STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF DECEMBER 10, 2009
Prepared on November 10, 2009

ITEM NUMBER: **12**

SUBJECT: **Department of Defense Program Update**

SUMMARY

The Central Coast Water Board is reimbursed for its regulatory oversight at Department of Defense (DoD) facilities in our region. This Staff Report summarizes DoD facility cleanup progress during the last calendar year and changes in the DoD program. *Note new information since the December 2008 Status Report is provided in italics.*

DISCUSSION

Congress established the Environmental Restoration Program 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. The DoD program follows the investigation, cleanup, and closure process laid out by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). 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 the Water Boards statewide and the Department of Toxic Substances Control (DTSC). The Former Fort Ord Army Base (Fort Ord) is the only DoD Superfund site in our Region.

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 our region, 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 polluted 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

DoD program staff include two full-time and three partial-time project managers, an approximately 1/2-time senior (shared with the Site Cleanup Program), and two student interns. *DoD Program resources for fiscal year 2009/2010 are similar to last year's at 4.6 personnel years and approximately $473,000. At the end of August 2009 with 20 percent of the year completed, 15 percent of these budgeted resources had been expended.*

Most of the DoD program budget for the Central Coast Region covers oversight at Vandenberg Air Force Base (VAFB), Former Fort Ord Army Base (Fort Ord), Fort Hunter Liggett Army Base, Camp Roberts National Guard Base, Lompoc Branch U.S. Disciplinary Barracks Federal Correction Facility (Lompoc Barracks), and Monterey Peninsula Airport (a former U.S. Navy Air Base).

There are numerous other military-related sites in the Central Coast Region that the military classifies as Formerly Used Defense Sites. Formerly Used Defense Sites are sites that were previously owned, operated, or leased by DoD, such as the Monterey Peninsula Airport (see site discussion below). In most cases, there is little site information and DoD ranks them as low priority for funding purposes.

As noted in the recent Executive Officer's Report for the October 23, 2009 Board Meeting, the Central Coast Water Board has decreased staff time spent on all military base cleanup projects and are currently prioritizing sites using risk criteria. However, each military facility develops environmental outcome-based goals for every site in their program. If the bases do not achieve these goals, the Pentagon may not fund cleanup at these facilities in future years. Furloughs are slowing down the rate at which both Water Board and DTSC staff can review and respond to technical documents, and thus will likely impact schedules associated with these environmental outcomes.

To leverage our time and effort, Central Coast Water Board staff continue to: a) prioritize our sites based on risk to human health and the environment; b) communicate with military base remedial project managers to better target context in report submittals and discuss schedules or contract deadlines; c) avoid duplication of efforts; and d) continue to reduce travel to meetings by participating via teleconference whenever possible,.

Central Coast Water Board and DTSC staff are currently developing staff funding estimates for each facility for the 2010/2011 fiscal year. State staff are also working with each of their facility remedial project managers to develop general work plans for each of the facilities for the 2011/2012 fiscal year.

VANDENBERG AIR FORCE BASE (VAFB)
Lead Staff: Don Eley, Carol Kolb, and Donette Dunaway

VAFB, located on the north coast of Santa Barbara County, is the third largest U.S. Air Force (Air Force) installation, occupying almost 100,000 acres and 35 miles of California coast line. 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.

VAFB's Installation Restoration Program recently won the annual T. D. White Award competition for the best Environmental Restoration Program at an Air Force Space Command Base. As the winner of this award, the VAFB Installation Restoration Program is now in the running for the Best Environmental Restoration Program at all Air Force installations for the year 2009.

