DDC Technology Projected to Save Money, Time at Colorado Cleanup Site

Density Driven Convection (DDC) technology is being used to clean up a computer component manufacturing site near Denver, Contaminated with tetrachloroethene (TCE).

"We had to consider a variety of factors both physical and financial, when selecting the best system to decontaminate this specific site," said Brad Stephenson, Principal Consultant for Cordilleran Environmental Consultants, of Golden Colo. Firm was hired by the manufacturing company to determine the best way to clean up the TCE which had polluted ground water at the site.

With data from 60 monitoring wells, the remediation firm delineated a TCE plume covering an area approximately 720,000 square feet, about 30 feet underground in tightly packed soil. The highest concentration of volatile organic compounds (VOCs), 70% of the total mass, was determined to be in an 1,800-square-foot area.

Pump and treat technologies were eliminated as an option because they are the most time consuming and costly of remediation methods available to meet clean-up standards. Several different types of forced air sparging systems were analyzed, but none were found to be cost effective or efficient.

"From my past experience with many different systems, I know that both 'pump and treat' and traditional high-pressure air sparging methods would not work well or be cost effective for this site, especially since we have a chlorinated contaminant and a low yield aquifer," stated Stephenson. He said their evaluation indicated DDC would be the best technology for the site.

The DDC system was designed and installed by Wasatch Environmental, Inc., a ground water and soil remediation specialist in Salt Lake City, Utah.

Also known as GRC, or groundwater recirculation, the DDC technique creates a convection cell beneath the water table. Air is injected inside the DDC well, pulling contaminated water into the bottom of the well, where it is air-stripped in situ. The contaminant gas then travels up the well casing into the open air if the level of VOCs is below required government standards, or to a vapor treatment system if required.

In this case, the wells are connected by underground piping to one common extraction pipe that vents VOCs to the open air.

Cordilleran decided to test the DDC system on a pilot well for nearly a full year to determine if it was suitable for this site. In October of 1999, after a ten month test, Cordilleran was convinced DDC technology was the best process to remove the VOCs from the tainted groundwater plume, and immediately began installing 37 additional DDC Wells.

DDC systems are easy to install and operate, according to Wasatch, and require very little regular maintenance due to few moving parts and off-the-shelf equipment. Site personnel can be

trained to maintain the system in less than one day.

"No matter what the substrate is, whether it's composed of fine or coarse grained materials, DDC works efficiently," Stephenson insists. "This site is mostly silt and fine sand, which is very difficult to process, but we've already pulled a large quantity of VOCs out of the aquifer." He noted that, "in the initial test area, calculated that we had about one million ppb of VOCs when we started; we've taken it down to about 100 ppb in only six months."

Cordilleran's calculations estimate about 110 gallons of TCE leached into the ground water, probably two full 55-gallon drums. They expect to pull about 400 lbs. of VOCs per year out of the site. Thus, the entire groundwater remediation project is estimated to take three to five years to complete.

"When the project if finally completed in a few years, we'll have saved our clients hundreds of thousands of dollars with the DDC system compared to the other systems," Stephenson noted. "We're going to finish cleaning up this site much more quickly with this DDC system, and the site will be cleaned up more thoroughly."

Contact: Wasatch Environmental (801) 972-8400; Fax (801) 972-8459; email wei@wasatch-environmental.com; web www.wasatch-environmental.com