



# *Report to* **STAKEHOLDERS**

June 2007

Volume 12 No. 6

*Earth Day event  
draws crowd*  
page 4

**ERP tries  
something new  
at Site 5/14**  
page 3

**Carbon dating helps  
archaeologists with  
time frames**  
page 6



*Report to*  
**STAKEHOLDERS**

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

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**Base Civil Engineer**  
*James Judkins*

**Division Chief,  
Environmental Management**  
*Robert Wood*

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Environmental Restoration**  
*Ai Duong*

**Branch Chief,  
Environmental Conservation**  
*Gerald Callahan*

**Branch Chief,  
Environmental Quality**  
*Robert Shirley*

**Next RAB Meeting**

**August 2007**

**5:30 p.m.**

**Wanda Kirk**

**Branch Library**

**3611 Rosamond Blvd.**

**The public is invited**

If you have a question about the Edwards Air Force Base Environmental Management program, you may address it to Stakeholders Forum, Attn: Gary Hatch or Miriam Horning, 5 E. Popson Ave. Bldg 2650A, Edwards AFB, CA 93524-8060, or send e-mail to: [95ABW.PAE@edwards.af.mil](mailto:95ABW.PAE@edwards.af.mil)

**Stakeholders  
Forum**

**Q.** What is a hybrid car? I see them all of the time in television commercials and on the road.

**A.** A hybrid car is any vehicle that combines two or more sources of power to propel it.

Most hybrid cars on the road right now are gasoline-electric hybrids. They usually have a gasoline powered internal combustion engine that drives a generator to provide power to an electric motor.

The hybrid is a compromise. It attempts to significantly increase the mileage and reduce the emissions of a gas-powered car while overcoming the shortcomings of an electric car — primarily limited power and range.

There is usually a computer on hybrid cars that ensures these two power sources — the gasoline engine and the battery powered electric motor — operate as efficiently as possible. For instance, instead of the gas engine solely charging the batteries, the motor acts as a generator during braking, using the momentum of the car to generate electricity that charges the batteries. Thus the energy that would normally be lost when stopping is stored and used to speed the car back up.

The primary benefits of hybrid cars are that they reduce tailpipe emissions and improve gas mileage.

RTS

**ON THE COVER** — *A young boy sports his desert tortoise stickers at the annual Earth Day celebration hosted by Environmental Management at the Base Exchange parking lot.*

# Restoration site gets new horizontal well treatment

**S**ites 5/14 in Operable Unit 2, the South Base area, are the first cleanup sites at Edwards Air Force Base (AFB) with a horizontal treatment well.

Installed in April, the well is part of the Sites 5/14 *In Situ* Chemical Oxidation (ISCO) Treatability Study. The Air Force will use data from this study to determine the effectiveness and cost efficiency of using horizontal wells to conduct ISCO treatment.

“A horizontal well can be installed across the entire width of the plume instead of just one spot, as is done with a vertical well,” said Rebecca Hobbs, environmental program manager for the site. “This means we can treat a bigger area using only one horizontal well.”

