Edwards Air Force Base
95th Air Base Wing
Civil Engineering Directorate
Environmental Management Division

Report to STAKEHOLDERS

October 2009 Volume 14 No. 10

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Report to
STAKEHOLDERS

Report to Stakeholders is a publication of Edwards Air Force Base, 95th Air Base Wing, Environmental Management. Its purpose is to inform and educate the public, base workers and residents about continuing environmental and safety efforts on base. It currently has a circulation of 6,000, including about 2,000 subscribers.

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Restoration Advisory Board (RAB) Meeting HIGHLIGHTS

The following report highlights the Aug. 20 Restoration Advisory Board (RAB) meeting in Mojave, Calif.

Feasibility Study, Proposed Plan and Record of Decision — Environmental Restoration Program manager, Rebecca Hobbs, led a mini-training session explaining the process for selecting a cleanup remedy for a site. First, a site undergoes a feasibility study which identifies the contaminants, potential exposure pathways, cleanup goals and possible methods for cleanup. Cleanup approaches selected by the Air Force and regulators are then presented to the public in a document called the proposed plan. At this time, the public has 45 days to submit comments to the Air Force regarding the proposed cleanup approaches for a site. The final remedy selected is documented in the record of decision. The majority of sites at Edwards Air Force Base are in one of these three stages of the process. The stages are part of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA).

CERCLA Proposed Plan for Air Force Research Laboratory (AFRL) Arroyos (Sites 162 and 461), Operable Unit 4, Edwards Air Force Base, CA — Patrice Hallman, environmental program manager for AFRL, announced the upcoming release of the proposed plan for the AFRL Arroyos. The Arroyos area is located in the northwest quadrant of AFRL and encompasses rocket test stands on Leuhman Ridge. Primary contaminants found at the AFRL Arroyos include chlorinated solvents that were used to clean rocket engine parts and pipelines prior to the early 1980s. Another contaminant in the groundwater is perchlorate, a component of solid rocket fuels.

The contaminant plumes at the AFRL Arroyos are located in hard granitic bedrock. Currently, no technology exists that could be used as a feasible and cost effective cleanup tool for groundwater residing in bedrock. As a result, the Air Force prefers a cleanup approach with a Technical Impracticability (TI) waiver, land-use controls and long-term monitoring. This approach relies on the low natural hydraulic conductivity of groundwater in fractured bedrock to contain the contaminants within a specified area. If groundwater contaminants threaten to breach the specified area — which, based on modeling results, won't occur for 124 years — the Air Force will take further action. The public comment period for the AFRL Arroyos Proposed Plan is scheduled to end Oct. 13.

The next quarterly RAB meeting is scheduled for Nov. 19, at 5:30 p.m. in Lancaster, Calif, at the Jane Reynolds Park Activity Building. For more information on the RAB, you may refer to the back page of this newsletter under RAB information.

What's on the cover?
THE WAY IT WAS — *A photo of what the crash site looks like today, after cleanup. See article on page 6.*

For all environmental concerns, please call the Environmental Management Customer Service Desk at (661) 277-1401.

Innovative team solution saves Air Force money and reduces base liability

When specialists at the Hazardous Waste Support Facility on base received a phone call that several gas cylinders at the Edwards Fire Department needed disposal, they figured it was just another everyday task. They did not realize that by the end of the day, they would have saved the Air Force $32,485, significantly reduced the base's hazardous waste disposal liability and earned money for the recycling program.

Dave Parker, a hazardous waste specialist at Edwards who has worked in the career field for more than 15 years, said this was the first time he had seen so many cylinders ready for disposal at one time. "Normally when we get this kind of waste in, we get one or two cylinders at a time," Parker said.

This time, the base Fire Department had 353 compressed air cylinders of various sizes — formerly used in their self-contained breathing apparatuses — that needed to be disposed of because they had expired. The normal route for disposing of this type of item is to have hazardous waste specialists profile, store and process the waste for shipment through the Defense Reutilization Marketing Office (DRMO).

This would include weighing the cylinders to determine the overall cost. "Cylinders are high on disposal costs. Some of them, like the large ones we had, were $150 each," Parker said.

When the hazardous waste specialists determined how much it would cost to prepare and ship the load of cylinders as hazardous waste, they decided to go another route — handling much of the disposal process on base.

"Price and cost savings were a big reason we decided to handle this differently," Parker said. "We deemed it was better to go the route we did because with an estimated 10 to 15 man hours, we could save the Air Force what it would cost us in disposal costs, which was about $32,485. That's a tremendous cost savings."

