Santa Clara Valley Water District

December 5, 2006

Mr. Hector Hernandez, P.E.
Water Resources Control Engineer
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Ste. 101
San Luis Obispo, CA 93401

Subject: Santa Clara Valley Water District Comments on Olin Third Quarter 2006 Monitoring Report

Dear Mr. Hernandez:

The Santa Clara Valley Water District (District) appreciates the opportunity to provide comments on the Third Quarter 2006 Monitoring Report for Monitoring and Reporting Program 2001-161 for the Olin/Standard Fusee Site at 425 Tennant Road in Morgan Hill. The Q306 report is the 11th quarterly report filed for this case. The report stands in stark contrast to the earlier reports in both the volume of data included and the advanced understanding of perchlorate distribution and basin hydrogeology controlling perchlorate migration. Olin has undertaken a major effort to collect a great deal of data to advance the understanding of perchlorate occurrence and plan for remedies. While the report represents substantial progress, we nevertheless offer the following suggestions and comments in the spirit of continuous improvement:

1. Olin presents Appendix E, the *Northeast Groundwater Flow Assessment – Final Update*. The title of this section suggests a cessation of work on the northeast flow issue; however, the report recommends recording groundwater elevations for "a second year" and to continue to collect groundwater samples "on a quarterly schedule." Because there has been recent confusion on expectations for when monitoring was committed to or required, the District finds the language in the Recommendations (Section E7) to be unnecessarily vague.

   Recommendation: The Water Board should obtain a clear commitment to an explicit and unambiguous schedule for obtaining water levels and groundwater samples for perchlorate analyses, with methods and reporting limits specified.

2. Olin has taken the initiative to step out and drill for additional grab samples at locations where the lateral extent of perchlorate occurrence has not been completely delineated. This process appears to be working well, and has resulted in significant new findings, including the occurrence of mildly elevated concentrations of perchlorate east of the site, and higher concentrations in the aquitard zones.

   Recommendation: the Water Board should continue working with Olin to complete vertical and lateral delineation of perchlorate occurrence wherever data gaps remain.

3. The occurrence of perchlorate east of the site and north of Tennant Road is new information; its significance warrants deliberation. The newly discovered occurrence of perchlorate in the B1 zone is in a location ostensibly cross-gradient of the Olin site in terms of currently observed groundwater flow patterns in the B1 zone. This suggests that the driving force to transport perchlorate from the Olin site to the area due east was present at some time in the past and is absent today. Olin has not provided a cause for the easterly occurrence of perchlorate discovered by Olin's CPT investigation. Nevertheless, the finding underscores that past flow regimes markedly different from those observed today played a role in transporting perchlorate from the Olin site in directions different from the main body of the plume. Until now, Olin's working conceptual model of perchlorate moving strictly in a southerly direction has precluded consideration of other hydraulic influences that could affect perchlorate distribution.

   Recommendation: The Water Board should consider requesting that Olin update their conceptual model to account for new data on the distribution of perchlorate east of the site. The Water Board should cause Olin to provide their interpretation of this new finding in the January 2007 update to the Basin Characterization Report.

4. Trend analysis in wells could benefit from additional review of possible causes of trends, a well as consideration of the following questions:

   - Is there a correlation between vertical gradient and perchlorate concentration trend in wells close to the new CMT monitoring wells?
   - Are the trends only discernible over the whole data set for each well, i.e., would a different count of wells in different trend categories emerge if only the last six or eight data points were included for each well, as opposed to the full data history of the well?
   - What is the Data Quality Objective for trend analysis? What is the Decision Threshold?
   - How has the inherent error of the analytical method been factored into the trend analysis? Since the error of the data may be smaller or larger from one analysis to the next, how is the error incorporated into the MAROS analysis?
   - What interpretation is provided for the increasing number of wells with perchlorate detections greater than 6 ppb in 2006 quarterly sampling events?

   Recommendation: The Water Board should consider requesting Olin to provide interpretation of trends, such as a more detailed discussion of changes in trends, as well as distinguishing recent trends from longer term trends.

5. In Figure 4.2, CPT OS-51-55 shows a detection of 5.2 ppb at a location detached from the main body of the mapped plume. This Figure should be prepared in a manner that flags this detection with a symbol or color change so that the reader can see that there is perchlorate at a location east of the mapped plume. If a perchlorate detection is mapped as being separate from the main plume, and explanation for its occurrence should be given.

6. In Figure 4.4, site data should be added and incorporated to give a more complete picture of the continuity of perchlorate occurrence.