VAFB's Installation Restoration Program set a goal to have a "Remedy in Place by 2012" (RIP) for a majority of its cleanup sites. VAFB is using significant staff resources to achieve this goal, including initiating several performance-based contracts with environmental contractors. Prior to full-scale implementation of a "remedy" or cleanup technology at a particular cleanup site, the CERCLA process requires VAFB to prepare a technical report, called a Record of Decision/Remedial Action Plan, which must be agreed upon by the regulatory agencies. The agencies will approve the document if the selected remedy protects human health and the environment, and is in compliance with applicable or relevant and appropriate requirements (e.g. California Water Code, Water Quality Control Plan, etc.). The Record of Decision is a public document describing the site history, site characteristics, community participation, contaminated media, types of wastes present, remedy selected to cleanup the waste, as well as cleanup objectives for the individual wastes present. If the

pilot-tested technology is successful, VAFB will expand the cleanup technology to include the entire site.

As many of the remedial pilot studies involve in-situ or in-place injections of various materials, the Air Force applied for enrollment under the General Waiver Enrollments for Specific Types of Discharges; Resolution No. R3-2008-0010 (General Order), which was adopted by the Central Coast Water Board at the meeting on May 9, 2008. The Air Force has provided sufficient information to demonstrate compliance with the appropriate General Waiver conditions for these sites *and injectate materials*. The waste discharge types, which are consistent with those listed in Section D of the General Waiver, are listed as injectate materials in the table below. The wastes targeted for treatment are also listed, as are the dates of the associated General Waiver enrollment letters:

Site Name	Site Waste(s) Targeted for Treatment	Injectate Material	Date of Enrollment Letter
Site 3	*TCE*	*Sodium persulfate (chemical oxidant)*	*February 27, 2009*
Sites 8 & 9	TCE and Perchlorate	*Emulsified vegetable oil with foodgrade stabilizers/additives (carbon substrate,) sodium bromide (tracer)*	*March 30, 2009*
Site 15	TCE	*LEB-H (endo-1,4-R-D-mannase; fruit ripening enzyme for accelerating fermentation of foodgrade natural polymer used for drilling)*	*September 17, 2009*
Site 24	*PCE, TCE and 1,4-dioxane*	*Sodium permanganate and potassium permanganate (chemical oxidants); emulsified vegetable oil, SDC-9™(dechlorinating microbes), sodium bicarbonate, sodium bicarbonate and sodium hydroxide (buffering media for in-situ bioremediation), lithium bromide and fluorescein dye (tracers) and modified Fenton's Reagent (oxidizer)*	*March 27, 2009; December 2009 anticipated*
32 Cluster/ Site 35	TCE	*Sodium and potassium bicarbonate/carbonate (buffering media); lithium bromide*	*March 27, 2009; October 19, 2009*
Site 50	TCE	*Sodium bicarbonate, sodium carbonate and sodium hydroxide (buffering media)*	*February 27, 2009*

VAFB Site Progress/Success Stories/Challenges

Approximately 20 VAFB sites have active Central Coast Water Board staff involvement; some of those sites with significant progress since the last status report are presented in detail below.

Site 3, Old Railroad Pumping Station & 9300 Block Buildings (Don Eley): Site 3 consists of the old railroad pumping station and the 9300 block of buildings of the cantonment area at VAFB. The Site includes fuel USTs and aboveground storage tanks (AGTs), numerous industrial buildings (e.g., printed circuit board manufacturing, painting and photographic processing operations, etc.), and the 9300 Block wastewater line. Dissolved metals, total petroleum hydrocarbons as diesel (TPHd), trichloroethene (TCE), tetrachloroethene (PCE), PCE-breakdown products, *methylene chloride*, benzene, and polynuclear aromatic hydrocarbons (PAHs), currently exist above California Department of Public Health groundwater Maximum Contaminant Levels (MCLs) in Site 3 wells.

In the first half of 2009 the Air Force performed a chemical oxidation treatability study near the wastewater outfall to treat TCE-impacted groundwater. The Air Force injected sodium persulfate

and reduced TCE concentrations within the treatment area by approximately 85 percent. In November, 2009, the Air Force submitted post-injection sampling results and a Field Modification Report to expand the treatability study to the leading edge of TCE wastes in groundwater, and to perform additional injections by the end of January 2010.

