

EnviroNews

Updating environmental issues and activities at Hill Air Force Base, Utah Fall 1999

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EM On-line:

New environmental web site boasts fresh face, new content and improved accessibility

Hill AFB's Environmental Management Directorate will soon be showing a new face to the world in the form of a redesigned site on the World Wide Web.

The web site has been in the works for several months and will feature a redesigned easy-access home page, as well as a plethora of new content not available on previous versions of the web site.

This will be the first "environmental only" web site at Hill. Previously, environmental information was included on a combined "Environment, Safety and Occupational Health" web site. According to webmaster Mark Holt, the site should be fully operational by the end of December.

The key to the new web site is the newly designed home page. Holt said the new page is designed to allow users quick, single-click access to the most commonly used portions of the web site.

"The old web site required users to click through several pages to get to what they were looking for," Holt said. "The new design will allow people to find what they're looking for and access it directly from the home page."

This is done using a system of cascading menus. Simply moving the mouse pointer over a particular menu item opens access to additional menu items. Holt said most of what people will be looking for can be found in the cascading menus.

Once past the home page, the site will look familiar to previous users. In fact, many of the pages on the old site will carry over to the new site with little or no change. However, browsers shouldn't let familiarity lull them into thinking this is the same old web site. The new site is filled with plenty of new content that will provide users a greater breadth and depth of information about Hill's environmental programs.

The web site's content centers around the Air Force's "Four Pillars of Environmental Excellence."

These include conservation, cleanup, compliance and pollution prevention. Each of these sections will have direct links on the home page, with specific information categorized within the cascading menus. In addition to these sections, Holt said there will be a "What's New" link to take browsers to the latest environmental information and a listing of links to other interesting and useful web sites.

Aside from the new home page, the highlight of the site is the new information now available to users. For example, the *Cleanup* section will feature new information about the base's Restoration Advisory Board. Now anyone with a computer and access to



New-look web site

Web surfers will soon have a new face greeting them along the Information Superhighway. The new Hill AFB Environmental Home page will introduce visitors to a virtual library of information about cleanup, pollution prevention, compliance and resource conservation.

the internet will be able to learn the date, location and time of the next RAB meeting; view the agenda for the upcoming meeting; download and view minutes from past meetings; and see a list of RAB members, complete with biographical information.

Also included will be new information about Hill's cultural and natural resource conservation program, pollution prevention initiatives and compliance updates, including recent compliance inspection reports.

In all, Holt said the web site will debut with about 500 individual pages. But he expects that figure to exceed 1,000 pages within six months. 🌐

Web site address

To find EM's new web site, point your browser to the following address:

<http://em.hill.af.mil>.

Navigator or Explorer?

The new web site can be viewed with version 3.0 or higher of either Netscape Navigator/Communicator or Microsoft's Internet Explorer.

Resolution Solution

The site is designed to be viewed at 800 x 600 resolution (SVGA) at 256 colors or more.

Limited Access

Certain portions of the web site, such as contact lists and militarily sensitive information, will only be available to Department of Defense users.

E-news Online

Looking for back issues of EnviroNews? They are available on line. Just go to <http://em.hill.af.mil/em/restoration/enews/index.html> and you can download the issue you want in Adobe Acrobat format.

Problems Connecting?

If you have difficulties with the site, contact Mark Holt at (801) 777-3684.

Operable Unit 2

This is the former site of Chemical Disposal Pit 3, which operated from 1967 to 1975. It received liquid wastes from industrial shops all over the base.

No records

Prior to the enactment of environmental laws in the 1970s, few records were kept regarding the use and disposal of hazardous chemicals. Therefore, we may never know the true quantity of chemicals dumped in the ground at Hill and hundreds of other industrial sites around the country.

DNAPL brings researchers

With Operable Unit 2 having one of the largest known deposits of DNAPL, it's no wonder that researchers from around the world come to Hill to test the effectiveness of experimental treatment methods. Using surfactants was one of many methods tested at the site over the past few years.

