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Report to **STAKEHOLDERS**

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**2020 sampling results
confirm no VI issues
at AFRL Arroyos**

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Report to Stakeholders is a publication of the Air Force Civil Engineer Center, Installation Support Section at Edwards Air Force Base (AFCEC/CZOW). Its purpose is to inform and educate the public, base workers and residents about continuing Environmental Restoration Program efforts on base. It currently has a circulation of 4,000, including about 1,100 subscribers.

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Any comments or questions about the contents of the Report to Stakeholders may be directed to: Gary Hatch, 412 TW/PA, 305 E. Popson Ave., Edwards AFB, CA 93524, (661) 277-8707.

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WHAT'S ON THE COVER?

RIISING TO THE TOP:

A bottom-up view of one of the arroyos leading up to rocket test stands at the Air Force Research Laboratory, Detachment 7 or AFRL. An arroyo is a dry creek or streambed. A third sampling event in February 2020 confirmed there are no vapor intrusion concerns for workers in five AFRL Arroyos buildings.

Sampling results, framework support VI characterization

As part of ongoing efforts to characterize vapor intrusion at Edwards Air Force Base, California, remediation experts confirmed there are no concerns for workers in five Air Force Research Laboratory, Detachment 7 — or AFRL — Arroyos buildings. Data results from a February 2020 sampling event were similar to results obtained from 2012 and 2013 sampling events. Based on the data, no further investigative efforts are expected to be performed unless building occupancy or usage changes.

The third round of sampling data supports the selected remedy for vapor intrusion in the AFRL Arroyos Record of Decision, which is still under formal dispute. While policy issues related to the dispute require resolution from executive-level management at the Air Force and regulatory agencies, the remedial project managers responsible for cleanup on the base were able to address the vapor intrusion aspect related to five AFRL Arroyos buildings, another key component of the Record of Decision.

Other cleanup areas on the base are still undergoing vapor intrusion assessments. The assessments determine whether chemical vapors from contaminated soil or groundwater are migrating into nearby buildings, potentially posing health risks to workers.

Groundwater and soil contaminants at Edwards have chemical properties that could cause them to volatilize — vaporize or evaporate, like rubbing alcohol — into the surrounding air. These contaminants are known as volatile organic compounds or VOCs for short. Because of their chemical properties, VOCs can vaporize out of the groundwater and enter into the gaseous phase of the underlying soil. These VOCs can enter buildings when chemical vapors from groundwater and subsurface soil leak through cracks and holes in a building's structure. In this way, people working in buildings above plumes of contaminated groundwater could potentially be exposed to VOCs. The most common VOCs found at Edwards include fuel constituents, such as benzene, and solvents that were used to clean dirt and grease, such as trichloroethene or TCE.

For Operable Unit 1/8, or OU1/8, Main Base buildings, vapor intrusion assessments led to the development of

an evaluation framework to guide Air Force and regulatory officials through a decision-making process on a building-by-building basis. "The framework has been an important part of the progress at OU1/8 because of the number of buildings to categorize and evaluate," said Julia Tseng, who manages environmental cleanup at OU1/8. "There are nearly 600 buildings within OU1/8 and the framework has assisted the Air Force and regulatory agencies in identifying a total of 28 buildings that required further investigation."

The framework established a protocol for assessing and characterizing vapor intrusion. The first step was to group buildings into five categories based on their occupancy and proximity to contaminant sources in the subsurface. Since 2018, a technical working group, or TWG, has focused on evaluating every Group A building in OU1/8. Group A buildings are occupied and located within 100 feet of a contaminant source. The TWG consists of Air Force and regulatory agency personnel who oversee the base cleanup program and their respective technical and subject-matter experts.

Other group categories include occupied buildings located more than 100 feet away from a contaminant source, currently unoccupied buildings, buildings that can never be occupied (like a storage shed or a canopy) and demolished buildings. According to the framework, the Air Force will routinely monitor changes in groundwater contaminant concentrations and building occupancy to verify if any buildings need to be reclassified as Group A in the future.

For occupied buildings, the framework requires an analysis of historical and current sampling data, which can lead to soil gas sampling near the building, a building survey and indoor air sampling within the building. If available data are insufficient, environmental experts will first look for evidence of vapors present outside an occupied building. Where buildings overlay contaminated groundwater, soil gas samples will be collected to screen for VOCs that could potentially migrate into indoor air. A building survey may be performed before the soil-gas survey to inspect the condition of the foundation, occupancy and use, ventilation, air handling

units and potential indoor VOC sources like cleaning products or markers. Based on the data, the OU1/8 TWG determines whether a vapor intrusion sampling event is necessary, whereby samples may be collected indoors, outdoors and under the foundation slab.

For buildings that undergo vapor intrusion sampling, the framework calls for a comparison of seasonal sampling results to ensure conditions are not affected by cold weather. Wintertime is considered to potentially pose higher risks from subsurface vapor intrusion than summertime for two reasons: 1) heating a building creates a stack effect where warm air rises and escapes through leaks near the top of a building, drawing air in from lower levels and through the floor, and 2) ventilation rates may be lower in the winter if occupants seal doors and windows to minimize cold drafts.

