Report to

STAKEHOLDERS

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Report to
STAKEHOLDERS

Report to Stakeholders is a publication of Edwards Air Force Base, 95th Air Base Wing, Civil Engineer Directorate, 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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Any comments or questions about the contents of the *Report to Stakeholders* may be directed to: Gary Hatch, 95 ABW/PAE, 5 E. Popson Ave., Edwards AFB, CA 93524-8060, (661) 277-1454.

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WHAT'S ON THE COVER?

Environmental personnel assisted in the T-38 crash site restoration effort last fall. It is estimated that using base workers rather than hiring off-base contractors saved the Air Force several thousand dollars.

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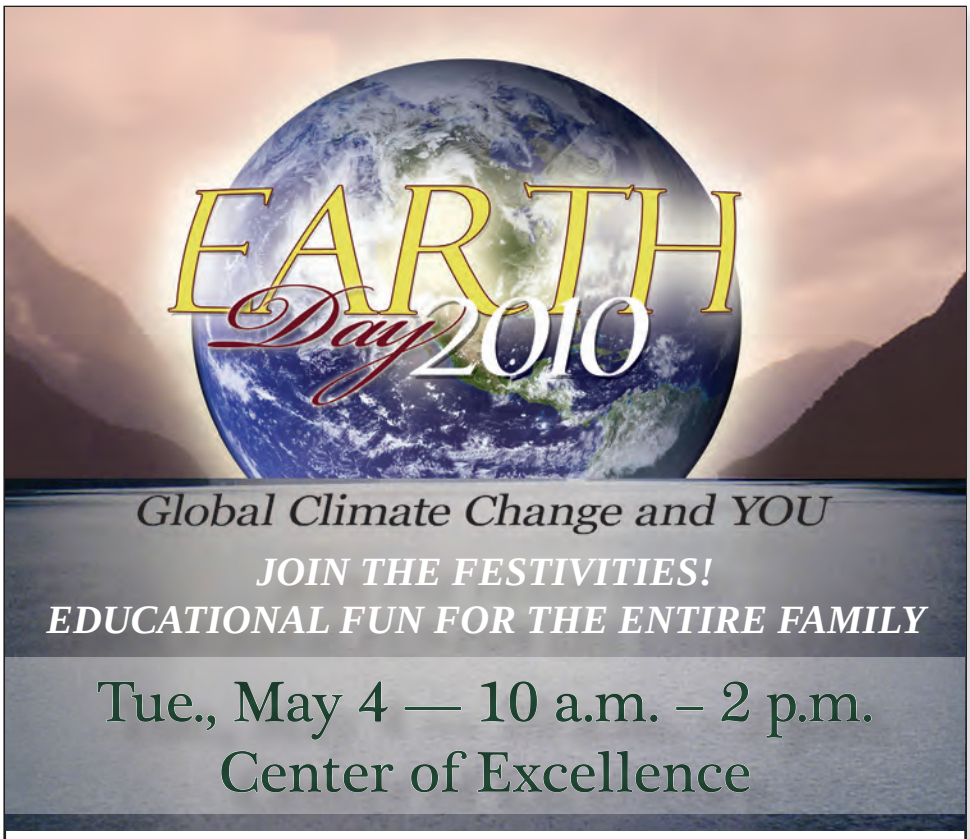

Climate Change *facts*

- **By 2030, the number of automobiles in the world is estimated to increase by 50 percent.**
- **According to Chevron, the world consumes two barrels of oil for every barrel discovered.**
- **It took 125 years to consume the first trillion barrels of oil — the world will consume the next trillion in only 30 years, according to Chevron.**
- **Since the Industrial Revolution, carbon dioxide in the atmosphere (a greenhouse gas linked to climate change) has increased by 35 percent.**
- **In addition to natural emissions of carbon dioxide emitted by volcanoes, human activities are now adding about 7 billion metric tons of carbon dioxide into the atmosphere every year.**
- **The International Energy Agency estimates that the world will need to invest $16 trillion over the next three decades to maintain and expand energy supply.**
- **The Arctic ice pack has lost an area about twice the size of Texas since the mid-1970s. This affects the wildlife and native people in the area.**
- **Planting a large shade tree can reduce a home's annual heating and cooling costs by up to 40 percent.**

* Facts courtesy of the Earth Day Network

T-38 site restoration effort saves time, money

With the slumping economy, businesses and organizations have been forced to run leaner and meaner, and the Air Force has been no exception. Missions must be accomplished with fewer personnel and by using more in-house resources. That's why it was only natural for Edwards Air Force Base officials to look inward for help in restoring a T-38 Talon crash site.