Other OU-2 cleanup actions

In addition to the Source Recovery System, other cleanup actions to be used at the site include an underground containment wall around the area of highest contamination, a surface cap to keep water out of the site, and soil vapor extraction to clean up the contaminated soil.

New technology used to free trapped solvents at OU-2

Solvents locked up in the soils beneath Operable Unit 2 may soon be freed as the Air Force initiates a new cleanup effort specially designed to remove residual soil contamination at the site.

The Air Force will use a technology called Surfactant Enhanced Aquifer Remediation to remove solvents trapped in the soil. This technology was successfully tested at Hill AFB and will be deployed here full-scale for the first time ever.

Dr. Jon Ginn, an Air Force environmental engineer who directed the research team at Hill, is hopeful this technology will be able to remove residual solvents trapped between soil particles in the shallow aquifer. Tests performed on test cells at OU-2 proved to remove more than 98 percent of the residual solvents—a figure experts considered unachievable just a few years ago.

The technique uses chemicals called surfactants to break the forces that trap solvent globules in the soil. Once free of the soil, the solvents can be removed using existing pump-and-treat systems already in place at the site.

The contamination at OU-2 has not impacted drinking water supplies.

The problem

For several years during the 1960s and 1970s, Chemical Disposal Pit 3 operated on the northeast side of the base. Workers routinely dumped waste solvents used at the base's maintenance facilities on the ground or in trenches. The Air Force currently estimates about 50,000 gallons were dumped there, perhaps more. Much of the solvent evaporated into the air, but thousands of gallons seeped into the soil, eventually reaching the water table.

But the solvents, primarily trichloroethene (TCE), do not dissolve very well in water. So while some of the solvent was dissolved and carried away into South Weber, much of the liquid solvent sank to the bottom of the shallow aquifer and formed numerous pools on a clay layer about 40 feet underground. The dumping stopped in 1975; however, the pools of slowly dissolving solvent remained, continuing to contaminate groundwater as it moved past.

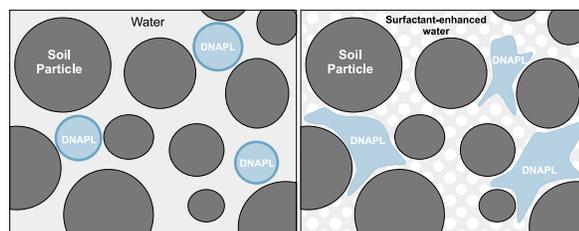
In the late 1980s, Air Force environmental investi-

gations discovered the pools of solvent, called Dense Non-Aqueous Phase Liquid or DNAPL (pronounced *DEE-napple*). In 1993, the Air Force constructed the Source Recovery System at OU-2. This interim system, which is still in operation, collects and treats both DNAPL and contaminated groundwater. To date, it has collected more than 40,000 gallons of solvent from the site. Engineers estimate that there are about 5,000 gallons of solvent still underground. The new technology will allow the Air Force to recover most, if not all, of that remaining solvent.

Why surfactants work

Residual DNAPL is difficult to remove due to the physical forces of capillary pressure and interfacial tension. Capillary pressure is the same force that draws water into a sponge. In the case of the DNAPL at OU-2, capillary pressure grabs and holds the solvent particles into the tiny spaces between soil particles. Capillary pressure, directly influenced by interfacial tension, traps the solvent globules in the soil.

According to Ginn, the key to removing the residual solvent is to reduce the capillary pressures.



Capillary pressures in the soil make the DNAPL form rigid globules that become wedged between soil particles and held like glue by interfacial tension. Adding surfactants to the water reduces the interfacial tension, which reduces the capillary pressure. This allows the DNAPL to soften and slip through the pore spaces in the soil.

That's where surfactants come in. Surfactants reduce the interfacial tension between the soil and the solvent, which in turn reduces the capillary pressures and frees the trapped solvent globules. The solvent can then be removed from the groundwater using the Source Recovery System.

The system will operate for about 30 days, at which time it will be evaluated for effectiveness and, if necessary, run again. 🌍

CleanUpdate

Cleanup news from the communities surrounding Hill AFB.

