

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

**STAFF REPORT FOR REGULAR MEETING OF FEBRUARY 7-8, 2008**  
Prepared on December 27, 2007

**ITEM NUMBER:** 4  
**SUBJECT:** Military Facilities Update

**INTRODUCTION**

This Staff Report summarizes the progress of cleanup efforts conducted under the Department of Defense's (DoD) Environmental Restoration Program during the last 12 months. *Note new information is provided in italics to differentiate from information that has been provided in prior reports.*

**Regulatory Background**

The Environmental Restoration Program was established by the Superfund Amendments and Reauthorization Act of 1986 to address historic activities at federal facilities that that could pose a threat to human health or the environment. DoD follows the investigation, cleanup, and closure process laid out by the Comprehensive Environmental Response, Compensation, and Liability Act. The U.S. Environmental Protection Agency (USEPA) is the lead regulatory agency at all California DoD facilities on the National Priorities List (i.e., federal "Superfund Sites") with support from Water Boards and Department of Toxic Substances Control (DTSC). Former Fort Ord Army Base is the only DoD Superfund site in the Central Coast Regional Water Quality Control Board's (Central Coast Water Board) jurisdiction. DoD has transferred two facilities, Former Fort Ord Army Base and Lompoc Branch U.S. Disciplinary Barracks Federal Correction Facility, to non-military uses. DoD continues to include these sites in the Environmental Restoration Program as "Base Realignment and Closure Installations."

A 1997 agreement between the State Water Quality Control Board (State Water Board) and DTSC designated the respective roles of the two agencies at the various DoD facilities. At DoD facilities in the Central Coast, the Central Coast Water Board either shares the lead regulatory role with DTSC (e.g., Vandenberg Air Force Base) or is the sole lead (e.g., Camp Roberts National Guard Base). The Central Coast Water Board's primary oversight responsibilities include: (1) reviewing and commenting on technical reports and studies designed to develop remedial alternatives; (2) achieving public outreach and education through public meetings and (3) providing oversight for leaking underground storage tank cases. The Central Coast Water Board's authority for cleanup of contaminated DoD sites include: California Water Code, Division 7, Section 1300, Section 13304, and Section 13172, and California Health and Safety Code, Chapter 6.7.

**Program Overview**

The Central Coast Water Board is reimbursed for regulatory oversight at DoD facilities through the DoD and State "Memorandum of Agreement." Most of the DoD budget for the Central Coast Region covers oversight at Vandenberg Air Force Base (VAFB), Former Fort Ord Army Base, Lompoc Branch U.S. Disciplinary Barracks Federal Correction Facility, Fort Hunter Liggett Army Base, Camp Roberts National Guard Base, and Monterey Peninsula Airport (a former Navy Air Base).

There are numerous other military-related sites in the Central Coast Region that DoD classifies as Formerly Used Defense Sites. Formerly Used Defense Sites are sites that were previously owned, operated, or leased by DoD. An example of a Formerly Used Defense Site currently being addressed through the Environmental Restoration Program is Monterey Peninsula Airport (see site discussion below). Many of the Formerly Used Defense Sites were only used for a short period of time (e.g., during World War II) or had limited activities (e.g., satellite stations). In most cases, there is little site information on Formerly Used Defense Sites and DoD ranks them as low priority for funding purposes. The State Water Board is currently working with the Water Boards, DTSC and DoD to prioritize actions at Formerly Used Defense Sites in California.

*The DoD unit consists of three full-time and two partial-time caseworkers, an approximately ¾-time senior (shared with land disposal program), and one student intern. The Program resources for fiscal year 2007/2008 are similar to last year's at 4.6 personnel years and approximately \$770,000. At the end of November 2007 (most current data available) with 40 percent of the year completed, 35 percent of these budgeted resources had been expended.*

### **VANDENBERG AIR FORCE BASE (VAFB)**

**Lead Staff: Carol Kolb, Linda Stone, Kristina Seley**

#### **Background**

VAFB, located on the north coast of Santa Barbara County, is the third largest U.S. Air Force installation, occupying almost 100,000 acres and 35 miles of coast line. Basewide cleanup is being implemented through the DoD's Environmental Restoration Program. Program implementation follows the provisions of a Federal Facility Site Remediation Agreement, entered into by the Air Force, Central Coast Water Board, and DTSC on August 22, 1991.

