



Guardian

America's First Choice for Environmental Restoration

A Publication of the Environmental Restoration Program

Travis Air Force Base, California

July 2009

INSIDE

Viewpoint:

Mike Wray is a project manager from CH2M HILL, an environmental and engineering consulting firm that is carrying out the investigation and cleanup of all Travis AFB groundwater sites. We thought a view of our clean-up program from a contractor's perspective might be of interest.....2

Retooling the Central Plant:

A technology shift has taken place in the largest groundwater treatment plant on Travis AFB, one that will get the job done and conserve a lot of energy....4

Eucalyptus Treatment:

A grove of red iron-bark eucalyptus trees has one last shot to prove its ability to remove solvents from groundwater.....5

Next RAB Meeting:

The next Restoration Advisory Board meeting will be held on October 22, 2009 at 7 p.m. at the Office of the Northern Solano County Association of Realtors. The meeting agenda is forthcoming.....6

Acronyms

RFP: A Request for Proposal is an invitation for suppliers to submit a proposal to meet a material or service need. The proposal describes how the supplier intends to meet that need, including assumptions made and their costs. For large service contracts (for environmental work) the selected proposal is both technically superior and cost effective.



(Photo by Glenn Anderson)

It's In The Bag: A field technician prepares to install a passive diffusion bag (PDB) into a monitoring well. A PDB is a membrane that is filled with certified, laboratory-grade deionized water. The use of PDBs speeds up the collection of groundwater samples while maintaining high data quality.

Working the Plan

Summer '09 Filled with Investigations and Cleanup Projects

By Glenn Anderson

Travis Environmental Project Manager

After devoting the winter and spring months to writing work plans and coordinating with federal and State of California environmental regulatory agencies, it is time to mobilize field teams and get started on site investigations and cleanup actions.

"Sometimes it seems that our most valuable cleanup tool is a spell checker," recalls Mark H. Smith, Travis AFB Restoration Program Manager. "But then the summer arrives, and we spend most of our time with hard

hats and shatter proof sunglasses on our heads and steel-toed boots on our feet. We transition from air conditioned offices to triple-digit terrain. In other words, we actually clean up the environment."

Field investigations to collect soil gas and groundwater data are particularly important this year, because the field observations and results of laboratory analyses will be used next year to support the remedy selection process for all remaining groundwater sites. Although there may be opportunities to fill in a few limited data gaps next year, all cleanup remedies have

See **PLAN** page 3

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



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The Road to RIP

From our perspective, the Performance-based Contract (PBC) process at Travis AFB has been a difficult, yet very rewarding process. Fortunately, since the Government awarded the project in September 2008, it has been nearly all skewed to the "rewarding" side.

The PBC had been in the works for more than a year prior to the request-for-proposals (RFP) being issued in July 2008. So, all of the prospective contractors had a great deal of time for strategizing, stressing, and hand-wringing, until the RFP was sent out. We all had to develop our own approach to move the cleanup program ahead in a quantum leap, by taking the steps necessary to achieve remedy-in-place (RIP) for 23 groundwater sites by September 2012. Of course, there are many intervening steps before getting to RIP.

After the RFP was issued, we had about six weeks to pull our wildly scattered thoughts and strategies together and organize them so that the Air Force and Army Corps of Engineers could evaluate our approach against the other bidders. Their mission was to choose the proposal with the best strategy to reach the contract objectives, from a technical superiority and from a cost-competitiveness standpoint. Writing the technical approach and figuring out the costs was a 7-day per week job for our team of 8 to 10 people (a great way to spend a summer!). The two-week time period in which the proposals were being reviewed by the Government was the most nerve-wracking two weeks I can ever remember.

After being awarded the project, the reality of the job ahead hit us hard. The planning and project execution had to be set in motion



VIEWPOINT

Mike Wray
CH2M HILL
Project Manager

immediately...and it is a very long road to RIP! However, once things got rolling, the highly touted advantages of a PBC began to appear.

The long proposal period and competitive atmosphere provided increased impetus to produce a superior technical approach. All of the moving parts needed to reach the objectives were well thought out and strung together in the proposal, in a way that provided a clear path to achieve RIP for the 23 sites, while also providing the flexibility needed to adjust to inevitable road blocks and challenges.

