STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING FEBRUARY 7- 8, 2008

ITEM NUMBER: 13

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). Five high profile sites 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 regionwide problem.

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 a UST system and service station ownership/operation was transferred from Chevron to an independent owner/operator who installed a new UST system.

Chevron is cleaning up a petroleum hydrocarbon discharge, including the fuel additive 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 the 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 the 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 was connected to the municipal drinking water supply. The CCSD's high school well is

needed as an alternative water supply and the wellhead treatment system CCSD installed on their Santa Rosa Creek wells will enable their use in the event of an emergency.

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.

The Third Quarter 2007 Groundwater Monitoring and Remediation Status Report indicates the following:

- *The monitoring wells within the plume boundaries continue to exhibit MTBE concentrations exceeding the cleanup goal of 5 micrograms per liter (µg/L); however, current concentrations have decreased significantly compared to historical maximum values. The third quarter 2007 maximum MTBE concentration was 970 µg/L in monitoring well MW-30. Maximum concentrations of MTBE in MW-30 was 12,000 µg/L. A maximum concentration of 700 µg/L tertiary butyl alcohol (TBA) was detected in monitoring well MW-48. The shallow-zone TBA and MTBE isoconcentration maps are shown on Attachment 1 and 2, respectively.*
- *Monitoring wells historically known to be located beyond the plume boundaries continue to exhibit non-detectable concentrations of MTBE.*
- *Neither petroleum hydrocarbons nor fuel oxygenates were detected in any of the samples collected from shallow groundwater samples from the northern bank of Santa Rosa Creek (three sampling stations) during this quarter.*
- *Neither petroleum hydrocarbons nor fuel oxygenates were detected in any of the samples collected from Santa Rosa Creek (three sampling stations) during this quarter.*
- *The high-vacuum dual phase extraction (HVDPE) system had been operating during the reporting quarter. The HVDPE system has extracted and treated approximately 4,900 pounds of vapor phase petroleum hydrocarbons (TPHg) and 190 pounds of vapor phase MTBE between January 26, 2001 and September 11, 2007.*
- *The groundwater extraction and treatment (GWET) system has been operating during the reporting quarter. The groundwater extraction and treatment system and the HVDPE system extracted and treated approximately 120,000 gallons of groundwater during the reporting quarter, which were disposed of at the City of Santa Maria wastewater plant.*
- *SECOR, on behalf of Chevron, conducted a pilot study during the third quarter 2007 to evaluate the feasibility of stimulating in-situ biodegradation by infiltrating aerated groundwater via existing remediation wells. Effluent from the GWET system was sparged in a small tank until oxygen saturation was achieved and released in batches to selected onsite wells. SECOR evaluated the response by monitoring selected onsite observation wells and offsite piezometers. Results of the pilot study demonstrate that infiltration is feasible for delivering oxygen to the subsurface, resulting in increased levels of dissolved oxygen (DO) to support microbial degradation of MTBE and TBA under aerobic conditions. SECOR consultants observed decreases in MTBE and TBA concentrations during the pilot study. Sustainable infiltration rates are unknown at this time due to the limited nature of the pilot study. Based on the favorable result of the pilot study, SECOR proposes to conduct a longer-term pilot study to further evaluate sustainable infiltration rates, water level and DO response to infiltration, and performance of the GWET system. Central Coast Water Board*

staff has approved implementation of the second-phase infiltration pilot study. Water Board staff will provide progress and results of this study in future reports.

Attachment 1 & 2: TBA and MTBE Isoconcentration Maps

California Water Service Company Supply Wells, Pajaro Street and Bridge Street, Salinas, Monterey County [John Goni 805/542-4628]

Central Coast Water Board staff was notified by a Salinas water purveyor, California Water Service Company (CWSC), that two supply wells in the Salinas area showed detections of the fuel oxygenate MTBE. Central Coast Water Board staff's review of known leaking underground tank cases near the wells indicated that there are no active cases with high concentrations of MTBE. Further investigation revealed a gasoline distributor (with 100,000 gallons of fuel products storage) close to the well, but a subsequent site investigation showed no evidence of a fuel release to underlying groundwater. Staff continued its 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, collected by Central Coast Water Board staff, near the CWSC supply wells showed non-detectable concentrations of gasoline constituents or MTBE. As suggested by Central Coast Water Board members, staff investigated a former packing plant near the CWSC supply wells. A joint investigation by the Monterey County Environmental Health Department (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 (State Water Board) 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; no operational violations were found. The Monterey County Water Resources Agency (Agency) performed additional groundwater analytical testing from nearby production wells up and crossgradient of the CWSC wells, and did not detect any MTBE. CWSC information and Central Coast Water Board staff inspections confirmed that gasoline has not been stored at their 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 μg/L).