#### **Sites/Chemicals of Concern**

Environmental Restoration Program sites at VAFB include: closed landfills, space launch complexes, missile silos, fuel and chemical spill areas, and underground storage tank areas. Typical chemicals of concern include: jet fuels, rocket fuels, petroleum hydrocarbons, solvents, polychlorinated biphenyls, pesticides, perchlorate, metals, and unexploded ordnance.

#### **Emergent Chemicals/Perchlorate**

The "Basewide Preliminary Assessment/Site Investigation" for six emergent chemicals of concern (e.g., perchlorate, n-nitrosodimethylamine, polybrominated diphenyl ether, 1,4-dioxane, 1,2,3-trichloropropane, and total/hexavalent chromium) began in January 2004. The total number of sites being evaluated is 133, including 58 Environmental Restoration Program sites and 75 Areas of Concern. *In December 2007, the Air Force's consultant completed the majority of all drilling and groundwater sampling. In January 2008, the consultant will have completed all sampling and will prepare the Limited Site Investigation Draft Report with the sampling results and proposed next actions.*

#### **Progress/Success Stories**

**Sites 8 and 9:** (Space Launch Complex-4 East and Space Launch Complex-4 West): These two adjacent launch complexes were active from 1964 until they were decommissioned in 2006. Launch activities resulted in two long, narrow groundwater plumes of trichloroethene and perchlorate. The Site 9 plume extends over 3,000 feet, reaching bluffs above the Pacific Ocean. In November 2003, VAFB began operation of a dual-phase (groundwater and soil vapor) extraction system at the Site 9 groundwater hot spot. Performance data through January 2007 show that approximately 2.2 million gallons of groundwater were processed by the system. Over this period, the treatment system removed 640 pounds of volatile organic compounds from soil vapor and 14.2 pounds from groundwater. In addition, 2.2 pounds of perchlorate were removed from groundwater. *Recently, the contaminant mass removal rate has leveled off. VAFB has expanded an in-situ bioremediation pilot study to remediate the groundwater hot spot.*

*Bioremediation is successfully reducing trichloroethene to concentrations at or below the corresponding maximum contaminant level (MCL) and perchlorate to below the detection limit of 1 part per billion (ppb). Based on the success of the in-situ system, VAFB installed a similar system in the Site 8 groundwater hot spot and is planning on installing downgradient in-situ treatment zones to minimize further offsite migration.*

**Site 15:** (ABRES-B Launch Complex): Site 15 is a former launch complex located approximately 1.5 miles from the Pacific Ocean. The complex was built in 1959 and was used for missile launches through 1967. Large quantities of the solvent trichloroethene were used to clean the missiles prior to launch. The trichloroethene migrated into the shallow aquifer in the underlying sand dunes. At least two narrow plumes extend from the launch pads to San Antonio Creek, over 3,000 feet south of the pads. *Surface water samples show that trichloroethene and its break down products are present at low concentrations in a 3,000 foot reach of San Antonio Creek beyond where the plumes discharge. To date, these detected concentrations are below MCLs and aquatic habitat standards; however, vinyl chloride has been detected at concentrations above its MCL. Because of staff's concerns, VAFB has expedited remedial plans for this site. In December 2007, the State approved a pilot study designed to treat a hot spot at the leading edge of the plume. The pilot study involves the use of an innovative technology that would establish a permeable reactive barrier using activated carbon impregnated with nano-sized iron. If the pilot study is successful it will be expanded to reduce contaminant migration into the creek.*

**Site 20:** Since 1998, VAFB has operated a source reduction system as an interim remedial action at Site 20, a former underground storage tank area. The Final Performance Monitoring Report shows that, since the system began operating, it has removed an estimated 12,270 pounds of hydrocarbons from the vapor phase and 108 pounds from the groundwater phase.