Another factor that made this task manageable on site was that the substance inside the cylinders was compressed air — a substance not hazardous if expelled into the atmosphere. So, the hazardous waste specialists coordinated with the fire department to pick up the cylinders and take them to the hazardous waste facility.

"It took two trucks to get the cylinders to the facility, but the fire department coordinated really well," Parker said. "So when we got back and unloaded the cylinders, we broke the valves, drained the compressed air and loaded the empty cylinders into bins.

"Normally, you have to render a cylinder inoperable, which means you have to do something to it so it can't be refilled or reused before it can be disposed of," he continued.

That is where the base landfill team came in. They picked up the bins of empty cylinders and took them to the base recycling center. Since a cylinder must be damaged before it can be disposed of or recycled, the landfill team ran over the cylinders with a compacter, and then packaged them as scrap metal and sent the inoperable cylinders off base for metal recycling. This move not only saved money in disposal costs, it earned money for another program on base — the Qualified Recycling Program. The cylinders added up to 4,224 pounds of scrap metal that will count toward the program's recycling amounts for the year, and the proceeds from selling the scrap metal will go back into the program.

"This task reduced the risk and liability for the base by managing it on site, so there was no hazardous waste disposal involved," said Cat McDonald, a hazardous waste specialist at Edwards. "This is a significant reduction in liability for the base."

"Another plus is that the state has regulations for waste reduction," Parker added, "and by not sending the cylinders out as waste, the weight of the cylinders didn't count against the base's hazardous waste disposal amounts."

The Hazardous Waste Support Facility disposed of 850,000 pounds of hazardous waste last fiscal year and goals are to reduce this by 5 percent basewide each year. The facility operates as a storage and shipment platform for all of the base's hazardous waste disposal needs. The base is set up with accumulation points. However, there are initial accumulation points where different units can store hazardous waste for a certain time period, from 90 to 270 days. Thereafter, the hazardous waste team picks up the waste and stores it at the permitted facility for up to a year. There they prepare it for shipment off base, usually through the Defense Reutilization Marketing Office.

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CYLINDERS *— After rendering the base fire department's 353 compressed air cylinders inoperable, hazardous waste specialists loaded them into bins, like this one, to be recycled as scrap metal.*

Site 5 dual extraction system makes way for new treatment at South Base

A ten-year era of cleanup in the southern section of Edwards Air Force Base came to an end in May 2007. A dual extraction system (DES) at Site 5, west of the Birk Flight Test Facility, was shut down after the goals for the system had been reached. By that time, the treatment system had removed more than 640,000 pounds of contamination from the soil, 1,000 pounds of contamination that was dissolved in groundwater, and 7,500 pounds of floating free product.

The majority of contamination was removed from the soil and as floating free product. Floating free product is contamination that has not dissolved into the groundwater; it is basically a layer of jet fuel floating on top of the groundwater.

"We actually used the groundwater extraction to create a cone of depression," said Rebecca Hobbs, program manager for South Base. "This opened up a bunch of soil that had contamination in it. Then, we used vapor extraction to remove the soil contamination. So by using groundwater extraction, we were intentionally trying to get more contamination out of the vapor phase [soil]."

The system was shut down in 2007 because it wasn't cost effective to operate anymore. "The cleanup goals for soil were reached, all of the free product had been removed, and only low levels of groundwater contaminants remained," Hobbs said. "As long as we were still getting large amounts of contamination out of the soil and groundwater, we continued to operate the DES."

The system remained at Site 5 while the Air Force, federal and state regulators decided on a final cleanup plan for South Base. In July, officials agreed to use two types of *in situ*, or in place, groundwater treatment technologies for Sites 5 and 14. Using this approach means the groundwater does not need to be pumped out of the ground to be cleaned, as was the case with the DES. Instead, a biological or chemical agent is injected into the groundwater and breaks down the contaminants into harmless byproducts underground.

LONG TIME RUNNING *— Restoration program manager Rebecca Hobbs stands next to the first system she ever worked on, a dual extraction system at Site 5 on South Base. The system was shut down in 2007 and remained at the site while the Air Force, state and federal regulators decided on a final cleanup plan for South Base.*

Sites 5 and 14 share a plume of jet fuel and trichloroethene (TCE), which is a solvent that was used in the past to clean grease off metal parts. For this reason, both sites will be treated under one cleanup approach.