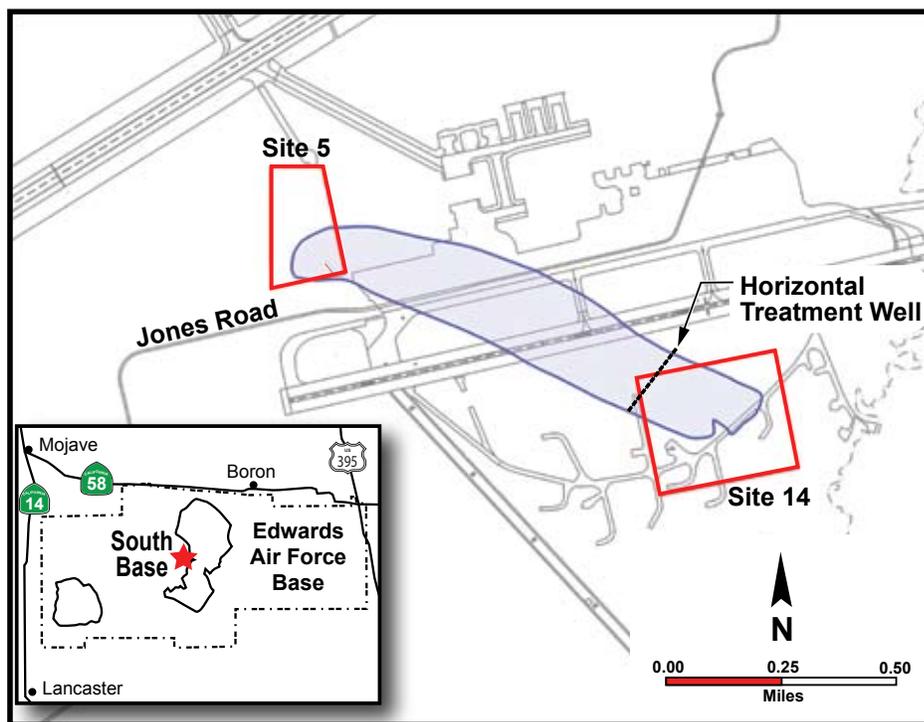
Hobbs and her team plan to inject potassium permanganate into both ends of the well to reduce trichloroethene (TCE) concentration levels in the groundwater. Trichloroethene was historically used on the base to remove grease from metal parts.

Potassium permanganate is a salt that oxidizes or breaks down TCE into harmless byproducts. The groundwater does not need to be pumped out of the ground to be treated; it will be treated *in situ* or in place.

In liquid form, potassium permanganate is a vivid purple color, which will allow visual monitoring of the potassium permanganate’s progress into the groundwater, according to Hobbs. Monitoring wells are installed alongside the horizontal well to test the groundwater after the ISCO treatment has been performed.

The well runs 55 feet underground into groundwater and extends 1,000 feet across the southeast section of the Sites 5/14 plume before running back up to the surface. The pipe used for the horizontal well is referred to as a screen because of the many narrow slits found at intervals along the pipe.

Lee Marusim, field manager for the



**MAPPED OUT** — This map shows the trichloroethene groundwater plume at South Base. The horizontal treatment well runs across the plume at Environmental Restoration Program’s Sites 5/14.

horizontal well project, explained that the pipe was made with a specific function in mind.

“The design of the pipe is unique because we have to push the potassium permanganate horizontally, not vertically, along a far length,” Marusim said. “The slits make for an even distribution of the potassium permanganate as it is pumped into the well.”

To prevent corrosion of the well over time, stainless steel was used to construct the screen pipe, which is expected to last more than 10 years.

Horizontal wells have been installed at other military installations like Vandenberg AFB, Calif., Moody AFB, Ga., and Marine Corps Air Station Cherry Point, N.C., according to Dan Ombalski, vice president of Directed Technolo-

gies Drilling (DTD), Inc., the company drilling the well.

“Drilling for a vertical well is pretty simple, you drill straight down” Ombalski said. “A horizontal well is different; you need to constantly monitor the progress of the drill and its location underground to ensure you are drilling in the right direction and at the proper depth.”

Every 15 feet, a field technician uses a sensor to mark the direction of the drill. A device called a sond emits magnetic fields from the head of the drill. These magnetic fields can be read by a sensor that provides readings detailing the drill head’s angle, direction and depth.

“Gravity and the soil work against the horizontal motion of the drill head,” Marusim said. “The drill operator needs to make minor

# Many celebrate Earth Day on base

# on base

*Environmental Management takes a different route this year to celebrate the day and educate people on base.*