*The consultant shut down the source reduction system to conduct an in-situ chemical oxidation treatment that included injection of Fenton's reagent (an oxidizing agent). Between June and October 2007, the consultant conducted three injections into the saturated zone to treat dissolved-phase chlorinated and fuel-related compounds including total petroleum hydrocarbons, benzene, 1,1-dichloroethane, and 1,2-dichloroethane. Central Coast Water Board staff anticipates receiving the in-situ chemical oxidation summary report in the first quarter 2008.*

**Site 21:** (Fire Training Area): From 2004 to 2005, VAFB excavated approximately 30,000 cubic yards of soil contaminated with petroleum, polychlorinated biphenyls, volatile organic compounds, and dioxin. VAFB disposed of the material at an appropriate off-site disposal facility. In November 2006, VAFB submitted a "Request to Backfill Main Excavation," which included findings from an abbreviated risk assessment. The risk assessment concluded that no additional excavation was necessary and the Air Force requested to backfill the excavated area. Central Coast Water Board staff concurred with the proposed backfilling; however, did not agree with the conclusion that no additional excavation was required. *During October 2007, VAFB backfilled the main excavation with 48,000 tons of soil. On December 12, 2007, VAFB submitted a Focused Feasibility Study to determine the cleanup strategy. The feasibility study addresses surface and subsurface soil (there is no groundwater pathway, and no standing surface water). The consultant conducted a risk assessment to determine soil cleanup values and the feasibility study outlines measures to ensure that the current and anticipated future land uses upon which their risk assessments were based will be maintained. The focused feasibility study proposes to implement land use controls to mitigate exposure threat from residual soil contamination that remains in place. Central Coast Water Board and DTSC staff are currently reviewing the feasibility study.*

**Site 60:** Site 60 (General Service Administration Service Station) is a former gas station at the South Base entrance that has methyl tert-butyl ether (MTBE) groundwater contamination. The monitoring results from the permeable reactive barrier system, installed in the summer of 2002 near the source area, continues to show declining MTBE concentrations. *The consultant will install another reactive barrier at the leading edge of the groundwater plume in 2008.*

*In November and December 2007, over 1600 cubic yards of contaminated soil were excavated at the source area. VAFB has requested funds to demolish a small storage building which lies above additional MTBE-impacted soil. Once the funds are attained, VAFB will demolish the building and complete soil excavation.*

**Additional Investigations: Areas of Interest and Areas of Concern**

VAFB is proactively investigating multiple onsite areas that be could be associated with releases of contaminants. An area of interest is defined as any area that could cause environmental concern, but does not pose a serious immediate threat to human health and the environment. If a review of historical information confirms the potential threat, the area of interest is classified as an Area of Concern and VAFB will undertake additional investigations to determine appropriate subsequent actions. Approximately 160 of the originally identified 166 Areas of Concern have been closed (since 2003, approximately 50 Areas of Interest have been converted to Areas of Concern). Also, 100 additional Areas of Interest have been converted to Areas of Concern. *Currently, approximately 60 Areas of Concern are being investigated using the Triad process outlined below. During the last six months, 13 sites were closed and an additional 29 are proposed for closure and are being evaluated by the Central Coast Water Board, DTSC, and the Department of Fish and Game.*

**"Triad" and Areas of Concern:** Central Coast Water Board staff, DTSC, Department of Fish and Game, VAFB and its consultants *continue to successfully work* together using the Triad model to conduct site investigations at Areas of Concern. "Triad," a term coined by the USEPA, is a new approach to hazardous waste site assessment and remediation that can lead to faster and more cost effective remediation, while returning sites to productive use. The approach is possible because of recent technology advances and better understanding of subsurface fate and transport.

The Triad approach consists of three main concepts: 1) decision-making and uncertainty analysis through systematic planning, 2) dynamic work strategies, and 3) real-time measurement technologies. Systematic planning includes identification of decisions to be made, development of a conceptual site model, and an evaluation of decision uncertainty. Dynamic work strategies are strategies for site characterization, remediation, and monitoring that allow for change based on real-time data. Real-time measurement technologies return results quickly enough to influence the progress of data collection and field activities. The Triad process is unique because it requires that staff make real-time decisions based on real-time data.

