleum hydrocarbons in weathered shale at the site do not pose a threat to public health and safety, the environment or to current and anticipated beneficial uses of water. UST case closure is appropriate.



Dennis Parfitt, CEG #1223
Senior Engineering Geologist

June 14, 2011

Date