

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF SEPTEMBER 7, 2007

Prepared on July 26, 2007

ITEM NUMBER: 18a

SUBJECT: Perchlorate Cases

DISCUSSION:

Note: *New information concerning the following sites is shown in italics.*

Background

Perchlorate is both a naturally occurring and man-made chemical, although it is rarely found naturally in the United States. One-third of all perchlorate used in the United States is used in California and 90% of California's perchlorate use is related to the aerospace industry. There are three major sources of perchlorate in the United States: ammonium perchlorate has been and continues to be used as an oxidizer in solid rocket propellant, sodium perchlorate is used in slurry explosives, and potassium perchlorate is used in road flares and air bag inflation systems. Wastes from the manufacture and improper disposal of perchlorate-containing chemicals are increasingly being discovered in soil and water.

Health Effects

Perchlorate is known to interfere with the natural function of the thyroid gland by inhibiting the uptake of iodide. Because iodide is an essential component of thyroid hormones, perchlorate disrupts how the thyroid functions. Such an effect decreases production of thyroid hormones, which are needed for prenatal and postnatal growth and development, as well as for normal body metabolism. Potassium perchlorate was used until recently to treat hyperthyroidism related to Graves disease, and is still used diagnostically to test thyroid hormone production in some clinical settings.

Regulatory Standards

Currently there is no California or federal drinking water maximum contaminant level (MCL) for perchlorate. Both the U.S. Environmental Protection Agency (USEPA) and the California Department of Health Services (DHS) are in the process of studying the occurrence and health effects of perchlorate.

On March 12, 2004, the Office of Environmental Health Hazard Assessment (OEHHA) published a final public health goal of 6.0 micrograms per liter ($\mu\text{g/L}$) (or parts per billion) for drinking water. The PHG is a public health-based drinking water goal used to establish the MCL. To date, DHS continues its internal process of reviewing the technical and economic feasibilities of setting California's primary MCL for perchlorate to 6.0 $\mu\text{g/L}$.

Until an MCL is in place, DHS uses a 6.0 $\mu\text{g/L}$ advisory action level (or notification level) to protect consumers from perchlorate's potential adverse health effects. The DHS raised the action level from 4.0 to 6.0 on the same day the PHG was released. A notification level is an advisory level and is not an enforceable standard. When it is exceeded, a water purveyor is required to notify local governing agencies and is recommended to issue a consumer notice. In addition, DHS recommends that a source of drinking water be taken out of service if perchlorate contamination exceeds 40 $\mu\text{g/L}$.

Treatment Methods

Treatment of perchlorate contamination in water is complicated because the perchlorate anion does not respond to typical water treatment techniques because of its fundamental physical and chemical nature. The perchlorate tetrahedron itself is structured such that the four oxygen atoms surround the central chlorine atom, effectively blocking reductants from directly attacking the chlorine. Although perchlorate is thermodynamically a strong oxidizing agent, it is a kinetically sluggish species, making its reduction generally very slow and rendering common reductants ineffective. It can persist in the environment for many decades under typical groundwater and surface water conditions because of its resistance to react with other available constituents.

Perchlorate treatment technologies may be generally classified into categories of destruction or removal technologies. Destructive processes include biological reduction, chemical reduction, and electrochemical reduction. Physical removal processes include anion exchange, membrane filtration (including reverse osmosis and nanofiltration), and electrodialysis, which all require subsequent disposal of removed perchlorate. The optimum treatment technology for a given perchlorate occurrence may depend on several factors, including perchlorate concentration, the presence and concentration of co-contaminants, other water quality parameters and geochemical parameters. The presence of indigenous perchlorate-reducing microbes and substances inhibitory to their activity will also influence perchlorate treatment technology effectiveness. For in-situ treatment of perchlorate contamination, variables related to the site hydrogeologic setting, such as depth to and distribution of contaminants, soil permeability, groundwater flow velocity, etc. are also additionally important.

