



Report to **STAKEHOLDERS**

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Microbes devour soil contamination at seven sites

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Base wins two environmental awards

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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.

Contents of the *Report to Stakeholders* are not necessarily the official view of, or endorsed by, the U.S. government, the Department of Defense or the Department of the Air Force.

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RECYCLE, RECYCLE, RECYCLE — Jun Kumazawa, restoration technician, throws white paper into a recycling roll-off bin. Environmental Management participated in a building-wide cleanup event on Nov. 12 to observe America Recycles Day. Participants in the building cleaned their work areas with environmentally friendly cleaners and recycled whatever they could for the day.



What's on the cover?
DISMANTLING SITE 88 — Restoration workers pull out bioventing air line piping at Site 88 as part of a work plan to remove soil cleanup systems at seven sites. See article on page 4 for details.

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

Coyote surveillance at Edwards

For the most part, people and wildlife have learned to coexist. But when vital resources become scarce, wildlife may venture closer to homes and work areas searching for the food and water they need to survive.

Reports of coyote attacks on family pets in the housing areas have prompted biologists at Environmental Management (EM) to regularly survey populated areas of the base to better understand the problem.

“We focused on base residential areas, parks, housing construction areas and unoccupied housing areas that can provide shelter for coyotes and their prey,” said Amber Hoehn, a biologist at EM.

Biologists first started the coyote survey during the early morning and late evening hours. They canvassed the dark streets equipped with night vision goggles and a spotlight in search of these wild animals. Monitoring also takes place during the day.

“We have received reports from residents that have seen the coyotes during the day,” said Mark Bratton, a biologist at EM. “It’s not uncommon or unheard of for them to be in the area.”

We are monitoring during the hours

when coyotes are more likely to be active,” Bratton said. “We also monitor throughout the day.”

“Hopefully, the data from this survey can be used to analyze if there are any areas that have recurring coyote visits or hot spots — areas that coyotes are using as corridors for movement — and any observations of aggressive or problematic behavior,” Hoehn added.

These animals, however, are often attracted to the conditions people create. Small dogs and cats left unattended become easy prey. Coyotes in urban areas occasionally take advantage of swimming pools, pet food and water dishes, ponds and water run-off from lawn sprinklers in housing and at the golf course.

“The key is to eliminate as many attractants as possible to all forms of wildlife,” Hoehn said. “Do not leave food or water outside or small pets unattended at night. We look for these attractants, as well as overfilled trash bins, when driving through the housing areas.”

“There will always be some contact between humans and the wild animals in the desert,” Bratton said. “But we need to do all we can do to discourage them from

lingering.

“We not only need to remove all food sources for predators like coyotes and bobcats, but we also need to stop feeding the smaller animals, like rabbits and squirrels. Feeding the smaller animals will bring the predators,” he added.

Data gathered from the findings will help biologists determine any trends or problems in residential areas at Edwards.

If a coyote is threatening to harm a pet or family member, the 95th Security Forces Squadron is prepared to respond. Base residents can contact Security Forces at (661) 277-3340.

Other concerns or biological questions may be referred to Environmental Management at (661) 277-1401. A form is also available online for base residents if a coyote is seen in your neighborhood at <https://bsx.edwards.af.mil/livelink/lisapi.dll/fetch/2000/37554/37555/2779077/wild-lifeform.htm?func=ll&objId=2779077&objAction=browse&sort=name>, where you may sign in as a guest to access the form.

More information about coyotes may be found at the California Department of Fish and Game Web site at <http://www.dfg.ca.gov/news/issues/coyote.html>.

RTS



PASSING BY — A coyote passes by a housing area at Edwards on a day when the wind blew over several garbage cans.

Microbes devour soil contamination at seven sites

Edwards Air Force Base restoration experts cleaned the soil at seven Environmental Restoration Program (ERP) sites using microbes, oxygen and water in just about a decade's time. The bioventing systems that were used to clean up the petroleum product in the soil to acceptable levels were removed last fall, marking the end of cleanup activities for many of those sites.

