

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING SEPTEMBER 4-5 2008

ITEM NUMBER: 14

SUBJECT: Cleanup Cases

DISCUSSION

Underground Storage Tank Program & MTBE Cases

New information for this report in italics

Water Board staff members are working on numerous petroleum underground storage tank (UST) cleanup cases involving methyl tertiary-butyl ether (MTBE). Four high profile or "worst case" problems are discussed below. Also attached to this report is a list of sites with MTBE in groundwater that gives an overall perspective of the region-wide problem. The attachment shows maximum MTBE concentrations reported in the first two quarters of 2008.

Chevron Service Station, 2194 Main Street, Cambria, San Luis Obispo County [John Mijares 805/549-3696]

Chevron Cambria service station, located on the corner of Main Street and Burton Drive in Cambria, has been a Central Coast Regional Water Quality Control Board (Central Coast Water Board) lead groundwater investigation and cleanup case since December 1993. In 1995 Chevron Products Company commissioned the removal of an underground storage tank (UST) system and transferred ownership of the service station to an independent owner/operator who installed a new UST system.

Chevron is cleaning up a petroleum hydrocarbon discharge, including the fuel additive methyl tertiary-butyl ether (MTBE), from the original UST system. The discharge threatened groundwater in Cambria Community Service District (CCSD) Wells No. 1 and 3, which provide supplemental water to the community of Cambria.

As part of interim corrective action beginning in May 2000, Chevron continuously pumped MTBE-contaminated water from four onsite wells. Currently, there are 15 shallow groundwater extraction wells. Beginning in November 2000, Chevron began full operation of groundwater extraction and high-vacuum, dual-phase extraction systems. Both systems operate continuously, except for periodic system upgrade, mechanical breakdowns, and system maintenance activities. Extracted and treated groundwater is stored in an onsite, 15,000-gallon tank until it is trucked offsite for disposal at the Santa Maria Wastewater Treatment Plant.

During a November 2001 technical work group meeting with Central Coast Water Board staff, CCSD representatives, and Chevron representatives, the CCSD indicated the new temporary high school well had been connected to the Cambria municipal drinking water supply. The CCSD needs the high school well as an alternative water supply. The CCSD installed a wellhead

treatment system on their Santa Rosa Creek wells which will enable well use in the event of an emergency. The Santa Rosa Creek Wells have not been impacted with MTBE.

On May 18, 2004, the Central Coast Water Board's Executive Officer rescinded Cleanup or Abatement Order (CAO) No. 00-28. The CAO required Chevron to provide CCSD with alternative water supply due to loss of CCSD's Well Nos. 1 and 3. The settlement agreement between CCSD and Chevron explicitly resolves all of CCSD's claims against Chevron, including claims for an alternative water supply.

Since the Last Staff Report:

The Second Quarter 2008 Groundwater Monitoring and Remediation Status Report indicates the following:

- *Monitoring wells within the plume boundaries continue to exhibit MTBE and tertiary butyl alcohol (TBA) concentrations exceeding the cleanup goals of 5 micrograms per liter ($\mu\text{g/L}$) and 12 $\mu\text{g/L}$, respectively; however, current concentrations have decreased significantly compared to historical maximum values. The second quarter 2008 MTBE and TBA maximum concentrations detected in piezometric well P-11 were 1,200 $\mu\text{g/L}$ and 5,000 $\mu\text{g/L}$, respectively. Historically, maximum concentrations of MTBE and TBA in were as high as 5,500 $\mu\text{g/L}$ and 8,800 $\mu\text{g/L}$, respectively. Shallow-zone MTBE and TBA isoconcentration maps are shown on Attachments 1 and 2, respectively.*
- *Monitoring wells historically located beyond the plume boundaries continue to be free of detectable concentrations of MTBE.*
- *Concentrations of petroleum hydrocarbons and fuel oxygenates were below reporting limits in all groundwater samples collected from the northern bank of Santa Rosa Creek (three sampling stations) during this quarter.*
- *Concentrations of petroleum hydrocarbons and fuel oxygenates were below reporting limits in all surface water samples collected from Santa Rosa Creek (three sampling stations) during this quarter.*
- *The high-vacuum, dual phase extraction (HVDPE) system operated during the reporting quarter. The HVDPE system has extracted and treated approximately 4,937 pounds of vapor phase petroleum hydrocarbons (TPHg) and 189 pounds of vapor phase MTBE between January 26, 2001 and June 9, 2008.*
- *The groundwater extraction and treatment (GWET) system also operated during the reporting quarter. The GWET system and the HVDPE system extracted and treated approximately 140,000 gallons of groundwater during the reporting quarter, which were disposed at the City of Santa Maria wastewater plant.*
- *In March 2008, SECOR conducted a Phase 2 pilot study to evaluate the feasibility of stimulating in-situ biodegradation by infiltrating aerated groundwater via existing remediation wells. Effluent from the GWET system was aerated in a small tank until saturated with oxygen then released to selected onsite wells. Results of the Phase 2 pilot study confirmed the positive results observed during the initial pilot study, and demonstrate that the infiltration of oxygenated water to the subsurface decreased concentrations of petroleum hydrocarbons, MTBE, and TBA, indicating enhanced biodegradation under aerobic conditions. On July 9, 2008, Central Coast Water Board staff approved Chevron's proposed full-scale implementation of this remediation strategy. Once implemented and evaluated, staff will include the progress of remediation in this report.*