East Area South Weber

OU-1
OU-2

At OU-1, the designs for the dewatering trench and cap repair are complete. A contract to construct these trenches is scheduled to be awarded in December 1999. Construction

should begin in February 2000. Meanwhile, the existing dewatering system will continue to operate and routine sampling of monitoring wells on and off base will continue.

At OU-2, a full-scale partitioning tracer test has begun in the area north of the containment wall at the former chemical disposal pit.

The Air Force estimates approximately 1,000 gallons of solvent exist in the soils on the base beneath Perimeter Road. This test will quantify the remaining solvent in the soil.

Inside the containment wall, the Air Force will begin the full-scale Surfactant-Enhanced Aquifer Remediation of the residual solvents in the soil. This will be the largest such cleanup of its kind ever performed. The operation will begin in January 2000 and last approximately 30 days. (See story on Page 2)

Also at OU-2, the EPA will begin a study to test how adding propane to the soil will affect the biodegradation of TCE. Called "Co-metabolic Bioventing," this one-year study will be conducted in the soil between the surface and the water table at the site of the old chemical disposal pit.

South Area Layton

OU-8

At OU-8, field activities associated with the Remedial Investigation are coming to a close. Several additional monitoring wells will be installed this fall and winter to further define the

horizontal and vertical boundaries of the plume. A detailed report of the findings will be published in the Remedial Investigation Report. In addition, a Baseline Risk Assessment will be performed to evaluate the risks posed by the contamination to residents and the environment. These documents are scheduled for completion in February 2001 and will be available for public review.

North Area Riverdale, South Weber

OU-4
OU-6

At OU-4, the horizontal drains continue to remove contaminated groundwater from the hillside.

At OU-6, the newly installed on-base groundwater extraction system continues to operate as crews work out some of the bugs. The off-base system in Craigdale continues to operate successfully.

Routine sampling of monitoring wells, seeps and springs continues for both Operable Units.

West Area Sunset, Clinton

OU-5

The discovery of a new area of groundwater contamination east of the Tooele Army Rail Shop caused the Air Force to re-open the Remedial Investigation for OU-5. The first phase of field

work to further characterize the groundwater plume was completed late this summer. The preliminary results found a large area of previously unknown contamination. Although the plume is not believed to be growing, the current area of off-base contamination appears to be more than twice as large as what had previously been known, pushing its boundaries further west and north. Additional field work is currently being performed to better define the edges of the plume.

Although the plume contains of a number of chemicals typically found on base, TCE is still the primary contaminant.

The newly discovered contamination is still confined within the shallow aquifer and does not impact drinking water supplies for any of the affected communities. For more details on the investigation, see page 5 of this issue of EnviroNews.

On-base Area Hill AFB

OU-3
OU-7
OU-9

At OU-9, field investigations are continuing at a number of on-base sites to identify and characterize soil and groundwater contamination. Most of these sites are confined to areas

around buildings in the industrial complex. This OU is still in the initial phases of the Remedial Investigation. A final report is not scheduled to be completed until the fall of 2002.

If you have any questions, or would like more information regarding the cleanup work at Hill AFB, please contact one of the people listed here.

Hill AFB Environmental Management Directorate Remedial Project Manager:
Shane Hirschi
(801) 775-3646

Environmental Public Affairs:
Charles Freeman
(801) 775-6951

Utah Department of Environmental Quality Remedial Project Manager:
Duane Mortensen
(801) 536-4172

Community Involvement Coordinator for UDEQ:
Kathy Grundhauser
(801) 536-4486

U.S. Environmental Protection Agency, Region 8 Remedial Project Manager:
Sandra Bourgeois
(800) 227-8917, ext. 6666

Community Involvement Coordinator for EPA:
Ellie Crandall
(800) 227-8917, ext. 6621

RAB News

Hill Air Force Base
Restoration Advisory Board

RAB takes risk evaluation responsibility seriously

by Jerry Everett
RAB Community Co-chair



As members of the Hill AFB Restoration Advisory Board (RAB), we have a responsibility to many different entities. We represent the interests of our community: both

the affected and non-affected residents, our fellow tax payers and our future—kids, grandkids and great-grandkids—those who will truly see the efforts of our labor as we return the land and water to its natural state of being.

