Remediating Groundwater While Providing Public Education

The Gilbert and Mosley groundwater treatment system includes over 5 miles of HDPE piping and a hydraulic-venturi air stripper.

The Gilbert and Mosley project site in Wichita, Kansas, encompasses more than 3,800 acres within the city limits, and contains a portion of the city's downtown business district. The groundwater beneath the site is contaminated with varying concentrations of tetrachloroethene, trichloroethene (TCE), dichloroethene (DCE), vinyl chloride, and additional contaminants. The city of Wichita hired CDM to develop and implement a full-service solution to the groundwater contamination that exists within the project area, including extensive environmental investigations and reporting efforts, engineering design and construction activities, and initial treatment system startup tasks.

Studying the Problem

"We began the project by conducting a remedial investigation/feasibility study (RI/FS) at the site that included extensive soil, surface water, and groundwater sampling efforts and data evaluation activities," explains Roger Olsen, CDM senior vice president. During the feasibility study, CDM performed detailed analyses of several different remediation approaches, including a variety of pump-and-treat alternatives, monitored natural attenuation, reactive permeable barriers, and *in situ* bioremediation.

As part of the investigation and remedial design efforts, CDM proposed an innovative remediation approach, which won the 1997 American Academy of Environmental Engineer's (AAEE) Grand Prize in the planning category. It included alternate cleanup levels instead of maximum contaminant levels (MCLs), and hydraulic containment of the contaminated groundwater instead of aquifer restoration. CDM also performed an *in situ* bioremediation pilot-scale demonstration, which won the 1998 AAEE Grand Prize in the research category and showed that TCE, DCE, and vinyl chloride could be aerobically degraded. Due to technical limitations regarding oxygen transfer and microorganism mobility and the estimated higher costs associated with the bioremediation option, a pump-and-treat air stripper treatment system was selected by the city of Wichita and approved by the Kansas Department of Health and Environment (KDHE). The use of alternate cleanup levels instead of MCLs reduced the volume of groundwater to be treated by more than 40 percent, resulting in substantial cost savings for the city. The groundwater treatment system includes 13 extraction wells, 5.5 miles of high-density polyethylene (HDPE) piping (installed using horizontal drilling methods), and a hydraulic-venturi air stripper that will treat a design-flow rate of approximately 1.2 million gallons of water per day.

"We've had a successful, ongoing relationship with CDM for more than 11 years," comments Jack Brown, director of Wichita's Department of Environmental Health. "CDM has provided us with a comprehensive range of quality services, from extensive groundwater, surface water, and soil investigations, to monitoring and reporting efforts, to engineering design and construction activities."

Implementing the Solution

CDM, with assistance from the Wichita architectural firm of Gossen Livingston Associates, Inc., is implementing the project using a design-build approach, allowing the project team to streamline the design and construction periods, incorporate value engineering improvements, and respond to changes in the conceptual design of the project in a timely and cost-effective manner.

The treatment building and other project components are being constructed in a city park, and the project has been divided into three phases to fast track the construction activities while the design efforts are finalized. The Phase I treatment building is a circular, colored-concrete structure with glass block walls and a hydraulic-venturi air stripper groundwater treatment system, mechanical area, and area for public tours. An aqueduct structure extends over the top of the building and points towards the Arkansas River, the final discharge point for the treated water.

CDM is constructing the Phase II environmental public education building using curved, colored-concrete walls and other architectural features to complement the architectural design of the treatment building, and will include an exhibit area, classroom, public restrooms, offices, and mechanical area. A plaza area will connect the treatment building and the education building, and an extensive network of fountains will be installed in the plaza using the treated water as a source. Phase III will include the construction of various site improvements, including a fish observatory and meandering creek that will use the treated water to foster the growth of aquatic plants and wildlife.

Building Community Awareness

Wichita and CDM are maintaining a project Web site (http://www.wichitaenvironment.org/gilbert-mosley.asp) that includes updates on the project's progress, weekly construction pictures, and links to environmental education Web sites. "Our longstanding working relationship with the city of Wichita has culminated in an innovative project that will not only remediate the groundwater, but will also educate the community," notes Olsen. Because of its unique approach in tackling the contamination problem, Wichita was awarded a Harvard University Kennedy School of Government/Ford Foundation Award for Innovations in Local Government.

"This project has earned Wichita national recognition for its development to avoid Superfund intervention and the impacts upon the local economy, public health, and environmental risks," stated Wichita Mayor Bob Knight in November 2001 during the groundbreaking ceremony for the treatment building construction activities. CDM continues to work with Wichita to achieve these goals through groundwater remediation activities and other project efforts.

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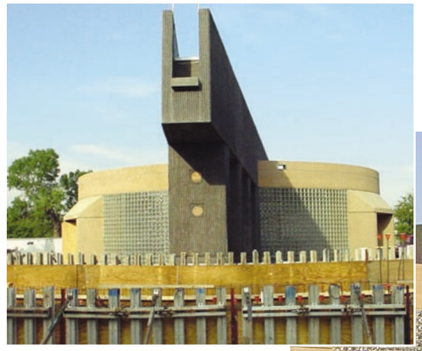

The Phase I treatment building, which contains the groundwater treatment system, was designed as a circular structure made of colored concrete with glass block walls.