The PBC encourages more involvement by the contractor, as well as by the regulators. The result is that the lines of communication have opened up a bit more, and innovative ways of involving each of the stakeholders in all aspects of the work have surfaced. We all are even more focused on executing the tasks to move each of the sites towards the Record of Decision (ROD) and to achieve RIP.

Perhaps the biggest benefits of the PBC for Travis AFB have been the innovative technical solutions being implemented, and the longer-term thinking and planning that is being conducted. The elephant in the room we all feel is the pressure to set the restoration program up for low-cost operations moving forward after 2012. In other words, aside from achieving RIP, our main goal is to reduce the life-cycle costs of completing the cleanup.


Viewpoint

■ From page 2

This last point leads to a benefit that I did not even realize existed until the project got under way. And that is the incredible win-win aspect of keeping costs down for the Air Force. The way the contract is set up is that for every

dollar saved on the project, as compared with the established budget, we split the savings 70/30...and the Government is the 70 percent owner of the savings! The very real result of this provision is that we work even closer as a team to achieve the project results, while always looking for the most ef-

ficient manner possible. And we help each other to that end.

This PBC at Travis AFB promises to move the program significantly forward over the next four years. After the contract is over, we believe the ultimate outcome will be lower ongoing operating costs and faster site cleanup. 

Plan

■ From page 1

to be selected and in place by the end of 2012 to meet the Air Force's often-stated cleanup schedule. So, there is little time to waste.

To complicate matters, some of the field work will be done off-base. Three solvent plumes traveled beyond the base fence, and three ground-water extraction well networks were built to clean them up. To identify any modifications that might be needed to ensure that all groundwater contaminants are captured, a well drilling team will install off-base monitoring wells and collect water samples for laboratory analysis. Since this work will be conducted on private property (on easements that were negotiated with the property owners), special care is used to ensure that the work does not pose any undue hardship on property tenants or livestock.


Any field work that is carried out near the flight line requires ad-

ditional coordination with aircraft and safety offices to ensure that it does not interfere with flight operations. If the field crew has to set up along taxiways, parking ramps, refueling stations, or runways; then a part of this coordination involves the partial or complete shutdown of airfield operations. This fieldwork is almost always scheduled for

negotiation, programming, and planning. Two sediment cleanup actions will take place in Union Creek toward the end of summer. They will involve the placement of portable dams in upstream and downstream locations, the draining of the area between the dams, the excavation of contaminated sediment, soil testing to verify the

cleanups were done properly, the transport of the sediment to an appropriate landfill, and the removal of the dams.

"When this year is over, our sediment cleanups will be complete, and another site will be ready for closure," remarked

Mr. Smith. "We will also be ready to identify groundwater cleanup actions that are technically superior, cost effective, and legally compliant. Then we can go back to our air conditioned offices." 



Wetlands Check: A wetlands biologist checks soil and vegetation conditions in preparation for upcoming field work. The presence of specific soil characteristics and plants species are used to identify wetlands (protected habitats where threatened or endangered plants and animals can live).

weekends and holidays (or those extremely rare cases when there are no scheduled aircraft activities).

Site investigations are valuable, but site cleanups give our office a sense of accomplishment. They are a culmination of years of study,

Retrofitting the Central Plant

Carbon Treatment Technology Leads to Energy Savings

By **Lonnie Duke**

Travis Environmental Project Manager

In the January 2009 Guardian, I discussed the concept of “Green Remediation”, performing environmental cleanups in a more sustainable or environmentally friendly manner. The Travis AFB Environmental Restoration Program has begun to apply these green concepts to its existing cleanup infrastructure.

Back in May, we took the first steps to optimize the largest ground water treatment system on base. The Central Ground Water Treatment Plant (CGWTP) receives contaminated groundwater from extraction well networks in the central and western parts of the base and currently treats about 2.5 million gallons of groundwater each month. This equates to an average groundwater flow rate of 66 gallons per minute, although the plant has a capacity to handle up to 300 gallons per minute.

To remove chlorinated solvents from the water, the CGWTP relied on an Ultra Violet Oxidation, or UV-Ox for short, as its primary treatment system. Although it is very effective, the special light bulbs in the UV-Ox require a tremendous amount of electricity to generate the UV radiation needed to break down the solvents.