7. In Figure 4.5, the location of OS-56 is shown to be coincident with a large building. The map should be corrected to show the true location of this boring. Because data is

sparse, Olin has chosen not to present a plume, yet there are several detections in the B3 zone. At a minimum, these detections should be called out with colored icons to better convey the data to the reader. Since the subject of this report is a regional occurrence of perchlorate, it would also be appropriate to display all B3 zone occurrences in a single image, including on-site and the new CMT wells.

Recommendation: The Water Board should request that Olin adhere to more rigorous graphical standards to improve data representation per comments 5, 6, and 7, above.

8. There are several instances where contours are presented that are not supported by the data displayed. Contours extend well beyond the limits of data in Figure 3.7, for example. Where limited data are available, it would be more informative to chart the wells showing their construction and the intervals in which water levels are measured to indicate both vertical and horizontal gradients that could potentially induce flow between monitored wells, geologic heterogeneities notwithstanding. Worley Parsons Komex has forwarded an analysis of unsupported interpretations of water level contours and potential flow directions in their comment letter of November 22nd. Their analysis warrants the Water Board's close attention.

   Recommendation: The Water Board should consider interpreting the data directly by contouring a few groups of wells presented in the Q306 report to determine whether Water Board staff concurs with Olin's conclusions.

9. Olin's consultants have used a proprietary software, *Geosoft OASIS Montaj v. 6.0,* to perform contouring and geostatistical data interpretation. Unfortunately, the report refers to this tool in a "black box" manner: none of the details of what analysis was performed, what parameters were selected, and what data were used is provided. For geostatistical interpretations, the kriging methods, search parameters, and graphed variograms and geostatistical parameters should be provided so that the reader may gauge the nature of the data and how well-suited the kriging method is for the data set. To facilitate ability to reproduce the results that Olin reports, a more accessible set of algorithms should be used, such as the public domain Stanford *GSLIB toolbox*, and/or the low cost and widely available Golden Software Surfer package.

   Recommendation: The Water Board should consider requesting that Olin fully document their use of geostatistical packages for interpreting both water level contours and spatial occurrence of perchlorate contamination so that the interpretations rendered can be independently corroborated.

10. Observations of the relatively quick response time for water level changes in piezometers and monitoring wells following onset of pumping in a distant municipal well warrant further exploration. Olin has not had the opportunity to make similar observations of water level response to onset of pumping in the Tennant Well because it is pumped continuously. The Tennant Well is located closer to some of Olin's new multi-port monitoring wells than the Nordstrom Park Well, and may offer valuable information on the dynamics of the deep aquifer. This is particularly important to pursue in light of the paradox that Olin describes at Page E-10 and E-15, in which relatively rapid hydraulic response of 17 feet is noted 3,000 feet away from a pumping well within 45 minutes, in contrast to low hydraulic conductivities measured in deep piezometers, which Olin say must restrict perchlorate migration.

Recommendation: The Water Board should consider facilitating cooperation by Olin and the City of Morgan Hill to stage a hydraulic response test in which the Tennant Well is taken off-line at a pre-announced time and allowed full water level recovery, followed by restarting at a later established time; and, in which Olin coordinates detailed measurement of hydraulic response in area multi-level wells north and south of the site, and at the site.

11. Olin justifiably presents the most recent data in each quarterly report. Periodically, it would be useful to analyze the complete data set, so that the total picture of perchlorate occurrence can be presented and understood. For example, a map of median or geometric mean perchlorate concentration in each well would inform the Water Board of all locations where perchlorate has been detected, allowing staff to view and interpret a larger data set in terms of the continuity of distribution and possible interpretation of contaminant migration patterns. Such a map should distinguish wells in which perchlorate has never been detected from those in which detections have occurred but whose median or mean concentration is below a reporting threshold.

    Recommendation: The Water Board should consider requesting that Olin present an annually updated view of the complete data set by mapping a summary statistic such as described in comment 11, above. The annual updated interpretation of the complete data set should be submitted with the annual Basin Characterization Report update.

This concludes our comments for the Third Quarter 2006 Quarterly Monitoring Report. Should you have any questions about these comments, please call me at 408-265-2607x2061.

Sincerely,

Thomas K.G. Mohr, P.G. 5583, E.G. 1734, H.G. 98
Perchlorate Project Manager

cc: Jim Ashcraft, City of Morgan Hill
Mark Truedell, Worley Parsons Komex
Rick Smelser, City of Gilroy
Suzanne Muzzio, Santa Clara County Environmental Health Department
Greg Van Wassenhove, Santa Clara County Agricultural Commissioner
Sylvia Hamilton, Perchlorate Community Advisory Group
Rick McClure, Olin Corporation
Steven Newsome, MACTEC Engineering and Consulting Inc.
Tracy Hemmeter, Behzad Ahmadi, Melanie Richardson, Keith Whitman, Walt Wadlow