STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING DECEMBER 10, 2009

ITEM NUMBER: 11

SUBJECT: **Underground Storage Tank Program and MTBE Cases**

DISCUSSION

Underground Storage Tank Program and MTBE Cases
(New information for this report in italics)

Central Coast Water Board staff oversees cleanup activities on numerous petroleum underground storage tank (UST) cases involving methyl tertiary-butyl ether (MTBE). Central Coast Water Board staff provides updates on four high profile MTBE cleanup cases below. Staff has also attached a list of sites with MTBE in groundwater providing an overall perspective of the region-wide impact of these releases. The attachment shows maximum MTBE concentrations reported in the third and fourth quarters of 2008. The final attachment is the Underground Tanks Summary Report.

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 Water Board-lead groundwater investigation and cleanup case since December 1993. In 1995 Chevron Products Company commissioned the removal of a 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 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.

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. Treated groundwater is stored in an on-site, 15,000-gallon tank until it is trucked off-site 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 Third Quarter 2009 Groundwater Monitoring and Remediation Status Report indicates the following:

- *Sample results from monitoring wells within the plume boundaries continue to show MTBE and tertiary butyl alcohol (TBA) concentrations exceeding the cleanup goals of 5 micrograms per liter (µg/L)and) 12 µg/L, respectively; however, current concentrations have decreased significantly compared to historical maximum values. The third quarter 2009 maximum MTBE concentration was detected in monitoring well MW-30 at 360 µg/L and the maximum TBA concentrations was detected in monitoring well MW-50 at 230 µg/L. Historically, maximum concentrations of MTBE and TBA were as high as 5,500 µg/L and 8,800 µg/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 and TBA.*
- *The high-vacuum, dual phase extraction system was not operated during the period. Chevron started an oxygenated groundwater infiltration at the site on October 15, 2008, to enhance the biodegradation of the petroleum hydrocarbon plume.*
- *The groundwater extraction and treatment (GWET) system operated during the reporting quarter. The GWET system extracted and treated approximately 20,000 gallons of groundwater during the third quarter that was disposed at the City of Santa Maria wastewater plant.*
- *Approximately 10,200 gallons of oxygenated groundwater were infiltrated into wells HVE-3, HVE-5, HVE-10, and HVE-11 during the third quarter. Historical laboratory results in well HVE-5 indicate an overall declining trend for MTBE concentrations. The other infiltration wells (HVE-3, HVE-10, and HVE-11) were not sampled. These wells will be sampled semiannually.*
- *In general, dissolved oxygen (DO) concentrations in the groundwater extraction wells downgradient of the southwestern portion of the site (MW-46 through MW-52) remained elevated compared to the wells downgradient of the southeastern portion of the site (MW-53 through MW-55) suggesting that dissolved oxygenated water has dispersed in localized groundwater.*
- *Oxidation-Reduction Potential (ORP) measurements indicated the localized groundwater in the vicinity of groundwater extraction wells southwest of the site is in an oxidized state. The ORP readings from wells southeast of the site indicate that groundwater is in neutral or reducing state.*
- *Stantec has expanded groundwater infiltration into wells HVE-8 and MW-7, and eventually into MW-15 at the eastern portion of the site to increase DO concentrations and promote oxidizing conditions in downgradient wells to accelerate degradation of hydrocarbons in groundwater..*

Attachment 1: Shallow Zone Groundwater MTBE Isoconcentrations December 2008
Attachment 2: Shallow Zone Groundwater TBA Isoconcentrations December 2008

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

In February 2002, California Water Service Company (CWSC) in Salinas notified Central Coast Water Board staff 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.

In an effort to expand the investigation, Central Coast Water Board staff assisted the Monterey County Water Resources Agency (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 funds and approved a contract between the Central Coast Water Board and the Agency. In early 2008, the Agency issued a request for proposal to perform a source investigation. The Agency received final bids on April 2008 and executed a contract with Todd Engineers (Todd) in May 2008. Todd has completed the first phase of the investigation, which included assembling background information, confirming the time line of MTBE occurrences in the Salinas area water supply wells, determining the mass of MTBE intercepted by the wells, and indentifying potential sources of MTBE and potential conduit wells.

Since the Last Staff Report:

The second phase of the investigation is underway. Todd installed shallow groundwater monitoring wells adjacent to the affected water supply wells to obtain samples for organic carbon, generalized minerals, and specialized isotope testing to determine if shallow groundwater is the source of MTBE and, if so, to trace groundwater to an MTBE source or sources. Responsible parties collected shallow zone groundwater samples at seven leaking underground tank sites in the area around the affected supply wells, and analyzed for specific isotopes. Common shallow groundwater characteristics identified by the testing will "fingerprint" each MTBE groundwater source in the area. Any common or closely related shallow groundwater fingerprints found between the water supply wells and leaking tank cases could indicate areas for further investigation as possible sources of MTBE.

