

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF DECEMBER 1-2, 2005

Prepared on November 2, 2005

ITEM NUMBER: 14

SUBJECT: Perchlorate Cleanup Sites

DISCUSSION: New information is shown in *italics*. Please refer to previous staff reports for historical information.

Olin Corporation Facility, 425 Tennant Avenue, Morgan Hill, Santa Clara County
Project Manager: David Athey 805-542-4644

Current milestones in the investigation of perchlorate contamination emanating from the former Olin facility include:

On-site Groundwater Treatment and Containment:

Update: Olin submitted a request to amend the General Waiver of Waste Discharge on September 27, 2005. Olin's current waiver allows discharge of treated groundwater to the Butterfield Retention Basin. Olin proposed to install on-site groundwater injection wells in order to cease discharging to the Butterfield Retention Basin. The Butterfield Retention Basin is owned by the City of Morgan Hill. Water Board staff has reviewed Olin's request, along with comments from the City of Morgan Hill, and has decided to amend Olin's enrollment under the general waiver for discharges to land. Water Board staff's amendment letter is included as Attachment 1.

Olin will perform hydrogeologic investigations to aid with injection system design and construction. Water Board staff's amendment letter required Olin to submit the investigation and design reports for Executive Officer approval prior to discharge. Water Board staff anticipates receiving the investigation

and design report by the middle of December 2005.

On-site Ex Situ and In Situ Soil Treatment:

Update: In situ soil treatment commenced on August 16, 2005. Olin is currently completing treatment system optimization. System optimization includes determination of infiltrative capacity for each treatment cell and nutrient injection optimization. Optimization of the in situ bioremediation system is proceeding according to the scope of work provided in the "Remedial Action Work Plan & 90% Design Report for Soil Remediation" submitted in April 2004. Olin has also collected lysimeter and moisture sensor data as required by the Monitoring and Reporting Program. Through September 22, 2005, approximately 1.2 million gallons of amended water has been applied to the in situ bioremediation system. The system was shut off on September 22, 2005, to allow establishment of a sustainable anaerobic bacterial soil population. The system was restarted in late October. In situ bioremediation system monitoring results are presented in Olin's Third Quarter 2005 Containment and Treatment Report (MRP 2003-168) submitted to the Water Board on October 31, 2005.

Groundwater Monitoring and Reporting:

Update: Olin completed monthly and quarterly sampling during September 2005. The water-level measurements included 20 on-site and off-site monitoring wells, and 26

nested BarCad wells at eight on-site locations. Groundwater samples were collected from the 28 on-site wells. The collection of off-site samples was completed for the Third Quarter 2005 monitoring event. Groundwater samples were collected from 145 off-site wells during September 2005.

Sampling results are included in Olin's "Third Quarter 2005 Groundwater Monitoring Report" submitted on October 31, 2005. Water Board staff is currently reviewing the third quarter report.

Northeast Perchlorate Area:

Update: Manual depth to groundwater measurements and weekly downloads of transducer data continue to be collected at the single screen and CMT piezometers. Additional transducer data were provided to the Water Board, via e-mail, on October 28, 2005. The transducer data show the change in groundwater elevation every ten minutes. Olin is required to install transducers in the multi-channel and single-stand pipe piezometers.

Cleanup or Abatement Order No. R3-2004-0101

Olin continues to install groundwater ion exchange (IX) treatment systems on domestic wells. Olin is working with the Department of Health Services on certification issues. Olin has not provided Water Board staff with an update regarding when IX certification is expected.

On September 22, 2005, Olin submitted a revised "Alternative Water Supply Implementation Work Plan." The work plan was submitted to revise the "Alternative Water Supply Implementation Work Plan" submitted in October 2004. The work plan was revised to incorporate State Water Resources Control Board Order WQ 2005-0007.

Olin continues to provide interim alternative drinking water accordance with Water Board CAO No. R4-2004-0101 (revised by the State Water Resources Control Board in its Order No. WQO 2005-0007, adopted on May 19,

2005). On September 15, 2005, Olin requested to discontinue bottled water service to 78 wells that have tested below 4 ppb for four consecutive quarters. In addition, Olin has requested to discontinue bottled water to an unknown number of additional wells. Water Board staff has reviewed the request and will present Olin's request at the February 10, 2006 Water Board meeting.

Cleanup or Abatement Order R3-2005-0014

Olin submitted the "Llagas Subbasin Characterization Work Plan" (Work Plan) on August 12, 2005. Water Board staff determined that the Work Plan was incomplete and provided comments to Olin. Water Board staff and Olin met to discuss comments related to the Work Plan on October 18, 2005. Olin resubmitted the Work Plan on October 24, 2005, and Water Board staff is currently reviewing it for completeness.

