



# Guardian

America's ~~First~~ Choice for Environmental Restoration

A Publication of the Environmental Restoration Program

Travis Air Force Base, California

October 2018

*Award-Winning*

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### Editor's Corner

Several Guardian readers correctly noted that the July edition did not arrive in their mailbox (or inbox) on time. What happened? As it turned out, the main story in the July edition described the connection between our restoration program and the construction of a new KC-46 hangar. We were waiting on the official word from Washington D.C. to announce that a squadron of new KC-46 refueling aircraft was going to be assigned to Travis AFB. After the date of the official notification passed, we had to delay the delivery of the newsletter until the KC-46 assignment was made public. So, we apologize for the delay and will temper our enthusiasm to share future good news until the time is right.



(Photograph by Angel Santiago (Aegis))

**Twenty-Year Treatment with Trees:** This grove of red iron-bark eucalyptus trees is slowly and quietly removing dissolved solvents from local groundwater. Upgradient of the trees is the first Travis bioreactor that is effectively treating the source of the groundwater contamination (see Figure 1).

## Decades of Dechlorination

A Glance at the Performance of our Tree Grove and Bioreactor

**By Glenn Anderson**

Travis Environmental Project Manager

It is hard to believe that it has been over 20 years since a small office in San Antonio and an environmental office in California took the first steps toward a new innovative but unproven strategy with the goal of improving groundwater cleanup performance and reducing cost. The October 1999 Guardian describes the first part of that strategy (known as phytoremediation) that uses water-loving trees (red iron bark eucalyptus trees) to remove and treat solvent contamination in

groundwater.

It has also been about 10 years since the Air Force Center for Environmental Excellence (now the Air Force Civil Engineer Center) funded the construction and operation of the second bioreactor in the Air Force and the first one in California. The January 2009 Guardian describes this groundwater treatment system that relies on biological processes to break down solvent contaminants into harmless compounds.

Both innovative technologies were tested on Travis AFB, and they led to a path of scientific discovery that cleared the way for other biology-based tech-

See **Decades** page 3

Visit our Environmental Program web site at <http://www.travis.af.mil/About-Us/Environment>



Travis Air Force Base, California

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# 2018 The Year of the Snail?

Recently, my wife and I dined at a local Chinese restaurant. While waiting for our meals, I glanced at our placemats that showed the animals associated with the Chinese New Year and learned that 2018 is the Year of the Dog. For the Travis AFB Environmental Restoration Program (ERP), it might as well be the Year of the Snail, because several of our soil cleanup projects have gotten off to a slow start.

As the Travis ERP Manager, I am responsible for all aspects of this multimillion dollar cleanup program. This includes the planning of site investigations and cleanup actions, coordination with federal/state environmental regulatory agencies as well as Air Force personnel, funds requests, and all of the paperwork that makes it happen. When it comes to the ability of the Travis ERP to support the Air Force mission, the buck stops here!

So when I look at the calendar and see that we haven't started several soil cleanup actions that are scheduled for this year, I cannot help but feel a little disappointed. We have had such a great track record of success for many years, so what happened?

We started 2018 with an aggressive schedule that included two amendments to our soil Records of Decision (RODs), three soil work plans, and a large assortment of technical memoranda and support documents. A ROD Amendment describes a significant change to an existing ROD (such as the selection of a more effective remedy), so it requires as much coordination as the original ROD. We honestly thought that we could knock out the two amendments in about 8 months, but that turned out to be too aggressive. So much for optimistic thinking.

On the bright side, most of our groundwater cleanup actions are performing well. The diagram on page 3 shows the cleanup of the second worst groundwater contamination source on the base. Basically, the source is gone, which is quite an accomplishment, so now the primary focus is on



## VIEWPOINT

Lonnie A. Duke  
 Travis AFB Restoration  
 Program Manager

the remaining dissolved portion of the contamination. Also, several other groundwater sites are getting close to their cleanup levels and we may close out these sites in a few years.

We also officially closed 12 oil/water separator sites and submitted a third ROD to close two sites associated with a former skeet range, so the news is not all bad. We knew from the beginning that our performance-based contract had a high tempo work schedule and was going to keep us busy all the way until the end. Also, our outstanding team of contractors, regulators and managers has accomplished a lot in the past, but recent retirements and personnel changes in several key positions have slowed things down a bit. I consider perfect execution to always be the goal to shoot for, even if we occasionally fall short.