In November 2009, The Air Force excavated fuel transfer station TPHd-impacted soil above the groundwater table. This excavation footprint overlaps a portion of the TCE groundwater treatability study, resulting in close coordination between remedial efforts of different contractors. By the end of January 2010, the Air Force is scheduled to complete the excavation activities. In addition, the Air *Force has committed new resources for* performing soil, groundwater and soil gas investigations at Site 3, which includes additional lateral and vertical assessment in association with TCE-impacted soil *and groundwater* resulting from historical discharges to the wastewater line. *By the end of December 2009, the Air Force will submit a work plan for additional assessment in the 9300 Block.*

Sites 8 and 9, Space Launch Complex-4 East and Space Launch Complex-4 West (Don Eley): These two adjacent launch complexes were active from 1964 until they were decommissioned in 2006. Launch activities resulted in TCE and perchlorate in groundwater extending over 3,000 feet to the bluffs above the Pacific Ocean. In November 2003, the Air Force began operation of a dual-phase (groundwater and soil vapor) extraction system at the Site 9 groundwater "hot spot". This system successfully removed wastes through 2007, and was turned off due to a diminished mass removal rate.

The Air Force subsequently installed in-situ bioremediation pilot studies at both Site 8 and Site 9. These bioremediation pilot systems have locally reduced TCE concentrations to below its MCL of 5 micrograms per kilogram (µg/L), and perchlorate concentrations to below the detection limit (typically 1 µg/L). Based on the great success of these in-situ bioremediation pilot study systems, the Air Force expanded both *source area treatment* systems, and *in January 2009 initiated installation of* downgradient in-situ treatment zones to minimize further offsite migration. Implementation of the expanded *source area* systems *and downgradient treatment zones* includes injection of carbon substrate, dechlorinating microbes, buffer compound, and tracer media.

Site 15, ABRES-B Launch Complex (Don Eley): 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 TCE were used to clean the missiles prior to launch. The TCE migrated into the shallow aquifer in the underlying sand dunes. At least two plumes extend from the launch pads to San Antonio Creek, over 3,000 feet south of the launch complex. Surface water samples show that TCE 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.

In October 2009 the Air Force installed an in-situ permeable reactive barrier pilot study designed to treat impacted groundwater at two locations near the leading edge of the groundwater wastes. After several unsuccessful attempts at building the permeable reactive barrier with standard and experimental injection methods in 2008 and early 2009, the Air Force successfully created two 50-foot long permeable reactive barrier walls, comprised of overlapping columns installed with a large-diameter auger drilling rig. Carbon impregnated with nano-sized iron (a reducing compound) is the reactive material in the columns that comprise the barriers. Results of the in-situ permeable reactive barrier pilot study will be available in mid-2010.

Site 19, National Aeronautics and Space Administration (NASA) Building (Donette Dunaway): Site 19 is currently an active NASA facility with multiple operations including satellite communications control, hardware assembly, and telemetry. The Air Force used TCE in the past as a degreasing

agent for parts cleaning and likely discharged TCE to the ground surface, resulting in a TCE-impacted groundwater plume approximately 240 feet in length, 110 feet in width, and 29 feet in depth. The depth to groundwater at Site 19 is at 9 feet below ground surface (bgs).

The Air Force initiated an enhanced in-situ biodegradation study in 2006, which included new well installations and injection of a hydrogen releasing compound substrate, and dechlorinating microbes. The initial injections effectively treated the lower sandy zone, but appear to have had limited affect on the waste concentrations in the upper clay zone in some areas.

The Air Force recently submitted a remedial action work plan for additional treatment of TCE and PCE-impacted groundwater at Site 19. Although the work plan is not yet approved, treatment will likely include injection of carbon substrate and dechlorinating microbes, and buffering media if needed. Approval of the work plan is anticipated by the end of December 2009, with subsequent implementation in early 2010. VAFB has committed to having RIP by 2012 for Site 19.