Olin continues to install groundwater piezometers south of the Olin site. To date, Olin has installed monitoring wells MW 16, 17, 21, 40 and 44 and has nearly completed monitoring wells MW 26 and 35. Each well location has a minimum of two monitoring wells. The monitoring wells consist of a multi-channel well with multiple screen intervals and another single standpipe well with one or more deeper screen intervals. The multi-channel wells are typically installed to 300 feet below ground surface. The single standpipe wells are typically installed at depths between 300 and 450 feet below ground surface.

Perchlorate Community Advisory and Perchlorate Working Groups

The next PCAG meetings will be held at the San Martin Lions Club on Friday December 9, 2005, at 2pm, and on Friday February 3, 2006, at 2pm.

Water Board staff attended a meeting with the representatives of the Perchlorate Working Group (Santa Clara Valley Water District, City of Gilroy, City of Morgan Hill, and Santa Clara County) on October 20, 2005. Water

Board staff discussed current 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>

McCormick Selph, 3601 Union Road, Hollister, San Benito County
Project Manager: David Athey 805-542-4644

The Discharger submitted the full-scale corrective action work plan on September 30, 2005. The work plan describes McCormick Selph's plans for implementing groundwater treatment using hydrogen release compounds over a much broader plume area. Water Board staff is evaluating the report and will be providing comments to McCormick Selph.

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

Perchlorate and volatile organic compound (VOC) remediation efforts continue at contaminated areas at and near the Whittaker Ordnance site. Whittaker submitted the First Semiannual 2005 Groundwater Monitoring and Remediation Status Report on July 31, 2005. The Report included groundwater monitoring results and the status of remedial activities including the Riverside Well air stripper, groundwater extraction and treatment system, in situ reactive zone bioremediation technologies, and point of use carbon adsorption and ion exchanges systems currently underway. An update of Site remediation and domestic use treatment systems is provided in the October 21st Board update.

Sampling and Analysis Plan – On September 9, 2005, Whittaker submitted the final Sampling and Analysis Plan (SAP). On October 19, 2005, the Water Board approved the final SAP. The SAP summarizes all actions required to perform groundwater, soil, and treatment system monitoring. The SAP addressed three main items: monitoring schedules, procedures, and objectives; quality assurance and quality control procedures; and site-specific health and safety plans.

The SAP will serve as the monitoring and reporting program. The SAP will be a living document updated by Whittaker with Water Board concurrence or direction. Changes to the SAP will be made as monitoring, sampling, and remediation efforts indicate revisions are needed. Whittaker will submit future monitoring reports in compliance with the SAP.

Remedial Design/Remedial Action Work Plan (Work Plan) - In a May 2, 2005 letter, staff directed Whittaker to submit a "Remedial Design/Remedial Action Work Plan" (Work Plan) for site-wide cleanup by May 28, 2005. We received the Work Plan on May 31, 2005 and the "Off-Site Groundwater Fate and Transport Modeling Report" on June 3, 2005.

The Work Plan included a description, rationale, and schedule for the design to mitigate impacts from Site constituents of concern including perchlorate, hexavalent chromium, and volatile organic compounds (VOCs). *The proposed remedial design is to contain off-site migrating groundwaters and reduce the risk to off-site groundwater beneficial uses.*

The proposed groundwater containment system (System) consists of 1) a groundwater extraction well network, 2) conveyance to a treatment system, 3) treatment, and 4) discharge of treated groundwater. The proposed extraction well network will consist of four shallow clustered wells that will operate at 70 gallons per minute (gpm) and two Unit 3 extraction wells that will operate at 22.5 gpm each. The purpose of the proposed extraction wells is on-site groundwater containment; the wells are not designed to contain impacted groundwater that has already migrated from the site.

After the on-site groundwater is extracted, Whittaker proposes to treat and discharge the water into the San Benito River (approximately 2000 feet north of the Site boundary) under an NPDES permit. The draft treatment system proposed consists of granular activated carbon for VOC removal and either ion exchange or a bioreactor for perchlorate

remediation. The Work Plan proposed to treat off-site contamination by natural attenuation, including dilution and dispersion for perchlorate ions. Results of the off-site monitored natural attenuation (MNA) approach indicated that once the on-site groundwater containment system is operational, the off-site COC plumes will stabilize and contract over time. The MNA approach will be developed and implemented, including identification and construction of additional monitoring wells, following the startup of the on-site containment system.