"I estimate we saved about $200,000 to $250,000 — and that may be a little conservative — by using in-house resources versus contracting the effort out," said Bruce Oshita, base environmental program manager for the restoration project. The restoration site was located 12 miles north of Edwards, where a T-38 aircraft crashed in May 2009 due to rudder failure, killing the pilot and seriously injuring the navigator.

According to Mikel Anderson, a heavy equipment operator from the 95th Air Base Wing Civil Engineer Directorate (CE), much of the cost savings came from using dump trucks and heavy equipment already owned by the base. "It costs a few thousand dollars just to have the contractor mobilize the equipment and bring everything out to a site," Anderson said. "But we have the equipment on hand, ready to be used. Using available CE resources equated to huge savings for the base."

SAMPLING SOIL *— Geologist Charles Klassette from Environmental Management takes soil samples from the crash site during the recovery effort.*

Another way the Air Force saved money was by using the former Base Environmental Analytical Laboratory to test soil samples before, during and after the environmental cleanup. This saved time and the expense of shipping the samples to an off-base laboratory.

"The primary contamination found in the soil consisted of jet fuel constituents," Oshita said. "We tested for total petroleum hydrocarbons, dioxins/furans, polycyclic aromatic hydrocarbons, metals and VOCs [volatile organic compounds]. The jet crash and burn left residuals at the site, so extensive soil sampling and testing had to be accomplished. We wanted to make sure we didn't leave any significant amount of contaminants at the site."

"Sampling started where the plane landed and worked out from the impact area," Cat McDonald, a hazardous waste specialist explained. "Sampling was also performed outside the debris area to get background levels for the soil characterization."

"Based on initial soil sampling, we knew the horizontal and vertical extent of the contamination in the soil," Oshita said. "We dug up the contaminated soil plus 2 feet beyond any detected readings. During the soil excavation, we used a PID [photoionization detector] — a field screening test method — to check for VOCs."

The base laboratory's follow-up soil analysis confirmed all contaminated soils had been removed by the CE excavation crew. All test results were compared to federal and state cleanup levels. The Kern County Environmental Health Services Department and the Bureau of Land Management were also consulted during the restoration efforts.

"Even though the PID readings did not detect any VOCs, we dug another 2 feet of clean soil, removing a total of 4 feet of extra soil surrounding the contaminated soil," Oshita said. "We knew the area was going to be backfilled and didn't want to come back again to remove a specific spot. Anderson and his crew fully supported the efforts since they knew this was going to be a one-time shot and it had to be done right the first time."

As Anderson recalled, "Usually — before we had Environmental Management — you just dug a hole until you couldn't smell the fuel anymore. But the environmental sampler and Bruce were there with us taking readings of soil samples, so it was great."

For the cleanup, base dump trucks transported about 45 cubic yards of contaminated soil to Edwards for safe storage in roll-off bins where it would remain until properly discarded. In turn, CE transported clean soil from the base to the T-38 restoration site. The clean soil was used to replace the contaminated soil taken from the crash site.

"The [contaminated] soil was sent to a qualified licensed treatment and disposal facility," McDonald said. "The Edwards Hazardous Waste Storage Facility was responsible for evaluating the soil test results to determine if the soil could be handled as nonhazardous waste. This waste determination allowed the base to use in-house resources to excavate and transport the soil back to base instead of hiring a specialized hazardous waste contractor, as was the case for the F-22 crash site."

At the F-22 site, the breakup of the aircraft produced carbon fibers, similar to asbestos fibers. Therefore, a contractor trained to handle such materials was hired to handle that site's cleanup. "But as far as the T-38 cleanup, it was a straight-forward fuel spill and aircraft pieces," Anderson said. "I've worked other crash sites before, but this was the most extensive."

"Every time there's an aircraft incident, we're involved to some extent," Anderson's supervisor, Thomas Keltner, said of the effort. "Once the investigation team released the site, our guys were ready to get to work. I'm thankful to the CE family and everybody involved in getting the job done quickly and efficiently."

RTS

Basewide biological opinion sought to streamline management

As fighter jets race through the clear blue sky, a desert tortoise steadily creeps toward its sandy burrow. It's a typical day at Edwards Air Force Base. Maintaining a safe coexistence between air and land activities on the base is a behind-the-scenes effort coordinated by Environmental Management.