After UV-Ox treatment, the ground water is clean but is still pumped through two 20,000-pound Granular Activated Carbon (GAC) vessels as a redundant treatment method, just in case the UV-Ox system experiences a problem. The system was designed to operate in this way over a decade ago when the chemical concentrations in ground water were much higher than they are today. At the time, this was a cost effective way of removing solvents from groundwater.

Over time, the contaminant concentrations in ground water have decreased to a point where GAC treatment is now cost effective and the energy-intensive UV-Ox sys-

at a cost of \$2,000 each!

The first step in changing treatment systems was to replenish the two 20,000-pound vessels with fresh carbon. Then, we treated a batch of groundwater with the new GAC and analyzed a water sample to ensure that the carbon is doing the job of removing the solvents. Today, the plant operates as before, except that the UV-Ox remains off-line. We will continue to do monthly sampling of the treated water to verify that the CGWTP with its GAC system is operating properly. The UV-Ox system remains in place, in case it is needed in the future.

Another optimization measure

that will be undertaken soon involves a Thermal-Oxidation (Therm-Ox) system, a part of the CGWTP that is used to thermally destroy solvents in soil gas. Contaminated soil gas is generated when a vacuum is placed on groundwater extraction wells to improve their cleanup efficiency.

Although thermal destruction does a very good job, it is also very energy intensive. The Therm-Ox unit at Travis AFB uses 8,000 kilowatt hours of electricity per month to run the vacuum

blowers and 2,500 therms (one therm equals 100,000 BTU) of natural gas per month to heat the solvent vapor enough to ensure complete thermal destruction. The energy used by the Therm-Ox unit annually is equivalent to the energy used by 300 average homes!



Pumping Carbon: A specialist in granular activated carbon monitors the flow of fresh carbon into one of two 20,000-pound groundwater treatment canisters. The canisters will take the place of an ultraviolet oxidation system that is no longer cost effective at removing organic compounds from groundwater.

tem is wasteful. So, the optimization of the CGWTP consisted of a shutdown of the UV-Ox system and the use of GAC as the primary treatment system. This reduced the plant's electricity consumption, reduced the amount of CO2 generated from electricity production, and eliminated the need to purchase the special UV-generating light bulbs

Can the Trees Cut It?

Final Test of Trees' Ability to Clean Up Solvents Has Begun

By Glenn Anderson

Travis Environmental Project Manager

Back in the July 1999 and the April 2003 editions of this newsletter, we reported on a long-term study to evaluate the use of trees to promote the cleanup of solvent contaminated groundwater. The study involved the planting of 480 red iron bark eucalyptus trees over a large solvent plume on the western side of the base. The source of the solvents was a battery acid neutralization sump adjacent to the base battery shop.

Known as the phytoremediation study, this tree stand offered a lot of promise, but there was insufficient information to prove whether the trees could clean up groundwater or at least stop contaminated groundwater from moving any further.

After ten years of growth, it is time to find out if the trees can be a part of a groundwater strategy. Last year, the Air Force Center for Engineering and the Environment funded a series of field visits to answer this question. Parsons Inc., an environmental and engineering consulting firm, and a team from Utah State University (USU) are carrying out this work.

"There are several ways trees can contribute to groundwater clean-up," says Mark H. Smith, Travis AFB Restoration Program Manager. "They can absorb solvents, release enzymes around the roots that can destroy contaminants, or move dissolved solvents through the sap and out of their leaves. We hope to find out whether these processes are enough to get the job done."

In early June, the Parsons/USU

team conducted their first set of tests. They extracted core samples from tree trunks and analyzed them to prove whether the trees can absorb contaminants through the roots and move them with the flow of sap to other parts of the tree. They also collected 'surface flux samples' around and in the center of the tree stand. Surface flux sampling is a way of collecting air samples directly from top soil to measure the amount of contaminants that is released directly from the ground. In theory, trees with



Dr. William Doucette from Utah State University explains to Mark Smith and Roger Engstrom from the Travis AFB Asset Management Flight how he will use his surface flux measurement equipment to evaluate the ability of trees to clean up groundwater.

well established roots will break up the subsurface soil and create paths for solvent vapors to move from groundwater to the soil surface. Although not expected to be significant, surface flux measurements will improve our understanding of the trees' impact on groundwater contamination.

