Dependable Pumping System Ensures Water Quality and Safety for Illinois Veterans Home

Gorman-Rupp pumps are to play a vital role in the new water treatment system at the Quincy Veterans' Home.

In August 2015, the discovery of legionella bacteria at the Illinois Veterans Home at Quincy triggered an investigation by the Illinois Department of Public Health (IDPH). Tragically, the outbreak led to the loss of twelve U.S. military veteran residents. The quaint town of Quincy, located along the Mississippi River in Illinois, was shocked by these events at the facility.

Responding to the crisis, the Illinois Department of Veteran Affairs and the IDPH undertook a comprehensive inquiry into the causes at the veterans' home, aiming to prevent any such tragic incidents in the future. The result was a $300 million project involving campus rehabilitation and new constructions. A pivotal aspect of the project was the integration of a Gorman-Rupp system into the design of the long-term care facility's ultra-filtration water treatment system.

Mickey Bernard, President and Owner of Hydro-Kinetics
Corporation and a longstanding Gorman-Rupp

The Illinois Veterans' Home is beautifully situated on a 200 acre campus in Quincy, Illinois. The Home provides a variety of services to roughly 600 residents.

distributor emphasized that all the equipment for the new treatment system was selected to ensure dependability. "These folks gave portions of their lives — and their lives — for the life we live today, and they deserve to be treated with respect and dignity," Bernard said. "Our goal was always to make sure what we do is going to provide the services and benefits

Many construction projects are in process across the home's campus. These include the ground storage tank which sits in front of the building housing the ultra-filtration system and future home of the Gorman-Rupp booster station for supplying on-site facilities with treated water.

that they deserve as members of our armed services who served and fought for our nation."

The new water treatment system design filters influent water from the City of Quincy on the veteran's home campus adjacent to the long-term care facility. After influent water is treated, it is discharged into a 20-foot-tall ground storage tank next to the ultra-filtration system. The Gorman-Rupp system provides a continuous flow 24 hours per day through the distribution loop providing treated water to the buildings on the campus, ensuring the residents receive treated and consistent quality water.

The Gorman-Rupp booster system influent is received from the ground storage tank and pumped into the distribution loop with the water returning back to the ground storage tank through a Red Valve duck billed tank mixing system. The design is not complicated, but many small considerations had to be made to ensure the residents' safety.

Continuous Pressure and Flow

Bernard explained that the project's design engineer envisioned a closed-loop system that would maintain a consistent pressure of 65 to 70 PSI with 24/7 flow, minimizing the risk of stagnant zones within the loop. A pressure relief valve at the end of the distribution loop ensures the constant flow and consistent pressure throughout the main loop.

To maintain the required steady flow, the design team incorporated four vertical inline booster pumps on the Gorman-Rupp pump skid. Two of these pumps, designated as the primary duty pumps, operate around-the-clock to deliver the desired pressure with constant flow. A field-adjustable, time-based alternator in the booster pump controls allows the water plant personnel to set the frequency at which the primary duty pumps alternate operation. The two larger pumps on the pump skid are dedicated to conducting a complete system flush at two to three times the flow rate of the smaller duty pumps. This flushing cycle schedule can be adjusted as required in the field.

The pressure relief valve has field-adjustable pressure control pilots to allow the water plant staff to set the desired loop pressure in the main loop. Any excess water not consumed by residents is redirected through the pressure relief valve and returned to the ground storage tank via the tank mixing system. "So as long as the loop pressure is above the pressure relief valve's set point there's always a constant flow in the loop," Bernard explains. "While the branches off the loop will be dead ended, there won't be any dead-end areas within the main loop where water can become stagnant as long as the loop pressure is above the PRV set point. The recirculated flow also helps ensure the water in the loop has the desired chemistry and residual."

The final design of the system guarantees an uninterrupted flow of water, consistent pressure, and the desired water quality for the residents.

