California Regional Water Quality Control Board
Central Coast Region

Linda S. Adams
Secretary for Environmental Protection

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Arnold Schwarzenegge
Governor

July 19, 2006

Mr. Richard W. McClure
Olin Corporation
Environmental Remediation Group
P.O. Box 248
Charleston, TN 37310-0248

Dear Mr. McClure:

SLIC: 425 TENNANT AVE, MORGAN HILL; BOTTLED WATER TERMINATION PHASE ONE THROUGH PHASE FIVE

Central Coast Water Board (Water Board) staff has reviewed five phases of analytical results that have been provided by Olin to determine if the State Water Resources Control Board (SWRCB) criteria for termination of bottled water (i.e., four consecutive quarters of perchlorate concentrations that are less than or equal to the 6.0 micrograms per liter [µg/L]) have been met. We carefully evaluated analytical data and their associated quality control/quality assurance (QA/QC) data for 459 wells to determine if perchlorate concentrations are less than or equal to 6.0 µg/L for four prospective quarters. With the exception of 40 wells, Water Board staff concurs that the SWRCB criteria have been met. Additionally, based on our review of the analytical results, Water Board staff recommends that Olin re-evaluate the analytical results for all the wells using a more conservative trend analysis approach and conduct additional sampling for those wells with quarterly sampling events separated by less than 30 days. Water Board staff also requests that Olin submit maps of specific wells that no longer receive replacement water, to aid in our evaluation of the analytical results from future monitoring.

Background

On July 6, 2004, the Executive Officer of the Water Board issued Cleanup or Abatement Order No. R3-2004-0101 (Cleanup Order), which required Olin Corporation and Standard Fusee, Incorporated to provide replacement water service to users of private domestic wells affected by discharges of perchlorate from the facility at 425 Tennant Avenue, Morgan Hill, in Santa Clara County. The Water Board Cleanup Order required Olin to provide replacement water for wells testing at or above 4 µg/L.

In March 2004, the California Office of Environmental Health Hazard Assessment (OEHHA) issued a final Public Health Goal (PHG) of 6.0 µg/L for perchlorate.

OEHHA's PHG is based upon a risk assessment to identify a level at which no known or anticipated adverse effects on health will occur, with an adequate margin of safety. PHG's are used by the California Department of Health Services (DHS) in establishing drinking water standards or Maximum Contaminant Levels (MCLs).

Based on OEHHA's final PHG, Olin and Standard Fusee filed petitions asking the SWRCB to review the requirement in the Water Board's Cleanup Order to provide replacement water service for wells with perchlorate detections at or above 4.0 µg/L. Olin's petition requested that replacement water be delivered to owners of private domestic wells in which perchlorate concentrations had been detected above 6.0 µg/L.

On May 19, 2005, the SWRCB issued Order WQ 2005-0007. Order WQ 2005-007 requires Olin to supply interim uninterrupted replacement water service (i.e., bottled water or equivalent), in accordance with California Water Code Section 13304, to users of private domestic wells in which perchlorate has been detected at concentrations greater than 6.0 µg/L. Order WQ 2005-0007 also allows Olin to stop supplying interim uninterrupted water service to individual well owners if four prospective quarters of monitoring show perchlorate concentrations equal to or less than 6.0 µg/L. In addition, Order WQ 2005-0007 provides specific monitoring requirements for wells subject to replacement water. These monitoring requirements address conditions under which Olin may discontinue monitoring.

Water Board Review of Well Analytical Results

From June 15 through July 18, 2006, Olin provided Water Board staff with five phases of analytical results for a total of 459 wells that Olin determined meet the SWRCB criteria for termination of bottled water (i.e., four consecutive quarters of perchlorate concentrations that are less than or equal to the 6.0 µg/L). Olin provided Excel spreadsheets and analytical laboratory data sheets for four consecutive quarters of sampling results for Water Board staff to review. Water Board staff has reviewed all the analytical and quality control data associated with phase one through phase five.