"We used the microbes that were naturally occurring in the soil to eat the jet fuel for us," said Rebecca Hobbs, Operable Unit 2 program manager. "We didn't have to spend a lot of money developing some kind of elaborate system. We literally just gave them oxygen and water, and they did the work for us."

Sites 5, 14, 71, 74, 82, 88 and 94 were areas formerly used to store petroleum products, like gasoline, jet fuel, diesel and heating oil. When the Air Force began removing the underground storage tanks at these locations in the early 1990s, they found contamination in the soil and groundwater at levels above regulatory requirements.

"What we did a long time ago in the program was look at how deep the soil contamination was. If it was just jet fuel,

we had a choice of doing what is called a 'scoop and run' — where you literally scoop out the contamination and run it to a place where it is treated above-ground. The other option was to put in a bioventing system," Hobbs said.

"If the contamination is shallow, it makes sense to scoop it out," Hobbs said, "but when the contamination is deeper, 20 feet or more, or difficult to excavate, it makes more sense to put in a bioventing system."

The bioventing systems worked by pumping moist air into the ground to increase the oxygen and moisture content in soil. This awakened naturally occurring microbes in the soil at the sites, which then ate the contamination.

According to Hobbs, when the Air Force removed underground storage tanks a number of years ago, they installed bioventing piping so that if the soil needed to be cleaned in the future, it could be. The bioventing systems at the seven sites cost approximately \$270,000 per year to operate and maintain, which is a cost that can be saved now that the systems are closed and being removed.

"The bioventing systems have done everything they can to clean up the

contamination in the soil," Hobbs said. "The contamination is gone or is at such low levels that it is no longer a hazard for people, for critters or for groundwater."

The traditional cleanup process, the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), excludes petroleum sites and so Hobbs coordinated with local regulators at the Kern County Environmental Health Services Department. All of the sites received Remedial Action Completion Certificates from the department for the former underground storage tank locations, which means that the bioventing systems and most of the equipment used to treat the soil will be removed.

Except for some small grouted wells in the soil, the sites will no longer contain any signs of bioventing systems or soil contamination. The wells will be grouted so they are not conduits for contamination to reach groundwater. Restoration workers will remove the blowers, water tanks, concrete pads, and underground air lines, except in places where they are under roads or near active utilities. When this work is completed, there will be no land use controls at the former under-