**FIRST PLACE POSTER - Kylie Nelson**  
2nd Grade - Bailey Elementary School

**My Life as a Glass Container**

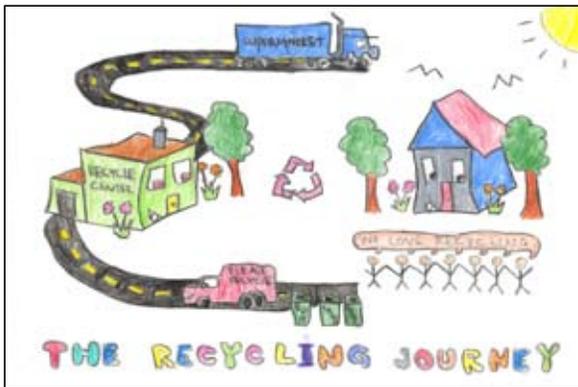
When I first became aware, I felt the heat of strawberry jam all around me. The children would take me out of the fridge to get my strawberry jam. The spoon would bang against my sides, which made me excited. When I was empty, the children cleaned me and put me in a green can. The worker took the green can to the sidewalk where a really truck picked me up. I thought I was going to end up with a shattered life in an alley.

I was quite scared. I didn't know what they were going to do with me. Another glass container told me I was at a recycle center. They put me on a machine we were going through the recycle process.

The next thing I knew it, I was smushed. The machine smushed me into really tiny pieces called culch. The magnets, screens, and vacuum systems separated my label and my cap from me. They blended me with streams of silica sand, soda ash, and limestone. Then they put me in the furnace, which melted me into molten glass. I was shaped into a new glass container.

I was sold to a food bottling company. They filled me up with jam. The store manager put me on a shelf with other jam jars. A family bought me and took me home. I couldn't believe it! It was the same family I was with when I was being jam. Now I like holding jam. It's hot!

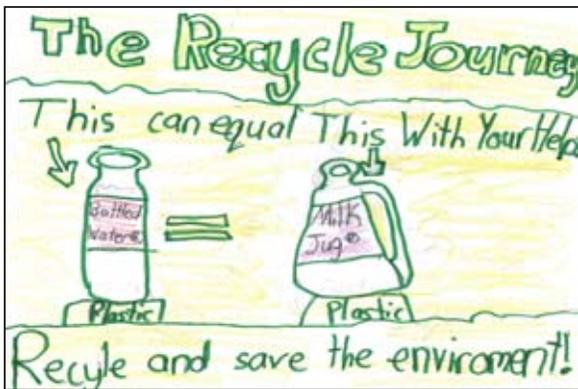
**FIRST PLACE ESSAY**  
**Isabella Millman**  
6th Grade  
Branch Elementary School



**SECOND PLACE POSTER - Tiffany Millman**  
2nd Grade - Bailey Elementary School



**CONTEST WINNERS**  
*First, second and third place posters along with the first-place essay winner are shown left. The top three poster winners and the one essay winner pose with Col. William Baird, Individual Mobilization Augmentee to the 95th Air Base Wing Commander. All of the winners attend Bailey and Branch Elementary Schools on base.*



**THIRD PLACE POSTER - Kayla VanDeFlier**  
4th Grade - Branch Elementary School

**ARBOR DAY** — Col. Brian Gallagher, 95th Air Base Wing Vice Commander plants a tree with Miss Edwards pageant winners, while Robert Wood, Environmental Management Division chief looks on.



A cool breeze blew through the Base Exchange (BX) parking lot as children lined up April 19 for Environmental Management's Earth Day event at Edwards Air Force Base (AFB).

A variety of booths with volunteers stood ready to educate the Edwards AFB community about Earth Day, the environment and safety. The event gave visitors the opportunity to learn about many resources available on base.

Families, schools and military personnel participated in activities at the Earth Day event.

Various Environmental Management section booths like Air Quality, Cultural Resources and Natural Resources provided educational information and materials. The environmental buzz game tested participants' knowledge of the environment, and liquid nitrogen ice cream was provided by the Base Environmental Analytical Laboratory, or BEAL. These were just a few of the activities that took place during the event.

Security Forces had safety in mind when they set up a child identification kit at their booth. Airman 1<sup>st</sup> Class Jason Slagle, wanted the base community to be more aware of Security Forces' presence at Edwards AFB.

"Through this Earth Day event, I think the base community will be much more proactive with their children's safety," Slagle said.