Whittaker states source area soil remedial measures in the most heavily impacted areas will not greatly benefit the restoration of Site-wide groundwater to cleanup goals within a reasonable time frame. Therefore, capping of the soil, opposed to soil remediation, is the preferred soil cleanup approach.

Whittaker plans to decommission the Riverside and Christopher agricultural wells to reduce the vertical migration of contaminants. Members of the Riverside Irrigation Company (RIC) have expressed their concern regarding replacement water for the Riverside Well. Staff required Whittaker to obtain written approval from landowners/residents of the RIC prior to submittal of an alternative water supply source final design.

On October 12, 2005, Water Board staff sent a letter that outlines the next steps anticipated in the cleanup process. (See Attachment 2) Staff provided detailed work plan comments in a letter dated October 25, 2005. In summary, we approved the System to extract, treat, and contain groundwater migrating from the site and to reduce the risk to off-site receptors provided Whittaker addresses our comments, addresses public comments, and enrolls in our general NPDES permit for highly treated groundwater. Performance monitoring of the System will dictate if additional cleanup or abatement is required. In summary, our comments requested:

- a. *A registered engineer or geologist stamp and signature.*
- b. *A review of off-site wells to determine if they are impacted by System pumping.*

- c. *Data and results from the bioreactor bench-scale study.*
- d. *Design details for extraction wells.*
- e. *Well owner approval for alternative water supply design.*
- f. *A community involvement draft fact sheet and distribution list*
- g. *Completion of additional investigations in the North Building 5 and Building 23 areas prior to approval of the proposed soil capping solution.*
- h. *A performance-monitoring plan.*
- i. *A final Remedial Action/Remedial Design Report.*

On September 23, 2005, staff received Whittaker's "Proposed Groundwater Treatment System Discharge Standards" letter. The letter proposed effluent values for the groundwater extraction and treatment system which will be enrolled under the Water Board's "Waste Discharge Requirements Order No. 01-134, NPDES General Permit for Discharges of Highly Treated Groundwater to Surface Water." In our October 21st letter, we approved the proposed values with modifications based on the anticipated monitoring program. Water Board staff will develop a site-specific Monitoring and Reporting Program following Whittaker's "Notice of Intent" submittal. We anticipate the Notice of Intent will be submitted in December of 2005.

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

On June 24, 2005, former United Defense representatives informed the Water Board that BAE Systems purchased United Defense Industries. Although BAE Systems now operates the facility, staff has not changed.

On March 28, 2005, Ms. Seley spoke with URS staff member Susie Vedantham, BAE Systems' consultant. Ms. Seley discussed the request by the Water Board to implement interim corrective actions at source areas. Pursuant to the request, URS will continue with the Phase IV work to delineate the

perchlorate and energetic contamination and characterize the source areas.

Staff received the Phase IV Environmental Investigation Report on May 13, 2005, and met with BAE Systems's consultant URS on June 2, 2005. URS reviewed the report findings and Water Board staff discussed initial comments. Water Board staff provided comments to the Phase IV Report on June 28, 2005. Comments included 1) approval to discontinue monitoring of the on-site windmill well 2) submittal of a Phase V work plan including well installation for two wells in the Arena 1 perchlorate contaminated area 3) additional groundwater analysis for energetics at the Building 6 area. A summary of the Phase IV Report and previous Report results at the areas under investigation are included below.

- **Arena 1:** Arena 1 work has expanded with each phase to assess the extent of COCs in soil, groundwater, and surface water. Previous sampling during the Phase II investigation found perchlorate at a maximum of 2,900 milligrams per kilogram (mg/kg) in soil and 2,600 micrograms per liter ($\mu\text{g/L}$) in groundwater.
- **Arena 2:** One soil boring at 0.5 ft had a perchlorate detection of 3.7 mg/kg.
- **Three Nearby Groundwater Wells:** Perchlorate was detected in the Rancher's well at 15 $\mu\text{g/L}$ and the Windmill well at 34 $\mu\text{g/L}$. Nitrate + nitrite (as N) was detected in the Windmill well and WW-1 at 45 $\mu\text{g/L}$ and 4.2 $\mu\text{g/L}$ respectively.
- **Ranch Pond Dredge Area:** Perchlorate was detected at 1.1 mg/kg in one of two soil boring samples taken. Nitrate + nitrite (as N) was detected at 8.2 mg/kg and 27 mg/kg in the two borings. Aluminum was also detected below the background sample result.
- **Building No. 6 Area:** Energetic sampling was conducted near Building No. 6 to further assess the extent of HMX, RDX, and TNB (energetics) contamination.