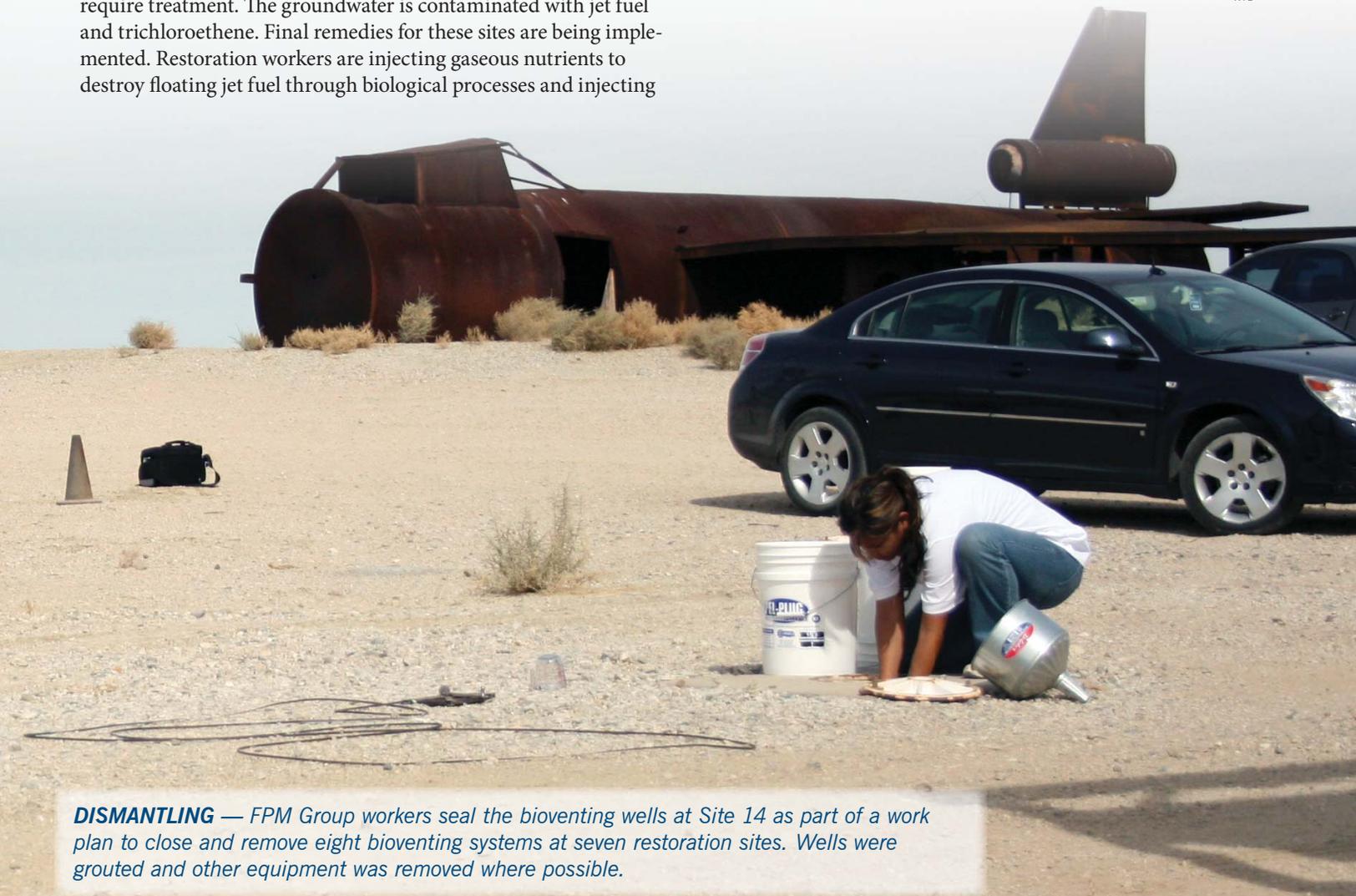
GROUTING WELLS — The bioventing well, left, at Environmental Restoration Program Site 14 is filled with bentonite pellets, center, and then hydrated, right, to seal the wells shut, which will keep the wells from being a conduit for contamination to get closer to groundwater.

ground storage tank locations. Based on the Remedial Action Completion Certificates, sites 71, 74, 82, 88, and 94 are closed.

Sites 5 and 14 will remain active under CERCLA since the groundwater contaminant plume connecting the sites continues to require treatment. The groundwater is contaminated with jet fuel and trichloroethene. Final remedies for these sites are being implemented. Restoration workers are injecting gaseous nutrients to destroy floating jet fuel through biological processes and injecting

a chemical reagent — a substance usually added to promote reaction — to destroy the trichloroethene contamination through chemical processes. Eventually, the contaminants will be broken down into harmless byproducts.

RTS



DISMANTLING — FPM Group workers seal the bioventing wells at Site 14 as part of a work plan to close and remove eight bioventing systems at seven restoration sites. Wells were grouted and other equipment was removed where possible.

Pollution prevention, cultural resources staff win awards

Two teams from Environmental Management were recognized for excellence by Air Force Materiel Command as they won the 2008 General Thomas D. White Environmental Awards for pollution prevention and cultural resources.

“We’ve got a great team at EM that works hard every day to ensure the Edwards mission can go forward without delay and in full compliance with all environmental requirements,” said EM director Robert Wood.