Olin Corporation Facility, 425 Tennant Avenue, Morgan Hill, Santa Clara County

Project Manager: Hector Hernandez

Technical Support: Thea Tryon

Current milestones concerning the Olin Cleanup Case are summarized below:

Background: The former Olin Corporation site is a 13-acre parcel located in southern Morgan Hill. Olin and Standard Fusee used potassium perchlorate in the manufacture of flares from 1956 to 1995. Olin manufactured signal flares at the facility for about 32 years from 1956 to 1988. Standard Fusee leased the site and manufactured signal flares for seven years from 1988 to 1995. Perchlorate was first detected at the site in August 2000 during a due diligence investigation by a potential buyer. Olin made initial contact with Central Coast Water Board staff regarding the perchlorate contamination in February 2001. Perchlorate contamination at the site may have occurred primarily from an unlined evaporation pond that received wastes from the cleaning of the ignition material mixing bowls, on-site incineration of cardboard flare coatings with residues on them, and accidental spills. The Central Coast Water Board never formally regulated waste disposal practices while the facility operated, but facility records do make reference to inspections by Water Board staff.

Groundwater in the region typically occurs in alluvial sediments, at depths ranging from 7 to 568 feet below ground surface. The alluvial deposits are composed of heterogeneous layers of clay, silt, sand, and gravel. Interconnected multiple aquifers exist within the area. Groundwater underneath the site is generally unconfined, although there are identified confined zones within the sub-basin to the southeast of the property. The groundwater flow direction is predominantly to the south-southeast with occasional variation to the south and south-southwest. Detailed description of geology and hydrogeologic conditions within the Llagas Subbasin are included in Olin's January 31, 2007, *Llagas Subbasin Characterization – 2006*, Santa Clara County Olin/Standard Fusee, Morgan Hill, California (2006 Characterization Report).

Bottled Water Service Terminations: Central Coast Water Board staff continues to take a conservative approach addressing all issues related to bottled water service termination and monitoring requirements after bottled water service has been terminated. Private domestic supply well users in the Morgan Hill, San Martin, and Gilroy area depend on their well water as their main drinking water source.

Olin continues to provide bottled drinking water to well owners and tenants whose wells have perchlorate concentrations greater than 6.0 µg/L. Olin provides bottled water in accordance with the Central Coast Water Board Cleanup or Abatement Order No. R3-2004-0101, as revised by the State Water Resources Control Board in its Order WQ 2005-0007 (State Water Board Order) and Central Coast Water Board staff's letter dated October 6, 2006. The October 6, 2006 letter provides comments and clarifies all replacement water requirements (e.g., bottled water) and post bottled water termination monitoring.

To date, Central Coast Water Board staff has determined that the State Water Board Order criteria have been met for eight phases of bottled water service termination. Central Coast Water Board's Executive Officer has concurred with Olin's request to terminate bottled water service for 534 wells, in accordance with State Board Order requirements. Additionally, users of 23 wells have had bottled water reinstated because perchlorate concentrations above 6 µg/L were detected through post-bottled water termination monitoring. Central Coast Water Board staff will continue to review and evaluate all data submitted by Olin that is associated with bottled water terminations and post-bottled water termination monitoring.

Presently, Olin provides bottled drinking water to owners and tenants at 181 wells that do not meet State Water Board criteria for terminating bottled water service. A total of 263 households are associated with these 181 wells. 63 of 312 domestic supply wells sampled during the second quarter of 2007 contained perchlorate concentrations above 6 µg/L.

On August 1, 2007, Olin submitted its ninth phase of bottled water service termination request. Olin's submittal includes a request to discontinue bottled water at 24 additional wells (29 accounts) and proposes post-termination monitoring frequencies for the wells. As of the date of this update, Central Coast Water Board staff had not completed its review of Olin's request.

Ion Exchange (IX) System Installations: To date, Olin has installed ion exchange (IX) systems on 16 domestic supply wells. Olin began IX system installation at wells exceeded 10 µg/L, then at wells with concentrations between 8.0-9.9 µg/L. Fourteen of the 16 ion exchange units installed are operating as designed, system installation remains on hold at one well, and access approval has been received at the other well. Olin has not scheduled installation for one candidate well located on vacant property and another well is not being used as a potable source. Olin continues to evaluate the need to install IX systems on candidate wells that have had greater than 6.0 µg/L perchlorate detections during the past four quarters. Data evaluation continues for the other candidate wells.