Biologists Wesley King and Amber Bruno, brought a live Mojave green rattlesnake for display so event goers could look at it as well as learn about it.

"We gave the visitors basic information about animals found at Edwards AFB and also about venomous snakes," Bruno said. "Most of the questions were about the rattlesnakes, but the most popular item at our table was Boomer, our male tortoise," King added.

Barry Boyer, an archaeologist, and architectural historian Hugh Davidson presented a variety of findings from cultural sites around Edwards AFB. "Many members of the public expressed surprise at the long term occupancy of the base and diverse materials found in the Cultural Resources' historical record," Davidson said.

"We wanted to inform the community how historical finds on Edwards AFB and related areas can enlighten us about what prehistoric weapons may have been like.



**SOLAR POWER** — Andrea Brewer, air quality specialist, shows two youngsters how solar cells can power a fan.

“

Participation was the highest yet, with an attendance of more than 800 people

Heidi Gesiriech  
Community Relations Specialist

”

The four-part atlatl dart was our most popular item,” Boyer added.

The event began with the national anthem sung by Cheryl Smith. Next, Environmental Management Division Chief Robert Wood announced the winners of the Earth Day essay and poster contest and presented them with certificates.

Branch and Bailey Elementary schools participated in the contest and Isabella Millman received first place for her essay titled *My Life as a Glass Bottle*. Wood awarded Kylie Nelson first place for her poster on recycling. Nelson was followed by Tiffany Millman, who received second place and Kayla VanDeFlier, who received

third place.

The first-place winners for the essay and poster contest will receive a class pizza party hosted by Anthony's Pizza. A class from Bailey Elementary was given an honorable mention because the entire class participated in the poster contest. They received an ice cream party hosted by Baskin Robbins.

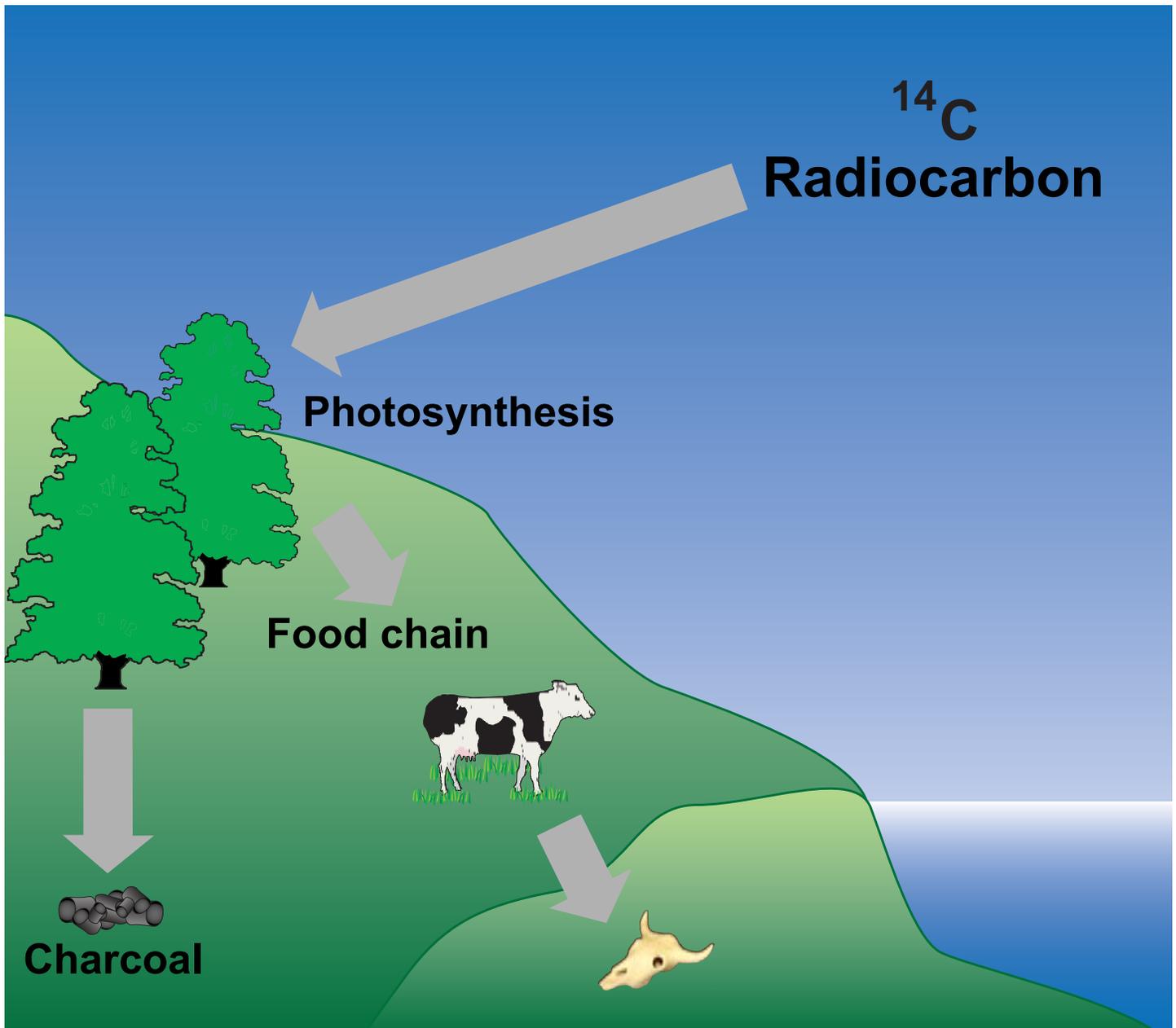
"It was fantastic," said Heidi Gesiriech, Earth Day coordinator, "several new features were added to the event including a live band, child identification kits, an educational passport for children and chalk ads. The costumed character 'Eddie the Edwards Tortoise' was also introduced.

