

## Hill evaluates more efficient cleanup strategies

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Hill Air Force Base is conducting optimization tests of three cleanup systems in surrounding communities to improve system efficiency in an effort to protect human health and the environment while controlling costs.

The tests began in September 2010 with the approval of the Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality (UDEQ) after environmental engineers evaluated the systems for cost and energy saving opportunities. Now engineers are carefully monitoring conditions to ensure that potential changes made to the systems will maintain the same high standard of cleanup.

"The changes we have selected are designed to eliminate the unnecessary use of resources, while maintaining the same cleanup results, just more efficiently," said Installation Restoration Program Manager Barbara 'B' Hall, PhD. "There won't be a negative impact on cleanup progress."

While tests are still in progress at Operable Unit 1 (OU-1) and at Operable Unit 6 (OU-6), one test at Operable Unit 5 (OU-5) has already proved successful and operational changes are currently being implemented.

### **Operable Unit 1 (South Weber)**

"Groundwater cleanup at OU-1 consists of two goals—contain the contamination and remove the contamination," Dr. Hall said. "Four trenches, identified as A, B, C, and D, were installed in 2001 as part of a groundwater extraction system to aid in site cleanup."

The first priority at OU-1 is to prevent any additional contamination from moving into the city of South Weber by containing it within the source area on base using Trench D. "This section of the system surrounds the former fire training and industrial waste source areas," Dr. Hall said. "It collects contaminated groundwater which is discharged to the sewer in accordance with EPA standards."

Removing contaminants from the source

### **OU-1 Optimization Test**

#### **Test**

- Turning off operation of two groundwater extraction system trenches
- Pending favorable results, a third trench will be turned off in Phase 2 of the test

#### **Status**

- In progress

#### **Duration**

- Began September 2010
- Test will continue until groundwater levels in the source area appear to have stabilized

#### **Potential Benefits**

- Reduce energy consumption
- Reduce equipment needs
- Allow LNAPL to collect, providing for more cost-effective removal

area is our second priority, Dr. Hall said. Trenches A, B, and C are designed to collect contaminants called light non aqueous phase liquid (LNAPL) and groundwater before it reaches Trench D.

“LNAPL is an oily material which does not mix with water. In fact, when it comes in contact with water, LNAPL actually floats,” Dr. Hall said. “Now, however, because of low water levels in the source area, the LNAPL is sticking to the soil.

“On one hand,” she said, “this situation prevents the contaminant’s movement, naturally accomplishing the first priority at OU1. On the other hand, it causes the LNAPL to be much more difficult to collect.”

Since July 2005, the LNAPL collection has consistently and significantly decreased. “It has reached the point that the residual LNAPL is so difficult to collect that the cost of running the entire system does not match the benefit of removal,” Dr. Hall said.

The optimization test at OU-1 involves first turning off Trenches A and C, which produce the least groundwater extraction and LNAPL collection, yet require the greatest energy usage. Monitoring will prove whether or not the optimization is effective.