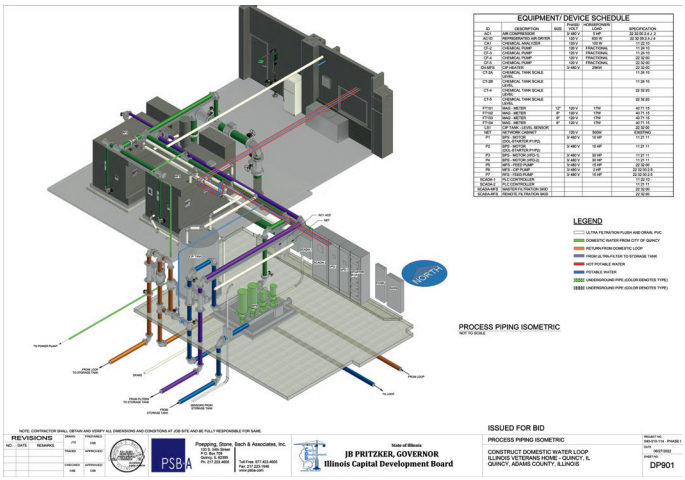
Maintenance and Automation

Due to limited available space for the new water treatment plant, the Gorman-Rupp design team faced the challenge of selecting a pump skid design that accommodated both functional requirements and ease of maintenance. The vertical arrangement of all pumps on the skid was chosen for easy access, eliminating the need to navigate around horizontal motors in the pump room. While small pumps and motors can be maintained by a single individual, larger pumps may require two people.

For Bernard, one of the most crucial elements of successful operation is a locally available and factory-certified customer service organization for equipment on the project, including the pumps, controls, chemical feed, and automatic valves. The Hydro-Kinetics team is uniquely qualified to provide mechanical, electrical and instrumentation field services for all the equipment involved in the project.

With the pumps serving as a critical component of water delivery to the residents, the project's design team selected Webtrol pumps for the pump skid. Located in St. Louis, Webtrol's close proximity to Hydro-Kinetics' office allows any pump failures or issues to be addressed very quickly, including potential same-day installations of replacement pumps. Webtrol's ability to provide the highest level of customer service, Bernard explained, adds even more peace of mind. "I've had instances where communities have called us up and said, 'Hey, we just had a pump go out,' and the staff at Webtrol will build us a pump that morning and they'll have it on their dock by 3:00 that afternoon, ready to go. It's a great little company that matches well with Gorman-Rupp's commitment to their customers."

As the project's design progressed, automation became a focus. Bernard noted that monitoring the booster pump discharge flow rate was a critical operational metric. "If the load in the system — people are using water — exceeds what one small booster pump can do," Bernard said, "we'll turn a second booster pump on to ensure the distribution system has continuous flow."



The isometric drawing, supplied by Poepping, Stone, Back & Associates, describes the layout/ flow of water through the ultra-filtration system. The booster station will ship from Gorman-Rupp as a complete pre-tested package, delivered on-site and ready for plug-and-play connection to piping and power.

In instances where the two smaller duty pumps, capable of delivering 250 to 300 gallons per minute of flow in parallel, struggle to meet demand, the Gorman-Rupp controls automatically engage the larger pumps to match system requirements. Working in conjunction with the Gorman-Rupp pump controls, a Primex SCADA system will monitor and archive system parameters, including the discharge flow and pressure of the booster pump skids. If the booster pumps fail to attain the desired discharge pressure during operation, the SCADA system generates an alarm that alerts the operations staff at the veterans' home. Additionally, the Primex iControl SCADA system issues alarm notifications for conditions such as excessively high or low storage tank levels, alarm conditions within the Ultra Filtration System, or any booster pump failures. The SCADA system timestamps each alarm event and

Established in 1886, the Illinois Veterans Home at Quincy is the largest and oldest in the state and one of the oldest in the country.

archives this data for future reference. The selected iControl system allows the plant personnel real-time access to SCADA data from anywhere via the cloud-based iControl platform.

Do Everything Right

The Illinois Veterans Home project carries profound emotional weight, and not without reason. Owing to the project's significance and the respect owed to military veterans, Bernard underscored the paramount importance of getting everything right in this project. "What was foremost in all our thought processes was that we have to get this right for our veterans," Bernard said. "There's a high sense of responsibility on the whole team."

The last structural beam of the project was installed January 12, 2023. The long-term care facility for which the pump system was designed is targeted for completion in February 2024.

About Gorman-Rupp Pumps

For more than ninety years Gorman-Rupp Pumps USA has manufactured pumps for municipal, sewage, industrial, mining, construction, petroleum, OEM, government, agriculture and fire markets.

The company's extensive line of pump products includes self-priming centrifugal pumps, standard centrifugal pumps, submersible pumps, rotary gear pumps, diaphragm pumps, engine-driven pumps, and priming assist pumps. In addition, Gorman-Rupp manufactures a complete line of state-of-the-art packaged lift stations and booster stations that include pumps, motors, controls, piping, accessories and enclosures.

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