Olin will continue providing bottled water to IX wells pending DHS acceptance of the domestic IX systems. In January 2007, Olin submitted its IX system pilot test protocol to DHS and provided an update in May 2007. All of the demonstration sites appear to be eliminating perchlorate from groundwater, as expected. MACTEC also conducts monthly inspections of the IX systems. DHS has not yet provided approval nor comments on the update.

CLEANUP ORDER NO. R3-2005-0014

Status of Investigation and Cleanup Activities: Central Coast Water Board staff concurs with Olin's objectives for groundwater restoration within the Llagas Subbasin and its proposed phased groundwater remediation approach. The phased remediation approach includes hydraulic control

and remediation of the plume core (the area of highest perchlorate concentrations in groundwater), and Monitored Attenuation in lower perchlorate concentration areas. The plume core cleanup is specifically addressed in Olin's Area I FS Report and Area I Work Plan. Olin's Revised Cleanup FS Report addresses perchlorate cleanup in groundwater outside the plume core.

To date, background perchlorate levels in the Llagas Subbasin have not been established. Central Coast Water Board staff believes it is not productive to spend any additional time debating the background concentration. Such debates only serve to delay implementation of active remediation of the most contaminated portions of the Llagas Subbasin.

Further, Central Coast Water Board staff does not concur with Olin's proposed cleanup level. Central Coast Water Board staff believes it is premature to be able to know with certainty whether it will be feasible to clean up perchlorate-impacted groundwater in a reasonable time within each individual aquifer zone to levels below the PHG. At this time, many uncertainties exist with respect to the effectiveness, expediency, and efficiency of the selected groundwater remedial strategy. Considering all of these unknowns and uncertainties, it is not prudent at this time to establish a cleanup level. As additional data are collected and evaluated, including data associated with the Water District's forensic chemistry study (for background determination purposes) and ongoing performance monitoring data, and as the parties thoroughly evaluate the efficacy of the selected remediation strategy, the appropriateness of establishing an alternative cleanup level greater than background will be reevaluated. Further discussions and evaluation of establishing an appropriate cleanup level must take place concurrent with implementation of the phased groundwater remediation strategy proposed by Olin.

For now, Olin is required to proceed with immediate implementation of groundwater remediation with the primary cleanup objective (goal) of achieving the background concentration¹ within each individual aquifer zone and throughout all affected portions of the Llagas Subbasin. Since Olin must at least achieve the maximum allowable cleanup level (6.0 µg/L), it is appropriate to use the maximum cleanup level as an interim groundwater cleanup goal. As groundwater cleanup proceeds, Olin must reevaluate the feasibility of achieving the primary cleanup goal (assuming that a background concentration has been established) or may reevaluate the feasibility of achieving an alternative groundwater cleanup level.

Central Coast Water Board staff has directed Olin to implement active remediation within the highest concentration areas expeditiously. Staff approved Olin's Area I FS Report and Area I Work Plan for immediate implementation. Further, we also conditionally approved Olin's proposed phased remediation strategy, as outlined in the Revised Cleanup FS Report.

Reports Under Review: *By the date of this update, Central Coast Water Board staff has completed or is in the process of completing its review and preparation of comments concerning the following reports:*

- *June 15, 2007 Llagas Subbasin Cleanup Workplan, Olin/Standard Fusee Site, Morgan Hill, California (Cleanup Workplan).*
- *July 30, 2007, Second Quarter 2007, Groundwater Monitoring Report, Olin/Standard Fusee Site, 425 Tennant Avenue, Morgan Hill California (2Q Monitoring Report).*

Llagas Subbasin Cleanup Workplan: *On June 15, 2007, Olin provided Llagas Subbasin Cleanup Workplan (Cleanup Workplan), in accordance with Cleanup or Abatement Order No. R3-2005-0014, Ordering Paragraph K. At Olin's request, on July 27, 2007, Olin staff and its consultants presented*