"Participation was the highest yet, with an attendance of more than 800 people," Gesiriech added.

In preparation for the event, workers added chalk advertising this year. Ten buildings on base were chosen based on heaviest foot traffic to feature chalk advertising.

The ads included information about the event with the time, date and location.

Earth Day started in 1970 and occurs annually on April 22. The day of recognizing the earth was prompted by Senator Gaylord Nelson and is intended to inspire awareness and appreciation of the earth and its resources.



**HOW DID IT GET THERE?** — Plants like trees and grass absorb carbon-14 from the atmosphere through photosynthesis. Animals and people eat plants and take in carbon-14. Following death, organic matter loses carbon-14 as it decays.

## Base archaeologists map history using decayed carbon

**E**ver wonder how archaeologists learn the age of a prehistoric site found on Edwards Air Force Base (AFB)? Like their counterparts around the world, base archaeologists use radiocarbon, or carbon-14, as a method of dating sites.

“Radiocarbon dating is not the only method we use,” said

Richard Norwood, base historical preservation officer. “But it is one of the most accurate tools that archaeologists have for dating an archaeological site.

“The technique does not work on materials such as metal. However, anything organic – bone, wood, charcoal, shells – can be easily processed.”

Carbon-14 and carbon-12 are naturally occurring isotopes that are absorbed in equal amounts from the atmosphere by plants. These carbon molecules are transferred into the food cycle when animals eat the plants. An isotope is one of two atoms having the same atomic number but different mass numbers.

It takes an average of 5,730 years for carbon-14 to decay to half of its original amount. By comparing how much carbon-14 has decayed in relation to the amount of carbon-12 left in the sample, one can calculate how long ago the organism was living.

“We prefer to find samples from as great a depth as possible,” said Cole Parker, archaeologist for Environmental Management. “This way, there is less of a chance of contamination from more recent human activity and thus a greater degree of accuracy in the dating.”

Prehistoric hearths are an archaeological site type from which significant amounts of radiocarbon datable materials are removed. Prehistoric hearths were used for warming, cooking, medicinal purposes and a variety of other activities. One such hearth found on Edwards AFB has been dated between A.D. 40 and A.D. 1290. Other sites with hearth features have dated as far back as the B.C. era.