So where do we go from here? I still believe we can complete the necessary coordination and get out in the field this year. The three soil cleanup actions are relatively small in size and will not require a lot of time to complete. In spite of the small setbacks, I believe in our restoration team and its ability to work through the issues and achieve successful milestones. We did not win awards and actively promote environmentally friendly technologies in the past by being pessimistic and accepting mediocre standards. We put in the work and kept our eyes on the prize and will continue to do so.

This Year of the Dog should be no different from past years. By barking louder, we may finish digging and hauling away contaminated soil before the start of the Christmas holiday season. I will let you know after the New Year if we ended 2018 with a whimper or a wagging tail! I'm hoping for more wagging tail and less snail!





## Decades

■ From page 1

nologies to be tested under real world conditions. Both technologies have also been selected officially as parts of an overall treatment strategy for the cleanup of the second largest body of contaminated groundwater on the base. This contaminated groundwater is associated with the former battery and electric shop in building 755.

Shop personnel worked on lead acid batteries and disposed of the used battery acid into a battery acid neutralization sump next to the building. Unfortunately, chlorinated solvents (primarily trichloroethene

or TCE) also found their way into the sump, resulting in a large teardrop-shaped solvent plume. Even after years of interim cleanup efforts, the groundwater around the former sump was heavily contaminated.

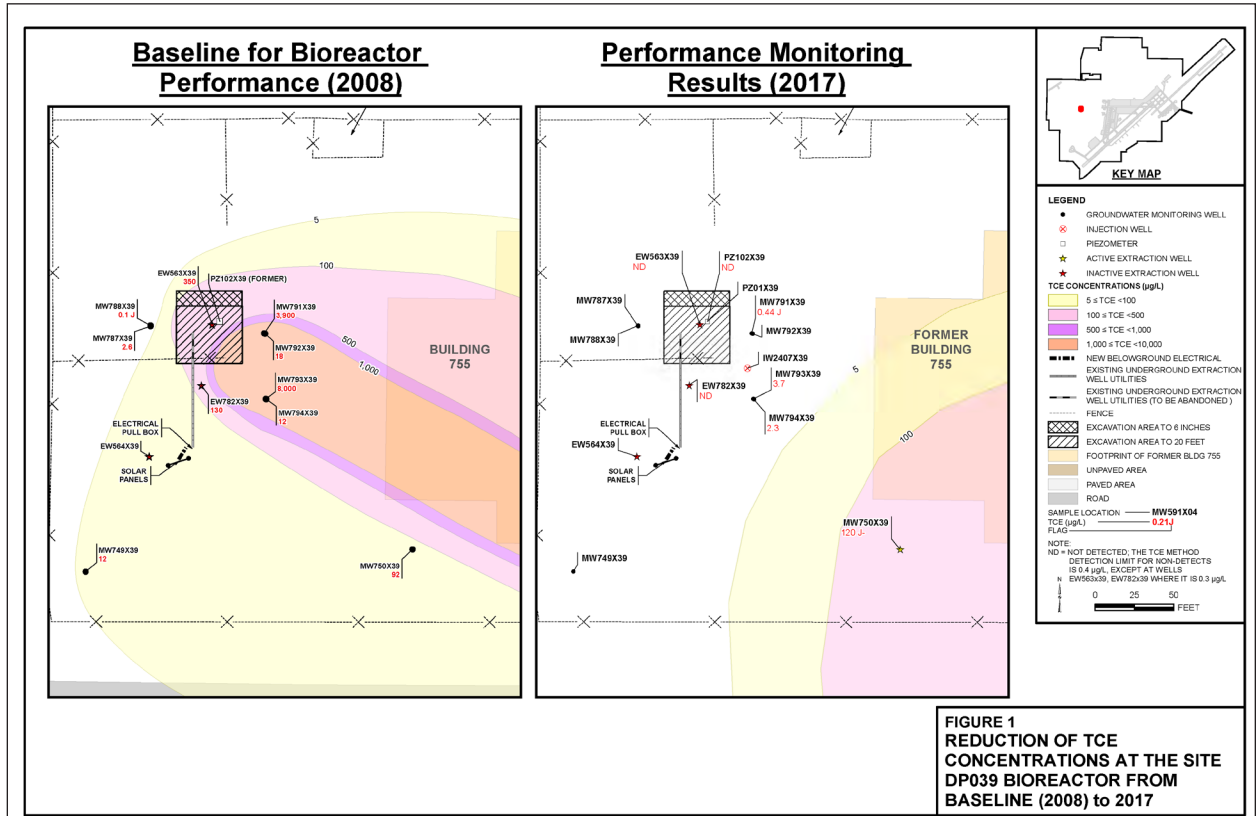
Figure 1 shows the approximate shape of the plume as it existed in 2008, based on solvent concentration data that was collected while the bioreactor was under construction. This was the starting point, or baseline, that the bioreactor faced. The TCE concentrations displayed in the diagram on the left were well over 1,000 parts per billion. The cleanup level for TCE is 5 parts per billion.