¹ If the implemented cleanup technology proves unsuccessful in achieving background in a technically and economically feasible manner, the Central Coast Water Board may adjust cleanup goals later.

the Cleanup Workplan to Water Board staff during an all day meeting at our Water Board office. The objective of the meeting was to present the primary components of the proposed Cleanup Workplan, implementation schedule, and to discuss Olin's anticipated overall cleanup strategy, remaining characterization activities, and anticipated road-blocks. Additionally, Olin presented recent findings from the ongoing characterization activities within the deep aquifer zone and how these new findings will affect implementation of the overall cleanup strategy. Water Board staff anticipates it will complete its review and prepare comments concerning Olin's Cleanup Workplan by early September.

Status of Groundwater Flow and Mass Transport Model: *Central Coast Water Board requested Olin to provide the electronic input files for MACTEC's nine-layer, three-dimensional groundwater flow and mass transport model of the Llagas Subbasin by August 3, 2007. In compliance with our Water Board directive, Olin submitted a detailed cover letter describing the material along with a thorough (55 pages) textual description of the requested model by the established deadline. Additionally, Olin also provided a proposed confidentiality agreement in conformity with Water Code Section 13267(b) (2) and the Public Records Act.*

The Central Coast Water Board has obtained the services of Department of Toxic Substance Control (DTSC) staff member Alice Campbell, to serve as an independent third-party consultant that will be tasked with reviewing and evaluating MACTEC's groundwater flow and transport model. Ms. Campbell will ascertain whether the input parameters, assumptions used, and the predicted flow and degradation rates are reasonable and appropriate. Olin has agreed to provide the requested electronic model input files for Water Board (and DTSC) review, but indicated it would formally request that the files remain confidential. Olin indicated it will provide a confidentiality agreement that will need to be executed before Olin can submit the electronic input files and a model development report. Olin has indicated that the groundwater flow and transport model electronic input files are intellectual property that are confidential, copyright protected, and are trade secrets. The model report will be provided for public review. Olin's legal team intends to work with our State Board attorney (Lori Okun) to execute the confidentiality agreement and determine whether the agreement must be between Olin and the Water Board, between Olin, the Water Board and DTSC, or just Olin and DTSC.

Presently, Olin is working with DTSC management to negotiate an agreement to facilitate DTSC's review of the model and payment for the contracted services. Water Board staff anticipates DTSC's review and evaluation of the model will be underway by the date of the September board meeting.

Status of Issuance of Replacement Cleanup Order:

At the July 6, 2007 water board meeting, Central Coast Water Board staff informed the board members that it intended to present a replacement cleanup order during the September 7, 2007 board meeting. The proposed replacement cleanup order will replace Cleanup Order Nos. R3-2005-0014 and R3-2006-0112 and will address the overall groundwater cleanup strategy and include a comprehensive cleanup implementation schedule in the areas of the Llagas Subbasin affected by the Olin Site. The cleanup order will not have a specific cleanup level, instead it will require cleanup to background. The cleanup requirement will be re-evaluated after several years and with the benefit of cleanup data generated through implementation of the Llagas Subbasin Cleanup Workplan, for economic and technical feasibility.

Subsequent to the July 6, 2007 board meeting, Central Coast Water Board staff contacted perchlorate community advisory group (PCAG) members and discussed the timing of presenting the proposed replacement cleanup order and public concerns related to the contents of the proposed cleanup order. Based on these discussions, PCAG representatives indicated that providing a longer public review period for the proposed cleanup order would be beneficial to the public for the following reasons:

1. *Long-term cleanup is obviously the most critical phase we have addressed to date. It is very important that we dedicate sufficient time for public review so that everyone can benefit from educated questions & comments.*
2. *A longer review period will give the PCAG committee members and attendees ample opportunity to review the document and then ask questions and get clarifications at the subsequent PCAG meetings. After the PCAG meetings, the public will have a better understanding of the information and thereby be able to provide more appropriate comments. These comments would also be discussed at subsequent PCAG meetings for additional clarification and fine tuning. A team of PCAG participants could then utilize the input from both of the above meetings and prepare the final community comment letter for the Regional Board's consideration.*
3. *PCAG is working hard to identify additional people from the Llagas Subbasin community to become members of PCAG. Hopefully the fruits of that effort will mean that more residents attend the meetings and are thereby better able to provide informed comments.*

Further, Santa Clara Valley Water District (Water District) staff indicated that they agree with the postponement because it would provide enough time for the Perchlorate Work Group to set a meeting to review and discuss the proposed cleanup order, prepare comments, and provide the Water District the opportunity to meet with Water Board staff (if necessary) to discuss any the contents of the proposed cleanup order prior finalizing their comments.