Generally, concentrations increase with depth. HMX, RDX, and TNB were found at 2,400 $\mu\text{g/kg}$, 1,200 $\mu\text{g/kg}$, and 240 $\mu\text{g/kg}$, respectively, 20 feet below ground surface.

- **Santa Ana Creek:** All surface water and sediment samples of perchlorate, nitrates and nitrites, and energetics were non-detect. Dissolved aluminum was detected in surface water in four samples ranging from 0.14 mg/L to 0.25 mg/L. Aluminum concentrations in sediment ranged from 6,300 mg/kg to 13,000 mg/kg.
- **Cattle Guard:** Soil samples where Arena 1 drainage meets the Santa Ana Creek were non-detect for perchlorate.
- **Water Well WW-2:** Historical groundwater results for perchlorate were not detected, however, nitrate + nitrite as N was detected at 3.5 mg/L.
- **Burn Pit Area:** Perchlorate has not been detected in soil borings at the Burn Pit Area. HMX has been detected in one of four historic soil borings.

On July 12th, BAE Systems submitted its Phase V Environmental Investigation Work Plan. The Work Plan included the efforts required to submit the Phase V Environmental Investigation Report due October 15, 2005. BAE Systems concluded additional site work should be completed prior to submittal of risk-based soil cleanup goals for perchlorate and energetics.

BAE Systems' consultant, URS, anticipates excavating and removing perchlorate-contaminated soils in Arena 1 prior to the upcoming rainy season (October 2005). BAE Systems will submit a work plan for the possible excavation in September.

On July 1, 2005, the Executive Officer issued Monitoring and Reporting Program No. 05-0113 for the BAE site. The first quarterly report, the Third Quarter 2005 Groundwater Monitoring Report, is due October 31, 2005.

Update: On October 15, 2005, BAE Systems submitted the Phase V Environmental Investigation Report. BAE Systems conducted additional site work to determine the extent of chemicals of concern in groundwater and soil. The following areas were investigated:

- **Burn Pit Area:** *The landowner identified this area as a location where refuse materials had been burned in the past. Perchlorate has not been detected in soil borings at the Burn Pit Area. HMX has been detected in one of four historic soil borings, and no energetics were detected in the Phase V soil borings.*
- **Arena 1:** *Perchlorate has impacted groundwater and storm water quality. The highest perchlorate concentrations were found at depths less than 5 feet. Perchlorate was detected in nine of ten Phase V drainage soil borings. Perchlorate was detected in eight of ten Phase V shallow groundwater samples ranging from 950 µg/L to 76 µg/L. BAE conducted source removal as described below.*
- **Building No. 6 Area:** *Phase V concluded that energetics including HMX, RDX, TNT, and TNB in soil are concentrated in two areas, the former wastewater clarifier and the Building 6 entrance road. During historical investigations, HMX (at 0.3 µg/L) at 32 feet bgs) was the only energetic detected. During the Phase V investigation, 2,4, DNT was the only energetic detected (12 µg/L at 104 feet and 19 µg/L at 105 feet bgs). Energetics were detected at low concentration in one of three Phase V borings.*
- **Building No. 1 Area:** *Rain runoff from metal parts and equipment storage may have resulted in soil and groundwater impacts at this area. Perchlorate was detected in two of three historic soil borings at concentration less than 0.160 milligrams per kilogram (mg/kg). During the Phase V investigation, perchlorate was detected in two of five soil borings ranging from 0.015 mg/kg and 0.12 mg/kg.*

Update: On September 21, 2005, BAE Systems submitted the "Interim Remedial Action Work Plan". The Work Plan proposed excavation and removal of shallow perchlorate-impacted soils at a concentration of 5 milligrams per kilograms (mg/kg) or greater and the installation of a temporary chip seal cap at Arena 1. The purpose of the work is to reduce the migration of perchlorate impacted surface water runoff into the Arena 1 drainage channel. BAE Systems expedited the proposed work in order to complete the work prior to the rainy season. BAE Systems excavated and removed approximately 330 cubic yards of perchlorate-contaminated soils to a depth of 2 to 2.5 feet.

BAE Systems will submit a Risk Assessment and Remedial Investigation/Feasibility Study by February 28, 2006. Water Board staff are currently reviewing the Phase V Report and will provide comments shortly.

ATTACHMENTS

1. Olin – November 1, 2005 letter to Richard McClure – Amendment of the Low Threat Enrollment.
2. Whittaker – October 12, 2005 Letter

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