Site 20, UST Area 1, Landfill and Drum Disposal Site Areas 2 & 3 (Donette Dunaway): Site 20 is located in the main cantonment area and is comprised of an UST Area (Area 1), Landfill 1 (Area 2), and Drum Disposal site (Area 3). At Area 1, the Air Force used a dual-phase (soil vapor and groundwater) extraction system and in-situ chemical oxidation to remove diesel fuel and gasoline wastes from soil and groundwater at the site. *The Air Force continues to monitor groundwater until groundwater cleanup objectives are reached.*

Area 2 (Landfill 1) served as the main landfill for VAFB between 1942 and 1957. Waste disposed of at Landfill 1 included municipal trash, incinerator ash, scrap metal, pesticides, waste oil, lubricants, and potentially unexploded ordnance. The Air Force submitted a field modification report (FMR) on June 24, 2008 to conduct fieldwork to investigate data gaps that were identified during a feasibility study scoping meeting on December 12, 2007. *Central Coast Water Board reviewed and approved the November 2008 Final Data Gap Sampling Technical Memorandum, which concluded there were no additional risks posed by PCBs and dioxins/furans (previously identified as a data gap) at the site.*

Area 3 (Drum disposal site) is located southwest of Landfill 1. Waste constituents buried at the site include drums of waste oil, lubricants, and solvents. *The Air Force is in the process of compiling a proposal to sample soils and groundwater in Area 3 in order to determine the presence and extent of contamination. Central Coast Water Board staff are working with the Air Force regarding sampling strategies, and anticipate receiving a draft sampling plan from the Air Force in early 2010.*

Site 24, Area between New Mexico Avenue, Iceland Avenue, and Utah Avenue (Donette Dunaway): *Previous Site 24 operations and historical infrastructure include vehicle maintenance/fueling/washing, military tank maintenance/fueling, pesticide mixing/washrack at the Entomology Building, historical laundry facility in Building 11193, and the sewer line associated with Building 11193. The Air Force has identified total petroleum hydrocarbon waste, organochlorine pesticide wastes, and VOC wastes, including PCE, TCE and to a lesser extent 1,4-dioxane, at Site 24.*

The Air Force has previously performed remediation efforts related to total petroleum hydrocarbons (e.g. excavation and chemical oxidation), organochlorine pesticides (e.g. excavation), TCE (e.g. in-situ bioremediation) and PCE (e.g. chemical oxidation). In April and May 2009, the Air Force performed chemical oxidation by injecting sodium permanganate and potassium permanganate for treatment of PCE in shallow soils and groundwater north of Building 11193.

In addition, the Air Force submitted a draft remedial action work plan in May 2009, for in-situ bioremediation of VOCs by injection of carbon substrate and dechlorinating microbes, and for in-situ chemical oxidation of 1,4-dioxane by injection of modified Fenton's Reagent. Finalization of this

remedial action work plan is anticipated by the end of December 2009, with implementation starting in early 2010.

***Site 27, Exploded Missile Silo (Donette Dunaway*)**: *Site 27 originally was a Titan 1 missile site, in which the first missile exploded within its silo in 1960. The explosion destroyed the silo and the adjacent equipment terminal. No missile launches took place at the site, and the site has not been used for any purpose since the 1960 explosion. The Air Force has detected the following constituents of concern in groundwater near the exploded missile silo: TCE, 1,1,2,2-tetrachloroethane (TeCA), and trichloro-fluoromethane (TCFM). As of winter 2008, concentrations of TCE and TCFM were below their MCLs. TeCA has not been detected at concentrations above its MCL since 2004.*

The Air Force conducted a Feasibility Study and chose Land Use Controls (LUCs) with no active remediation or monitoring as the selected Record of Decision/Remedial Action Plan. In the Feasibility Study, the Air Force concluded that active remedial action is not warranted to protect site workers and ecological receptors, and adverse effects of habitat destruction resulting from active remedial action would likely outweigh the benefit of hazard removal. Despite the fact that constituents of concern were below MCLs since 2008, a "No Action" alternative was not acceptable because: 1) The Human Health Risk Assessment did not evaluate soil exposure pathways for residential receptors; and 2) The Air Force did not evaluate the potential vapor intrusion by collecting soil gas samples. Site conditions will reduce the toxicity, mobility, and volume of the few remaining waste constituents over time. DTSC and Central Coast Water Board staff plan to approve the Record of Decision/Remedial Action Plan because the remedy protects human health and the environment, and is in compliance with applicable or relevant and appropriate requirements.