Central Coast Water Board staff continues to require leaking underground tank cases in the area of the water supply wells to vigorously cleanup fuel releases associated with their cases. Valero has started a dual phase extraction cleanup system test for the Valero (formerly Beacon) station at 430 North Main Street. Shell is currently extracting groundwater to contain their release from the station at 417 North Main Street. Sturdy Oil Company is implementing a soil vapor extraction system to cleanup soil and groundwater associated with the former Exxon Station at 225 North Main Street.

In an effort to expand the investigation, Central Coast Water Board staff assisted the Agency in applying to the State Water Board for Cleanup and Abatement Account money to fund additional groundwater sampling. The State Water Board approved the allocation of funds to perform additional investigation and a contract between the Central Coast Water Board and Agency was approved. Central Coast Water Board staff is assisting the Agency and the MCEHD in soliciting proposals from consultants for investigating the source of the MTBE. *On December 13, 2007, a well site visit and informational meeting were hosted by the Agency for prospective investigators/bidders. Approximately 25 representatives of responsible parties and 14 consulting firms were present. The Agency, MCEHD, CWSC and Central Coast Water Board staff made presentations. Proposals for investigation concepts are due January 18, 2008. The time line for completion of the investigation will depend on the nature of the investigation concepts.*

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 and MTBE have been detected in groundwater beneath the Tosco, Shell, BP, and Chevron service stations located at the intersection of Mount Hermon Road and Scotts Valley Drive. An expanded site plan is illustrated on Attachment 3.

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; therefore, onsite remediation has been discontinued at all four sites.

The MTBE plume mass appears to have "detached" from the original plume, and migrated to a downgradient offsite location beneath the King's Village Shopping Center with a maximum concentration of 38,300 µg/L detected in well CEMW-6 in May 1999. In addition, the Manana Woods water supply well was impacted by benzene and MTBE and extracted water is being treated using a wellhead treatment facility to remove the 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 the General NPDES Permit for highly treated groundwater. *The discharge continued after the General NPDES Permit renewal in December 2006, which includes some new requirements, particularly sampling requirements for various metals and other priority pollutants. In July 2007, effluent samples showed zinc at a concentration of 133 µg/L, exceeding the effluent limit of 120 µg/L for zinc. The system has been shutdown. Staff has worked with the dischargers in attempts to identify the cause of the elevated zinc effluent concentrations and to evaluate various options to ensuring compliance with the new General Permit. However, it appears the current treatment systems cannot meet the effluent limits for metals, probably because the treatment system has been 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 discharger 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 similarly or equally stringent limits for petroleum hydrocarbons. In December 2007, the dischargers received a discharge permit from the City of Scotts Valley for discharging highly treated groundwater to its sanitary sewer system. The dischargers are*

currently working on reconfiguring the discharge connection to the City's sanitary sewer system and restarting operation of the treatment system. Staff expects the treatment system will be restarted in early March of 2008.

Third Quarter 2007 groundwater samples collected on July 30 through August 2, 2007, indicate maximum MTBE concentrations of 9.7 µg/L in onsite monitoring well Tosco MW-13, and 87 µg/L in off-site monitoring well CEMW-19B. A maximum concentration of 2,300 µg/L TBA was detected in offsite monitoring well CEMW-6. 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 5.9 µg/L in August 2007. 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 less than 2.5 µg/L in August 2007. Wells CEMW-6 and CEMW-16 are located upgradient of groundwater extraction well CEEW-1. These results suggest that the downgradient remediation system is effective in removing the contaminants.

Well CEMW-19B is located downgradient of extraction well CEEW-1 and cross-gradient of the Manana Woods well. MTBE concentrations in CEMW-19B have been fluctuating at similar levels since its installation in 2002, suggesting that a residual MTBE plume passed the influence zone of extraction well CEEW-1 before its installation and operation. This residual MTBE plume appears to be localized around well CEMW-19B because well nests CEMW-20's and CEMW-21's, which are located downgradient from well CEMW-19B, have shown non-detect or trace (up to 2.3 µg/L) MTBE concentrations since 2002. The responsible parties are currently evaluating various remedial alternatives to cleanup the residual MTBE contamination localized around well CEMW-19B.

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 Central Coast Water Board-lead groundwater investigation and cleanup case since June 1999.

The approved corrective action plan consisting of a permanent dual-phase (soil vapor and groundwater) treatment system has been operating since July 5, 2002. The treated groundwater is discharged to the sanitary sewer under a County of Santa Cruz Permit (No. 00002829) and the catalytic oxidizer treatment system operates under a Monterey Bay Unified Pollution Control District air permit (No. 11054).

Three additional vapor extraction wells were installed in December 2003, in the vicinity of MW-3, to enhance cleanup system effectiveness. In addition, MW-3 was overdrilled and converted into a 4-inch diameter well to enhance groundwater extraction efficiency. The highest concentration of MTBE was 230,000 µg/L in monitoring well MW-4 (near the source area) on March 2, 2000.