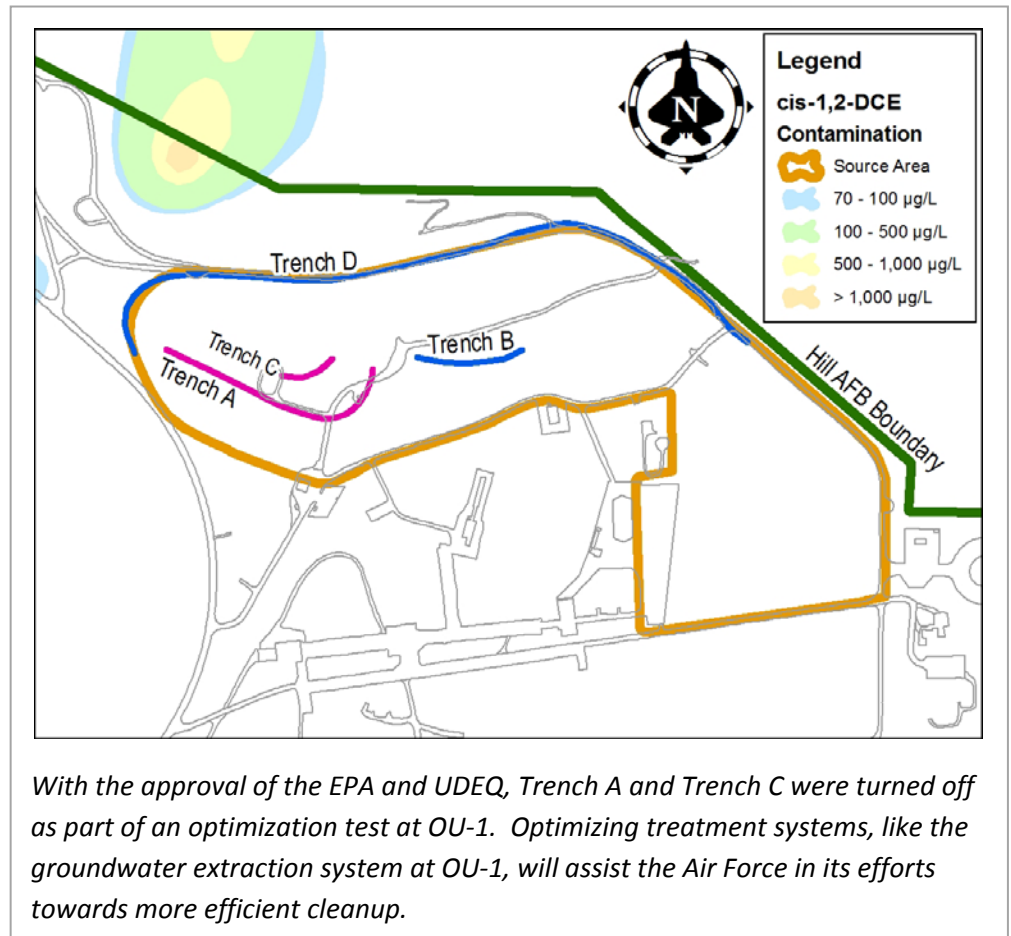
“As the test continues, we’re watching Trench D to ensure that water levels do not rise above what it can handle. At the same time, we’re also watching water levels at Trenches A and C and hoping to see them rise, so that the LNAPL will be able to pool on the groundwater for easier removal,” Dr. Hall said.

The monitoring which occurs during optimization tests is more frequent than typical monitoring, Dr. Hall explained. “This is because we want to be absolutely certain that the protection of human health and the environment is not put at risk. If at any time we have reason to be concerned, we can immediately resume operation of Trenches A and C,” she said.

According to Dr. Hall, initial results of the test show that groundwater elevations near Trenches A and C have risen as predicted and at Trench D the groundwater elevations and pumping rates are remaining steady as expected. If results continue to be favorable through the high water period expected from this spring’s heavy runoff, Trench B may be turned off as Phase 2 of this test.

### **Operable Unit 5 (Sunset)**

“The aeration curtain installed in 1997 between Interstate 15 and Main Street in Sunset is designed to treat contaminants in the groundwater as it passes through the curtain,” OU-5 Project Manager Mark



Roginske said. Pipes installed at the bottom of a 30-foot trench blow air bubbles toward the ground surface. The bubbles carry trichloroethene (TCE) to the surface where it is dispersed into the air at undetectable levels.

“The system is divided into three sections, which in the past have operated simultaneously,” Roginske said. Engineers concluded that running the sections separately in a daily rotation pattern with a smaller piece of equipment would reduce energy consumption and extend the life of the system. They also predicted that operating one section of the curtain each day would be sufficient to maintain TCE treatment. In August 2010, Hill AFB initiated an optimization test whereby air was blown into the sections on a daily rotation pattern.

“We carefully monitored the groundwater for TCE detections east of the aeration curtain to know the condition of the groundwater before it was treated, and west of the curtain to see if TCE contamination was being treated as expected,” Roginske said.

Results showed that the system functioned as expected and provided the same TCE treatment as the simultaneous operation.

“Giving sections of the system a break actually provided better underground conditions for the treatment to occur,” he said. After six months, data proved the test was successful, and now the rotation pattern is being implemented long-term.

### **Operable Unit 6 (Riverdale)**

“Six groundwater extraction wells installed in Riverdale in 1999 remove contaminated groundwater and, in accordance with EPA standards, discharge it to the storm sewer,” OU-6 Project Manager Mark Roginske said. Three wells were installed along 1150 West, and three were installed along 1200 West.