***Site 32 Cluster/ Site 35,* Atlas F Missile silos (Don Eley):** Site 32 Cluster (32C) is comprised of Sites 32 and 35, which are missile silo complexes that were historically used for launching Atlas F missiles. The Air Force launched two Atlas F missiles from the Site 32 facility in the 1960s. However, this silo facility served primarily as a training facility for active launch operations from Site 35. The Air Force launched seven Atlas F missiles from the Site 35 facility in the 1960s. The Air Force used dry pad technology for launches at both facilities, which typically generated waste including some TCE. More recently, the Air Force used Site 32 as a radar facility until 1999. Site 35 is currently used for equipment storage and office space.

The Air Force has identified VOC wastes, most notably TCE, associated with the Site 35 facility. Site characterization performed in 2007 *through November 2009* identified a subsurface paleochannel that conveys VOC-impacted groundwater at *approximately 4,000* feet downgradient to the southwest. *In December 2008, the Air Force began injecting carbon substrate and dechlorinating microbes into a mid-plume bio-treatment barrier. This treatment barrier required addition of buffering agents in April of 2009 for the purpose of optimizing subsurface conditions for the dechlorinating microbes. In October 2009, the Air Force began construction of a second bio-treatment system closer to the identified source release area. In addition to treating groundwater plume, the Air Force is currently preparing a work plan for excavating the TCE source area, and is currently preparing a work plan for excavating shallow soil impacted by polychlorinated biphenyls (PCBs). VAFB has committed to having RIP by 2012 for Site 32C.*

Site 33, **Missile Silo 576-E (Donette Dunaway):** Site 33 is an active Taurus missile launch facility historically used for launching Atlas F missiles. The Air Force excavated and removed burned metal debris and approximately 40 tons of metal-wastes in soil, and removed a diesel UST and an emergency rocket propellant fuel dump tank, as part of the silo's decommissioning process in 1993 and 1994. The Air Force identified VOC wastes, most notably TCE, in groundwater at Site 33. The lateral extent and amount of TCE groundwater waste is limited and has decreased over time.

In October 2008, Central Coast Water Board staff recommended closure of Site 33 with land use controls. Based on Central Coast Water Board approval of this recommendation at the meeting on October 17, 2008, the Executive Officer issued a letter approving closure, with land use controls (i.e., no installation of water supply wells), and directing the Air Force to properly destroy existing Site 33 monitoring wells. *Subsequent to this action, DTSC concluded that a Record of Decision/Remedial Action Plan was more appropriate than site closure to address residual TCE at the Site. The Air Force submitted, and DTSC and Central Coast Water Board staff approved, a Feasibility Study in March 2009 which analyzed various activities, which include land use controls. VAFB presented the plan at public meetings in June and July, 2009, with no objections from the public. Central Coast Water Board staff received and is currently reviewing a Draft document which contains the accepted Proposed Plan activities.*

Site 50, Area located between 6th and 8th Streets, and Iceland and Nevada Avenues (Donette Dunaway): Previous Site 50 operations include missile engine assembling and cleaning, metal plating, and hazardous materials storage. The main contaminant of concern in soil and groundwater at Site 50 is TCE and its breakdown products. The Air Force has performed TCE-related treatability studies at Areas 1 and 2 of Site 50. The studies performed from 2007 *to date,* include in-situ chemical oxidation (injection of oxidants) at Area 1, *which was expanded November 2008 through January 2009,* and in-situ bioaugmentation (injection of carbon substrate, *buffering media*, and dechlorinating microbes) at Area 2, *which was expanded in June 2009.* Both remediation study methods have lowered TCE waste concentrations in groundwater. *VAFB has committed to having RIP by 2012 for Site 50.*

