



Village of Hazel Crest

Designed for Success

Results

- Overtime reduced by 50%
- Higher water quality and service
- Scalable system to allow for plant growth
- Portable diagnostic troubleshooting
- Easy-to-use interface requiring minimal training
- Faster, more precise reporting
- Trend charting reduced from half a day to 15 minutes

"Our overtime is cut in half. Now we can focus on other projects, like installing a new chlorination system and upgrading water and flow meters. We also have time to do more charts. And, I have more personal time again to ride my Harley, and can monitor the system from the road."

Jerry Davis
Water Plant Operator
Village of Hazel Crest

Hazel Crest Water Plant Riding Automation Wave

PLCs and software increase system capability and flexibility

Soaked with operational costs caused by obsolete and proprietary hardware, the Village of Hazel Crest, IL Water Plant was becoming increasingly difficult to maintain and repair. Its 15-year-old manual data collection and reporting system was sending overtime skyrocketing, and the waiting period for outdated system replacement parts was up to eight weeks. Knowing their existing system was too old and rigid to upgrade, Water Plant Operators Jerry Davis and Jim Hughes began evaluating state-of-the-art automation technology, hoping to put the "end" back in "weekend."

While small water treatment plants are often intimidated by advanced automation systems, Hazel Crest's Davis and Hughes decided to dive right in. Conducting more than 200 hours of research, including visiting other utilities, talking to system integrators, taking college computer courses, and meeting with engineers, Davis and Hughes agreed they needed a system that could adapt in a changing environment and remain a viable long-term solution to maximize Hazel Crest's investment. To meet these needs, project integrator Telemetry Process and Control (TPC) of Stillwater, MN, worked with GE Fanuc Automation to construct a highly capable, highly flexible system that would carry Hazel Crest well into the 21st century.

Padding Out

Receiving Lake Michigan water from Harvey, IL, the Hazel Crest Water Plant distributes 1.6 MGD to 14,000 Hazel Crest and East Hazel Crest residents. The facility consists of three pumping stations, three ground storage tanks, one elevated tank, one metering station, and one reduced pressure valve vault. In the past, metering information, water levels, chlorine levels, and all other basic functions of the plant were physically recorded, compiled, plotted, and reported by only two operators.

Using GE Fanuc's open, mainstream technology at the hardware and software level, including standard PLC components and database formats, TPC was able to provide Hazel Crest with a cost-effective solution that would also allow for continuous growth and easy maintenance. With GE Fanuc's user-friendly CIMPLICITY®*, software, GE Fanuc 90™-30 PLCs, and spread spectrum radios, TPC constructed a cost-effective system capable of reducing manual data collection through online instrumentation and monitoring.

Seven Series 90-30 PLCs serve Hazel Crest's water pump stations, meter vault, elevated water tank, operation center, and East Hazel Crest pressure reduction valve. Networked to two desktop computers via spread spectrum radios, the PLCs collect a total of 96 digital inputs, including flow switches, flood and intrusion alarms, power fails, valve and pump fails, PLC status, and radio communication. Digital outputs include 36 device controls like pumps, solenoid control, and audible alarms. Fifty-six analog inputs communicate the statuses of pressure transducers, differential pressure reducers, storage tank levels, valve positions, and transmitters for water temperature, tank weights, residuals, flow rates, and air compressors. Interface modules using industry standard communication protocol Modbus RTU further demonstrate the PLCs' openness and allow adaptation as required.

Another attractive feature for Hazel Crest was the PLCs' programming. "We specified State Logic so that any operator could easily understand it without extensive ladder logic training," Davis notes.

Hazel Crest's intake from Harvey and distribution to East Hazel Crest is monitored by CIMPLICITY software to prevent overcharges and undercharges. Ease of learning was a major factor in Hazel Crest's selection of the software. "The Windows®-based CIMPLICITY software is very user-friendly," Davis says. "Point and click is much simpler to use and familiar for the operators."

At the plant, CIMPLICITY runs on Windows NT® and features graphical annunciation, alarming, and trending capabilities. Low tank levels, high chlorine residuals, and pump failures



are just a few of the 96 alarm conditions captured by CIMPLICITY. System data is logged directly into Microsoft® Excel or Access, so Hazel Crest operators can automatically generate a variety of reports, including those required by the EPA. Reports are used for daily, weekly, and monthly tracking of water and chlorine usage and calculating of excessive water use in different zones for known water main breaks. Monthly reports are distributed to the Village manager and the board of trustees for comparison of monthly and yearly water use. "We now have the time to produce more reports because we don't have to physically go to each station," says Davis. "Our reporting is much more precise now, too."

During the engineering phase of the project, the decision was made to use a single laptop computer as the operator interface (OI) for all of Hazel Crest's master and remote locations. This decision saved a substantial amount of money, as an OI at every site was then unnecessary. With dial-in modem access to the CIMPLICITY server, the laptop provides portable diagnostic troubleshooting, so operators can diagnose and troubleshoot from home. This convenient feature allows an on-call operator increased personal freedom while automatically logging the remote access for overtime compensation.

With the new system in place, Hazel Crest instantly experienced the benefits of the technological revolution that had transformed its plant into a modern-day model of automation.

Riding the Wave

After operating with the new system in place for six months, both operators immediately noticed one major difference.

* Part of Proficy Intelligent Production Solutions from GE Fanuc.

"Our overtime is cut in half," Davis says. "Now we can focus on other projects, like installing a new roof and new chlorination system, and upgrading water and flow meters. We also have time to do more charts." Adds Hughes: "And, I have more time to ride my Harley, too, and can monitor the system from the road using the remote monitoring features."

According to Hughes, a typical trending chart, formerly plotted by hand, would have taken approximately half a day



to produce, whereas now CIMPLICITY can produce the same chart with greater accuracy within 15 minutes. "So far, we've cut approximately 200 hours of overtime," explains Davis. "That's more than \$6,000."

Glenn Graney, GE Fanuc Water Wastewater Manager, adds, "State-of-the-art automation is no longer limited to large, complex plants. In fact, Hazel Crest is an excellent example of how smaller water plants can effectively implement today's automation technology." Graney says Hazel Crest was careful to select operator-friendly, standards-based products that they could maintain themselves. This "ownership" approach helped Hazel Crest develop an automation system that effectively meets the plant's needs today, and, as importantly, positions the Village to adapt to the inevitable changes of tomorrow.

Davis says he is pleased with the results, as accurate reporting is the key to any successful water operation. Faster data logging means fewer man-hours spent on paperwork and more time spent on plant improvements. "Reliability is really the most striking change," says Davis, who adds that he and Hughes have more time to dedicate to sampling and general upgrades. "With more confidence in our own daily tasks and in the service we provide our customers, I'm convinced our water quality and service will continue to improve."

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Additional Resources

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