



# Guardian

America's First Choice for Environmental Restoration

A Publication of the Environmental Restoration Program

Travis Air Force Base, California

January 2015

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## Acronyms

**BTEX:** BTEX is an acronym for Benzene, Ethylbenzene, Toluene and Xylene. These chemical compounds are classified as volatile organic compounds and are found in petroleum products. BTEX compounds are considered to be soil and groundwater contaminants.

**PAH:** Polycyclic Aromatic Hydrocarbons are organic compounds that contain only carbon and hydrogen ions. PAHs are formed by the incomplete combustion of organic material.



[Photo by Tony Chakurian (CH2M HILL)]

**Pushing for Answers:** A field technician prepares to use his geoprobe rig to push a soil sample collector into the ground. This specialized type of field equipment speeds up the sample collection process and reduces the amount of contaminated soil that requires disposal.

## Elementary, My Dear Travis

### Field Team Deductive Reasoning Solves Motor Oil Mystery

By Glenn Anderson

Travis Environmental Project Manager

“When you have eliminated the impossible, whatever remains, however improbable, must be the truth.” This line was spoken by Sherlock Holmes in Sir Arthur Conan Doyle’s novel “The Sign of the Four.” Sherlock Holmes is a fictional detective who used logical reasoning and forensic science to solve challenging cases.

Last autumn, it took this type of reasoning and science to resolve an environmental challenge that initially appeared to be impossible.

Site CG508 is a petroleum site that

was reported to have motor oil in its groundwater. It was discovered in 2002 when the base dug up an underground storage tank that was never used to store petroleum products. The analysis of soil samples from the tank excavation confirmed that the tank was not the source of the motor oil-impacted groundwater, so the source of the motor oil or how far the oil had spread was not known. Eventually, the Solano County Department of Resource Management closed the tank site, and Site CG508 became a part of the Travis AFB Environmental Restoration Program.

The investigation of Site CG508 was conducted in three phases, starting with

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



Travis Air Force Base, California

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# The Cost of Vandalism

In my last Viewpoint, I commented on the funding status of the Travis AFB Environmental Restoration Program during fiscally challenging times. This quarter, I will piggyback on that Dollars and Sense theme as well as follow up on the main article in the October 2014 *Guardian*, which reported on the damage to our groundwater extraction and treatment systems from natural causes.

After we published the October *Guardian*, our EPA representative asked a great question: how much did all of this damage cost us? As you will discover, the answer is complicated.

In past *Guardians*, we reported that our soil and groundwater cleanup actions for the foreseeable future will be carried out under a Performance-based Contract (PBC). Under this contract, engineers and geologists implement the groundwater remedies and operate them for the life of the contract for a negotiated price. So, what happens when a part of an extraction well network shuts down, and the cause of the shutdown resulted from the chewing of electrical cables by a common field mouse?

In response, the PBC field technicians have to troubleshoot the system (billed at an hourly rate), identify and replace the damaged components (replacement part costs and more work hours), and restart the system (even more work hours). There is a cost associated with each task, and the cost increases based on the level of damage and the amount of effort needed to fix it. But it is a PBC, and the Air Force does not have to pay extra for these services, so was all of this work done for free?

Of course not. The additional funds have to come from somewhere. In this case, the PBC allocated a certain amount for repair work, based on past experience and costs. However, as these repair/replacement costs mount, some other part of the groundwater program may be short-changed, such as a reduction in the frequency of some



## VIEWPOINT

Mark H. Smith  
Travis AFB Restoration  
Program Manager

routine maintenance tasks.

The bright side is that our contracted staff is really sharp and can get a lot done in a short period of time (a.k.a., less hours involved which equals less cost). However, there is a long-term cost associated with system downtime; the longer a groundwater extraction and treatment system sits idle, the less time that it will operate under this PBC, and the more time it will take to achieve cleanup levels under another contract.

It gets worse. Less system operating time means that there is less contaminated water that is treated by the activated carbon in our treatment systems, which means less carbon usage, which means that some darn mouse could cheat us out of a carbon change-out (replacing used carbon that is full of contaminants with fresh 'clean' carbon) for which we paid. This is similar to what happens when a taxicab picks up a nail in a tire; the car has to be towed to a tire repair shop, and the tire is repaired or replaced and then balanced before hitting the road again. So, what was the true cost of this nail? Not the tow or the tire repair. It was the lost revenue from the fairs that were picked up by the taxicab's competition while the tire and the taxi were out of commission. Darn nail.

I have not done an exhaustive analysis, but my educated guess is that the greatest loss from environmental vandalism that was described in our last *Guardian* is not from the cost of replacing an individual treatment plant component but rather is the lost opportunity to get the job done (a.k.a., time wasted is money wasted).

For this and many other reasons, we worked with our regulatory agency

## Elementary

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the analysis of groundwater samples from local wells and expanding out the sampling based on wherever the highest detections were found. A phased approach allows a field team to track down contaminant sources in a cost effective manner while keeping environmental regulatory agencies and base representatives informed of its progress.

However, after the field work was complete, a source of motor oil still had not been discovered, and a lot of the data did not really make sense. If a large quantity of motor oil had been spilled, a lot of soil staining would have been seen, and the concentrations of motor oil in the soil would have been high. The field team saw none of this.