Edwards is not only a mecca for flight test, but is also home to the federally threatened desert tortoise and its designated critical habitat that encompasses about 65,569 acres. Edwards is required by law to consult with the U.S. Fish and Wildlife Service (USFWS) on activities that may impact the desert tortoise or its habitat.

Currently the base accomplishes this consultation on a case-by-case basis. Sometimes the consultation is formal, which requires a written submission that may include a letter or biological assessment that explains the activity the base plans to perform, its anticipated ground disturbance, and which measures the base will take to prevent injury or death to the desert tortoise.

Sometimes the consultation can be informal and handled with a phone call.

However, the base is looking to develop a basewide biological opinion that would cover a large majority of these consultations. This will save the base lead time needed to bring new projects along. It also will save many man hours required for each separate consultation. The key will be writing a basewide opinion that the USFWS can approve, but Edwards' good track record in managing the desert tortoise to date will likely help in attempting to gain that approval.

Currently the formal consultation process can be lengthy.

"The Fish and Wildlife Service uses our letter or assessment to determine if the activity will adversely affect the desert tortoise or its critical habitat," said Dave Charlton, a base biologist. "The Fish and Wildlife Service has up to 180 days to provide us with their determination in a document called a biological opinion," he said.

"Very few projects are denied or turned down," said Danny Reinke, natural resources planner. "In my experience, the Fish and Wildlife Service works with you to help you do what you need to do. They may want to tweak a few project details. But that's only done to prevent any impacts to the species or habitat."

Biological opinions allow for a very limited amount of tortoise injuries, harassments or mortalities resulting from mission-related activities. However, the USFWS understands that the base takes every precaution to ensure the safety of the desert tortoise.

"We have an excellent record here and we're not doing a lot of ground activities," Charlton said. "Base people are educated via tortoise awareness training to watch for the desert tortoise."

All military personnel and base contractors attend a desert tortoise briefing as part of orientation, in which they are instructed about the penalties associated with disturbing the desert tortoise. According to the California Bureau of Land Management Web site, anyone who knowingly harasses or harms a desert tortoise can be fined up to $50,000 and/or placed in jail for one year.

Other commonly used protection measures include having biologists conduct surveys of the area before any activity begins, installing desert tortoise fencing where necessary, and regular monitoring of the area throughout the project. Base biologists also undergo specialized training before they are allowed to handle desert tortoises or perform surveys.

"We record harassments, injuries, mortalities and other pertinent data under each biological opinion," Charlton said. "All of this information is put into an annual report for the Fish and Wildlife Service. If we have more deaths than allowed, the Fish and Wildlife Service will require a re-consultation to find out what we're doing wrong."

The annual report to the USFWS is one of the reasons Edwards decided to apply for a basewide biological opinion. Instead of keeping track of tortoise data for 20 different biological opinions, the base will be able to report using one biological opinion.

"You get a more accurate picture of the base's effect on the desert tortoise if you are working under one biological opinion," Charlton said. "Each biological opinion is reported separately in the annual report, so we don't see the big picture, just individual pieces."

Another reason for the basewide biological opinion is to address the full range of current and future base projects. Currently, each biological opinion only covers a specific area of the base for a certain type of project. This is very limiting considering the types of activities the base may need

Volunteering Opportunities at Environmental Management

Interested in learning new skills? Do you need community service hours? Are you environmentally conscious? The Environmental Management Volunteer Program is looking for volunteers with base access. If you are interested, you may contact the Environmental Management Customer Service Desk at *95abw.em.customer.service.helpdesk@edwards.af.mil* for more information. Or you may obtain an application at *https://bsx.edwards.af.mil*, after clicking on "Edwards Air Force Base - Environmental Management", and then "Volunteering Opportunities at EM".

to perform in the future.

"The question we are frequently asked is, 'can I do what we do here in another location?'" Reinke said. "Most of our projects are not one-time events. We have routine and recurring activities, like fixing roads and running the sewer plant. So it's very time consuming to request a biological opinion every time we do the same type of project in another area of the base. It makes more sense to have one biological opinion that covers all areas of the base.

Another issue is boundary areas, Reinke said. For example, one biological opinion covers North Base but doesn't carefully delineate the area covered under the opinion. Having one basewide opinion for all base projects will eliminate confusion.

The basewide biological opinion also will include projects that Air Force officials predict the base will be testing in the near future. Reinke cited laser technology, directed energy and unmanned aerial vehicles as the wave of the future.

"A current basewide biological opinion means that when someone comes here to do a test mission, they are not delayed by the environmental side of the house," he said.

