

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING FEBRUARY 3, 2011

Prepared on January 10, 2011

ITEM NUMBER: 10

SUBJECT: Underground Storage Tank Program Summary & MTBE Cases

DISCUSSION

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 periodically 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 MTBE attachment described at the end of this report (Attachment 7) shows the most recent data for all Water Board-lead cases with MTBE concentrations exceeding five micrograms per liter.

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 remains responsible for cleaning up the petroleum hydrocarbon discharge, including the fuel additive methyl tertiary-butyl ether (MTBE), leaked 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 (HVDPE). Both systems operate continuously, except for periodic system upgrade, mechanical breakdowns, and system maintenance activities. In October 2008, Chevron implemented the enhanced in-situ bioremediation via infiltration of treated and oxygenated groundwater using existing dual phase extraction wells for infiltration. Consequently, operation of the HVDPE system has been suspended during implementation of the in-situ bioremediation to enhance natural attenuation processes by creating oxidizing conditions in groundwater onsite and immediately south of the site.

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 Semiannual (June through December) 2010 Groundwater Monitoring and Remediation Status Report indicates the following:

- *Sample results from monitoring wells within the plume boundaries continue to show benzene, MTBE, and tertiary butyl alcohol (TBA) concentrations exceeding the cleanup goals of 1 microgram per liter ($\mu\text{g/L}$), 5 $\mu\text{g/L}$, and 12 $\mu\text{g/L}$, respectively; however, current concentrations have decreased significantly compared to historical maximum values. The second semiannual 2010 (based on the November 18, 2010 groundwater monitoring event) groundwater monitoring report indicated maximum benzene concentration in monitoring well MW-55 at 120 $\mu\text{g/L}$, maximum MTBE concentration in monitoring well MW-50 at 210 $\mu\text{g/L}$, and the maximum TBA concentration in monitoring well P-6 at 1200 $\mu\text{g/L}$. Historically, maximum concentrations of benzene, MTBE, and TBA were as high as 8,000 $\mu\text{g/L}$, 41,000 $\mu\text{g/L}$, and 47,000 $\mu\text{g/L}$, respectively. The concentration of benzene in well MW-55 exhibits a declining trend from a high of 1,700 $\mu\text{g/L}$ in April 2004. The concentration of MTBE in well MW-50 exhibits a declining trend from a high of 5,500 $\mu\text{g/L}$ in April 2004. The concentration of TBA in P-6 exhibits a declining trend from a high of 47,000 $\mu\text{g/L}$ in March 2003.*
- *Benzene concentrations above cleanup goals appear to be most concentrated at the southeastern portion of the site and off-site to the east and southeast in the vicinity of wells MW-7, MW-54, MW-55 and P-10. Attachment 1 shows the most recent concentrations for benzene in groundwater.*
- *MTBE concentrations above cleanup goals appear to be most concentrated at the western portion of the site with the plume extending offsite to the southwest. Attachment 2 shows the most recent concentrations for MTBE in groundwater.*
- *TBA concentrations above cleanup goals appear to be most concentrated at both the central and southeastern portions of the site and extend offsite to the southeast. Attachment 3 shows concentrations for TBA in groundwater. The isoconcentration maps are based on data from the wells sampling on October 28, 2010.*
- *The groundwater extraction and treatment (GWET) system operated during the reporting period. The GWET system extracted and treated approximately 54,300 gallons of groundwater from July to December 2010. Approximately 19,300 gallons of oxygenated groundwater was infiltrated into the combined wells and 35,000 gallons were trucked to, and disposed of, at the City of Santa Maria wastewater plant.*
- *Laboratory analytical results and field measurements indicate that the groundwater cleanup effort is progressing utilizing both GWET and oxygenated groundwater infiltration technologies. In addition, natural attenuation data indicate that the continued infiltration of oxygenated groundwater at the site promotes biodegradation.*

Attachment 1: Shallow Zone Groundwater benzene Isoconcentrations 2nd Half 2010

Attachment 2: Shallow Zone Groundwater MTBE Isoconcentrations 2nd Half 2010

Attachment 3: Shallow Zone Groundwater TBA Isoconcentrations 2nd Half 2010

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 of its municipal 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 municipal 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. The Agency mailed a scope of work for performing the investigation on February 29, 2008, using ideas from seven conceptual proposals. The Agency finished their review and selection process on April 24, 2008. The Agency executed a contract with Todd Engineers in May of 2008.

Since the Last Staff Report:

The Agency completed their investigation in December 2010. The Agency submitted the full report, titled Subsurface Site Investigation to Characterize and Determine Source(s) of Methyl tertiary-Butyl Ether (MTBE) in Salinas Water Supply Wells. Staff included the Executive Summary of the report as Attachment 4. The investigation did not pinpoint a specific source(s) of MTBE affecting water supply wells, but rather determined probability zones for sources of MTBE affecting the wells, and ranked the probability of known leaking underground tank cases to affect the wells. The report also includes a number of recommendations with cost estimates for further study to better find the sources of MTBE. These recommendations include specific numbers and locations of deep groundwater monitoring wells, additional evaluation and testing of existing wells, and defining additional specific criteria for a better groundwater model.