Even more baffling was the lack of chemicals in the soil and groundwater samples that you would normally find in motor oil. You can think of motor oil as a “petroleum soup” that has a recipe of various ingredients, such as polycyclic aromatic compounds (PAHs) and benzene-type constituents (BTEX). The PAH and

BTEX compounds were missing.

After eliminating all scenarios that involved a motor oil spill at the site, the only remaining possibility was a series of “false positives” for diesel and motor oil. A false positive is when the laboratory report shows a quantity of a chemical in a sample that is not actually there. But what could cause so many false positive results over such a large area?

Canadian researchers have been studying how organic material from living organisms can create these types of false positives. When a sample is analyzed by laboratory equipment used to measure petroleum hydrocarbons, it produces a chromatogram. The researchers inspected chromatograms from the analyses of diesel fuel, crude oil, engine oil, tar and peat. They concluded that the presence of non-petroleum organic-based materials, such as decaying plants or animal waste, could create false positives in laboratory analyses. But where was the source of organic materials at CG508?

After looking at utility maps of the local area, the field team noticed that

a sanitary sewer line ran through the site. This led to discussions with the base civil engineers who confirmed that repairs had been made to breaks in the sewer line near CG508. From that point on, all of the field observations during the Site CG508 phased investigation made sense. The laboratory equipment had detected the aged sewage in the samples and reported it as motor oil. Mystery solved!

By eliminating motor oil as a potential environmental contaminant, the field team concluded that there were no industrial chemicals at Site CG508 that presented a human health or ecological risk. The base is in the process of documenting the results of this investigation for regulatory review.

At most sites, the past activities that led to environmental contamination are well understood, and it is rare to find an environmental puzzle that requires the talents of a famous British detective to solve. Fortunately, the geologists and chemists assigned to the investigation were up to the task and made the final answer look so...elementary. 

# A Webpage Facelift

By Glenn Anderson

Travis Environmental Project Manager

A key component of an environmental restoration program (ERP) is community involvement, and one of the best ways to promote effective community involvement is to inform interested community members of our progress in cleaning up contaminated soil and groundwater.

Most people have little time in their busy schedules to monitor every government program that directly or potentially impacts their lives. So, it helps to make available as much information as possible to allow each individual to decide for themselves whether they want to actively participate or just keep their fingers on the pulse of the progress achieved.

Last April, we reported on a new website from the Air Force Civil Engineer Center (AFCEC) that offered interested readers a way to access environmental restoration information from any Air Force installation in the United States. It is called the AFCEC Administrative Record, and its address is <http://afcec.publicadmin-record.us.af.mil>.

As one might expect, the AFCEC Administrative Record contains tens of thousands of records. This is why it might be best to start an information search with the local Travis AFB public website (<http://www.travis.af.mil/>).

One previous limitation with the public website was that it was not easy to find environmental information on it. You had to know exactly where to click

on to even find the main environmental webpage.

Recently, the main base webpage received a bit of a facelift to make information more accessible. Now when you click on the address of the public website, you will find a group of links to environmental programs on the right side of the webpage under the “Featured Information” column.

Currently, there are three links available: Environmental Restoration, Hazardous Waste Management, and Drinking Water Report. These are the most commonly requested topics that are mentioned in information requests. The Travis AFB Public Affairs Office maintains the public website and will look at adding more links to environmental topics, based on community feedback and compliance with Air Force Public Affairs policy and guidance. 

# Viewpoint

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counterparts over the last five years to select biology-based groundwater cleanup remedies that do not rust and cannot be shut down by masticating Mickey Mouse mandibles. We have described in detail in past Guardians our success in relying on microscopic organisms to break down contaminants at a rate fast enough to be considered a treatment strategy.

Let's face it. Equipment breaks down and pumps wear out over time, so there will almost always be repair work to keep us busy. By staying on top of equipment maintenance while looking for ways to keep natural vandalism to a minimum, we will continue to get the most out of our groundwater treatment systems and strive to complete the restoration of groundwater beneath Travis AFB as quickly as possible.

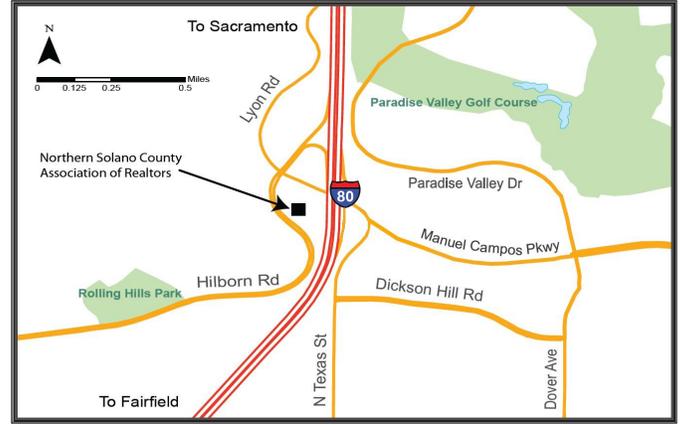
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## Travis AFB Restoration Advisory Board Meeting

April 23, 2015  
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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