Work on the investigation was delayed in July 2009 because of budget problems in Sacramento. The contract problems were corrected and work re-commenced in November 2009. Todd is now analyzing the isotope data for potential sources and water level data for hydraulic conductivity between shallow groundwater and the deeper zones serving the supply wells. A status report is due in mid-December with the conclusions of this analysis and the recommendations for the next action.

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.

A monitoring event in the late 1990s showed that an MTBE plume mass detached from the original plume and migrated to a downgradient offsite location beneath the nearby King's Village Shopping Center. The historic maximum MTBE concentration, recorded in May 1999, was 38,300 micrograms per liter (µg/L). 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 is discharged to the City of Scotts Valley sanitary sewer.

Since the Last Staff Report:

Second Quarter 2009 groundwater sample results indicate maximum MTBE concentrations of 37 µg/L in on-site monitoring well (Tosco's) RW-2, and 290 µg/L in off-site monitoring well CEMW-9 which is located upgradient of groundwater extraction well CEEW-1 (see Attachment 3 for well locations). Results showed a maximum concentration of 130 µg/L TBA in downgradient, off-site monitoring well CEMW-16. The treatment system has reduced MTBE concentrations in well CEMW-6, which historically had the highest MTBE concentrations, from a maximum of 38,300 µg/L in May 1999 to 2.6 µg/L in April 2009. In addition, MTBE concentrations in downgradient offsite well CEMW-16, which is near the groundwater pumping and treatment system, have fallen from 4,710 µg/L in January 2001 to 3.5 µg/L in April 2009. Wells CEMW-6 and CEMW-16 are located upgradient of groundwater extraction well CEEW-1.

Groundwater generally flows towards North-Northeast in Camp Evers area. The following table provides concentration ranges for the furthest well downgradient from the source (CEMW-21A, B, C) for the last four quarters of groundwater monitoring:

Volatile Organic Compound	*Groundwater Cleanup Goal (µg/L)*	*Concentration range in Groundwater – last four quarters (µg/L)*
TPHg	*1,000*	*ND*
Benzene	*1*	*<1 – 7.2*
MTBE	*5*	*<1 – 6.3*
TBA	*12*	*<1 – <10*
Toluene	*150*	*ND*
Ethylbenzene	*300*	*ND*
Xylenes	*1,750*	*ND*

ND Not detected above Method Detection Limit

The downgradient offsite remediation system has removed more than 24.3 million gallons of water, 346.1 pounds (lbs) of TPH, 11.4 lbs of benzene, 66.8 lbs of MTBE, and 28.3 lbs of TBA since November 26, 2002.

Attachment 3 Monitoring Well Locations

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.

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).

Quik Stop installed three additional vapor extraction wells in December 2003 to enhance cleanup system effectiveness. In addition, Quik Stop 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 *pg/L* in monitoring well MW-4 (near the source area), on March 2, 2000.

Since the Last Staff Report:
Third Quarter 2009 monitoring samples showed a maximum concentration of 4.2 µg/L MTBE in onsite monitoring well MW-1. Samples also showed a maximum concentration of 1,480 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 samples Nobel Creek at four downgradient locations. Quick Stop sampled the creek on September 10, 2009. 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. (Monitoring and remediation wells are shown in Attachment 4.)

The remediation system has removed approximately 921,205 gallons of water, 929.83 pounds of MTBE, and 259.85 pounds of TBA since system start up in April 2001. On August 13, 2009 the Central Coast Water Board staff approved a workplan to enhance bioremediation by using an in-situ submerged oxygen curtain (iSOC) that infuses oxygen into the groundwater. Quik Stop is currently obtaining permits from Santa Cruz County and anticipates installing the system during the Fourth Quarter 2009.

Attachment 4 Site 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. Central Coast Water Board 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 (µg/L), which is a taste and odor threshold. The primary MCL, based on threat to public health, is 13 µg/L.

Attachment 5: Region Wide MTBE Listing

Underground Tanks Summary Report

The Underground Tanks Summary Report (Attachment 6) provides a snapshot of program caseload distribution and performance measures, including new and closed cases for this fiscal year. The UST program performance measure target for Water Board-lead closures during this fiscal year (started July 1, 2009) is 17 cases closed. At the time of this report, staff had reached closure for 6 Water Board-lead UST cases, with another four Water Board-lead cases pending well abandonment. Water Board staff recommends four additional closures on the current agenda.

The Summary Report also shows the number of currently active cases in the region, the total number of closed cases since the beginning of the program and cases pending closure. Cases pending closure have met closure criteria but will not be officially closed until the responsible party has properly destroyed all monitoring and treatment wells at the site.

Attachment 6: Underground Tanks Summary Report