Environmental Management archaeologists send their organic samples to laboratories that specialize in radiocarbon dating. The samples are analyzed and archaeologists get results with approximate date ranges.

Of the 4,000 archaeological sites on Edwards AFB, one is listed on the National Register of Historical Places and the National Historic Landmarks – Rogers Dry Lake. A number of other sites on base, including the Pancho Barnes site, are determined to be eligible for the National Register. The National Register is the nation’s official list of cultural resources worthy of preservation.

When the Air Force proposes to take an action with the potential to physically impact an area of the base, the archaeologists must first survey the area and document any evidence of prior

human activity.

“There are several things we look for systematically when surveying an area,” Parker said. “First we look for artifacts to determine if there is an archaeological site in the area. We then evaluate the site to determine if it is eligible for the National Register. As part of that evaluation, we take soil samples that may contain organic matter suitable for radiocarbon dating.”

When there are no organic samples at a site, archaeologists can fall back on two other types of dating methods, typological dating and obsidian hydration dating. The date ranges obtained from these methods are not as accurate as radiocarbon dating, but they are valued methods for getting an idea of the age of a site, according to Norwood.

Typological dating compares objects found at the site to documented styles of artifacts that are known to have existed during certain periods. If the styles match, the archaeologist can extrapolate, or infer, the time period that the site was occupied.

Obsidian hydration dating measures the thickness of the weathered surface on a piece of obsidian – a volcanic glass-like material. There is a direct relationship between the thickness of the weathered surface and how long ago the piece was formed. However, there are several formulas that can be applied, depending on an area’s humidity or depth at which the piece was located, just to name a few examples.

One thing is certain. No matter what types of treasured pieces base archaeologists find at a site, they will continue to use whatever evidence they can to establish a date.

“The date of a site is in direct correlation to its significance,” Norwood said. “The more accurate the date, the better able we are to define its historical value.”

Parker agreed with the importance of knowing the timeline of a site, saying that it contributes not only to the history of Edwards AFB, but also to the history of the entire Antelope Valley.

RTS

## HORIZONTAL

### From page 3

adjustments throughout the process.”

While the installation of a horizontal well was a first for Edwards AFB, the collaboration it took to make the well a reality was nothing new. The study required extensive coordination between the Air Force, state and federal regulators, contractors and DTD.

“It’s exciting that we can investigate new techniques for cleanup,” Hobbs said. “This study will help us determine if we should install additional horizontal treatment wells at Sites 5/14 and whether this technique can be applied to other sites on base.”

RTS



**NEW HORIZON**  
this drill head was used to install a horizontal treatment well at South Base.

New subscription  
 Change of address  
 Cancel subscription

**Name** \_\_\_\_\_  
**Organization** \_\_\_\_\_  
**Address** \_\_\_\_\_  
**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip** \_\_\_\_\_

**Mail to:**  
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**Where to Find More INFORMATION**

Published data and documents relating to the Environmental Restoration Program are available for public review in information repositories at four locations. The current information repositories are located in the cities of Boron, Lancaster and Rosamond, as well as Edwards AFB. 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](mailto:95ABW.PAE@edwards.af.mil).



Location	Days	Hours
<b>Edwards AFB Library</b> 5 W. Yeager Blvd. Building 2665 Edwards AFB, Calif. (661) 275-2665	Mon-Thu Fri Sat & Sun	9:30 a.m. - 7 p.m. 9:30 a.m. - 6 p.m. 10:30 a.m. - 6 p.m.
<b>Kern County Public Library Wanda Kirk Branch</b> 3611 Rosamond Blvd. Rosamond, Calif. (661) 256-3236	Tue & Wed Thu-Sat	Noon - 8 p.m. 10 a.m. - 6 p.m.
<b>Los Angeles County Public Library</b> 601 W. Lancaster Blvd. Lancaster, Calif. (661) 948-5029	Mon-Wed Thu & Fri Sat	10 a.m. - 8 p.m. 10 a.m. - 5 p.m. 11 a.m. - 5 p.m.

**Report to STAKEHOLDERS**

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