In order to best address the public's concerns with respect to the proposed cleanup order, Central Coast Water Board agreed to postpone its presentation of the consolidated cleanup order until the December 7, 2007 board meeting, scheduled in San Luis Obispo.

Central Coast Water Board staff believes that postponing the cleanup order until December will not cause any aspect of the cleanup process to stop or even slow down because remediation time schedules and cleanup strategy have been approved through workplans that have been submitted. The longer review time simply gives the public and all stakeholders additional time to review and comment. Central Coast Water Board staff sent out a draft cleanup order for public review during the first week in August. Considering the re-scheduling of the presentation of this item, the public review period was extended to 45 days. Central Coast Water Board staff intends to present the cleanup order to the Water Board at the December 7, 2007 meeting.

Status of Monitoring and Reporting Program (MRP) Revisions: Central Coast Water Board staff is in the process of updating, revising, and consolidating all monitoring requirements (MRP No. 2003-0168 and MRP No. 2001-161) into a new MRP. Central Coast Water Board staff and Olin recognize the need for a revised MRP that updates and incorporates all the monitoring requirements necessary to effectively monitor perchlorate concentrations over time, plume migration, and cleanup progress. The new MRP will include a detailed monitoring network to ensure that perchlorate concentrations are effectively monitored in specific areas of the plume and that increasing trends in groundwater with perchlorate concentrations near 6.0 µg/L can be identified prior to these concentrations reaching domestic supply wells.

On March 9, 2007, Olin provided an update to the sampling and analysis plan and quality assurance project plan. Central Coast Water Board staff intends to work closely with Olin and its consultants during the revision process and plans to issue the new consolidated MRP.

Characterization and Monitoring in Northeast Area: The sharing of water level data between the City of Morgan Hill's consultant (WorleyParsons-Komex) and Olin's consultant (MACTEC) continued throughout the first part of 2007. The sharing of water level measurements from several City water supply wells and Olin's monitoring wells located northeast of Tennant Avenue has helped all parties

gain a better understanding of water level fluctuations northeast of the Olin facility. Further, trace perchlorate concentration data provided by City of Morgan Hill from its municipal water supply wells and data collected by Olin from private domestic wells located north of the Olin site indicate that concentrations of perchlorate are present up to three miles north and northeast of the Olin site. *July 2, 2007, sampling results reported by the City of Morgan Hill for of the City's municipal supply wells continue to show concentrations of perchlorate in all municipal supply wells at concentrations less than 4 µg/L (with the exception of the Tennant Avenue well).*

Pursuant to Cleanup or Abatement Order No. R3-2006-0112, Olin continues implementing a step-wise approach of characterizing the lateral and vertical extent and degree of groundwater pollution that originates from the Olin site.

STATUS OF REMEDIATION ACTIVITIES

On-site Groundwater Treatment and Containment: The on-site groundwater treatment system continues uninterrupted operation. The treatment system began operation on February 23, 2004. Groundwater is extracted at a rate ranging from 50 to 175 gallons per minute (gpm). Extracted groundwater is filtered, and perchlorate is removed using an ion-exchange process. The treated groundwater is reinjected at a rate of 50 to 250 gpm. Olin continues to evaluate the effectiveness of the extraction and re-injection system to ensure that hydraulic control is occurring. *To date, 18.8 million gallons of groundwater has been treated by the on-site groundwater extraction system and a total of 71 pounds of perchlorate has been removed.*

UPDATE CONCERNING OTHER POTENTIAL SOURCES

To date, none of the other potential perchlorate sources identified by Olin have been investigated to determine if any of them are contributing to groundwater impacts. Therefore, until confirmed with data, Central Coast Water Board staff believes it is plausible that the source(s) of perchlorate concentrations detection could include the Olin site as well as any of the other identified potential sources.