The goal at OU-6 is to reduce TCE concentrations in the groundwater below the maximum contaminant level (MCL) established by the EPA and the UDEQ. The MCL is the highest level of a contaminant allowed in a public drinking water system. Although the groundwater is not used for drinking, Hill uses the MCL as the cleanup standard.

## **OU-5 Optimization Test**

### **Test**

- Operate three sections of aeration curtain in daily rotation pattern rather than simultaneously

### **Status**

- Complete

### **Duration**

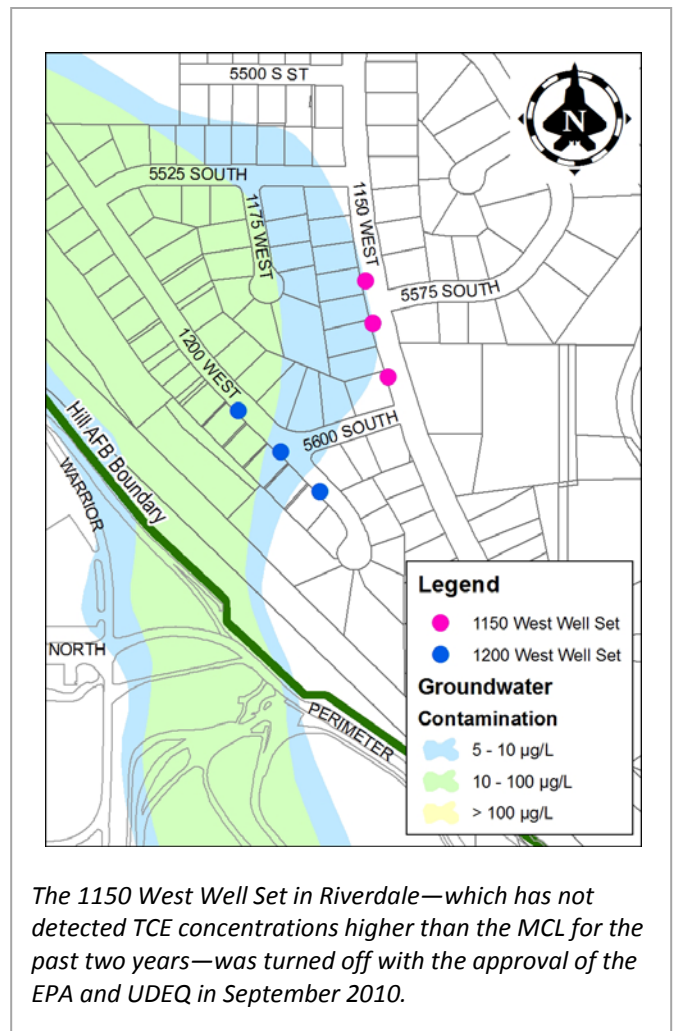
- August 2010-January 2011

### **Potential Benefits**

- Reduce energy consumption
- Reduce equipment replacement
- Extend life of the system
- Provide better underground conditions for cleanup

### **Results**

- Successful



## OU-6 Optimization Test

### **Test**

- Operate 1 set of wells rather than 2 to maintain and reduce contaminant concentrations

### **Status**

- In progress

### **Duration**

- Sept. 2010-Sept. 2012

### **Potential Benefits**

- Reduce energy consumption
- Reduce operation costs

For the past two years, TCE concentrations downgradient of the 1150 West well set have been below the MCL, Roginske said. "This indicates that the extraction wells along 1200 West are successfully capturing contaminants," he said.

In September 2010 Hill AFB initiated the optimization test by turning off the 1150 West well set.

"Through this test we should be able to determine if the wells on 1200 West will continue to maintain downgradient contaminant concentrations below the MCL," Roginske said. "For two years, we'll be monitoring TCE concentrations in the area every six months." If TCE reaches, or goes above, the limit three consecutive times during that period, Hill will resume operation of the second set of wells to bring TCE concentrations back below the limit.

Initial results continue to show TCE concentrations below the MCL, Roginske said. If the test is successful, the wells will remain off.

The current optimization tests demonstrate Hill's commitment to wisely managing resources while achieving cleanup goals. According to Dr. Hall, "Proving that we can maintain high cleanup standards at a lower cost protects not only human health and the environment, but it also protects taxpayer pocketbooks."

## EnviroNews

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