**Underground Tank Program:** *To date, a total of 780 underground storage tank sites have been closed. Currently, 15 sites are undergoing investigations, and an additional 85 to 100 tank sites may require assessment in the future. In addition, miles of solvent and petroleum/oil/lubricant transmission lines will likely require assessment over the next five years.*

**FORMER FORT ORD ARMY BASE**

**Lead Staff: Grant Himebaugh**

**Background**

The former Fort Ord Army Base encompasses 28,000 acres between the cities of Seaside and Marina. The USEPA declared the base a federal Superfund site in February 1990 based on impacts to the City of Marina's municipal water supply from facility-related groundwater contaminants. The base officially closed in September 1994 and most of the facility became available for conversion to civilian use.

**Sites/Chemicals of Concern**

Since the facility's closure, the U.S. Army's base closure team has identified over 40 environmental sites. The primary water quality concerns involve landfill gas, one carbon tetrachloride groundwater plume, and three trichloroethene groundwater plumes.

**Progress/Success Stories**

On this federal Superfund site, Central Coast Water Board staff work with USEPA and DTSC to oversee cleanup activities. Several large-scale groundwater plumes are undergoing remediation. Landfill gas and the carbon tetrachloride groundwater plume are being remediated via gas removal systems. *During 2006 (most recent information), over 63 pounds of trichloroethene were removed from the three active remediation systems.*

*The carbon tetrachloride plume's Record of Decision, containing the agreed final remedy, was signed by the Army and regulatory agencies in November 2007. Construction has begun on the final remedy, an in-situ biodegradation system.*

Regarding the Operable Unit 1 trichloroethene plume, when concerns arose regarding the spread of Operable Unit 1 contaminants across the former Fort Ord border, the U.S. Army circumvented problems with a fixed-price contract by hiring a separate contractor for the investigation. *This strategy of using a second contractor has been extended to include construction and operation of a separate cleanup system. The newly defined plume geometry extends from the original plume boundaries, and the expanded cleanup system is under construction.*

*The current Operable Unit 1 groundwater extraction and treatment system added four new extraction wells in autumn 2007. The new wells significantly increased system effectiveness. In addition, the plume source area extraction wells have been shut down and are being evaluated for rebounding levels of contaminants. A November 2007 Army report characterizes the plume origin cleanup as complete, and recommends that most of the wells at the southern end of the plume be destroyed.*

*In autumn 2007, an agricultural supply well on nearby University of California Santa Cruz property was identified as producing water from shallow aquifers in conflict with the conditions of its operating permit. As this water production threatened to aggravate sea water intrusion and the Army's groundwater cleanups, Water Board staff worked closely with University and Monterey County staff to identify possible solutions and terminated pumping of the well. Permanent well destruction plans are underway.*

**Challenges**

*Cleaning up groundwater contaminant plumes beneath current and developing areas in the City of Marina continues to be a challenge. Coordination with the numerous responsible, regulatory agencies, and the community, while often dealing with concurrent property development issues requires flexibility and cooperation. In 2007, title to over three thousand acres of former Ft. Ord property, and the responsibility to clean up all non water-related issues was transferred from the Army to the Ft. Ord Reuse Authority. Millions of dollars of federal funding accompanied what is termed a "Finding of Suitability for Early Transfer." Water Board staff remains involved in water-related issues, and is accessible to the community regarding any questions or concerns.*

**MONTEREY PENINSULA AIRPORT**

**Lead Staff: Grant Himebaugh**

**Background**

Monterey Peninsula Airport is a Formerly Used Defense Site comprising 455 acres three miles southeast of downtown Monterey. Formerly leased by the U.S. Navy from the Monterey Peninsula Airport District in 1942, today the Airport serves the local area with commercial and private air service.

**Sites/Chemicals of Concern:**

Known cleanup sites include two former 50,000-gallon concrete underground storage tanks with an associated petroleum groundwater plume and a trichloroethene groundwater plume. A former fire fighting

training facility and several other potentially contaminated sites have been ruled out as contaminant sources.

#### **Progress/Success Stories**

In May 2003, The U.S. Army Corps of Engineers (Army Corps) initiated a treatability study to remediate trichloroethene in groundwater at the Casanova Oak Knoll's Park. Another cleanup system at the Airport's trichloroethene contaminant source area began operation in fall 2003. Community feedback for both of these facilities has been positive.