PERCHLORATE COMMUNITY ADVISORY GROUP

The Perchlorate Community Advisory Group (PCAG) meets monthly in San Martin. The advisory group is a forum for public discussion of the perchlorate problem and potential solutions. Central Coast Water Board staff solicits advisory group input at key decision points in the investigation and cleanup process.

As mentioned during the July board meeting, the public is most concerned about receiving bottled water and the speed of the cleanup. Central Coast Water Board staff has solicited input from the PCAG concerning the contents of the proposed Cleanup Order and will provide the public ample time to review the proposed cleanup order and obtain clarification during the monthly public meetings. PCAG is preparing questions for Water Board and Olin staff that they are interested in having answers to. Water Board staff will share their questions and concerns with the board members.

Central Coast Water Board staff is concerned with the level of community attendance at PCAG meetings. For several months, community attendance has been unusually low. Explanations for the low attendance may include that people are staying informed through other means, people are not that interested, or people feel comfortable with how the Central Coast Water Board is handling the project. Regardless of what the reason may be, the PCAG Chair is concerned and is working on increasing PCAG attendance by posting the PCAG agenda at the Post Office and encouraging attendees to talk to friends. After the proposed cleanup order is adopted, PCAG will evaluate the monthly meeting frequency.

The next PCAG meeting will be held at the San Martin Lions Club on Thursday, October 5, 2007 at 2 pm. Central Coast Water Board staff will attend and be available to address questions from the public concerning the ongoing Olin cleanup issues.

Olin Reports and Significant Correspondence can be accessed on our website at:
<http://www.swrcb.ca.gov/rwqcb3/Facilities/Olin%20Perchlorate/Olinsite.htm>

Olin's latest monthly update to the Central Coast Water Board is included as Attachment 1.

Whittaker Ordnance Facility, 2751 San Juan Road, Hollister, San Benito County
Project Manager: Kristina Seley: 805-549-3121

Remedial Design/Remedial Action Work Plan (Work Plan): On May 28, 2006, Central Coast Water Board staff received Whittaker's "Remedial Design/Remedial Action Work Plan" (Work Plan). The Work Plan contains the remediation strategy for perchlorate, hexavalent chromium, and volatile organic compounds (VOCs) contamination in soil and groundwater. The Work Plan includes a design description, rationale, and schedule to mitigate the soil and groundwater impacts. The Work Plan includes design of a groundwater extraction and treatment system, plans to fill hydrogeologic data gaps, plans to conduct an additional source area investigation, and plans to decommission two offsite agricultural wells.

Groundwater Extraction and Treatment System: The purpose of the proposed groundwater extraction and treatment system is to contain groundwater migrating from the site to reduce the risk of impacting off-site groundwater beneficial uses. After the on-site groundwater is extracted, Whittaker will treat the groundwater with a treatment system consisting of granular activated carbon for VOC removal and a bioreactor for perchlorate and hexavalent chromium remediation.

Whittaker installed seven on-site extraction wells for the groundwater extraction and treatment system. Whittaker has not completed construction of the treatment system. Whittaker anticipates starting the system in late summer of 2007. On December 7, 2006, the Central Coast Water Board approved the reissued General NPDES Permit for Discharges of Highly Treated Groundwater. On December 19, 2006, Central Coast Water Board staff informed Whittaker that the updated General NPDES permit requires Whittaker to sample all extraction wells for the 126 priority pollutants, and sample the San Benito River (receiving water) at the discharge location when there is surface water flow. On June 6, 2007, Whittaker informed staff that one of the priority pollutants, selenium, was detected in one of the seven groundwater extraction wells over ten times the effluent limit. *Central Coast Water Board staff will meet with Whittaker to discuss permitting options. Based on the NPDES requirements, Whittaker will have to treat for selenium or explore other permitting options before the system begins operation. Whittaker is currently evaluating and researching alternative options.*

Offsite Agricultural Wells: In the RD/RA Work Plan, Whittaker proposed decommissioning of the Riverside and Christopher agricultural wells to reduce the vertical migration of contaminants. The agricultural wells are screened across multiple deep aquifer units. Whittaker first focused on the Christopher well located approximately 200 feet west of the property boundary.