Attachment 1: Shallow Zone Groundwater MTBE Isoconcentrations May 2007

*Attachment 2: Shallow Zone Groundwater TBA Isoconcentrations May 2007***California Water Service Company Supply Wells, Pajaro Street and Bridge Street, Salinas, Monterey County [John Goni 805/542-4628]**

In February 2002, Central Coast Water Board staff was notified by California Water Service Company in Salinas (CWSC), that monitoring indicated MTBE in two domestic supply wells in the Salinas area. Central Coast Water Board staff's review of known leaking underground tank cases near the wells found no active cases with high concentrations of MTBE in the area. Further investigation revealed a gasoline distributor (with 100,000 gallons of fuel product storage) close to the well, but a subsequent site investigation showed no evidence of a fuel release to underlying groundwater. Staff continued their investigation and directed other permitted underground tank facilities without previously reported leaks to perform groundwater investigations. These investigations failed to find a release of MTBE of significant size to account for the contaminant in the supply wells.

Surface water samples from the Salinas Reclamation Ditch near the CWSC supply wells showed no gasoline constituents or MTBE. A joint investigation by the Monterey County Health Department, Division of Environmental Health (MCEHD) and Central Coast Water Board staff concluded former packing houses in this area are not likely the source of MTBE contamination because (1) tank sizes were small, (2) the dates of tank closures precedes significant use of MTBE, and (3) hydrocarbons were not found in soil beneath the removed tanks.

Central Coast Water Board staff continued to coordinate the investigation with other agencies in search of the source of MTBE. A review of the State Water Resources Control Board's implementation of enhanced leak detection testing requirements for all underground tank facilities within 1000 feet of water supply wells did not identify any new potential sources of MTBE. The MCEHD agreed to increase inspections of all nearby permitted underground and aboveground tank facilities to ensure compliance and found no operational violations. The Monterey County Water Resources Agency (Agency) performed additional groundwater analytical testing at nearby production wells up- and crossgradient of the CWSC wells but did not detect any MTBE. CWSC information and Central Coast Water Board staff inspections confirmed that gasoline has not been stored at CWSC supply well locations. CWSC performed depth discrete sampling of Well Station 13-02 in December 2004. The sampling results indicate that the shallower/180-foot aquifer contains the highest concentrations of MTBE (67 ug/L).

In an effort to expand the investigation, Central Coast Water Board staff assisted the Agency in applying to the State Water Resources Control Board (State Water Board) for Cleanup and Abatement Account money to fund additional groundwater sampling. The State Water Board approved the allocation of cleanup and abatement funds to perform additional investigation and recently approved the contract between the Central Coast Water Board and the Agency. On December 13, 2007, the Agency hosted a well site visit and informational meeting for prospective consultants. Approximately 25 representatives of potential responsible parties and 14 consulting firms were present. As a result of the informational meeting, the Agency received and evaluated seven conceptual proposals for the investigation. The Agency mailed a scope of work for performing the investigation on February 29, 2008, using ideas from the seven conceptual proposals. The Agency received final bids on April 3, and finished their review and selection process on April 24.

Since the Last Staff Report:

The Agency executed a contract for the investigation in early May. Central Coast Water Board staff attended a project kick-off meeting and field trip on May 24. The consultant, Todd Engineers, is currently gathering site background information, consolidating information into a GIS compatible format and calculating the MTBE mass removed by the pumping of the California Water Service Company water supply wells. The next phase is groundwater characterization to determine the MTBE vertical distribution, flow, and gradient near the affected water supply wells. Characterization will include installing monitoring wells on the site of the California Water Service Company water supply wells.

Camp Evers Combined Site (Four Gasoline Service Stations) Mount Hermon Road and Scotts Valley Drive, Scotts Valley, Santa Cruz County [Wei Liu 805/ 542-4648]

Petroleum hydrocarbons including benzene, 1,2-dichloroethane (1,2-DCA) and MTBE were first detected in groundwater beneath the Tosco, Shell, BP, and Chevron service stations located at the intersection of Mount Hermon Road and Scotts Valley Drive in the mid-1990s. Previous onsite corrective actions at the Tosco, Shell, and BP sites included soil vapor extraction, air sparging, dual phase extraction, and/or groundwater extraction to remediate the MTBE plume. Chevron has continued remediation of the benzene plume. The onsite corrective actions have successfully removed MTBE and other gasoline constituents from groundwater directly beneath the four service station sites and onsite remediation has been discontinued at all four sites.

An MTBE plume mass appears to have “detached” from the original plume, and migrated to a downgradient offsite location beneath the nearby King’s Village Shopping Center. The historic maximum detected MTBE concentration was 38,300 micrograms per liter (µg/L) in a May 1999 monitoring event. In addition, both benzene and MTBE have been detected in the adjacent Manana Woods water supply well and this well was fitted with a wellhead treatment system to remove these contaminants.

