



Guardian

America's First Choice for Environmental Restoration

A Publication of the Environmental Restoration Program

Travis Air Force Base, California

April 2009

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Editor's Corner

1. The front page article is a continuation of the "Care About Indoor Air" article in the July 2008 Guardian. We hope to report the conclusions of these two nationwide studies in a future Guardian.

2. The hyperlink to the Travis AFB Environmental Restoration Program web site has changed. It is shorter, so you do not need to type as much to obtain the latest information about our program. The full link is shown at the bottom of this page.

3. We wish we could print our environmental newsletter in color, since it would look better than the black-and-white version. However, in this economic climate, it is not easy to justify the extra expense. Instead, we provide electronic copies in color on our web site. You can find links to all of our newsletters at <http://www.travis.af.mil/enviro/news/index.asp>.



(Photo by Glenn Anderson)

Tracking Progress: A field technician uses a track-mounted rig to install vapor monitoring points next to a building that is undergoing a Vapor Intrusion (VI) Study. Data from VI studies will be used to better understand the relationship between groundwater contamination and the structures above it.

Travis In A Test Tube

Base Hosts Two Independent Vapor Intrusion Studies

By Glenn Anderson

Travis Environmental Project Manager

Since 2000, Vapor Intrusion (VI) has become a big environmental concern and a significant consideration in the selection of groundwater cleanup remedies. VI is the movement of contaminated air from subsurface soil into occupied buildings through cracks in basements or foundations. Contaminants are usually volatile compounds, such as trichloroethene and benzene, which evaporate quickly and pose potential health risks.

"Imagine that a gas line beneath your house had a leak," says Mark Smith, Travis AFB Remedial Program Manager. "If you could smell the vapors that entered your house

through its foundation, you would want the leak fixed and all released fuel cleaned up. Or maybe you would install a vacuum system so that all of the harmful vapors could be sucked out before they enter your basement. In our case, the solvents in our groundwater are odorless, so an evaluation to find out if contamination is entering a building is important to protect our base workers."

To support groundwater cleanup decisions, Travis AFB is conducting a VI assessment wherever dissolved solvents have been found beneath the base. We will complete the last phase of that assessment this summer. Technical experts from the San Francisco office of the U.S. Environmental Protection Agency are providing technical support for the assessment

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Visit our Environmental Restoration Program web site at <http://www.travis.af.mil/enviro>



Guardian

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Seeing Green on Travis

It is a privilege to write my first ever Viewpoint. In past editions of the *Guardian*, I have contributed articles that focused on specific projects, such as indoor air studies or groundwater treatment plant repairs. In the January 2009 issue I focused on Green Sustainable Cleanups. With this Viewpoint I intend to delve a little deeper into my involvement with the Green Sustainable Cleanup movement.

I am a California native, born and raised in the San Francisco Bay area, so I've always been in touch with the environment. As a young man, I was surprised when traveling around the country to see that other states were so different than California and did not recycle materials the way Californians did.

But the real surprise though came in 2001 when I transferred to Aviano Air Base in Italy and saw what a real recycling effort was about. In Italy there is no garbage collection day because by law, nearly every bit of trash had to be sorted and recycled! The town recycling centers would take items, such as used clothing and glass sorted by color. Food scraps and yard waste had to be composted. Plastic bottles are rare in Italy, as beverages are sold in reusable glass bottles. The Italians thought Americans were crazy because so many of us drive large cars, trucks and SUVs that burn lots of fuel and are not at all environmentally friendly. The average Italian car is the size of a mini Cooper!

When I returned to Travis in 2006, I had a new appreciation for the environment and was delighted to learn that while I was away, the base had installed its first two solar-powered extraction wells. By 2007, I was managing our groundwater treatment plant operation and maintenance program and started to learn what it took to keep these plants operating. The treatment plants had been on line for around ten years and were starting to show their age. While working through repair issues, I realized that while the solar powered extraction wells were a great idea, there was room for improvement. I added batteries to the solar-powered wells that charge during the day and then run



VIEWPOINT

Lonnie Duke
Travis AFB Remedial
Project Manager

the pumps at night, thereby doubling the amount of groundwater treated, all without tapping into the county's power grid.

