

# In Action

Application Field Notes:  
Water Treatment  
Volume 01, Issue 1

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# rotork

## RENOVATED WATER TREATMENT FACILITY IS CLEVELAND'S CROWN JEWEL

The Crown Water Treatment facility, one of four water treatment plants in the Cleveland (OH) Division of Water system, recently has undergone a major renovation that is already proving itself to be a winner.

According to plant management, the renovated facility is providing significant benefits, including a dramatic increase in capacity, better water quality, more efficient energy utilization, improved safety, and important productivity gains.

Constructed in 1958, the plant's original capacity was 50 million gallons per day (MGD). Over the years, as Cleveland's need for water increased, steps were taken to increase the plant's capacity to 70 MGD.

Then, in 1995, a major renovation began that more than doubled the original capacity to over 112 MGD. The renovation consisted of upgrades to virtually every process in the plant and included the addition of a new treated water reservoir and high service pump, which increased distribution pumpage capacity.

### Major Goals of the Renovation

In recent years, the Cleveland area has experienced a



*The Crown Water Treatment facility (Cleveland, OH) has recently invested in a major renovation to increase its capacity, provide better quality as well as improve energy utilization, worker safety, and productivity. It is one of four water treatment plants in the Cleveland Division of Water system.*

sharp increase in the demand for treated water, especially during the very hot and dry summer months. In order to satisfy the demand for more capacity and avoid water bans and advisories, Cleveland decided to invest in renovating the Crown facility,

which is the smallest of its four filtering facilities. Fortunately, the Crown plant's original layout enabled the expansion of its capacity without the need to increase its physical size.

Other goals of the renovation were to attain a high degree of



*Richard Papp, Crown Plant Manager, said the renovation is a major success. He said integration of highly effective and reliable automation has enabled Crown to achieve and even surpass its capacity, water quality, and cost efficiency goals. All of the pumps and valves in the plant are automated and can be controlled through password-protected control consoles and desktop engineering workstations.*



*More than 180 Rotork IQ electric actuators have been installed at Crown and all are connected to Pakscan master stations, which, in turn, are linked to the facility's Bailey Control system. Significant savings were realized in the installation process, because the Pakscan system only requires a simple two-wire connection to each Rotork actuator.*

redundancy throughout the facility; help maintain a “steady state” of output, so the need for dramatic operational adjustments could be avoided; and improve the environmental quality of the backwash water that would be returned to Lake Erie from Crown’s backwash operation.

Another important goal was to make the renovated plant more energy efficient than the original facility. The cost of energy is the single greatest cost associated with the day-to-day operation of the plant.

#### **Renovation Overview**

Richard Papp, plant manager, said, “The renovation was extensive, and we upgraded just about everything. The only thing we didn’t have to worry about was our intake. We are fortunate, because Lake Erie provides us

with an abundant and consistent intake supply, and the original plant could handle an intake of up to 150 MGD. Therefore, the main limiting factor of our operating capacity is how much water we can filter here at the facility. So, we focused our renovation efforts on making the processes at the Crown as efficient as possible.”

The major steps in the renovation included:

- an upgrade of the electrical system throughout the facility
- total renovation of the existing 15 million gallon intake reservoir
- construction of a new 18 million gallon intake reservoir
- replacement of existing raw water pumps
- an upgrade of all chemical feed systems
- installation of tube settling

equipment in the settling basins

- installation of an air scour system in all of the filters
- addition of deep bed filters
- addition of two new backwash pumps
- addition of a high service pump and enhancements to the low service pumping capacity
- installation of automated controls for all major processes, including all pumps and valves throughout the facility.

Papp said that he was especially impressed with the installation of the actuators and Pakscan systems. He said that Michael Bais of Northcoast Process Controls, a Cleveland-based Rotork representative, took a very active role in making sure that the installation and commissioning went smoothly. “The hands-on attention and



*Rotork IQ actuators work every two minutes, 24 hours a day in order to maintain the appropriate water level above Crown's filters.*

advice that Nevio Bais and his son, Mike, provided were major contributions to the project's success," Papp commented.

**Automation: The Key To Success**

According to Papp, the integration of highly effective and reliable automation is at the heart of the renovation's success.

The facility has more than 180 Rotork IQ electric valve actuators, which automatically operate most of the valves around the clock. The IQ actuators are all connected to Pakscan master stations via two-wire connections. The master stations, in turn, are linked to a

Bailey control system.

The system enables Crown operators to monitor and operate all the pumps and valves in the facility at five password-protected consoles. In addition, there are nine desktop engineering workstations where operators can monitor real-time valve and actuator performance, obtain historical valve operation reference data for maintenance purposes, and perform other tasks such as changing graphics. There are audio and visual alarms which display on the computer screens if an out-of-parameter situation occurs at any of the automated valves on

the system. There are also chlorine alarms throughout the plant.