Christopher Well: The 370-foot deep Christopher well was identified as a possible vertical conduit for migration of contaminants from the Whittaker Facility. Therefore, Whittaker must abandon the well and provide replacement water supply to the Perry Farms. Whittaker drilled and sampled a replacement well and found that the water quality does not meet agricultural supply use criteria; therefore, Whittaker may not be able to use the well for replacement water supply. Whittaker is currently researching other replacement water options including supply from San Benito County's irrigation supply line. *On July 13, 2007, Whittaker submitted the Christopher Well Abandonment*

Work Plan, which outlines the approach for abandoning the inactive Christopher Well. This workplan includes well cleaning, casing perforation, and placement of seal materials. Whittaker's consultants will destroy the well on August 8, 2007, in accordance with San Benito County Water District and California Well Standards. Central Coast Water Board staff approved the Work Plan in a July 20, 2007 correspondence. Thirty days following destruction, Whittaker will submit a report of the results.

Riverside Well: The Riverside well is an agricultural supply well impacted with both VOCs (430 µg/L to 600 µg/L in 2005) and perchlorate (50 µg/L to 100 µg/L in 2005). In 1993, Whittaker voluntarily equipped the well with a VOC treatment system for continued agricultural use and connected the 12 well users to City water for domestic supply. Because the well is impacted with perchlorate, and because the well may act as a vertical conduit for plume migration, Central Coast Water Board staff requested Whittaker shut down the well and properly decommission it.

The well was originally pumped at 500 gallons per minute (gpm) for crop and pasture irrigation. Whittaker proposed, in the 2005 Remedial Design/Remedial Action Work Plan, to abandon the Riverside well and provide alternative water supply to the associated users.

Central Coast Water Board staff met with Whittaker's consultant and five of the 12 Riverside Irrigation Company members on February 15, 2007. Central Coast Water Board staff explained our concern that irrigation with the Riverside Well poses a health risk and causes migration of perchlorate-impacted groundwater. We requested that the Riverside Irrigation Company members de-energize the well and that Whittaker decommission the well to prevent vertical migration of groundwater. Whittaker must obtain permission from the Riverside Irrigation Company members to conduct well decommissioning. Following the meeting, a Riverside Well Irrigation Company representative informed the Central Coast Water Board that PG&E shut down power to the Riverside well on February 23, 2007. Central Coast Water Board staff is working with the well users and Whittaker to decommission the well.

At the February 15, 2007 meeting, Whittaker's representative informed the Central Coast Water Board staff and Riverside Irrigation Company members that Whittaker does not legally have to provide replacement water based on a settlement agreement between the two parties in 1997. Central Coast Water Board staff is working with the Riverside Irrigation Company users and Whittaker's consultants to obtain an agreement between the two parties with respect to replacement agricultural supply water for the Riverside Well. *Whittaker's consultants are currently working on a solution to replace the Riverside agricultural supply well, which may include hook up to the "Blue Valve" agricultural supply line. Staff encourage Whittaker to find a similar solution for replacing the Riverside well water and reach an agreement for replacement with the Riverside Irrigation Company members. Whittaker is currently preparing a well abandonment work plan, and are working with the Riverside Irrigation Company members to receive approval to decommission the well.*

BAE Systems (former United Defense), 900 John Smith Road, Hollister, San Benito County
Project Manager: Kristina Seley 805-549-3121

Background: BAE Systems has conducted military armor and tracked vehicle testing since 1968. The site, located on approximately 1,200 acres, contains several buildings, former munitions magazines, and two munitions test arenas. Constituents of concern identified in soil and/or groundwater include perchlorate and explosives.