In May 2008, I attended a conference on cleaning up chlorinated compounds and noticed a 'Sustainability in Cleanup' theme in the various poster sessions. One that stood out was from the United Kingdom, where they studied the generation of greenhouse gases from the proposed cleanup of a soil site. The original plan was to dig up contaminated soil with diesel-powered equipment and haul it to a landfill in diesel powered trucks. This study concluded that it made no sense to burn thousands of gallons of fuel and generate tons of greenhouse gases, just to move the soil from one place to another. The final decision was to leave the soil in place and use land use controls to protect human health and the environment.

This made sense to me, and upon returning from the conference, I looked closely at the amount of energy consumed by our groundwater treatment plants. Our thermal-oxidation unit eliminates vapors of volatile organic compounds (VOCs), but it generates carbon dioxide (CO₂) from the burning of natural gas along with the VOCs. I am currently working to switch to a more sustainable treatment system that does not use natural gas or create CO₂.

While researching sustainable remediation on the Internet, I learned that the Environmental Protection Agency (EPA) is developing tools for people in charge of cleanup projects. The Technology Primer on Green Remediation that the EPA published in April 2008 has some great information and really got me thinking about the whole sustainable remediation concept. In fact, the January 2009 *Guardian* describes a demonstration project, called a Solar-Powered

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Bioreactor, that the Air Force Center for Engineering and the Environment built on Travis. I was sold on the concept and wanted to learn more.

Last February, I attended the Global Perspectives in Green Remediation Forum at the California Department of Toxic Substances Control (DTSC) office in Sacramento. A number of environmental experts participated, including speakers from Canada and the United Kingdom via

teleconference. My big take-away from the forum was that Green Remediation is very much an evolving process. DTSC has their Green Remediation team working this issue and eventually will be modifying California environmental law to require the consideration of green house gas generation in most major decisions. Other environmental organizations, like the U.S. EPA, are also trying to clarify what Green Remediation means.

All in all some very interesting information was presented, and it was

unique chemical structure that is easy to identify at low concentrations. It is often used to track gas flow and find gas leaks in pipes. At one point, Dr. McHugh's team set up large industrial fans in the windows to induce first a negative pressure and then a positive pressure in the building. The idea was to see if pressure changes within the building encouraged the movement of gases through the foundation.

"The procedures that U.S. EPA and most states use to evaluate vapor intrusion at contaminated sites are very conservative, mainly because our current understanding of the physical and chemical processes that contribute to vapor intrusion is so limited," says Dr. McHugh. "By focusing on key site characteristics, our proposed procedures avoid the need to collect large amounts of data over extended periods of time. Validation of these procedures through this project will demonstrate their protectiveness of human health and promote regulatory acceptance."

Travis AFB was one of three demonstration sites selected for this project. Naval Air Station Jacksonville, FL and a former dry cleaning plant in Houston, TX are also participating.

The U.S. Air Force School of Aerospace Medicine (USAFSAM) in San Antonio, TX (the former Air Force Institute of Operational Health) also chose Travis AFB as a VI test site for a more traditional environmental study. The initial phase noted that very little vapor made it through the foundations and into the indoor air of several Travis buildings. However, based on groundwater conditions alone, vapor migration into these buildings should have taken place, according to a commonly used VI prediction model. So, the purpose

refreshing to realize that the Travis AFB restoration program is already using some of these technologies that other folks are just beginning to think about. I look forward to attending future symposiums and conferences that promote the latest in green technology. In the meantime I will continue my cleanup efforts at Travis, while looking for more sustainable and environmentally-friendly ways to complete this work.



of the study was to identify reasons for the absence of VI.

The USAFSAM team compared soil gas samples from a number of sampling probes above the water table and groundwater samples from the same locations. They used vertical soil gas profiles, observations of soil physical properties, and air exchange rates to evaluate the processes that were taking place outside and inside the building.

Fieldwork for both studies is complete, and the results of lab analysis of soil gas and groundwater samples are under review. Draft reports of the findings and conclusions from these studies will undergo scientific peer reviews.

Travis has a history of hosting or supporting research projects that directly benefit the scientific community and either directly or indirectly benefit the base. Vegetable oil injection, dual-phase extraction, permeable reactive wall, phytostabilization, and bioreactor demonstration projects have been conducted under real-world conditions to identify more efficient ways to clean up groundwater. Risk assessment studies involving the ways that toxic metals are absorbed into an organism and the impact of contaminated sediment on amphibians have improved our understanding of how contamination impacts the environment. Sustainability projects such as the use of solar panels to support groundwater treatment are in line with the latest government policies on global warming and Green Remediation. Collectively, these studies and demonstration projects add to the legacy that Travis AFB has established as a proactive steward of the environment.



