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New technology helps clean up contaminated water near Tinker

Brion Ockenfels - Office of Public Affairs

For the first time ever in Oklahoma, Environmentalists are using a deep iron barrier to clean up contamination - and it's happening right here at Tinker.



Chad Givens, GeoSierra site manager inspects specialized bore hole casings with Scott Bowen, Environmental Management Directorate hydrogeologist and project manager. (Photo by Brion Ockenfels)

Called a Permeable Reactive Barrier, the new technology eliminates contaminants from groundwater deep below the surface. The Environmental

Directorate is using the technology to help clean up a contaminated groundwater plume which began migrating into the Tinker View Acres neighborhood.

The solvents migrated from a sludge pit on top of a landfill used during the 1950s and 1960s. The solvents, primarily trichloroethene, are common contaminants in underground water sources around the world.

The PRB consists of iron filings which are injected into the ground using specially designed well casing installed 100 feet below the ground surface. The iron filings react with the solvents by stripping out the contamination, decreasing or eliminating contaminant concentrations.

"The name 'barrier' is kind of a misnomer," said Tinker hydrogeologist and project manager Scott Bowen. "The reactive barrier or wall is not designed to stop the flow of ground water, but instead allows it to flow through and cleans it as contaminants are oxidized or neutralized by the injected iron filings."

"In fact we purposely design the barrier to be more porous than the surrounding soil which allows the ground water to pass through easily, said Grant Hocking, president of GeoSierra.

The work plan, developed in part by Tinker environmental engineers, received praise from the regulatory agencies.



"Tinker has a very proactive restoration program," said Oklahoma Department of Environmental Quality regulator Robert Replogle.

According to Mr. Replogle, Tinker will have the first deep permeable reactive barrier in the state using the patented injection method. "We've visited the site a couple of times during different phases of construction and are interested in seeing how the new technology can be applied at similar sites in the state."

The barrier technology has produced clean-up rates of greater than 99 percent in other clean up programs similar to Tinker's said Dr. Hocking.

When completed, the barrier will be approximately 500 feet long. Environmental restoration experts create the barrier by first mixing iron filings with a food-grade starch which creates a gel similar in consistency to a very thick yogurt.

According to Dr. Hocking, mixing the gel to right consistency is needed to transport and evenly disperse the iron in the ground.

Within a few hours, the food-grade gel breaks down to harmless sugars and water, leaving in place the iron filings which form a wall about 4 inches thick. As the groundwater passes through the iron, the chlorine molecules are stripped from the solvent, transforming the contaminated plume to clean water as it exits the barrier.

According to Mr. Bowen advantages of the technology include safe and nearly dust free installation, no maintenance after installation, no energy source is required for operation, and once installed, the land above the barrier will be replanted with grass.

Mr. Bowen said next spring the area will look undisturbed and begin to make its transition back to nature.

He said the groundwater on both sides of the barrier will be sampled regularly to determine the progress of remediation. The results will be briefed at regular Community Advisory Board meetings as the data become available.

Reports will also be issued by the ODEQ documenting the effectiveness of the technology and data shared with other ground water remediation industry partners throughout the state and the Air Force, he said.

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