We also have a huge responsibility to the many organizations, which are involved in this cleanup project. The governmental organizations (i.e., the Air Force, Environmental Protection Agency and Utah Department of Environmental Quality) that together developed this RAB program, so that the “silent majority” would have some say as to what cleanup efforts would go forth. Let’s not forget the many contractors who have spent many hours, some a career, in developing methods or equipment to restore our earth back to its near original state, obviously at some financial gain.

As a primary part of our responsibility, we must be a part of the “Risk Assessment Process.” In order to do that, we must understand risk. Marilyn Null of the Air Force says “Risk is the chance of injury, damage or loss. *Environmental Risk* is the chance of injury, damage, or loss (disease or death) resulting from exposure to a potential environmental hazard.” In the “risk assessment process” we must ask the experts and ourselves many questions: both the “Does it” and “Does it not” questions are important to this process. We must know the hazard, exposure and toxicity, and

combine these to characterize the risk”.

We must then communicate the risk to the best of our scientific ability. *Risk Communication* is the early and ongoing process of building and maintaining relationships based on mutual trust and respect through dialogue with diverse audiences about complex issues. After we have assessed the risk, characterized

As a premium part of our responsibility, we must be a part of the “Risk Assessment Process.” In order to do that we must understand risk. We must know the hazard, exposure and toxicity, and combine these to characterize the risk.

it and communicated it, then we can go forward and manage the risk.

What we know, understand, and can manage, we should not fear, as we now to the best of our ability, can control our own destiny. Through this knowledge we now “Reduce the Risk” and move forward in the cleanup process for the “Elimination of the Risk.”

There are many constraints on us in the “Elimination of the Risk” process, including laws, regulations, technology and financial concerns. Therefore, we as members of the RAB must pay attention to the facts and work closely with all involved for the unbiased betterment of all concerned and make our decisions based upon risk. 🌐

Hill AFB RAB Members

- Allan Dalpiaz
Air Force Co-chair
- Jerry Everett
Community Co-chair
Layton Cmnty. Rep.
- Dave Hultgren
Clearfield City Rep.
- Ken Kennedy
Clinton Cmnty. Rep.
- John Keck
Clinton City Rep.
- Peter Matson
Layton City Rep.
- Lynn Moulding
Riverdale City Rep.
- Joel Workman
South Weber City Rep.
- Mark Perkins
South Weber Cmnty. Rep.
- Mickey Hennessee
Sunset City Rep.
- Mel Wood
Sunset Cmty. Rep.
- Al Herring
Sierra Club Rep.
- Scott Paxman
Weber Basin Water Conservancy District
- Louis Cooper
Davis County Health Dept.
- Brian Cowan
Weber-Morgan County Health Dept.
- Rex Averett
Central Weber Sewer District Rep.
- Cliff Specht
North Davis Sewer District Rep.
- Floyd Baham
Davis-Weber Canal Co. Rep.
- Sandra Bourgeois
EPA Region 8 Rep.
- Duane Mortensen
UDEQ Rep.

Operable Unit 5

This Operable Unit is located on the base's west side. The primary source area is the Tooele Army Rail Shop, with other smaller source areas. These sources have caused a plume of contaminated groundwater that extends into the communities of Sunset and Clinton.

Tooele Army Rail Shop

This railroad locomotive maintenance facility is still operated by the Army, and the only operation of its kind in DOD. It has operated since the 1940s. The Rail Shop is managed by the Tooele Army Depot.

Remedial Investigation

The Remedial Investigation is the primary field study done during the cleanup process. The extensive data gathered during the RI are used to help engineers decide how to best clean up the site. The data are also used to assess risks to people and the environment at the site.