In general, we concur that the analytical data for a majority of the wells meet the SWRCB criteria of less than or equal to 6.0 µg/L for four prospective quarters. However, we have identified several wells that have perchlorate results with associated quality control data that have matrix spike[1] recoveries less than the recommended recovery limit of 80%[2] (as specified in EPA Method 314.0) in at least one quarter of the

[1] The matrix spike is a measured portion of a matrix (groundwater sample) fortified (spiked) with a known quantity of perchlorate, and analyzed. The matrix spike sample is analyzed exactly like a sample and its purpose is to determine whether the sample matrix contributes bias, such as interferences, to the analytical results of the environmental sample.

[2] Recovery is expressed in percent, and is defined as the amount of perchlorate found in the spiked sample divided by the amount spiked into the sample prior to the analysis, times 100. If the recovery for perchlorate falls outside 80 - 120 percent, the result for perchlorate in the unfortified sample must be flagged to inform the data user that the result may be biased low due to matrix effects.

last four consecutive quarters. We are aware that the wells with matrix spike recoveries outside the recommended percent recovery range have laboratory control sample[3] QA/QC results that show recovery within the acceptable limits. This means that if the recovery for perchlorate falls outside the recommended 80 to 120 percent and the laboratory's performance for all other QC performance criteria (i.e., laboratory control sample) is acceptable, the accuracy problem encountered within the spiked sample is judged to be matrix related, not analytical system related. Therefore, the result for perchlorate in the actual groundwater sample must be flagged to inform the data user that the result may be biased low due to matrix effects. It should be noted that all the wells (459 wells) sampled during the second quarter of 2006 (the most recent data), have perchlorate concentrations less than or equal to 6.0 µg/L with valid QA/QC results.

Based on a thorough evaluation of all the analytical data and QA/QC results for each well identified in phase one through five, we have identified 40 wells that do not meet the SWRCB criteria. These 40 wells do not have four prospective quarters of analytical results with valid QA/QC. Attachment A provides a list of the 40 wells that do not meet the SWRCB criteria.

Effective immediately, Olin must supply replacement water (i.e., bottled water) to the users of the wells identified in Attachment A and conduct sampling until four consecutive quarters of perchlorate results with concentrations less than or equal to 6.0 µg/L (with valid QA/QC data) are obtained prior to termination of bottled water. We understand that sampling of the wells identified in Attachment A will be conducted this month. Olin must submit analytical data and QA/QC results for these and all wells prior to termination of bottled water. You must continue to provide water until you receive Executive Officer concurrence with your request to terminate replacement water.

Trend Analysis

We appreciate Olin's efforts to evaluate each monitoring well's analytical results for trends using the Mann-Kendall analysis. Olin has not terminated bottled water for those wells that show increasing or probably increasing trends even if the last four quarters have perchlorate concentrations less than or equal to 6.0 ug/L. However, we are concerned that the Mann-Kendall analysis may not be capturing increasing trends for some wells. The Mann-Kendall analysis includes all the sample results available for a particular well. However, when the perchlorate results are plotted for the last four quarters there is an observed increasing trend in some wells. To be conservative, we recommend that Olin continue supplying bottled water for those wells that show increasing trends or possibly increasing trends during the last four quarters using the Mann-Kendall trend analysis.

[3] The laboratory control sample is made up of a clean matrix (e.g., reagent water) that has been spiked with a known quantity of perchlorate. The percentage of the compound that is recovered in the analysis provides a measure of method accuracy.

Spacing of Sampling Events

Water Board staff has identified 24 wells that were sampled less than 30 days apart but were considered representative of two consecutive quarters of data. Technically, the samples are collected during two different quarters but if samples are collected less than 30 days apart, the samples may not be as representative of perchlorate concentration variations in groundwater during that six month period. One set of samples was only a week apart. We concur with the termination of bottled water for the wells listed in Attachment B but we request that Olin collect one more round of quarterly sampling for the wells identified in Attachment B to ensure that the perchlorate results are representative of four prospective quarters.