Site 14 was home to two training areas for firefighters in the 1960s. Jet fuel and TCE were used in training exercises at this site. Although a small amount of TCE in the groundwater at Site 14 is attributed to past firefighting training activities, the majority of contamination migrated from Site 5.

Site 5 was the location for underground storage tanks that housed airplane fuel for the Muroc Army Airfield flightline in the early 1940s. By 1972, a few of the tanks were used to store waste fuels and solvents. The main solvent present at Site 5 is TCE.

Use of the tanks ceased in 1984, and all of the underground storage tanks at Site 5 were removed by 1994. Prior to the tanks' removal, the contents had leaked into the soil and reached the groundwater. In 1997, the DES was installed to reduce the concentration of jet fuels and solvents in the soil and groundwater.

"We had the initial source area, which is where the Site 5 DES was operating," Hobbs said, "and we've cleaned up that source area. There's still some residual contamination in the groundwater, but the soil's clean.

"We have an area about mid-section of the plume that has floating product. This is acting as a continuing source of contamination to the groundwater. So, in that area, we are going to use gaseous phase nutrient injection," Hobbs said.

The injection contains a mixture of air and gaseous nutrients proven to stimulate

the growth of bacteria, also known as methanotrophs. The bacteria then biologically degrade or "eat" the contaminants.

"Then for the areas where we have dissolved contamination in the groundwater — which is the remainder of the plume — we're going to use horizontal wells and potassium permanganate injection, which is *in situ* chemical oxidation," Hobbs added.

Potassium permanganate is a salt that causes a chemical reaction to break down contaminants into harmless byproducts. It has been used successfully at other base cleanup sites in the past. Horizontal wells are similar to vertical wells, except that they are installed by drilling across the length of an area instead of drilling straight down. Using horizontal wells allows for the potassium permanganate to be applied across the entire width of the plume without interfering with flight operations or existing infrastructure.

"Currently, we plan to put in horizontal wells upgradient of the source area and clean up that beginning section of the plume," Hobbs said. "At the same time, we're going to work on the source area with floating product. We'll clean up the source area before we work downgradient. It makes no sense to clean up downgradient if we still have a source area. So the cleanup will be phased."

The cleanup remedy for Sites 5 and 14 will cost approximately $7 million over a 12-year period. At the completion of the effort, the groundwater is expected to be clean enough to be used as drinking water.

Because the DES is not part of the final cleanup plan for South Base, it was removed from Site 5 in late July. The Air Force, having planned ahead, will be able to reuse parts of the system and its associated wells.

"The DES is an aboveground system on a skid-mount," Hobbs said, "so we were able to move it into storage. The system can be used again if it's needed."

Vertical wells installed when the DES went online in 1997 will remain in place during the final cleanup at South Base. Many of the wells will be used to monitor the contamination in the groundwater.

While looking forward to a new phase of cleanup at South Base, Hobbs can't help but look back. The Site 5 DES was the first treatment system of her career. "We knew that the system would do a good job of removing the contamination," she recalled. "But I don't think we expected for it to continue removing the contamination so well for so long."

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> "We knew the system would do a good job of removing the contamination. But I don't think we expected for it to continue removing the contamination so well for so long."
>
> Rebecca Hobbs
> Program Manager
> Environmental Restoration Program
> Environmental Management

***PHASE TO PHASE** — This picture shows where the dual extraction system used to sit at Site 5. Now only wells remain, as cleanup at the site moves into a new phase.*

Environmental Management helps base restore order after tragedy strikes

When tragedy struck and an F-22A Raptor from Edwards Air Force Base crashed northeast of the base on March 25, Environmental Management responded in a new way to aid the accident investigation with its Geographic Information System (GIS). The system helped investigators piece together critical information to learn what went wrong in the accident that cost test pilot David Cooley his life.

Typically Environmental Management's role is initially to identify and address any hazardous substance concerns. Then later, after investigators have gleaned all the information they can from the site, Environmental Management moves in to restore the crash site to as near its original state as possible.

This time however, base officials called on Environmental Management for additional early support. As the initial accident respsonse transitioned to investigation and recovery efforts, workers from Environmental Management's GIS team were called to the site along with members of security forces, flight maintenance and civil engineering and transportation to support the effort.

The GIS team team was requested at the beginning of the investigation. This team uses computer software to collect, store, analyze and display information related to geographic locations.

"By analyzing aerial photos and other data of the area, optimal locations for entry control points and access routes to the site were able to be determined," said Wesley King, a GIS analyst and developer at Environmental Management. "Our team also surveyed the incident site and collected GPS coordinates for a large portion of the debris. By doing this, we were able to determine and plot the debris fields and establish a survey perimeter."