Areas of Interest and Areas of Concern Program (Carol Kolb): The Air Force is proactively investigating multiple onsite areas that be could be associated with waste releases. The Air Force, DTSC, and Central Coast Water Board staff defines an Area of Interest as any area that could cause environmental concern, but does not pose a serious immediate threat to human health and the environment. If a preliminary assessment (review of historical information/site visit) confirms the potential threat, the Air Force and the agencies will classify the Area of Interest as an Area of Concern and the Air Force will undertake site investigations to determine appropriate subsequent actions. Approximately 160 of the originally identified 166 Areas of Concern have been closed (since 2003, approximately *150* Areas of Interest have been converted to Areas of Concern). Currently, approximately *50* Areas of Concern are undergoing site investigations and another *20* Areas of Interest are undergoing preliminary assessments. During the last *twelve* months*, 28* Areas of Concern and *53* Areas of Interest were closed, and an additional *20* are proposed for closure and are being evaluated by the Central Coast Water Board, DTSC, and the California Department of Fish and Game.

UST Program (Carol Kolb): The Central Coast Water Board is the lead agency for UST cleanup sites. To date, a total of *784* UST sites have been closed. Currently, *10* sites are undergoing investigations, and an additional 85 to 100 UST sites may require assessment in the future. Also, approximately 7 miles of solvent and petroleum/oil/lubricant transmission lines are scheduled to be investigated and remediated within the next 5 years.

FORT ORD

Lead Staff: Grant Himebaugh

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 wastes. The U.S. Army (Army) officially closed the base in September 1994 and most of the facility has since been transferred to civilian use. Since the facility's closure, the Army's base closure team has identified over 40

environmental waste sites. The primary water quality concerns involve landfill gas, one carbon tetrachloride groundwater waste plume, and three TCE groundwater waste plumes.

Fort Ord Progress/Success Stories/Challenges

On this federal Superfund site, Central Coast Water Board staff work with USEPA and DTSC to oversee cleanup activities. The Army is remediating several large-scale groundwater waste plumes. Landfill gas is being remediated with a gas removal system. *During 2008, the Army removed over 50 pounds of groundwater wastes from the three active groundwater remediation systems. This is a 30% drop over the previous year. The drop in mass removal occurred mainly at Sites 2-12, and is due to a drop in what had been greatly accelerated mass removal from the operation of a new air stripper system.*

The first treatment area of the Army's carbon tetrachloride groundwater remediation system is in full operation. The Army injected five thousand gallons of sodium lactate into this treatment area during the months of September and October 2009. The second treatment area is under construction and will receive similar treatment in 2010.

Operable Unit 1: To complete offsite assessment and prevent Operable Unit 1 TCE groundwater plume migration, the Army hired a separate contractor for the investigation and cleanup. The Army completed offsite plume characterization and construction of the groundwater treatment system in 2008. *This new offsite system has been successful in reducing contaminant levels below remediation goals. The Army is currently conducting a rebound evaluation for the offsite area.*

The Army's 2008 mass removal rates for the original on-base portion of Operable Unit 1 have generally increased since 2006. Mass removal for 2008 was 2.0 pounds of contaminants versus the previous year's figure of 1.31 pounds. However, system efficiency has begun to predictably decrease, and the projected mass removal for 2009 is 0.91 pounds. This reduction in mass removal is a significant reflection of contaminant mass available for removal. Water Board staff believes there is a significant possibility of Operable Unit 1 remedy completion in the next four to six years.