Cleanup Actions: In late September 2005, BAE Systems excavated shallow perchlorate-impacted soils in Arena 1 at concentrations greater than 5 milligrams per kilogram (mg/kg). BAE Systems removed approximately 400 cubic yards of soil and installed a 35,000 square foot temporary chip seal cap at Arena 1 to minimize potential mobilization associated with rainfall and runoff infiltration.

Current Investigation: On April 25, 2007, Central Coast Water Board staff discussed Work Plan comments with BAE Systems' consultants via phone, and concurred with the Work Plan recommendations in a letter dated April 26, 2007. BAE Systems will submit the Phase VII Report with findings and recommendations on October 31, 2007. Central Coast Water Board staff will meet with the consultants at the site during Phase VII investigative work to discuss initial findings and review BAE Systems' response to comments regarding the 2006 Human Health and Ecological Risk Assessment Report.

MK Ballistic Systems, 2707 Santa Ana Valley Road, Hollister, San Benito County
Project Manager: Kristina Seley 805-549-3121

Background: The MK Ballistic Systems site is located west of the BAE Systems Test Facility property. Currently, MK Ballistic Systems leases buildings and storage magazines on the five-acre property and manufactures "less-lethal" explosives and ordnance components and devices. Numerous other tenants have conducted similar operations at the facility and have used perchlorate and other explosive compounds in their manufacturing processes. In 1991, U.S. EPA conducted a time-critical cleanup action when one of the former tenants, Caelus Devices, Inc., went bankrupt and abandoned the facility without proper containment and storage of shock-sensitive explosive chemicals.

Concern: BAE Systems tested all its site wells for chemicals of concern. Perchlorate was detected for three consecutive quarters at about 30 ppb in a windmill well upgradient from all identified soil and groundwater perchlorate impacts. BAE Systems' *Phase IV Environmental Investigation Report* proposed that historical use of perchlorate at the neighboring site, MK Ballistic Systems, may be the cause of contamination. Based on the historical use of perchlorate and explosives at MK Ballistic Systems, and due to the perchlorate detections in the windmill well, staff believe that current or past practices at the MK Ballistics site may have impacted groundwater.

Action: On January 9, 2006, Central Coast Water Board staff met with the landowner, her attorney and environmental consultant, and the current operator at the facility to discuss our concern that past practices may have impacted the windmill well. In a January 24, 2006 letter, the Central Coast Water Board directed the landowners and current operator to provide a work plan by March 24, 2006. The requested work plan must include a summary of historical practices, proposed investigation tasks, sampling and analysis plan, and time schedule.

On April 14, 2006, staff received the "MK Ballistic Systems Site Environmental Investigation Work Plan." The work plan summarized historical site operations and proposed a perchlorate soil and groundwater investigation. Water Board staff generally concurs with the work plan, and provided comments in a June 23, 2006 letter. MK Ballistic Systems' landowner and lessee are required to submit a summary of their findings and an interpretation of the data in an Environmental Investigation Report.

Water Board staff was contacted by the Department of Toxic Substances Control (DTSC) regarding this site. Currently, DTSC is investigating the storage and handling of hazardous waste and explosives contained at the site. On February 15, 2007, Central Coast Water Board staff met with DTSC staff and the land owner's representatives in Hollister, CA. DTSC staff provided a copy of the soil sampling results that they conducted as part of their investigation.

In a May 23, 2007 correspondence, the Central Coast Water Board staff directed the responsible party to submit a work plan addendum by June 22, 2007. The directive requires metal analysis in soil at locations DTSC detected elevated surface contamination during their December 2005 site investigation. *During the last week in July, the consultant obtained additional environmental reports that include information on materials stored, removed, and demolished at the site. The consultant*

requested a time extension in order to review the new data and optimize the soil and groundwater sampling locations, and to determine if there are additional constituents that shall be tested. Central Coast Water Board staff agree with the consultant's approach and approved a one-month extension.

ATTACHMENTS

1. Olin's Progress Report #60, dated August 10, 2007.

S:\Site Cleanup Program\Regulated Sites\Santa Clara Co\OLIN Corp\Water Board\Board Meetings\EO Reports\2007\EO_REPORT_FOR_Sept_07_2007-FINAL.doc