Toward the end of June, the team returned to Travis to carry out a sequence of transpiration tests. Transpiration is the way that plants 'breathe.' They absorb carbon dioxide and release oxygen. They can also release solvents into the air, where they eventually break down into harmless compounds.

Using a specialized gas collec-

tion apparatus designed at USU, transpired air is run through filters that collect both solvents and water vapor. The filters are processed in the laboratory, and the results are used to estimate the solvent concentration in the water vapor and the amount of solvents that all trees release into the air each day.

Parsons plans to repeat this sample collection and analysis in August 2009 when the soil is drier and the water table is lower. They will then report their findings and provide Travis AFB with a recommendation to either use this clean-up strategy as part of an overall groundwater remedy or discontinue further evaluations.

"Obviously, we hope that the trees can help the base to reach groundwater cleanup standards at this site, because they offer a number of advantages over pump-and-treat systems," stated Mr. Smith. "Trees require no electricity and almost no maintenance, they self-optimize their root systems to improve their ability to extract solvents from the subsurface, and they generate no hazardous waste."

Before phytoremediation can be selected as part of the final remedy at this site, it must receive both regulatory and community acceptance. For the next two years, Travis AFB will be working with both federal and State of California environmental regulatory agencies and the public to select the most technically appropriate and cost effective remedies for all contaminated groundwater sites. If the study supports the use of trees for groundwater cleanup, then phytoremediation will be included in the decision-making process.

"Otherwise, we may have a lot of cheap tree mulch to give away in the near future," Mr. Smith joked.



Retooling

■ From page 3

One way to make the Therm-Ox system more efficient is to run it in a pulsed mode instead of continuous operation. The contaminated soil gas builds up in the subsurface for two months and then is drawn off and treated for one month.

With this small operational change, the same amount of vapor is treated but with a 66% reduction in electricity and natural gas consumption and a 66% reduction in the amount of CO2 generated.

“Travis AFB is on the leading edge of green remediation,” says Mark H. Smith, Travis AFB Restoration Program Manager. “We will continue to look for ways to clean up the environment in the most efficient and sustainable manner possible.”

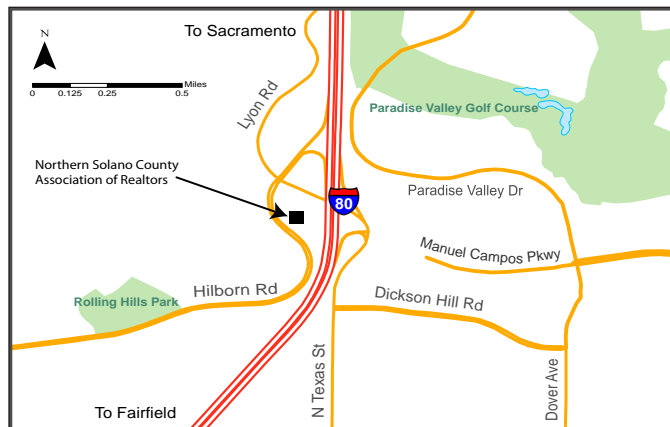
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Travis AFB Restoration Advisory Board Meeting

October 22, 2009
7 p.m.

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



LOCATION OF INFORMATION REPOSITORIES

Vacaville Public Library

1020 Ulatis Drive
Vacaville, CA 95688

(707) 449-6290

Monday-Thursday: 10 a.m. - 9 p.m.

Friday-Saturday: 10 a.m. - 5 p.m.

Sunday: 1 p.m. - 5 p.m.

Fairfield-Suisun Com. Library

1150 Kentucky Street
Fairfield, CA 94533

(707) 421-6500

Monday-Thursday: 10 a.m. - 9 p.m.

Friday-Saturday: 10 a.m. - 5 p.m.

Sunday: 1 p.m. - 5 p.m.

Mitchell Memorial Library

510 Travis Boulevard
Travis AFB, CA 94535

(707) 424-3279

Monday-Thursday: 10 a.m. - 9 p.m.

Friday: Closed

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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