City Council updates

Representatives from Hill's Restoration Program plan to update the city councils of Sunset and Clinton on the progress of the investigation and cleanup. The exact dates have not yet been finalized, but should occur in January 2000.

Operable Unit 5:

Recent sampling tells a new story

A recent collection of groundwater sampling has given Hill AFB environmental experts a new and improved picture of the area of contamination west of the base in the communities of Sunset and Clinton. This new information shows the area of contamination to be larger than originally thought. The contamination is limited to the shallow aquifer, which is not used as a drinking water source.

This latest sampling included information from approximately 60 newly installed monitoring wells located on base and in the streets of Sunset and Clinton. These wells were installed in late 1998 through September 1999. The on-base wells were used to help find the sources of the groundwater contamination. The off-base wells were intended to help fully define the area of contamination.

The wells are part of the Remedial Investigation, or RI, effort for Operable Unit 5. This investigation, which was reopened in 1998, will give engineers and geologists the information they need to evaluate and recommend the most effective ways to clean up the area.

Background

Air Force experts have long known that the primary source of off-base contamination on the west side of the base has been the Tooele Army Rail Shop. In early 1998, further investigative work was done in conjunction with another operable unit, OU-9. This investigation revealed that the rail shop was not the only source, and investigative work was needed in the area to fully understand the origin of the contamination and how it was moving underground.

At the end of the investigation, two sites emerged as potential source areas for the additional groundwater contamination west of the base:

- A flash pond associated with a missile maintenance facility.
- An explosive disposal area known as the Open Burning/Open Detonation (OB/OD) area.

These additional sources of contamination discovered on base were also deeper and co-mingled with contamination in Sunset and Clinton. At this point, the Air Force decided to reopen the RI for OU-5. Even though the previous RI had been completed in 1995, the Air Force decided it was incomplete, in light of this newly discovered information.

What we've found

The initial field effort of the reopened RI included installing monitoring wells and collecting soil and groundwater samples to define the area's geology and the extent of groundwater contamination both on and off base. This work helped hydrogeologists learn more about the direction of the groundwater flow, the depth of the groundwater and how fast it was moving. Monitoring wells installed in Sunset and Clinton helped to better define the area of contamination. After the first phase of the investigation, however, several questions remained:

- What are the outer boundaries of the plume of contamination?
- Are the contaminants still migrating?
- Are there any other unknown source areas?

In September, a second phase of fieldwork began. This effort included installing 36 monitoring wells both on base and off base. Data from this additional work shows a much clearer picture of the contaminated groundwater. The newly defined plume is larger than previously thought and is now estimated to underlie approximately 300 to 350 acres (see map on the next page). Despite this improved picture, these wells did not reveal the plume's edges to the west and north. This uncertainty makes it difficult to answer other questions.

The fieldwork required to fully answer all the questions regarding the plume is already underway. Monitoring wells and other investigative tools will be used to collect groundwater and soil samples off base, while other samples will be taken on base to locate other contaminate sources. This effort will provide more information. Hydrogeologists know that as the information is gathered and analyzed, the size and shape of the plume will most likely change again.

The Air Force hopes to complete the Remedial Investigation Report in 2001. Following the RI, the Air Force will begin a Feasibility Study to determine how best to clean up the contamination. At the conclusion of this study, currently planned for 2002, the Air Force will propose its final cleanup remedy for the site. In the meantime, the Air Force plans to implement accelerated cleanup actions. Levels of the contaminants are dropping in the areas where earlier