Fourth Quarter 2007 groundwater samples were collected on December 11, 2007. Monitoring samples showed a maximum concentration of 3.8 µg/L MTBE in offsite monitoring well MW-6. Samples also showed a maximum concentration of 1,800 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 on a quarterly basis at four downgradient locations. TBA was detected in Creek sample A at 47µg/L on December 11, 2007. All other 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.

Former Bear Valley Chevron, 1099 Los Osos Valley Road, Los Osos, San Luis Obispo County, [Corey Walsh 805/542-4781]

Water Board staff are evaluating the responsible party's request for closure of this UST case. However, groundwater sample results indicate pollution remains at concentrations greater than Central Coast Water Board cleanup goals for benzene, MTBE and TBA in three offsite monitoring wells. The cleanup goals for benzene, MTBE, and TBA are 1 µg/L, 5 µg/L, and 12 µg/L, respectively. *October 2007 groundwater sample results indicate contaminant concentrations of 3.8 µg/L benzene in monitoring well ML2-C3; 13 µg/L MTBE, 45 µg/L TBA in monitoring well ML5-C3, 5.6 µg/L MTBE and 14 µg/L TBA in monitoring well PT-2. Attachment 1, Groundwater Analytical Results, shows well locations and concentrations. Other typical petroleum hydrocarbon constituents of concern (e.g., total petroleum hydrocarbons, toluene, ethylbenzene, xylenes, 1,2-Dichloroethane, and other fuel oxygenates) are below cleanup goals or were not detected in groundwater samples.*

Southern California Water Company (Los Olivos No. 3) and the Los Osos Community Services District (10th Street) municipal water wells are located approximately 1,000 feet (ft) from the site. In August 2000, samples showed MTBE in the Los Olivos No. 3 well at a concentration of 1.2 µg/L. MTBE was found in samples until June 2003. Well construction details indicate this well is screened from 148 to 202 ft below ground surface (bgs) and 222 to 232 ft bgs. The maximum concentration of MTBE detected was 3.6 µg/L in January 2002 and again in November 2002. This well is sampled monthly, while the 10th Street well is sampled once every three years. Water production from the Los Olivos No. 3 and 10th Street wells continues to run at normal rates. *Monitoring results for the Los Olivos No. 3 well continue to be less than 0.5 µg/L (non-detect) for MTBE (last sampled November 7, 2007) and non-detect for MTBE in the 10th Street well (last sampled September 4, 2007).*

Soil and groundwater cleanup began in 1997 with operation of an onsite soil vapor extraction (VE) and air sparging (AS) remediation system, which operated through the summer of 2000. The AS/VE system was shut down due to reduced influent concentrations, and was restarted in January 2003 to evaluate hydrocarbon concentrations. However, due to reduced influent concentrations, system upgrade costs, and nuisance complaints, the system was shut down in April 2003 and later removed. Consultants conducted dual phase (groundwater and soil vapor) extraction events on select monitoring wells from January to June 2001. In late 2001, during removal of the USTs and dispensers, 160 cubic yards of contaminated soil was also removed. After further assessment, an offsite remediation system made-up of an integrated AS, VE, and groundwater circulation well system began operation in April 2002. The groundwater

remediation system was shut down in June 2005 to evaluate contaminant concentration rebound, and to conduct verification monitoring. The in-situ groundwater remediation system treated approximately 26,489,077 gallons of groundwater and removed an estimated 61 pounds of hydrocarbons. *Consultants collected groundwater verification monitoring samples in January 2006, July 2006, April 2007, and October 2007. The groundwater monitoring data continue to indicate on-going natural biodegradation of hydrocarbons, and a continued reduction in concentrations to below or near cleanup goals. The TBA concentration increased temporarily in one well and currently appears to be declining, and is thought to be the result of on-going natural biodegradation of MTBE.*

The groundwater plume currently underlies a portion of Los Osos Valley Road and the adjacent property owned by MWF Properties LLC. This is also the location of the treatment system, treatment wells, and the majority of monitoring wells. This property owner has objected to removal of the treatment system, and case closure while groundwater contaminant concentrations exceed cleanup goals. MWF Properties has indicated additional verification monitoring should be conducted prior to case closure.

Site investigation and cleanup activities have been funded (reimbursed) through the State Water Board UST Cleanup Fund (Fund). Staff projects that remaining UST funds will nearly be exhausted upon removal of the treatment system and monitoring wells. If additional verification monitoring is warranted, treatment system and well removal will likely require other sources of funding considering estimated costs associated with monitoring, well destruction, and treatment system removal.

Water Board staff is meeting with interested parties to discuss and evaluate alternatives. Alternatives include recommending the case for closure; continuing groundwater verification monitoring; and restarting the groundwater treatment system. Staff will report the results of these meetings in the next update.

Attachment 4: Groundwater Analytical Results map

Regionwide MTBE List

The Regionwide MTBE Listing and High Priority Sites list is included as Attachment 5. 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. Interim cleanup action is required 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 (μg/L), which is a taste and odor threshold. The primary MCL, based on threat to public health, is 13 μg/L.