#### **Challenges**

*While cleanup at both treatment areas is progressing, there are questions regarding the cost effectiveness of the system at the Cassanova Oak Knolls Park. Labor costs for balancing water chemistry and associated chemical and system repair costs may no longer be appropriate. However, there will be no system changes until the current supply of hydrogen peroxide (the treatment agent) is expended.*

*In March 2008, the Army Corps' program manager is due back from a two year assignment in Iraq. After his return, modifications to the current system will be evaluated.*

### **FORT HUNTER LIGGETT**

**Lead Staff: Grant Himebaugh**

#### **Background**

Fort Hunter Liggett is a U.S. Army training facility consisting of approximately 165,000 acres in southern Monterey County. Current and historic uses of this facility include field exercises and weapons and equipment testing. Most of the land is undeveloped and is used for field training. Portions of Fort Hunter Liggett are leased for cattle grazing. The Main Garrison includes offices, barracks, motor pools, and instrument fabrication/testing facilities. The DTSC is the lead agency for cleanup activities; however, the Central Coast Water Board is primarily responsible for most of the sites that require further action.

#### **Sites/Chemicals of Concern**

Environmental Restoration Program sites include a closed landfill, former underground storage tanks, spill areas, unexploded ordnance areas, hazardous waste accumulation sites, and former fire fighting training areas. The primary chemicals of concern include chlorinated solvents, petroleum, oils, lubricants, heavy metals, chlorinated pesticides, and PCBs.

#### **Progress**

The basewide restoration program is ahead of schedule. To date, action is complete at 32 of the 34 sites at Fort Hunter Liggett. The two remaining sites consist of the facility landfill and a groundwater plume associated with two former petroleum tanks. Both of these sites are being successfully remediated.

The U.S. Army has responded to the Central Coast Water Board's letter regarding assessment for emergent chemicals in a letter stating that, based on site history, the emergent chemicals are not constituents of concern. Additionally, analytical results for the facility's water supply well found no detectable concentrations of perchlorate.

*In 2007, the installation initiated its Military Munitions Response Program. Because this assessment deals mainly with explosives, DTSC is overseeing this action.*

**LOMPOC BRANCH U.S. DISCIPLINARY BARRACKS****Lead Staff: David Schwartzbart****Background**

The Lompoc Branch U.S. Disciplinary Barracks Federal Correction Facility is located approximately two miles northwest of the City of Lompoc in Santa Barbara County. The property was purchased by the War Department in 1941, and operated as part of Camp Cooke until 1946, when it was converted to a military detention center. In 1959, the U.S. Bureau of Prisons (Bureau of Prisons) took over management of the facility, which is currently operated as high, medium, and low security prisons. The property consists of approximately 2,900 acres and includes a sign factory, electron cable manufacturing plant, furniture factory, print shop, cattle ranch, dairy, butchering plant, sewage treatment plant, and farm.

This facility was selected for closure as part of the 1995 DoD's Base Realignment and Closure and ownership was transferred to the current operator, Bureau of Prisons, in 2003. An Environmental Baseline Survey Report, which delineated potential or known areas of concern, was completed in June 1997. The Central Coast Water Board is the lead agency for this site and the County of Santa Barbara is also overseeing environmental issues at a closed landfill.

**Sites/Chemicals of Concern**

Cleanup sites include the Wood Dump/Landfill, Washrack Site, and Farm Fuel Site. Constituents of concern include chlorinated solvents, petroleum, oils, lubricants, and metals.

**Progress**

*Wood Dump: The Wood Dump cover, erosion controls and runoff conveyances functioned well during the 2006-2007 rain season. Ongoing groundwater monitoring and reporting continue to indicate relatively minor contaminant impact.*

*Washrack Site: Perchloroethene, trichloroethene and their breakdown products were formerly present in upper groundwater up to approximately 30 times their drinking water MCLs and in the next deeper zone at much lower concentrations. Enhanced reductive dechlorination by carbon injection started in 2002, but appeared to have limited effect. Injection was expanded from September 2005 to June 2007, resulting in significant reduction in contaminant concentrations. The site consultant predicted enough carbon was injected by June 2007 to enhance dechlorination to less than contaminant MCLs by approximately 2012. Injection was suspended after June 2007.*

