



Pumping System Diverts 5.9 Billion Gallons of Water for Kalamazoo River Remediation

The project was finished ahead of schedule and \$4 million under budget.

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For decades, paper mills along a section of the Kalamazoo River had dumped polychlorinated biphenyls (PCBs) into the waterway. The river flow then took the contamination far downstream from the original source, making a large swath of southwest Michigan subject to contamination.

PCBs are linked to an increased cancer risk, compromised immune systems in people and animals, and impaired memory/cognition. PCB exposure can occur when people come into direct contact with contaminated soil or water or eat fish from an affected waterway. While the use of PCBs stopped in the late 1970s, the contamination has remained in the river bed and surrounding area.

The federal Environmental Protection Agency (EPA), in conjunction with the Michigan Department of Environmental Quality, declared an 80-mile stretch of the Kalamazoo River as part of a superfund site in 1990. Superfund sites are polluted locations requiring a long-term response to clean up hazardous material contaminations.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) is a federal law designed to clean up sites contaminated with hazardous substances as well as broadly defined “pollutants or contaminants,” and it gives the EPA the authority to clean up locations such as the Kalamazoo River.

As part of that Kalamazoo River superfund site cleanup, a two-and-a-half mile stretch of Portage Creek, in the Edison neighborhood of Kalamazoo, required remediation for PCBs. During this process, more than 19,000 cubic yards of PCB-contaminated soil and sediment were removed. To facilitate the cleanup, Portage Creek was dammed and diverted in sections. The sections furthest upstream were treated first so the contamination could move downstream, allowing areas cleaned above the existing contamination to remain clean.

The Approach

To provide access to the creek bed and surrounding area, the creek was diverted in seven



Image 1. An aerial view of the Portage Creek project shows pumps with sound-attenuated enclosures. (Courtesy of Cornell Pump Company)

segments over two years. Work was completed from late March through mid-October, when risk of freezing was reduced. The project also dealt with various flow rates, depending on rainwater runoff. During the working season, the pump distributor abated sound in the neighborhood while still operating the pumps 24 hours a day to divert flow and avoid backfill flooding. Sufficient pump capacity to deal with a strong rain event and uneven flows was necessary.

The project used three 16-inch discharge pumps with 18-inch suction, 16-inch discharge, the ability to handle a 4.5-inch solid, flow rates up to 17,800 gallons per minute (gpm), heads up to 240 feet, and efficiency up to 85 percent. These pumps were combined with one 12-inch discharge pump with a 14-inch suction, 12-inch discharge, the ability to handle a 3-inch solid, flow rates up to 9,000 gpm, heads up to 200 feet, and efficiency up to 84 percent.

The distributor also used several on-call 4- and 6-inch discharge pumps to dewater Portage Creek. The system bypassed the flow from upstream around the work site and back into the creek below the ongoing mitigation. The pumps were able to handle significant solid sizes because of the unpredictable nature of items that could be found in the creek and the amount of potential plugging solids in the creek bed. The pumps were driven off diesel engines and housed in sound-attenuated packages.

The Process

The remediation portion of the project began in July 2012. Working through the summer, contractors used the pumps to tackle three sections of remediation. Pumps were sized to

handle flow rates up to 9,600 gpm. The four larger pumps dealt with the main flow, while the smaller pumps were used as backups and occasionally addressed areas of high groundwater seepage.

Spring and summer 2013 were extraordinarily wet in southwest Michigan. While the project had originally been sized for 9,600 gpm, rain flow was pushing flows to more than 11,300 gpm. Given the robust nature of 16- and 12-inch pumps on-site, the distributor was able to handle the increased flow without resorting to additional equipment.

The Outcome

The remediation project was completed in September 2013 ahead of schedule and more than \$4 million under budget. The use of pumps with great uptime reliability, durability, efficiency and variable flow rate contributed to those time and cost savings. The distributor’s know-how in managing noise levels—with the need for continuous operation and on-call backup for large water events—also contributed to the project’s success.

Overall, more than 19,000 cubic yards of soil and sediment were removed through the project. It is estimated that more than 5.9 billion gallons of water were bypassed during the effort—enough to fill nearly 9,000 Olympic-size swimming pools.

The mitigation also opened up an area in Kalamazoo that had previously been unused by residents because of fear of contamination. The Kalamazoo Nature Center’s (KNC) Urban Nature Park borders the mitigation site. Dr. Bill Rose, president and CEO of KNC, headed up efforts to replant the Urban Nature Park

with native plants, shrubs and trees. Plantings were selected to be suitable for local soils and to provide optimal habitat for native bird and butterfly species. A trail was cut, connecting the Urban Nature Park to the Kalamazoo River Valley Trail, affording walkers, runners and cyclists access to miles of recreational activities.

“The bypass project is a real win for Kalamazoo and our community as a whole,” Dr. Rose said. “What once had been a blighted, highly contaminated industrial site is now an urban oasis where residents and visitors can have an easy encounter with nature. The Urban Nature Park is now a vibrant and revitalized part of our city. We hope it will serve as model for future projects in urban areas across the nation.”

The senior branch sales representative for the contractor in charge of the project commented, “The durability and reliability of the pumps met or exceeded our expectations throughout the project.”

The Portage Creek project was a success. The EPA was able to use the money saved and available contractor hours to begin remediation on other sections of the superfund site. ■

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