“These awards are not only representative of the work accomplished within EM, but also of the tremendous support we receive across the base,” he said.

“The efforts in both pollution prevention and cultural resources were wide-ranging, far-reaching and substantial,” Wood said.

The pollution prevention team helped Edwards earn a Bronze Award designation from the United States Environmental Protection Agency in its Federal Electronics Challenge. The challenge is set up to gauge federal programs as they demonstrate effective management through the lifecycle of electronic devices.

Through the team’s efforts, Edwards donated 2,200 computers, 2,100 monitors, 360 printers, 330 laptops and 100 servers — primarily to Federal Prison Industries and approved General Services Administration vendors. The base also donated more than 1,000 computers, 220 laptops and servers and 10 monitors to local schools.

Donating the equipment also had the side benefit of cost avoidance totaling more than \$6,000 for disposal of the items.

Team members certified the Fisher-Tropsch synthetic fuel blend for various aircraft — including the B-1, B-52 and C-17 — and for refueling trucks.

They also stepped up efforts to promote awareness and participation around the base in pollution prevention efforts. The team:

- Established a reuse center for usable



equipment and furniture, which cuts both procurement and disposal costs and saves landfill space.

- Developed a Green Procurement Plan that considers environmental factors in purchasing decisions and keeps the base on track to meet executive order requirements and objectives.

- Met the Environmental Management System objectives and targets for reduction of hazardous waste.

- Increased awareness of its programs through tours, workshops and newspaper articles.

- Implemented a Hazardous Material Management Process quarterly newsletter for base organizations.

- Set up booths at on- and off-base events.

- Promoted the Environmental Volunteer Program.

The cultural resources award covers a three-year period, and during that time the cultural resources team has reviewed more than 3,000 projects as part of the Environmental Impact Analysis Process. This process ensures all cultural resources are protected in accordance with existing laws and regulations and without delaying the projects.

The team’s efforts in this area were on display during the base runway replacement project. Construction for the temporary runway was going to run through part of the historic town of Muroc, which is eligible for the National Register of

Historic Places. Before any work started, the cultural resource team completely catalogued the site, logging nearly 130,000 artifacts. They also evaluated 48 other sites in the footprint of the project, all without any project delays.

Just this year, the team has surveyed 15,000 acres, identifying sites and entering them into the base’s geographical information system.

All told, the cultural resource team has catalogued more than 4,000 sites including more than a million artifacts. Hundreds of thousands of those artifacts are stored at the curation facility located near the Air Force Flight Test Center museum.

Additionally, the cultural resources team has been busy sharing their expertise. They have trained 5,000 base employees about cultural resources and site protection through targeted briefings during the past three years. They have also incorporated cultural resources elements into newcomer orientation and commanders call briefings.

Also, building managers of historic structures have been trained in using historically relevant materials and techniques for care and maintenance of their facilities.

The cultural resources team also promoted conservation by:

- Training local students and teachers through tours and workshops.

- Conducting tours focusing on base history and regulations regarding preservation for the Air Force Association, the Antelope Valley Civilian/Military Support Group, the base commander and guests and other VIP groups.

- Setting up displays and participating in activities like the base’s Earth Day celebration, Plant 42’s Salute to Youth and the Antelope Valley JetHawks Stadium Career Day.

Restoration Advisory Board (RAB) Meeting

HIGHLIGHTS

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

Federal Register Recommendations Update — Environmental Public Affairs Chief Gary Hatch presented suggested amendments to the RAB charter that would allow the public to directly address RAB members during meetings. These suggestions were made because of changes to the Federal Register — a publication of rules and guidelines for federal agencies and organizations. Currently, the public cannot directly address the board during meetings. Instead, citizens are asked to speak privately with their public representatives or submit inquiries through the environmental public affairs office. The RAB members were asked to review the suggested changes and be prepared to finalize the issue at the next RAB meeting.

