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ORANGE COUNTY WATER DISTRICT
ORANGE COUNTY'S GROUNDWATER AUTHORITY

January 8, 2014

Vivian Gomez-Latino
State Water Resources Control Board
1001 I Street, P.O. Box 2231
Sacramento, California 95812

Subject: State Water Resources Control Board – Closure Notice
Case No 89UT155
Shell Station
12950 Garden Grove Boulevard
Stanton, California

Orange County Water District (District) concurs with Orange County Health Care Agency (OCHCA) concerns regarding a site closure notice for the Shell station at 12950 Garden Grove Boulevard in Stanton, California (Shell site) and opposes closing the Shell site at this time. OCHCA provided comments for consideration in opposition to closing the Shell site in a letter to the State Water Resources Control Board (SWRCB), dated December 30, 2013. OCHCA's letter was in response to the SWRCB's Notice of Opportunity for Pubic Comment, which is undated, but contains a signature date of October 17, 2013. SWRCB's notice contained a deadline for written comments of December 27, 2013.

According to the SWRCB notice, the notice was provided to the OCHCA, water replenishment district, the local water purveyor, the municipal water district, county water district, the special act district, and other groundwater authorities. Orange County Water District (District) learned of the notice, however, on December 20, 2013, when the OCHCA forwarded a copy of the notice to the District with a similar notice for public comment concerning G&M #140 at 8032 Garden Grove Boulevard in Garden Grove. The deadline for comments concerning G&M #140 was also December 27, 2013. The District provided written comments in opposition to closing G&M #140 on December 27, but was unable to respond in time to the Shell site closure. The SWRCB issued a comment deadline extension for the Shell site and G&M #140 within minutes of the December 27 deadline. The District is now taking advantage of the deadline extension to oppose closing the Shell site for reasons similar to the District's opposition to closing the G&M #140 site.

OCHCA states in their December 20 letter that in January 2011 the groundwater contaminant. [petroleum hydrocarbon] plume was not stable or decreasing in extent. The District agrees with the OCHCA's characterization is so far as it is correct that it cannot be said that the groundwater contaminant plume *is* stable or *is* decreasing in extent. There is insufficient data to make this statement. The contaminant plume was not delineated as of January 2011 and remains undelineated now because no new investigation has been conducted since before that date. In addition, it appears that no

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conceptual site model has been developed as required by the Low-Threat UST Case Closure Policy that assesses the nature, extent, and mobility of the contaminant release. Therefore, because the contaminant plume cannot be said to be stable or decreasing in aerial extent, and no conceptual site model has been completed for the site, the site does not meet the Low-Threat UST Case Closure Policy criteria for closure.

Groundwater contamination has not been delineated laterally.
MTBE was detected at up to 100,000 micrograms per liter (ug/L), equivalent to parts per billion (ppb), in an on-site Shell well (B-5, 1989) that is the deepest well drilled on site or off site (37.45 feet below ground surface [bgs]) (Wayne Perry, Inc, Groundwater Monitoring and Status Report, Third Quarter 2013, 10/16/13). The MTBE concentration is more than 7,000 times the primary maximum contaminant level (MCL – 13 ug/L), the state's safe limit for drinking water, which is also the state's public health goal (PHG); and 20,000 times the states secondary MCL (5 ug/L), a taste and odor threshold. TBA was detected at up to 84,420 ug/L in B-5 (1997). An MCL for TBA has not yet been established, but the TBA detection is more than 8,000 times the PHG or action level (AL) for TBA (12 ug/L). These concentrations exceed safe limits in the extreme.

Groundwater beneath the Shell site has been calculated to flow southwest and occasionally or party south and west based on groundwater levels measured over the past eight years, which are published in approximately every report for the Shell site in the state's GeoTracker database. Well B-5, in which the maximum MTBE and TBA concentrations were detected, is located at the southwest site margin, southwest of and downgradient from the underground storage tanks (USTs), at least one of the sources of petroleum contamination at the Shell site. It is reasonable to believe that contaminants detected in well B-5 at such elevated concentrations have flowed past well B-5, off site to the southwest. The area southwest of the site has never been investigated.

Remedial efforts on the Shell site consisted of soil excavation, soil vapor extraction for about 26 months (Jan-1994 to Mar-1996), groundwater extraction for about 30 months (Man-1994 to May-1996), free product removal, and oxygen injection (SWRCB, Preliminary USTCF 5-Year Review Summary, 3/25/10). Shell's remediation has helped to reduce contaminant concentrations in existing wells on site and off site to the south in Garden Grove Boulevard.