According to King, Air Force officials were able to use GIS maps to make informed decisions about how to secure the area, efficiently provide additional support as needed and recover the aircraft.

Base biologists from Environmental Management also were called to the scene because the area is within desert tortoise critical habitat, and other natural resources are also located on the site. The desert tortoise and its critical habitat are protected under the *Endangered Species Act of 1973*. For this reason, biologists were on site to provide support and conduct briefings for site workers to be careful of desert tortoises and move them out of harms way. Biologists also scoured the area for other, potentially harmful, critters like the Mojave "green" rattlesnake.

DEBRIS COLLECTION *— Workers collect debris from the F-22A jet crash site, northeast of Edwards Air Force Base.*

Because of the type and classification of aircraft involved, security forces were constantly present throughout the effort.

"The F-22A is still a highly classified aircraft," explained Paul Schiff, a restoration program manager at Environmental Management. "Civil Engineering had to set up an emergency contract to recover the aircraft. Ground penetrating radar [GPR] was used to identify where there was potential subsurface or buried aircraft debris. Using the GPR information, the contractor recovered the black boxes and other aircraft pieces from the crater."

> "The goal was to restore the site to preexisting conditions to the best of the Air Force's ability."
>
> Paul Schiff
> Restoration Program Manager
> Environmental Management

Hazardous waste cleanup specialists used portable devices to test for contaminants, such as jet fuel, in the soil at the crash site. Once the buried aircraft debris had been recovered, Schiff and civil engineers hired another contractor to begin restoring the site to its original condition.

"The goal was to restore the site to preexisting conditions to the best of the Air

Force's ability," Schiff said. "Since the incident occurred on private property, there was increased emphasis to maintain this goal."

Because of the sensitivity of the aircraft parts the debris laden soil was transported to a secure on-base facility for storage.

"This decision benefited us twofold," Schiff explained, "by providing us with a no-cost place to store the soil while securing the technologies contained within.

"In order to match the soil at the site to best support future revegetation, we used a half-and-half blend of decomposed granite and top soil taken from borrow pits on the PIRA," Schiff said. "We used recent elevation data of the area to contour the site back to its original elevations. This effort included reestablishing the exact elevations of a dry wash that ran through the west side of the 5-acre site.

"We didn't want to leave the site bare; rather, we wanted to prepare a site that could more rapidly revegetate, recover and support refuge for wildlife," Schiff said. "With that goal, we salvaged 129 dead or displaced creosote bushes from the area and transplanted them to the site. We also staged boulders and rocks that had been excavated from the site to help capture seed and support wildlife habitation. Now, when you look down at the area from a vantage point, you can't even tell the area has ever been disturbed."

According to a report released by the Air Force Materiel Command July 31, total cost of the aircraft, equipment damage and property restoration has been estimated at $155 million. The test pilot, Cooley, was killed and the aircraft destroyed. The report cited physiological stressors on the pilot associated with high gravitational forces as the cause for the crash.

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Keeping universal and household waste out of landfill benefits Air Force, environment

Military members preparing to move have a lot on their minds. Making arrangements, packing and cleaning are just a few of the many tasks they have to get through before they close up the back of the moving truck and head down the highway. In the process, the old television, batteries in the garage and the cleaners under the kitchen sink might become an afterthought and, at the last minute, a hassle. However, the base has made it easy on residents to properly dispose of these types of items.

Universal Waste

Universal waste includes aerosol cans, batteries, fluorescent lighting, electronics and mercury-containing devices — items found in most households. None of these can be tossed into the trash. The California Universal Waste Rule applies to all residents, schools, offices and facilities on base. Under this rule, universal waste may not be discarded in solid waste landfills. According to state scientists, such waste products leak toxic substances, mostly metals, into a typical landfill.

Working electronic devices and appliances should be donated to the Airman's Attic located at 1100 Kincheloe Ave. They also will take furniture, most clothing and housewares. Summer hours for the Airman's Attic are Tuesdays and Thursdays from noon to 2 p.m. and Wednesdays from 6 p.m. to 8 p.m. During the winter, it is open Mondays, Wednesdays and Thursdays from 10 a.m. to 2 p.m., as well as Wednesdays from 6 p.m. to 8 p.m. You may call the Airman's Attic at (661) 277-2246 for more information. There are also charities in surrounding communities that will take these items.