Tube

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to ensure that it is done right. The results of this work will be published in an upcoming decision document that describes the selected remedies for every groundwater site on the base.

However, other groups also want to do VI work here. For example, two separate research studies were recently conducted by contracted scientists. They hoped to find ways to streamline the VI assessment process, improve the accuracy of assessment methods, and reduce project costs.

Both studies took place in Building 828, a former security forces armory that is scheduled for demolition. A plume of solvent-contaminated groundwater lies beneath the building.

GSI Environmental of Houston, TX is the first independent environmental consultant to study VI on base. They won a grant from the Environmental Security Technology Certification Program to test new field procedures for VI assessments. The procedures are designed to evaluate the pathway contaminated air takes to get from the contaminant source (soil or groundwater) to the breathable zone of a building occupant. If there is no pathway, then there are no health concerns.

Dr. Thomas McHugh from GSI Environmental considered soil grain size, moisture content, building foundation permeability and building pressure in the development and validation of his field procedures. Using a tracer gas, he conducted a thorough evaluation of the building foundation and its interaction with the underlying soil. Tracer gas is a harmless, lighter-than-air gas with a

Meeting Agenda

6:30 - 7:00 p.m. Open Forum:

The open forum allows RAB and community members to discuss ongoing Travis AFB restoration program activities with the Travis AFB environmental staff on a one-to-one basis.

7:00 - 9:00 p.m. RAB General Meeting

- I. **Welcome and Introductions**
- II. **Approval of Minutes**
- III. **Additional Agenda Items and Questions**
- IV. **Discussion Topics**
 - Bioreactor Demonstration Project
 - Vapor Intrusion Studies

Break

 - Treatment Plant Optimization
 - 2009 Summer Fieldwork Schedule
- V. **Cleanup Program Status**
- VI. **Regulatory Agency Reports**
- VII. **Focus Group Reports**
- VIII. **RAB/Public Questions**
- IX. **Set Time and Place for Next RAB Meeting**
- X. **Set Focus Group Meeting Times**
Adjourn

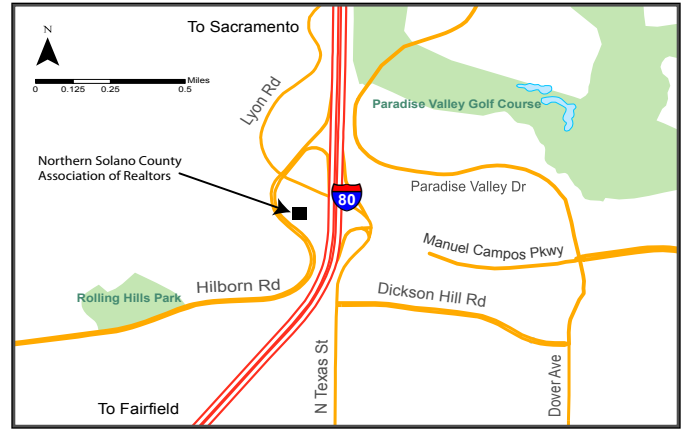
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Travis AFB Restoration Advisory Board Meeting

April 23, 2009
7 p.m.

Northern Solano County Association of Realtors
3690 Hilborn Road
Fairfield, CA



LOCATION OF INFORMATION REPOSITORIES

| Vacaville Public Library | Fairfield-Suisun Com. Library | Mitchell Memorial Library |
|--|---|--|
| 1020 Ulatis Drive Vacaville, CA 95688 | 1150 Kentucky Street Fairfield, CA 94533 | 510 Travis Boulevard Travis AFB, CA 94535 |
| (707) 449-6290 | (707) 421-6500 | (707) 424-3279 |
| Monday-Thursday: 10 a.m. - 9 p.m. | Monday-Thursday: 10 a.m. - 9 p.m. | Monday-Thursday: 10 a.m. - 9 p.m. |
| Friday-Saturday: 10 a.m. - 5 p.m. | Friday-Saturday: 10 a.m. - 5 p.m. | Friday: Closed |
| Sunday: 1 p.m. - 5 p.m. | Sunday: 1 p.m. - 5 p.m. | Saturday: 12 p.m. - 6 p.m. |
| | | Sunday: 12 p.m. - 6 p.m. |

If you would like more information or need special accommodations for the RAB meeting, please contact Mark Smith, (707) 424-3062. You can also view our web site at <http://www.travis.af.mil/enviro>

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