Central Coast Water Board staff is using the probability analysis and ranking in the report to direct specific underground tank owners in the vicinity to conduct additional-site specific investigations to help identify possible sources of MTBE. Depending on the results of these investigations, staff will also consider seeking funding to implement selected recommendations for additional study.

Attachment 4 Executive Summary

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 the responsible parties have discontinued on-site remediation 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, off-site location beneath the nearby King's Village Shopping Center. The historic maximum MTBE concentration, recorded in May 1999, was 38,300 micrograms per liter ($\mu\text{g/L}$). In addition, samples from the adjacent Manana Woods water supply well contained both benzene and MTBE. This well was fitted with a wellhead treatment system in October 2003 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.

Groundwater generally flows towards the northwest in the Camp Evers area. The following table provides concentration ranges for the furthest well downgradient from the source (CEMW-21A, B, C, see Attachment 5) for the last four quarters of groundwater monitoring:

Table 1
Offsite/Detached Plume Groundwater Data
(Wells CEMW-21A, -21B, -21C)

Volatile Organic Compound	Groundwater Cleanup Goal ($\mu\text{g/L}$)	Concentration range in Groundwater -- last four quarters ($\mu\text{g/L}$)
TPHg	1,000	ND
Benzene	1	<1 – 5.3
Methyl tertiary Butyl Ether (MTBE)	5	<1 – 4.6
Tertiary Butyl Alcohol (TBA)	12	<10
Toluene	150	ND
Ethylbenzene	300	ND
Xylenes	1,750	ND

ND Not detected above Method Detection Limit

Since the Last Staff Report:

Second Quarter 2010 groundwater sample results indicate maximum MTBE concentrations of 32 $\mu\text{g/L}$ in Tosco's on-site monitoring well RW-2, and 96 $\mu\text{g/L}$ in off-site monitoring well CEMW-9 which is located upgradient of groundwater extraction well CEEW-1 (see Attachment 5 for well locations). Results showed a maximum concentration of 510 $\mu\text{g/L}$ TBA in downgradient, off-site monitoring well CEMW-6. The treatment system has reduced MTBE concentrations in well CEMW-6, which historically had the highest MTBE concentrations, from a maximum of 38,300 $\mu\text{g/L}$ to 1.5 $\mu\text{g/L}$ in April 2010. In addition, MTBE concentrations in downgradient, off-site well CEMW-16, which is near the groundwater pumping and treatment system, have fallen from 4,710

$\mu\text{g/L}$ to $7.5 \mu\text{g/L}$ in April 2010. Wells CEMW-6 and CEMW-16 are located upgradient of groundwater extraction well CEEW-1.

The groundwater extraction and treatment system located at the Kings Village Shopping Center was not operational for the first and second quarters in 2010. The system was shut down because the groundwater level in extraction well CEEW-1 dropped below the pump intake level. However, the downgradient off-site remediation system has removed more than 24.4 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 5: 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 four inch diameter well to enhance groundwater extraction efficiency. The highest historic concentration of MTBE was $230,000 \mu\text{g/L}$ in monitoring well MW-4 (near the source area) on March 2, 2000. On August 13, 2009 the Central Coast Water Board staff approved a proposal to enhance bioremediation by using an in-situ submerged oxygen curtain (iSOC) that infuses oxygen into the groundwater.

Since the Last Staff Report:

Third Quarter 2010 semiannual groundwater monitoring samples collected on September 2, 2010 showed a maximum concentration of $106 \mu\text{g/L}$ TBA in onsite well MW-2. The TBA concentrations are highest near the fuel tank complex, which is consistent with past monitoring. Quik Stop samples Nobel Creek at four downgradient locations. Quik Stop sampled the creek on September 2, 2010. 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 6). Quik Stop will continue to monitor the iSOC oxygen injection system along with the groundwater treatment system. Influent and effluent samples from the groundwater treatment system will continue to be collected on a monthly basis.

The remediation system has removed approximately 1,032,976 gallons of water, 929.84 pounds of MTBE, and 262.04 pounds of TBA since system start up in April 2001.

Attachment 6: Site Map

Regionwide MTBE List

The Regionwide MTBE Listing and High Priority Sites list is included as Attachment 7. 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. Central Coast Water Board MTBE groundwater 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 $\mu\text{g/L}$.

Attachment 7: Region Wide MTBE Listing

Underground Tanks Summary Report

The Underground Tanks Summary Report (Attachment 8) 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, 2010) is 17 cases closed. At the time of this report, staff had reached closure for three Water Board-lead UST cases, with another eight 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 8: Underground Tanks Summary Report