The OU1/8 TWG identified 17 additional buildings for vapor intrusion sampling; results had already been collected in 11 other OU1/8 buildings. The 17 buildings were sampled in January and February as part of a winter sampling round. A summer round of vapor intrusion sampling is expected to occur later this year.

The goal of the OU1/8 vapor intrusion assessments is to collect sufficient data to determine a path forward for addressing vapor intrusion in the OU1/8 Feasibility Study. "The framework helped the Air Force and regulatory agencies jointly identify how to address vapor intrusion now and into the future," said Paul Schiff, base remedial project manager. "Because of its success at OU1/8 buildings, we agreed to apply the framework at other OUs still undergoing vapor intrusion assessments, like OU5/10 North Base."

To date, only two buildings on base have been identified for routine sampling to ensure worker safety: Building 8595 at OU4/9 South AFRL and Building 1807 at OU1/8 Main Base. Sampling results in both buildings continue to show contaminant concentrations in indoor air remain below regulatory action levels.

Vapor intrusion assessments will continue into the future as base environmental officials monitor groundwater contaminant plumes. With the help of the vapor intrusion evaluation framework, buildings will be properly identified, categorized and investigated when necessary. More information can be found on www.ar.afcec-cloud.af.mil.



UNDER THE FOUNDATION: A vapor intrusion expert drills into a foundation slab before installing a vapor probe (inset). The probe was installed as part of vapor intrusion sampling efforts that occurred in January and February.

Improving base groundwater cleanup

Groundwater treatment systems installed in 1998 and 2003 have treated millions of gallons of groundwater at Edwards AFB, removing more than 300 pounds of contaminants between them (see table below). Environmental cleanup officials plan to optimize both systems, as well as other groundwater treatment systems on base. One of the optimization goals is to obtain real-time information regarding system status and operational and maintenance needs. Updates to system mechanical features and software will be applied to systems at Operable Unit 2, or OU2, South Base Sites 5, 14, 76 and 86, and OU5/10 North Base Site 285. Unlike the pump-and-treat systems at Sites 14 and 285, the groundwater treatment systems at Sites 5, 76 and 86 inject chemical or biological components into the subsurface to help break down contaminants into harmless byproducts. The system optimizations are expected to continually improve contaminant recovery, injection rates and remediation progress into the future for these groundwater cleanup sites.

Groundwater extraction and treatment system	Gallons of groundwater treated	Contaminant removed from groundwater
OU2 South Base Site 14	113.7 million, since 1998	125.4 pounds of solvent (a degreaser) called trichloroethene or TCE
OU5/10 North Base Site 285	100.7 million, since 2003	187.2 pounds of a rocket propellant component called perchlorate

Where to find more INFORMATION



Published data and documents related to the Environmental Restoration Program at Edwards are available for public review at three Information Repositories and online at <https://ar.afcec-cloud.af.mil>.

The Information Repositories are located at:

Edwards Air Force Base Main Library

5 W. Yeager Blvd.
Edwards AFB, California
(661) 275-2665
www.edwardsfss.com/wordpress/library

Kern County Public Library

Wanda Kirk Branch
3611 Rosamond Blvd.
Rosamond, California
(661) 256-3236
www.kerncountylibrary.org/rosamond-branch

Los Angeles County Public Library

601 W. Lancaster Blvd.
Lancaster, California
(661) 948-5029
www.colapublib.org/libs/lancaster

For questions about documents in the repositories, you may contact Gary Hatch, 412th Test Wing Public Affairs, at (661) 277-8707 or by e-mail at 412tw.pae@us.af.mil.

General information about the environmental program at Edwards can be found at the following websites:

www.edwards.af.mil/About/Environment
www.facebook.com/EdwardsEnvMgt



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Restoration Advisory Board Information

The Restoration Advisory Board (RAB) is made up of appointed representatives from communities on 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 between the public and those responsible for environmental cleanup at the base.

The board meets semiannually, rotating meeting locations among communities surrounding the base. The public is welcome to attend. Those who have questions or concerns about cleanup activities at Edwards

may contact any RAB member or Gary Hatch, 412th Test Wing Public Affairs, at (661) 277-8707.

The RAB also has its own Facebook site: www.facebook.com/RAB.Edwards. "Like" us on Facebook today!

NEXT BOARD MEETING

May 20, 2021 at 5:30 p.m.
Microsoft Teams link will be posted on RAB Facebook site

RAB Members

OFF-BASE COMMUNITIES

Boron

Vacant — If you live or work in Boron, you may apply to be a public representative.

California City

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North Edwards

Vacant — If you live or work in North Edwards, you may apply to be a public representative.

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NASA Armstrong

Vacant — If you work at NASA Armstrong, you may apply to be a public representative.

North Base

Vacant — If you work at North Base, you may apply to be a public representative.

South Base

Vacant — If you work at South Base, you may apply to be a public representative.

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Report to STAKEHOLDERS

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