Reinke stressed that the base's track record is the key reason the basewide biological opinion may be granted. History has shown that the base is a good steward of the environment.

"We have more than 15 years of experience doing the things we do here to protect the tortoise and its habitat," Reinke said. "So, we have a proven track record that we do a very good job of being careful and making sure our people are briefed. That was one of the points we stressed in our biological assessment. We're not just saying we'll be protective of the desert tortoise; we have a 15-plus year track record of having done a good job."

RTS

***BASE WILDLIFE** — Environmental Management biologists manage hundreds of different species of flora and fauna on base property. The wildlife pictured here — (from top left) a desert tarantula, desert tortoise, desert candle, wood rat and bat — are just a handful of the wildlife base biologists track and manage.*

Navy tests real-time perchlorate sensor with contaminated base soil

Identifying perchlorate contamination may be quicker in the near future, thanks to a sensor developed by U.S. Navy research and development experts. The sensor — designed to analyze perchlorate concentrations in real time and onsite — will test soil samples taken last fall from Edwards Air Force Base cleanup Site 285.

"We're collecting soil from as many contaminated military sites as possible to test the accuracy of the sensor in the laboratory using real field samples," said Mike Putnam, an engineering scientist from the Navy Space and Warfare Systems Command in San Diego, Calif.

According to Air Force restoration program manager Bruce Oshita, letting the Navy access Site 285 last September was a no-brainer. "This cutting-edge sensor will save the government time and money," he said. "Normally, a team has to send samples to a lab, where it can take 2 to 6 weeks for an analysis. Many times, it means 2 to 6 weeks of waiting for the sampling crew because the test results allow the team to determine where the next samples are to be taken in order to step out and delineate the plume.

"With the Navy's sensor, a team would be able to take samples and get onsite analysis, real time. This expedites the cleanup process and saves time and money," Oshita continued.

SAMPLE THIS — *Technicians take soil from Edwards Environmental Restoration Program Site 285 to test the accuracy of their perchlorate sensor in the lab.*

SCAPS — *The site characterization and analysis penetrometer system, shown below, was used to penetrate the ground surface and collect contaminated soil.*

Field testing

Although the perchlorate sensor is designed to sample groundwater, Putnam and sensor developer Pamela Boss collected contaminated soil from Site 285. "To simulate groundwater conditions, we'll run clean water through the soil samples to move the perchlorate from the soil into water," Boss explained. "Then we'll use the sensor to measure the perchlorate concentration in the water."

Perchlorate acts like a solid in soil but will dissolve, like common table salt, into water. Scientists from the NASA Jet Propulsion Laboratory used Site 285 to test solid fuels in rocket technology research. Contamination at the site resulted from the use of ammonium perchlorate, an ingredient in solid rocket fuel.

Using field samples to test the sensor will provide insight into the sensor's accuracy. According to Boss, "even though the sensor has been bench tested, testing the concentration in the real world is different. The porosity and soil type varies; clay inside the sample could cause an effect."

The sensor uses Raman spectroscopy to establish perchlorate concentrations. When exposed to light from a laser, a chemical emits unique wavelengths of light forming a signature for the chemical. To distinguish between different concentrations, the perchlorate sensor compares perchlorate peak intensities. The more intense the peak, the higher the concentration level. The perchlorate sensor will be able to detect concentration levels as low as 50 micrograms per liter.

Collecting the samples

Putnam and Boss collected soil samples from below the surface of Site 285 using a site characterization and analysis penetrometer system (SCAPS). The SCAPS is a mobile unit that houses equipment for data collection, a cone penetrometer and sensors. A cone penetrometer is a steel cone that is hydraulically pushed into the ground at up to 40,000 pounds of pressure.

Sensors on the tip of the cone collect data about the soil which is relayed to a computer aboard the SCAPS. There are separate sensors to identify different types of soil contamination, such as metals, trichloroethene — a degreaser — and oils. Because the perchlorate sensor is not yet packaged for use in the cone penetrometer, the cone was used solely to gather soil samples at Site 285.

To test the accuracy of the perchlorate sensor, the Site 285 soil samples will be split. One set will be tested in the Navy's lab with the sensor and the other set will go to an independent lab. "We hope for a match," Boss said.

Putnam and Boss have developed about 15 environmental sensors during the past 20 years. Thanks to their talents and a little cooperation from Edwards AFB, another environmental sensor will soon be available as a tool for site cleanups.

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Groundwater sampling monitors health of water below Earth's surface

Physicians often use blood tests as a means for diagnosing medical issues hidden deep within a patient's body. While the blood samples may look normal after being drawn from a patient, laboratory test results can pinpoint potential health problems.