SWRCB reports that Shell's groundwater extraction consisted of dewatering, which is consistent with the 1,956,400 gallons of water recovered over the 30 months, estimated to average 1 to 3 gallons per minute (gpm). Shell's remediation program, however, was not designed to capture or contain the contaminant plume; and, therefore, did not prevent the groundwater contamination from migrating downgradient off site. The District believes groundwater contamination has been delineated to the south across Garden Grove Boulevard owing to the groundwater investigation conducted on the G&M #140 site on the south side of Garden Grove Boulevard. But because no investigation has been conducted downgradient to the southwest, the contaminant plume has not been delineated laterally.

Groundwater contamination has not been delineated vertically.
Shallow groundwater replenishes deeper groundwater in the Pressure Zone as well as in the Forebay Area part of the Orange County Basin. Based on years of hydraulic data collected throughout the Orange County Basin, downward hydraulic gradients and correlations between multiple potentiometric surfaces confirm the downward flow of water in all parts of the basin. There are aquitards, or intervals of lower relative permeability, within the Pressure Zone as stated in the 5-Year Review Summary.

However, the 200 feet of fine-grained material that the SWRCB reports separates the shallow groundwater (i.e.: the contaminated zone beneath the Shell site) and "the drinking water that is under hydraulic pressure," which the SWRCB calls "Pressure Area," is *not* impermeable. While the aquitards in the Pressure Zone might inhibit downward flow, they do not prevent downward flow. It is reasonable to believe that contaminants detected in well B-5 (only 37.5 feet bgs), at such elevated concentrations have migrated below well B-5, which has never been investigated. Therefore, the contaminant plume has not been delineated vertically.

Groundwater contamination from the Shell site has comingled with groundwater contamination from G&M #140:
Groundwater contamination detected in off-wells and borings (B-13, CPT-2, GWE-1, GWE-2, HP-1, OSW-1, OSW-2, and OSW-3) that are located in Garden Grove Boulevard between the Shell site to the north and the G&M #140 site to the south, originates from both the Shell site and the G&M #140 site. In G&M Oil Company's letter to the SWRCB on December 26, 2013, G&M states that the contaminant plume remaining between the Garden Grove Boulevard, the portion of G&M site and Beach Boulevard is a result of the release from the Shell station. This is not so. G&M #140 is a separate source of petroleum hydrocarbon impact to soil and groundwater that included both MTBE and TBA.

TBA detections in G&M #140 site wells have been consistent with TBA detections in the Garden Grove Boulevard wells, and several thousand times the TBA detections in Shell site wells, except for B-15 on the Shell southwest site margin and B-14 immediately adjacent to the Shell USTs and near well B-5. MTBE detections in the G&M #140 site wells concentrations have been an order of magnitude higher than MTBE detections in Garden Grove Boulevard wells, except for B-13, and have been consistent with MTBE detections in Shell site wells, again except for B-5. These analytical data support that G&M #140 is a separate contaminant source.

Groundwater flow directions have been calculated for the shallow aquifer from historic groundwater levels in wells on the G&M #140 site, in Garden Grove Boulevard, and on the Shell site. For more than 8 years, the period for which groundwater elevation contour maps are available in the state's Geotracker database, groundwater flow beneath the G&M #140 site has consistently been to the northwest, with occasional westerly and northeasterly gradients. Groundwater flow beneath the Shell site has consistently been to the southwest with occasional southerly gradients. Groundwater flow beneath Garden Grove Boulevard has consistently been to the west and northwest. These flow directions, coupled with the analytical data, contradict the notion that G&M #140 is not a contaminant source and that the Shell station is the source of contamination beneath the G&M #140 site. Therefore, G&M #140 is at least a clear partial source of the contaminant plume that extends north and northwest from the G&M #140 USTs. Groundwater contamination from both the Shell and G&M #140 sites has comingled between the two sites. The degree of contribution to the comingled plume from either site, however, is not known.

Summary:
The Shell site is a source of petroleum hydrocarbon, including MTBE and TBA impacts to soil and groundwater. The highest groundwater contaminant concentrations detected in Shell's on-site wells was in Shell's site margin well B-5, which is downgradient from the on-site USTs, believed to be at least one of the sources of contamination on the Shell site. Groundwater beneath the Shell site flows southwest and occasionally south in the shallow zone. No investigation has been conducted southwest of B-5 or below the maximum depth investigated by Shell either on site or off site. No conceptual site model has been developed and Shell's remedial efforts have not captured or contained the contaminant plume, so there is no evidence that the plume has been delineated laterally or vertically.

Until the plume is fully investigated, it cannot be stated that the plume is stable or is decreasing in extent. Therefore, the Shell site does not meet the Low-Threat UST Case Closure Policy criteria and should not be closed.

Please contact the District at (714) 378-3200 if you would like to discuss this matter further. Thank you.

David Bolin, PG, CHg
Orange County Water District

Attachments:
OCHCA December 20, 2013 Comment Letter
SWRCB March 25, 2010 Preliminary USTCF 5-Year Review Summary
G&M Oil Company December 26, 2013 Comment Letter