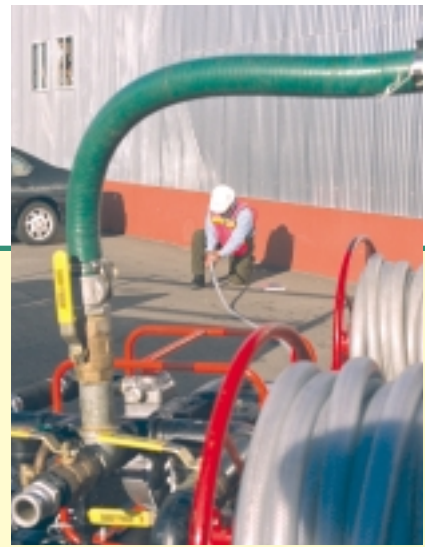


About 150 gallons of molasses solution was injected into the soil in each of approximately 100 injection points. Three separate injection events occurred over a two-year period, causing only minor disruption to area residents and businesses. ►



Natural Bacteria Treat Pollution at Industrial Sites

An environmental consulting firm used bacteria found naturally in soil to treat toxic substances located in contaminated industrial sites.

In the San Francisco Bay area, a former hard-chrome plating facility was struggling with the need to clean up contamination by hexavalent chromium and trichloroethylene (TCE) in shallow groundwater below its site. Hexavalent chromium is a potential carcinogen; TCE is a colorless liquid that, when ingested or inhaled at high levels, can cause various nervous system problems and damage to the liver and lungs.

Initial estimates using the conventional approaches of digging up the contaminated soil and hauling it away to a special waste management facility, or pumping and treating groundwater on-site, would cost in the range of \$2 million and would not adequately clean the groundwater. Furthermore, the area is densely populated with apartment

buildings and commercial sites, and the disruption to residents would have been significant. ARCADIS G&M, Inc., consulting engineers for the project, used a new approach that would accomplish the cleanup without disruption to the neighborhood and at a fraction of the estimated cost.

The company's patented approach uses a molasses-based mixture that includes special nutrients. Bacteria found naturally in the soil and groundwater feast on the solution and multiply rapidly. In the process of breathing, the bacteria use up the dissolved oxygen, nitrates and sulfates in the groundwater. The resulting soil and groundwater environment causes a chemical reaction that converts the hexavalent chromium in the groundwater into a benign solid chromium hydroxide that becomes part of the soil. In a related chemical reaction, the bacteria degrade common chlorinated solvents such as TCE and PCE.

More than one hundred injection points were installed at accessible areas throughout the site and within the facility. About 150 gallons of remediation mixture was injected into each of the injection points during each of the three injection events. Average concentrations of both hexavalent chromium and TCE in the injection wells have been reduced 99.9 percent, and two on-site groundwater monitoring wells are not detecting hexavalent chromium.

For more information on this subject, circle 862 on the reader service card.