Well Locations

Replacement water has been terminated for numerous well users. As outlined in Attachment A of the SWRCB Order, Olin must now implement specific monitoring requirements for wells subject to replacement water. Water Board staff will continue to evaluate analytical results for all wells as they become available. Water Board staff considers each well with equal importance, however; we are particularly observant of those wells that are within 500 feet of a well that has or has had perchlorate results greater than 6.0 µg/L in the past and those wells that are in close proximity to the Olin site located at 425 Tennant Avenue in Morgan Hill. To aid in our evaluation, Water Board staff requests that Olin provide maps for all wells for which replacement water was terminated and are located within 500 feet of a well that has or has had perchlorate results greater than 6.0 µg/L in the past. Water Board staff also requests that Olin provide a map of all wells for which bottled water was terminated and are located in "Area 1" identified in the Final Plume Migration Assessment Report dated March 3, 2006.

We appreciate your cooperation on this matter and if you have any questions, please contact **Thea Tryon at (805) 542-4776** or Hector Hernandez at (805) 542-4641.

Sincerely,

Roger W. Briggs
Executive Officer

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Attachment A: Wells Not Meeting State Water Board Criteria
Attachment B: Wells with Sampling Frequencies less than 30 Days Apart

cc via E-mail:

Ms. Lori Okun
Office of the Chief Counsel
State Water Resources Control Board

Olin Technical Contacts IPL

Attachment A
Wells Not Meeting State Water Board Criteria

Well Number	Phase	2Q 2006 Sample Result
10S04E18K002	1	3.8
10S04E18Q007	1	3.6
10S04E19C012	1	3.3
10S04E07D010	1	5.5
10S04E07E001	1	4.4
10S04E07E005	1	5.2
10S04E07E016	1	4.1
10S04E07E018	1	3.2
10S04E07E023	1	4.2
10S04E07E029	1	4.0
10S04E07E034	1	5.3
10S04E07M020	1	4.7
10S04E17N007	1	4.7
10S04E18G007	1	4.6
10S04E18J001	1	5.8
10S04E19B008	1	4.4
Private Well 6	2	3.0
10S03E01P003	2	5.8
10S03E12A013	2	5.4
10S04E07N017	2	5.2
10S04E07N024	2	5.6
10S04E18B009	2	5.1
10S04E18H011	2	3.7
10S04E18H016	2	4.2
10S04E18J005	2	4.9
10S04E18L004	2	4.2
10S04E18Q001	2	3.8
10S04E18R004	2	3.9
10S04E18R016	2	5.3
10S04E19A002	2	6.0
10S04E19A004	2	2.8
10S04E19A011	2	5.7
10S04E19C009	2	4.1
10S04E20E002	2	5.1
10S04E20E003	2	5.2
10S04E20M002	2	5.9
10S04E29D002	2	5.6
10S04E33M006	2	5.9
11S04E04C006	2	5.3
11S04E04C009	2	5.0

Attachment B
Wells with Sampling Frequencies less than 30 Days Apart

Well Number	Phase	Frequency Days
09S03E25L002	1	27
09S03E26G002	1	7
09S03E26N008	1	13
09S03E35A007	1	28
09S03E35A015	1	27
09S03E35D009	1	20
09S03E35E003	1	27
09S03E35E013	1	28
09S03E35K004	1	27
10S03E01A005	1	16
10S03E02M007	1	15
10S03E11K004	1	15
10S04E06N008	1	28
10S04E07C003	1	19
10S04E17C019	1	22
09S03E35C008	1	12
09S03E26N011	2	28
10S03E11D001	2	29
BW-UNKNOWN-108	2	28
BW-UNKNOWN-80	2	27
10S03E12H008	2	25
10S04E18C009	2	22
10S04E19K006	2	20
10S04E33N005	2	29