Fast forward 9 years, and the results show quite an improvement. The right diagram indicates that the TCE concentrations in the wells surrounding the bioreactor are below the cleanup

level, and the detectable plume is at least 60 feet away from the original sump's location. The source of the solvent contamination is almost completely clean, and only the dissolved portion of the plume remains. Currently, the bioreactor is treating contaminated water that is pumped from a

reduction by the trees contributes to the overall groundwater cleanup effort at this site.

"We are pleased with the progress that our bioreactor and phytoremediation trees have made in cleaning up this challenging solvent site," said Mr. Lonnie Duke, Travis AFB Environ-



downgradient well (MW750x39).

Further downgradient from the bioreactor is the tree grove that marks the phytoremediation part of the groundwater treatment train. Although the trees are actively removing solvents from groundwater, their contribution to the overall cleanup is not as obvious as that of the bioreactor. One reason for this is the constant flow of contaminated groundwater into the phytoremediation area which makes the changes in solvent concentrations less noticeable. Also, phytoremediation is a slow process. The contaminated water moves past the trees relatively quickly, so there is not enough time for the trees to significantly reduce contaminant concentrations. However, phytoremediation is very cost effective, since it is powered by the sun, and the demonstrated solvent mass

mental Restoration Program Manager. "It is doubtful that we would have reached the amount of cleanup in the sump area with a high-maintenance, energy-intensive engineered treatment technology."

In the spirit of this success, field technicians continue to look for ways to get more out of these technologies. In 2015, we built a solar-powered recirculation system around the trees to allow contaminated water to pass through the root zone multiple times. The goals of this optimization are to improve the cleanup efficiency of the trees while providing additional water to trees so that they are better able to deal with future drought conditions.

We will continue to report on the progress of our groundwater cleanup efforts and the technologies that get the job done right the first time.

## Community Relations Corner

Documents Soon to be Available in 2018 for Public Review

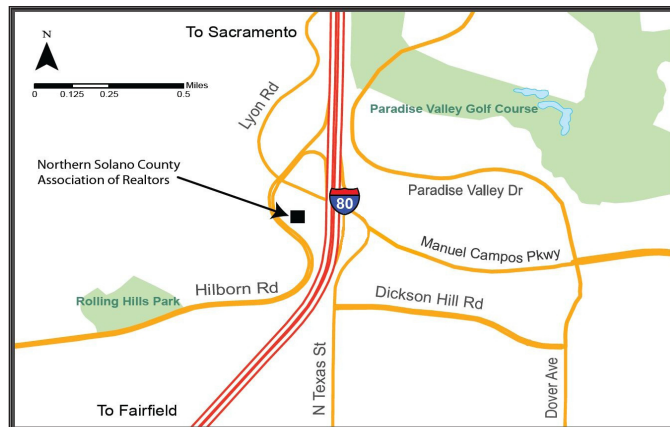
1. Fourth Five-Year Review Report
2. Amendment to the West/Annexes/ Basewide Operable Unit Record of Decision
3. Amendment to the North/East/ West Industrial Operable Unit Record of Decision
4. No Further Action Record of Decision for the TS060 Munitions Response Area (Old Skeet Range)

Please check our environmental program website for these and future opportunities to support the Travis AFB Environmental Restoration Program.

## Travis AFB Restoration Advisory Board Meeting

April 18, 2019  
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.

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*If you have any questions or would like more information about the RAB tour, please contact Lonnie Duke, (707) 424-7520.*

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