Hydrogeology in Vicinity of Operable Unit 1, Main Base Flightline — Restoration program manager Paul Schiff outlined the hydrogeologic relationship between the Antelope Valley groundwater basin and the cleanup to take place at Operable Unit 1 (OU1), Main Base Flightline. The Air Force's cleanup plan will prevent groundwater contamination from entering into the basin. Schiff said he wants to build public support for the Air Force's cleanup plan since the basin is a source of drinking water for the Antelope Valley. His presentation focused on providing the RAB and the public with an understanding of the area's hydrogeology — how the different layers of underground, earthy materials affect groundwater movement and treatment.

The OU1 contaminant plumes are located in nonbasin areas that are composed primarily of granitic bedrock. Bedrock is basically solid rock that has very few or very small pore spaces for groundwater to be stored in or flow through. Consequently, groundwater flow through bedrock is relatively low. While this makes cleanup difficult, it also means the contaminant plumes migrate very slowly. The geologic makeup changes closer to the basin boundary. East and south of OU1, a thicker alluvium layer develops. An alluvium layer contains silt, clay, sand and gravel. Groundwater moves faster and more consistently through alluvium than bedrock.

Schiff plans to prevent migration and treat the contaminated groundwater as it moves into the thicker alluvium layer closer to the basin boundary. This migration control and treatment will only be necessary where the plume is expected to reach the basin before it is fully remediated. The hydrogeology of the area favors an approach that results in a zero net withdrawal of groundwater. This will prevent decreases in groundwater levels that cause the land to irreversibly settle to a lower elevation level. The migration control and treatment system that Schiff proposed would be used to hold back any contaminated plumes and protect the groundwater basin. More details of the OU1 cleanup plan — including *in situ*, or in place, cleanup planned for the higher concentration, or hot spot, areas of OU1 — will be presented at the February 2009 RAB meeting.

Site 333 In Situ Bioremediation Treatability Study Progress Update — Air Force officials began a treatability study in the Mars Boulevard area of Air Force Research Laboratory to see if *in situ* bioremediation would be an effective cleanup approach. The idea was to feed naturally occurring microbes in the ground and stimulate them to degrade the contaminants, said geologist Glenn Wagstaff. Cleanup experts chose Site 333 because one of the site's monitoring wells produced the best groundwater flow rate in the area.

The original plan included a biobarrier approach, which involves using a line of wells running perpendicular to groundwater flow to inject treatment products. An edible, soybean-based, oil product would be injected to feed the microbes. The product was expected to be carried downgradient by the groundwater flow into the bulk of the contaminant zone at Site 333. However, a borehole drilled 25 feet from the monitoring well yielded a groundwater flow rate 40 times less than the monitoring well. A second borehole drilled 20 feet away yielded a flow rate 10 times less than the monitoring well. A video taken inside the first borehole showed very little groundwater seepage through the fractures in the bedrock. Some fractures were dry, indicating these locations would make poor injection sites.

Wagstaff explained that as a result, the Air Force has proposed to forgo the biobarrier approach. Instead, the edible oil product may be injected through the monitoring well that produced the best flow rate. The distribution radius of the oil product, over time, would still help the Air Force decide if *in situ* bioremediation is a feasible option for cleaning up the Mars Boulevard area. Contaminants at the site include the solvents tetrachloroethene (PCE) and trichloroethene (TCE), and rocket fuel byproducts N-nitrosodimethylamine (NDMA) and perchlorate.

The next quarterly RAB meeting is scheduled for Feb. 19, at 5:30 p.m. in Rosamond, Calif. The venue will be determined at a later time. For more information on the RAB, you may refer to the back page of this newsletter under RAB information.

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-Wed 12 p.m. – 8 p.m.
Thu-Sat 10 a.m. – 6 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.

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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: Feb. 19, 2009
Time: 5:30 p.m.
Location: Rosamond, Calif.
Venue is to be determined

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