For redundancy, in addition to being controlled at the consoles, each of the IQ actuators can be operated at the Pakscan master stations, or locally employing any of three different methods: an operator can use an IQ infra-red hand-setting tool in the immediate proximity of each actuator, can activate the push-button controls on the IQ itself, or can turn the IQ's handwheel to open or close the valve.

**Examples of Effectiveness**

"An example of how automation and Rotork actuators have really helped us," Papp said, "is at our settling basins. We have 25 flocculation tanks and ten settling basins. Sludge is removed once a shift. This is a very rugged application for an actuator, because it must activate a six-inch plug valve so the sludge can be pumped out."

He added, "Another example of Rotork reliability is how well they perform on the butterfly valves which maintain the water level on top of the filters. There, we have twelve IQ actuators on



*David Milcinovic, Water Plant Operator 1, uses a Pakscan IIS unit to control Rotork operated valves in the filtration building.*

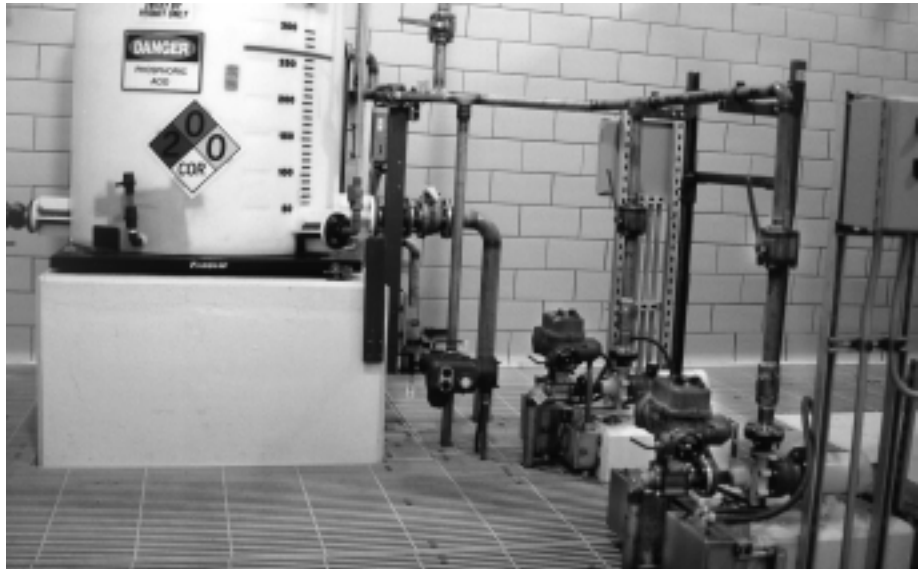
twelve 20-inch butterfly valves which are operating every two minutes, 24 hours a day.”

### Other Features

In addition to having a superior system of automated valve control, the Crown renovation incorporated other innovative features, which help it improve water quality and operating efficiency.

For example, they utilize mono media filters, which consist of six feet of pure anthracite coal. Papp said, “Instead of adding new filters, we deepened our existing filter beds and effectively doubled our capacity without adding new filters.”

Papp noted that they are utilizing new tube settlers, which are angled to achieve maximum effectiveness. He said, “This helped us more than double our capacity in our 70-foot long settling basins. Also, we utilize air scouring in all our filters during the wash cycle. Compressed air is sent through the filter and helps dislodge particles which adhere to the filter media.”



*Rotork Q300 actuators are used in the chemical feed area.*

### Steady-state Operation

Papp said, “We are extremely happy with our ability to constantly monitor the operation of each of the automated valves in our system. By comparing current data to historical benchmarks, we can determine when and if a valve needs maintenance. We can also make precise determinations about our filtering process. There are turbidity meters and particle counters on

each filter, and the information is stored in a database.

“The thoroughness and reliability of our system helps us to maintain our operation at a steady state. That is, it helps us avoid peaks and valleys in our processes that are costly and labor-intensive.

“Also,” he concluded, “automation has helped improve the safety at our facility as well as productivity and energy efficiency. Furthermore, our process is so efficient that the backwash water that gets returned to Lake Erie is much cleaner than the lake water itself. That makes everyone happy.”



*Richard Papp, Plant Manager, (at left) and Nevio Bais of Northcoast Process Controls, Inc. discuss aspects of the renovation project. Northcoast Process Controls worked closely with Crown personnel to install and commission the Rotork actuators and Pakscan system.*

### FOR MORE INFORMATION

For more information about how Rotork may be able to help you find the best solution for your specific automated valve application, contact Mr. Chris Warnett, vice president of sales, Rotork Controls, Inc. 675 Mile Crossing Blvd., Rochester, NY 14624. Telephone: 716-328-1550; fax: 716-328-5848. Email: [info@rotork.com](mailto:info@rotork.com).

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