*June 2007 monitoring indicated perchloroethene, cis-1,2-dichloroethene, chromium, arsenic and nickel in groundwater in excess of their MCLs. September 2007 monitoring data indicate 1) reductive dechlorination may remain effective, 2) perchloroethene concentrations within the plume core remained relatively constant since mid-2006 at approximately 10 times its MCL, 3) cis 1,2-dichloroethene concentrations remained generally constant throughout much of the plume over the previous year (up to three times its MCL), 4) vinyl chloride was first detected in the southern portion of the plume in March 2007 and has exceeded its MCL since.*

*Farm Fuel Site: Formerly, cis-1,2 dichloroethene 1,2 was present in the core of the groundwater contaminant plume up to 310 micrograms per liter ( $\mu\text{g/L}$  [MCL=0.5  $\mu\text{g/L}$ ]). Enhanced reductive dechlorination by carbon injection started in 2002, but appeared to have limited effect. Injection was expanded from September 2005 to June 2007, resulting in significant reduction in contaminant concentration. The site consultant predicted enough carbon was injected by June 2007 to enhance dechlorination to less than contaminant MCLs by approximately 2015. Injection was suspended after June 2007.*

*June 2007 groundwater data indicate cis-1,2 dichloroethene in groundwater at approximately 1.2  $\mu\text{g/L}$ , and selected metals (iron, arsenic and selenium) in groundwater above their MCL, though the metal concentrations may be natural or from ongoing groundwater treatment.*

*At their December 7, 2007 meeting, the Central Coast Water Board approved staff's recommendation to close the Farm Fuel Case conditional upon favorable third and fourth quarter 2007 groundwater monitoring results, deed restriction recordation, monitoring well destruction and submittal of a Case Closure Summary form.*

*September 2007 groundwater data indicate 1,2-DCA concentrations increased since June 2007 to 5.5 µg/L and that iron concentrations remained high; arsenic and selenium were not analyzed. Central Coast Water Board staff are awaiting December 2007 groundwater sampling results.*

## **CAMP ROBERTS**

**Lead Staff: Grant Himebaugh**

### **Background**

Camp Roberts is a California Army National Guard installation located approximately 10 miles north of Paso Robles. The 42,000-acre facility spans northern San Luis Obispo County and southern Monterey County. The installation was built in 1941, and used as a staging/training area for the U.S. Army until 1971, when it was transferred to the California Army National Guard. The National Guard and U.S. Army currently use Camp Roberts for training. The installation contains two developed areas, the Main and East Garrisons. The remaining lands are used for training and firing ranges. Most areas of potential or known contamination are associated with industrial-related activities conducted during World War II and the Korean War and are located in the Main Garrison. Because of limited funding from the Army National Guard, the environmental restoration process is being conducted for limited groups of sites. The Central Coast Water Board is the sole regulatory lead at this installation.

### **Sites/Chemicals of Concern**

Fifty-eight sites were investigated during the Site Inspection phase, which was completed in 2003. The potential chemicals of concerns consist mainly of petroleum hydrocarbons and some solvents. The contents of the former landfills are largely uncharacterized but include burn ash and ordnance.

### **Progress**

In the fall of 2005, the Army National Guard awarded a "paid for performance" environmental investigation contract. The Army's consultant presented its scope of work and schedule for a Remedial Investigation/Feasibility Study and for closure of two former landfills. *Except where endangered species issues have prevented some of the work, final covers have been completed for all of the landfill cells. A "Remedial Investigation Report" was completed for six suspected or known contaminant sites in 2007. Water Board staff approved the report, leading to soil cleanup activities at the FMC Corporation yard and groundwater cleanup at Site 936.*

Beginning in late 2005, perchlorate was reported in the active landfill monitoring program. The first detected concentration was 6 µg/L, which is at the MCL. *A facility water supply analysis found no detectable concentrations of perchlorate. The Army National Guard has continued the landfill detection-monitoring program, and a final evaluation report regarding the perchlorate source and appropriate responses is expected within approximately one year.*

## **CONCLUSION**

The Central Coast Water Board's DoD oversight program remains very active and effective. Cooperative relationships with military personnel, consultants, various regulatory agency staff, and the public have been maintained and substantial groundwater and soil remediation continues.