ISCO Helps Rural Illinois Community Avoid Water Crisis

Fast Action to Build Three Miles of Temporary Pipeline Revives Reservoir
Oakland, Illinois

A crisis loomed before Oakland, Illinois, a small town of 1,000 residents in east central Illinois. The dry summer and fall of 1999 resulted in annual rainfall six inches below normal. The dry spell also left the 26-acre Oakland Lake dangerously low. The lake, which draws from an 11,000-acre watershed to provide the city's drinking water supply, has an average depth of 3 feet-9 inches (45 inches). But in November 1999, the lake was 32 inches below normal pool level. Collaborative problem solving, ingenuity, and partnering with ISCO Industries, LLC, helped the City survive the immediate crisis.

It was a desperate situation, observes Garry Bouvet, ISCO Regional Sales Manager. "Assuming no additional rainfall, Oakland had only three to four weeks of water," he says. "The City had to take action, and take it quickly." Thanks to a call from the Illinois Department of Natural Resources (IDNR), Bouvet was able to apply ISCO's problem-solving expertise to the problem.

The Course of Events

Initially, Dale Hanner, Superintendent of Oakland's Water Department, contacted the Illinois Emergency Management Agency (IEMA) for help. The Governor's Office stepped in, and IEMA asked IDNR's Office of Water Resources (OWR), to develop a solution to Oakland's problem. According to Hanner, IDNR-OWR studied various alternatives, including drawing on groundwater supplies, pumping from Embarras River, or pumping from a 46-acre lake in Walnut Point State Park about three miles away.

The team, including Oakland Mayor Jim Parks, decided the best alternative was to pump supply water from the lake in Walnut Point State Park into Oakland Lake, which was dropping day by day. They hoped to fill the reservoir to within one foot of normal elevation.

IDNR-OWR put Terry Burke and the Havana maintenance crew in charge of implementing the solution, including construction of the pipeline. "IDNR's Fox Waterway Agency (FWA) near Chicago suggested that we contact ISCO for technical services," recalls Burke. "One call to ISCO put us in contact with Garry Bouvet in their St. Louis office."

"Based on Terry's flow calculations, we needed to allow 16 days of pumping to fill the reservoir," says Bouvet. To establish a timeline, the team also had to figure in pipe delivery time, site constraints, and construction time for the temporary 15,600-foot pipeline. "It looked like building the pipeline was manageable, but time clearly was of the essence," he says.

Bouvet consulted with the team both on-site and on-call to finalize an optimum alignment for the aboveground pipeline. He walked and drove the corridor to identify locations that would facilitate access during construction and observation during pumping, provide the shortest distance between the lakes, and simplify pipeline placement. "It was like building a three-mile maze from scratch," observes Bouvet.

The team was up against more than time. The final alignment crossed timber areas in Walnut Point State Park, relied on roadside ditches, and ran along the edges of farm fields, through existing culverts, across residential yards, and along the lakes.

That's not all: to be most cost-effective, the pipeline would need to be constructed of two types of material. The team's plan took advantage of readily available high-density polyethylene (HDPE) and aluminum pipe. A sister division of IDNR-OWR owned the pipe, which was in storage at the FWA site 200 miles away.

IDNR-OWR had purchased the HDPE pipe for FWA several years earlier for dredging operations, but some of the pipe had never been used. The inventory included 3,800 feet of 10-inch HDPE SDR 17 and 26 pipe and 9,300 feet of 8-inch HDPE SDR 32.5 pipe.

The aluminum pipe, owned by the city of Havana, Illinois, had been used during the Midwest's 1995 floods. Havana had 4,600 feet of the 10-inch irrigation pipe in 40-foot lengths. The City of Oakland also rented an additional 3,300 feet of aluminum irrigation pipe.

Faster Than 'Fast-Track'

"The term 'fast track' doesn't even begin to describe

this project," says Bouvet, noting that HDPE fusion of the HDPE sections started up a mere five days after Terry Burke's first phone call to Bouvet.

FWA furnished a McElroy fusion machine, and ISCO delivered a second one, plus various fittings for the 10-inch HDPE section of the three-mile line. Bouvet trained the two-person IDNR field crew on the fusion process – the two field technicians had never worked with HDPE pipe before. When the 10-inch HDPE run was completed and joined to the aluminum pipe, ISCO brought in a third McElroy fusion machine to facilitate fusion of the 8-inch HDPE section.

Fusion was completed in nine 16-hour days. Garry visited the job site during that time, remaining on call for troubleshooting the entire time. Taking a proactive view also was critical to the success of this plan. "Garry was able to help prepare us for anticipated problems and problem solve with quick fixes when necessary," says Burke. "He provided a back-up electrofusion machine, and he made sure we had materials on-site to handle the potential problems we tried to anticipate."

With the entire pipeline in place, Oakland was ready to start pumping. The temporary pipeline transmitted about 18 million gallons of water from Walnut Point State Park at a rate of 1,040 gpm at 40 psi in just 13 days. The plan was a success: the reservoir was within one foot of its normal level – and the City of Oakland had a supply of water to meet short-term demand.

The HDPE and aluminum pipe was easy to dismantle when the project was completed. Three chainsaws and four hours later, the crew had cut all the joints in preparation for removal.

From the Governor's Office approval to construction, pumping, pipeline demolition, and final cleanup, the project took one month. The effort relied on the labor of five IDNR-OWR employees; two employees from the City of Oakland (Hanner and Assistant Superintendent Randy Duzan); two IDNR state park staff members; and 15 to 30 inmates from an Illinois Department of Corrections work camp, plus their supervisors.

"This was a monumental team effort – lots of work in a very short time," says Bouvet. "Sure, ISCO provided fusion equipment and special fittings," says Bouvet, "but I think what I'm especially proud is that we added value by assisting people in solving their problems with a combination of hardware and good old know-how. That's really the bottom line for ISCO."

IDNR's Terry Burke agrees with this assessment. Garry's round-the-clock availability during fusion and even after pumping got underway was critical – we even pumped on Christmas.

"Garry brought more than HDPE fittings and fusion equipment to the project – he brought essential expertise that helped us avoid a crisis."

Alignment & Hydraulic Design Details

The final design for the aboveground, three-mile pipeline from Walnut Point State Park to Oakland Lake was based on these requirements:

- Flows of 700 gpm.
- Working pressure of 37 psi.
- Static head of 80 feet.

In addition:

- The design specified two 6-inch diesel pumps, each rated at 1,100 gpm capacity under the actual operating conditions. ISCO provided fittings to mate the HDPE pipe to the pumps, as well as several special fittings.
- One pump operated at a time. The second pump served as backup during maintenance and emergency pumping, if necessary.
- The irregular terrain for the first 3,800 feet of the alignment dictated a 100-foot radius bend. The line wound along a park road, ran through two culverts, and 600 feet through timber. Using the 10-inch HDPE pipe for this run met the need.
- For the 7,900-foot straight run, crews placed 10-inch aluminum irrigation pipe along the boundaries of farm fields. ISCO provided fittings to join the aluminum and HDPE sections.
- The final 3,900-foot stretch used 8-inch HDPE pipe to curve along the farm fields, across waterways, and through residential yards before ending in Lake Oakland. Again, HDPE easily met the requirements of this winding alignment.

"Even in cold temperatures and rough terrain, the HDPE could be worked in the field," says Burke. Its characteristic flexibility, strength, and natural abrasion resistance withstood the wear and tear of site-specific demands. "No doubt about it – HDPE worked great in these problem areas," he says.