Broken electronics and other universal waste should be taken to the U-Fix-It Store at 1897 Payne Ave. or the Consolidation Recycling and Universal Waste Facility (CRUW) at 446 N. Rosamond Blvd. The U-Fix-It Store is open from Wednesday through Saturday, 8 a.m. to 5 p.m. The CRUW facility is open during normal business hours. For more information, the U-Fix-It Store's telephone number is (661) 277-2550 and the CRUW facility's is (661) 277-3681. Items should not be left after hours at either location.

Household Hazardous Waste

Household hazardous waste includes unused portions of old paints, household cleaners, automotive products, pesticides, aerosol sprays and other household items that have hazardous properties. They can also include: deodorizers, personal hygiene products, herbicides, insecticides, pet-care products, and photographic and swimming pool chemicals.

These items should be taken to the U-Fix-It Store. Do not mix waste, and keep waste in its original container, if possible. If it is usable, it will be made freely available to other housing residents. It will be entered into a database of reusable household items for other base residents to use if they wish.

To drop items off, users need to complete a base resident hazardous materials turn-in form. This form helps housing management keep track of these items, so they can then dispense them to other residents. Although the items are free, residents wishing to pick up cleaners for their home, gas for their lawn mower or some paint for their bathroom walls, need to fill out a hazardous waste reuse form.

Environmental Management also conducts universal and household hazardous waste roundups in the spring and fall.

Off-Base Drop-Off Locations

The U-Fix-It Store, the CRUW and Environmental Management cannot accept waste from off-base residents. The first and third Saturdays of each month, the Antelope Valley Landfill in Palmdale, Calif., accepts universal, electronic and household hazardous wastes from 9 a.m. to 3 p.m. For more information, you may call the landfill at (661) 223-3427.

Also, the Kern County Special Waste Facility, Eastern Region, accepts universal, electronic and household hazardous waste the first Saturday of each month from 9 a.m. to 12 p.m., at the Mojave Airport. For more information about this drop-off location or others in Kern County, you may call (661) 862-8922.

California's universal waste list and applicable regulations can be found at www.dtsc.ca.gov/hazardouswaste/universalwaste. For more information about universal waste and hazardous waste disposal at Edwards, you may contact Environmental Management at (661) 277-1401.

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Where to Find More INFORMATION

Published data and documents relating to Environmental Management are available for public review in information repositories at three locations. The current information repositories are located in the cities of Lancaster and Rosamond, as well as Edwards Air Force Base. They are updated when new documents are released.

For questions about information in the repositories, you may contact Gary Hatch, Environmental Public Affairs at (661) 277-1454 or by e-mail at *95abw.pae@edwards.af.mil*. Here is a list of our current information repositories:

Edwards Air Force Base Library
5 W. Yeager Blvd.
Edwards AFB, Calif.
(661) 275-2665
Hours of operation: Mon-Thu 9:30 a.m. – 7 p.m.
Fri 9:30 a.m. – 6 p.m.
Sat-Sun 10:30 a.m. – 6 p.m.

Kern County Public Library
Wanda Kirk Branch
3611 Rosamond Blvd.
Rosamond, Calif.
(661) 256-3236
Hours of operation: Tue-Thu 11 a.m. – 7 p.m.
Sat 9 a.m. – 5 p.m.

Los Angeles County Public Library
601 W. Lancaster Blvd.
Lancaster, Calif.
(661) 948-5029
Hours of operation: Mon-Wed 10 a.m. – 8 p.m.
Thu-Fri 10 a.m. – 5 p.m.
Sat 11 a.m. – 5 p.m.

For general information about Edwards and an electronic version of the latest issue of Report to Stakeholders or other documents of public interest, please visit the following link: *http://www.edwards.af.mil/library/environment/index.asp.*

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Restoration Advisory Board (RAB) Information

The RAB is made up of appointed representatives from communities in and around Edwards Air Force Base, regulators from federal and state agencies and base officials. The board's purpose is to provide a forum for two-way communication among base restoration officials, regulators and representatives regarding the cleanup of contamination from past military activities.

The board meets quarterly, rotating meeting locations in communities surrounding the base. The public is welcome to attend. If you have any questions or concerns about the cleanup activities going on at Edwards, you may contact your community's RAB member or Gary Hatch, Environmental Public Affairs, at (661) 277-1454.

Next Quarterly Meeting

Date: Nov. 19, 2009
Time: 5:30 p.m.
Location: Lancaster, Calif.
Jane Reynolds Park
Activity Building
716 W. Oldfield St.

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