Just as a doctor relies on these test results to unveil potential issues, Edwards Air Force Base restoration officials rely on groundwater sampling results as a means of viewing contamination beneath the Earth's surface.

"Even when you pull groundwater up to the ground surface, you can't see the contamination, you can't smell it," said restoration program manager Rebecca Hobbs, who oversees South Base, chemical warfare materiel and Site 3. "It looks like regular water. It isn't until you perform an analysis that you know whether you have a problem or not."

The driving force behind groundwater sampling is the base restoration program, which was established under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*. The Air Force is legally responsible for cleaning up contamination from past military activities. But first, base restoration officials need to know what they are dealing with.

"Groundwater sampling lets us know the extent and the severity of the contamination — what contamination is there, how big it is, how deep it is," Hobbs said. "We need to know because that will indicate to us what kinds of treatment systems we should look at. Once we know where it is and how bad it is, then we can design a system to treat it."

Hydrogeologist Tara MacHarg added that the sampling results determine where to place monitoring and treatment wells. "We want to treat the source of the contamination and monitor the perimeter for signs of migration or movement of the contamination," she said.

Groundwater wells are installed within and around contaminant plumes found during research and site investigations conducted throughout the base. Altogether, there are approximately 1,000 groundwater wells that are sampled on a regular basis.

Each well extends from 25 to 600 feet below the ground surface. Many wells contain a pump sitting below groundwater level that connects to the surface with clear, heavy-duty plastic tubing. The well has to be purged to remove any sediment, foreign material or stagnant water in the well. This purging is similar to running the hot water faucet long enough to get the cold water out of the line. Scientists purge, or 'let the water run,' until conditions are optimal. Groundwater conditions such as temperature, pH and oxygen levels are measured during the sampling.

Sampling results help paint an accurate picture of groundwater movement and contaminant plumes. Over time, groundwater sampling acts like a 'big brother' system that consistently tracks plume movement and cleanup progress occurring underground.

"We use sampling results to create charts and maps that show us the trends of the contamination — such as how fast it is moving, the direction it is moving and if there are any decreases or increases in concentration level," said remediation scientist Josefa Silva.

Restoration officials can compare changes in concentration levels to determine the effectiveness of any treatability studies or cleanup systems.

"Once we put a treatment system in, we have to monitor how well it's doing and we want to be sure that the contamination is not escaping the area of the treatment system," Hobbs said, "and that it's adequately treating what's there and that there aren't any bad side effects."

Groundwater samples are collected, recorded and shipped to an off-base laboratory for analysis. When the analyses come back from the lab, remediation officials interpret the data, write reports and input the results into databases used to make charts and plume maps. Groundwater monitoring reports become a part of the official record for each cleanup area on base.

"The lab results will also show us where the contamination is flowing and if contamination is building in a particular spot," added remediation scientist Manuel Jaramillo.

Groundwater sampling can continue after an area has been cleaned up. According to remediation technician Louis Miles, "even after remediation [is completed], we still check the wells to make sure nothing is showing up in the groundwater."

Unexpected surprises can pop up during or as a result of a treatment. Hobbs has seen areas of groundwater that seemed to have been cleaned up show signs of contamination again. This is called rebound. Regardless of which contaminants show up in the groundwater samples or at what point in the treatment cycle they appear, restoration officials say the goal is to clean up everything to below maximum contaminant levels, or the maximum allowable concentration of chemicals in drinking water.

"When you perform *in situ* chemical oxidation (ISCO), like we're doing at Sites 5/14, you actually have metals that precipitate out of the soil into the groundwater," Hobbs said, referring to a study being performed at one of her sites in the South Base area. "You don't want to leave the metals there because then you can end up with another area of contamination that you never had.

"In our ROD [Record of Decision] for South Base, we wrote that within two years after ISCO is completed, the metals must go back to baseline levels or we have to treat them. We will use groundwater monitoring to check for the metals as well," she said.

Groundwater samples are not only taken at cleanup sites. Wells used to monitor for possible runoff can be found near compliance areas such as the Open Burn/Open Detonation area, base landfills and wastewater treatment plants. Whether for past or present activities, groundwater sampling remains the best way to monitor the quality of the water beneath the surface at Edwards.

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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.

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Restoration Advisory Board (RAB) Information

The RAB is made up of elected 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 the community 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: May 20, 2010*
Time: 5:30 p.m.
Location: Boron, Calif.
Venue to be determined
**Date and location subject to change*

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