Operable Unit 2: In autumn 2007, Monterey County identified that an agricultural supply well on nearby University of California Santa Cruz (UCSC) property was 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, Central Coast Water Board staff worked closely with University and Monterey County staff to identify possible solutions. *On December 23, 2008, this problem well was properly destroyed by a UCSC contractor.*

The Army's biggest challenge has been to control the highly diffuse leading edge of the waste plume in groundwater, as the Army gains ground In the winter when groundwater use declines. In September 2009, the first detection of TCE contaminants were made in Marina Coast Water District (MCWD) supply well Number 31. To date, low levels of TCE contaminants, always below MCLs and seasonally non-detectable, are now found in all three of the former Fort Ord – now MCWD wells. An October 2009 meeting with MCWD staff revealed that due to sea water intrusion issues alone, these three supply wells are planned for abandonment in favor of installing deeper municipal wells in the next two to three years. Despite the wastes reaching the supply wells being well under actionable levels (MCL for TCE is 5 ug/L), the Army and regulators continue to work together in determining appropriate responses.

Sites 2/12: The Army has operated the new air stripper treatment system modification for nearly two years. The Army uses the air stripper to treat vinyl chloride after extracted groundwater exits the granular carbon treatment units. The Army's modification, compared to the prior treatment (i.e. using carbon alone), creates greater treatment efficiency. *This efficiency is now on the decline.*

However, like Operable Unit 1, Sites 2/12 contaminant mass has been greatly reduced, and site remedy completion will begin to reach a predictable time range.

Carbon Tetrachloride Plume: *The Army and regulatory agencies signed a Record of Decision for the carbon tetrachloride plume, which contains the agreed upon final remedy for this waste. The Army completed operational aspects of a pilot project study in 2008. The Army has kept regulatory staff regularly informed of study results, with all indications pointing towards a successful project. The Army's official pilot study project report is due to Central Coast Water Board staff at the end of the year. The Army has begun construction on the final remedy, an in-situ biodegradation system, which is located largely in the Preston and Abrams Park areas within the City of Marina.*

Prior to aquifer substrate injection in September 2009, Water Board staff provided the Army with a General Waiver of Waste Discharge Requirements for Specific Types of Discharges (Resolution No. R3-2008-0010). The waiver was proved for the injection of sodium lactate into the uppermost or unconfined A-Aquifer. The sodium lactate was injected to enhance in-situ biodegradation of carbon tetrachloride contaminants.

MONTEREY PENINSULA AIRPORT
Lead Staff: Grant Himebaugh

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. Known cleanup sites include two former 50,000-gallon concrete USTs with an associated petroleum waste groundwater plume and a TCE waste groundwater plume. A former fire fighting training facility and several other potentially polluted sites have been ruled out as waste sources.

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

Due primarily to program funding and staffing shortages, the Army Corps has experienced delays in officially recognizing the final cleanup remedy and completing some of the administrative project requirements. However, these requirements are self-imposed by the Corps, and have no real bearing on site cleanup progress. The Army Corps and Central Coast Water Board staff has scheduled these tasks for the first half of 2010.

FORT HUNTER LIGGETT
Lead Staff: Grant Himebaugh

Fort Hunter Liggett is an Army training facility consisting of approximately 165,000 acres in southern Monterey County, with current and historic Army uses of this facility to include field exercises and weapons and equipment testing. Most of the land is undeveloped and the Army uses the property for field training.

Environmental Restoration Program sites include a closed landfill, former USTs, 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 polychlorinated byphenols. To date, action is complete at 32 of the 35 sites at Fort Hunter Liggett. The Army's three remaining sites needing action consist of the facility landfill, and two groundwater waste plumes associated with former petroleum storage facilities. *In 2008, the Army had significant installation funding challenges for site cleanup activities.*

In 2009, the Army received additional funding and Central Coast Water Board staff is working closely with the Army Corps to expedite assessment and cleanup of two large petroleum groundwater cleanup sites.

CAMP ROBERTS
Lead Staff: Grant Himebaugh

Camp Roberts is a California Army National Guard (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 Army built the installation in 1941, and used it as a staging/training area until 1971, when it was transferred to the National Guard. The National Guard and 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. Because the Army's funding has been limited, the environmental restoration process has been conducted for only limited groups of sites. The Central Coast Water Board is the sole regulatory lead agency at this installation.