Official Business

OU-5

Continued from page 5

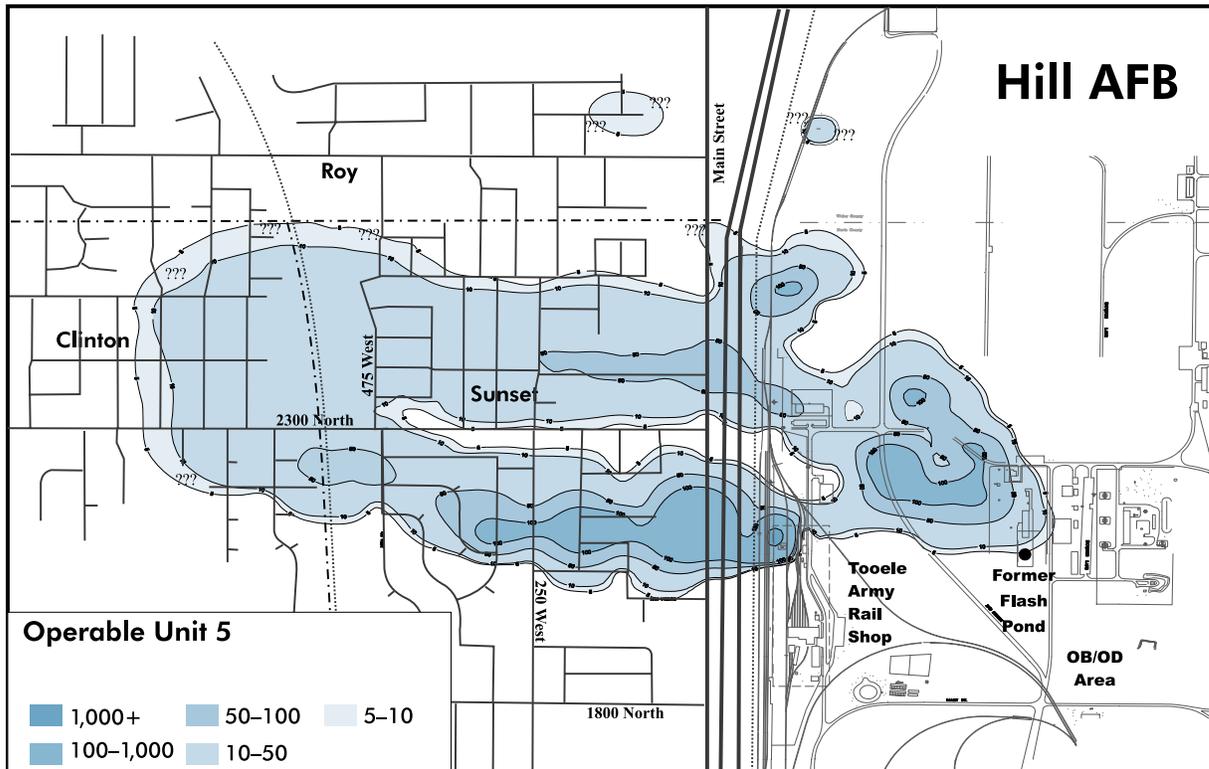
cleanup measures were taken in Sunset. These measures included an aeration curtain located on Main Street, and a pumping system located on 2125 North in Sunset. Both systems are designed to remove contaminants from the groundwater.

Even though this groundwater is not used for household or drinking water purposes, the Air Force is committed to cleaning up the contamination to meet the same health standards as those for drinking water.

The Air Force updates city government leaders on

its cleanup efforts at regularly scheduled city council meetings. The Air Force hopes to present its next update at a January city council meeting.

Anyone with questions or concerns about the Air Force's environmental cleanup program, can contact Mark Loucks, the project manager for the investigative work, at 777-6299, Steve Hicken, the operable unit manager for OU-5, 775-3648, or Charles Freeman, the chief of environmental public affairs, at 775-6951. 



This plume map shows the area of contamination as September 1999. The map shows trichloroethene (TCE) in the shallow groundwater. The shaded areas indicate the range of contaminant concentrations found. Concentrations below 5 parts per billion (the drinking water standard for TCE) are not shown on the map. A reminder: the contamination is only in the shallow aquifer, not in the much deeper aquifers that supply drinking water. As the investigation progresses, this map will change.

EnviroNews is a quarterly publication of the Environmental Management Directorate, Hill AFB, Utah, designed to inform the public of hazardous waste cleanup and other environmental activities at Hill AFB.

Contents of EnviroNews are not necessarily the official view of, or endorsed by, the U.S. Government, the Department of Defense, the U.S. Air Force, or its contractors.

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