The responsible parties installed a permanent groundwater pumping and treatment system at the King’s Village Shopping Center in November 2002, to remediate and hydraulically control the detached plume. Treated groundwater was discharged by way of the storm sewer system to surface water (ultimately Bean Creek) under a Central Coast Water Board General NPDES Permit for highly treated groundwater. The recently updated General NPDES Permit includes sampling requirements for various metals and other priority pollutants. In July 2007, effluent samples from the treatment system showed a zinc concentration which exceeded the General Permit effluent limit for zinc. The system has since been shutdown. Staff has worked with the dischargers to identify the cause of the elevated zinc effluent concentrations and to evaluate various options to ensure compliance with the new General Permit effluent limit. However, it appears the current treatment systems cannot meet the effluent limits for metals, as it was designed primarily for treating hydrocarbons. In addition, metals occur naturally in the area and are present in some parts of the treatment system itself.

Staff recommended the responsible parties apply for a permit to discharge highly treated groundwater to City of Scotts Valley’s sanitary sewer system, which allows higher metal effluent limits while maintaining equally stringent limits for petroleum hydrocarbons. In December 2007, the dischargers applied for and received a discharge permit from the City of Scotts Valley for

discharging highly treated groundwater to its sanitary sewer system. The responsible parties re-started the treatment system in March 2008, with treated groundwater currently discharging to the sanitary sewer system.

Since the Last Staff Report:

First Quarter 2008 groundwater sample results indicate maximum MTBE concentrations of 26 µg/L in onsite monitoring well (Tosco's) RW-2, and 120 µg/L in offsite monitoring well CEMW-9 which is located upgradient of groundwater extraction well CEEW-1 (see Attachment 3 for well locations). A maximum concentration of 1,300 µg/L TBA was detected in offsite monitoring well CEMW-16. MTBE concentrations in downgradient offsite well CEMW-6, which historically had the highest MTBE concentrations, have been reduced from a maximum of 38,300 µg/L in May 1999 to 1.0 µg/L in February 2008. In addition, MTBE concentrations in downgradient offsite well CEMW-16, which is near the groundwater pumping and treatment system, were reduced from 4,710 µg/L in January 2001 to 3.3 µg/L in February 2008. Wells CEMW-6 and CEMW-16 are located upgradient of groundwater extraction well CEEW-1.

The downgradient offsite remediation system has removed approximately 23.7 million gallons of water, 340.4 pounds (lbs) of TPH, 11.4 lbs of benzene, 66.7 lbs of MTBE, and 28 lbs of TBA since November 26, 2002.

Attachment 3: Well Location Map

Quik Stop Market No. 78, 5505 Soquel Drive, Soquel, Santa Cruz County [Tom Sayles 805-542-4640]

Quik Stop Market No. 78 (Quik Stop) is an operating gasoline service station located on the corner of Soquel Drive and Hardin Way in Soquel. The site has been a Regional Board-lead groundwater investigation and cleanup case since June 1999.

A permanent dual-phase (soil vapor and groundwater) treatment system has been operating at the site since July 5, 2002. Treated groundwater is discharged to the sanitary sewer under a County of Santa Cruz Permit (No. 00002829) and a catalytic oxidizer treatment system operates under a Monterey Bay Unified Air Pollution Control District permit (No. 11054).

The responsible party installed three additional vapor extraction wells in December 2003 to enhance cleanup system effectiveness. In addition, the responsible party converted one on-site monitoring well into a 4-inch diameter well to enhance groundwater extraction efficiency. The highest historic concentration of MTBE was 230,000 µg/L in monitoring well MW-4 (near the source area) on March 2, 2000.

Since the Last Staff Report:

Second Quarter 2008 monitoring samples showed a maximum concentration of 420 µg/L MTBE in onsite monitoring well MW-4R. Samples also showed a maximum concentration of 2,400 µg/L TBA in onsite extraction well RW-2. The MTBE and TBA concentrations are highest near the fuel tank complex, which is consistent with past quarters. Quik Stop is sampling Nobel Creek at four down gradient locations. Quik sampled the creek on April 4 and June 5, 2008. All creek samples were below detection limits for MTBE and TBA.

Groundwater extraction pumps continue to operate in extraction wells RW-2, RW-3, and MW-4R and cleanup is ongoing.

The remediation system has removed approximately 850,012 gallons of water, 929.78 pounds of MTBE, and 246.89 pounds of TBA since system start up in April 2001.

Regionwide MTBE List

The Regionwide MTBE Listing and High Priority Sites list is included as Attachment 4. The list shows site names and addresses as well as the priority listing (Rank A, B, or C) based on State Board MTBE guidelines. Staff has required accelerated cleanup at some higher priority Rank A sites. We require interim cleanup action as soon as technically feasible until full-scale cleanup activity can begin. MTBE cleanup goals are typically set at the secondary maximum contaminant level (MCL) for drinking water of 5 micrograms per liter ($\mu\text{g/L}$), which is a taste and odor threshold. The primary MCL, based on threat to public health, is 13 $\mu\text{g/L}$.