The Army investigated 58 sites during the Site Inspection phase, which was completed in 2003. The potential chemicals of concerns consist mainly of petroleum hydrocarbons and solvents. *In November 2009, Central Coast Water Board staff met with National Guard staff to discuss current and future environmental work at the base. Because the National Guard is in a relatively unique staffing and budgetary position to pursue further work, Central Coast Water Board staff expect additional assessment and possible remediation activities at the twelve remaining sites in the 2009/2010 fiscal years.*

In the fall of 2005, the Army 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. The Army has completed final covers for all landfill cells, except where endangered species issues have prevented some of the work. The Army completed a "Remedial Investigation Report" for six suspected or known waste sites in 2007. Central Coast Water Board staff approved the report, which resulted in soil clean up activities at the FMC Corporation Yard and Site 936 groundwater cleanup. In summer 2008, the National Guard performed a second slurry injection of oxygen release compound at Site 936. *These treatments have reduced groundwater waste concentrations, although additional treatment will be necessary to reach groundwater cleanup goals.*

Beginning in late 2005, the Army reported perchlorate detections in the current landfill monitoring program. Perchlorate monitoring detections are in the 2 µg/L to 5 µg/L range; for reference, the MCL for perchlorate is 6 µg/L. The Army analyzed the facility's water supply and found no detectable concentrations of perchlorate. The Army has continued the landfill detection-monitoring program, and a final evaluation report regarding the perchlorate source and appropriate responses will be issued upon completion of the monitoring program.

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

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 an Army 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. In June 1997, the Army completed an Environmental Baseline Survey Report, which delineated potential or known areas of concern. 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 and at the Wood Dump/Landfill. Ongoing cleanup sites include the Wood Dump/Landfill and the Washrack Site. Chemicals of concern include chlorinated solvents, petroleum, oils, lubricants, and metals at the Washrack Site.

Wood Dump: A former landfill, the Wood Dump cover, erosion controls and runoff conveyances functioned well during the *2008-2009* rain season. *The Army's most recent Wood Dump monitoring data submitted (April 2009) continue to indicate little to relatively minor waste impact to groundwater. During the most recent sampling event, methane was detected in landfill gas. In a July 16, 2009 submittal, the Army requests ceasing almost all site monitoring, including well abandonment. Central Coast Water Board staff are currently evaluating the Army's request.*

Washrack Site: Due to historic operations, petroleum fuel compounds and solvents were discharged to soil and groundwater. In 2002, the Army performed enhanced reductive dechlorination by carbon injection, but the injections appeared to have limited effect. From September 2005 to *December 2008*, the Army expanded its injection program, resulting in significant reduction in waste concentrations in shallow groundwater. *The Army's most recent Washrack groundwater monitoring data submitted (April 2009) indicate solvents and metals remain in groundwater above their respective MCLs. During the April 2009 monitoring event, PCE was present in groundwater up to 39 µg/L and arsenic was present up to 26 µg/L. For reference, the MCL for PCE is 5 µg/L and the MCL for arsenic is 10 µg/L. In a February 10, 2009 letter, Central Coast Water Board staff approved a revised groundwater monitoring plan, allowing, in part, monitoring frequency reduction to semiannual. On November 10, 2009, the Army submitted a case closure request letter dated September 10, 2009. Central Coast Water Board staff is currently evaluating the Army's request.*

FORMERLY USED DEFENSE SITES PROGRAM

Lead Staff: Grant Himebaugh (Engineering Geologist)

In 2008, Central Coast Water Board staff requested Army Corps funding to address underground storage tank (UST) releases at the former military airfield in Santa Maria, and the former Navy Marine Air Training Base in Goleta, which is now part of campus at the University of California, Santa Barbara*. In response, the Army Corps is providing funding in the 2009/2010 fiscal year for Central Coast Water Board staff oversight for the UST cleanup at the former base in Goleta and for a UST cleanup on Santa Cruz Island. Water Board staff is optimistic that the Santa Maria site will receive funding in future years.*