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**PUMPING SOLUTION Gives
Rolling Foothills Communities a
Foothold on Wastewater Efficiency**

Beaver Falls, Pennsylvania, characterized by the rolling foothills of the Appalachian Mountains, is located in Western Pennsylvania, northwest of the city of Pittsburgh. In the past, a city that was dominated by the heavy steel industry, it is now home to a suburban community and an abundance of parks, open spaces and scenic views.

A mature community, with an aging infrastructure, Beaver Falls has faced many challenges. As home to one of the oldest and largest wastewater treatment facilities in Beaver County, the city has been forced to address issues such as keeping costs down and updating technologies that have reached their operating capacities. The solutions would require innovative thinking and a creative approach to managing the community's wastewater activity.

"Here, there are a lot of communities within communities," shares Jim Breznal, Chief Mechanical Supervisor for the city of Beaver Falls Wastewater Treatment Plant. "When faced with the challenge of a mature market, and declining wastewater flows, the answer was to combine the collection systems of the nearby communities to better utilize the treatment capacity that we had in place." As a result, Breznal and his maintenance team are responsible for managing the services of 10 outlying communities – with the Eastvale Borough and the Big Beaver Municipal Authority (BBMA) being his team's primary responsibility outside of the plant. On the flip side, as Beaver Falls' wastewater treatment responsibilities have grown, so has the need for innovative thinking. "We are historically the least costly system in Western Pennsylvania," shares Breznal. "We're very proud of that, and by servicing the additional communities, we've been able to keep our per-capita costs down – even as we grow and new systems connect to ours."

"What Beaver Falls has done is innovative because they have aggressively sought out additional business," shares Mark Place, CEO of John Place, Inc., the Gorman-Rupp distributor and applications partner. Mark Kennedy, of Widmer Engineering, is the city's consultant for the recent sewerage expansion projects. "Beaver Falls has positioned itself to provide wastewater treatment service to an expanding region of customers as new sewers are constructed. And they have done this intelligently over the years without breaking the bank in the process," adds Kennedy. "The leadership role of the recently retired WWTP superintendent, which is now being carried forward by the whole operations and maintenance staff, was critical to this success. The staff understand the big picture,

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not only their day-to-day jobs, and the entire region is better for it. Other jurisdictions should take note."

"Our plant is in no way considered aging," boasts Breznal. "Eight years ago, we invested \$5 million in upgrades - mainly electronics. We're very advanced as far as variable frequency drives and the overall operation of the plant. As a result of that upgrade, today we are able to take in outlying communities - because the actual capacity is here."

A River of Challenges

In the latest stage of the sewer collection system's growth, Eastvale Borough, a rural community located across the Beaver River from the Beaver Falls WWTP, posed a unique challenge. Originally, the sewage pump station that existed to serve the Eastvale area of the system was a below ground, "wet well-dry well" pump station. Installed in 1983 to provide sewerage for approximately 300 homes, the station served the residents well for nearly 25 years. But today, pumping needs have grown with the addition of flows from neighboring North Sewickley Township coming to the Eastvale station. "This community was a little further out and had plans to connect 1000 additional homes - approximately 300,000 gallons a day. There was no physical way to bring the wastewater across the bridge to our plant with the existing pumping system. Our piping - everything - was pretty much undersized," explains Breznal.

To rise to the challenge, both pipe size and pump technology upgrades were required. But the immediate upgrade wasn't the only challenge facing the city. A small footprint provided additional challenges to how the new lift station was to be designed. Safe and efficient access - to ensure the new station was easy to maintain - was also a priority. "The site is wedged between a dead-end street, a bridge abutment and the train tracks. It's got a pretty steep grade, and simply put, is a pretty tough site all the way around," shares Breznal.

The challenge was to connect a temporary pumping system to the existing 4-inch bridge line, install a new 8-inch line on the other side of the bridge, and pump active wastewater flows through the old line while the new line and pump station were being installed. "The hardest thing to ever do is a retro-fit ... to upgrade a system that needs to perform while you're working on it," attests Place. "New systems are easy because you wait until they are done, you test it, prove it and then you tell the people to start tapping in. This was done live under the gun, because we could not tell 300 homes to stop using water."

The design team was faced with the challenge of engineering a solution that would pump 25,000 gallons a day to the plant during the construction, which lasted from April through August. However, a rainy day would severely increase the flows, demanding additional muscle to handle up to 250,000 gallons a day. Still, the design team prepared, and was able to ensure the temporary system could handle that additional flow. "We had no problems, no bypasses, and our new pumping system was online before many

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additional homes were added," recalls Place. "Ultimately, our job is to bring options to the owner and the engineer. We had the solutions, but it was simply a matter of having the communication path open - ensuring we're all talking through the needs of the project. There are no cookie cutter solutions." The added engineering forethought paid off. "We were glad we decided not to demo the old line, and instead utilize it as a backup," shares Breznal. "It was a big payoff, because even now, I can hook up the temporary system at any time as a backup, in the event something were to happen. And, it saved the demolition cost of the old pipe, too."

"It wasn't just the bypass issue that needed to be addressed," adds Place. "The liability had to be addressed as well. The city had a pretty good idea of what they wanted and needed. It was our job to take those expectations and match them up to the hydraulic and capacity requirements." To meet the challenge, the station was upgraded with a Gorman-Rupp Super T-6 AutoStart system for emergency power all housed in a modular fiberglass enclosure and in conjunction with a Gorman-Rupp Super T-6 trailer mounted Silent Pump station to handle the bypass duties during construction.

The Gorman-Rupp base mounted Auto-Start station uses a 12V DC level control that drives a pump with a standby engine providing normal pumping service during power failures rather than a noisy and expensive generator. The smaller standby engine reduces operating noise in the neighborhood and is less costly to operate than a generator. The pump station is also configured with the Super T-Series pump technology, providing the city with advanced design features such as external shimless adjustment, dual protection of bearings and an "easy-grip" cover plate handle. The pump features a large volute design that automatically reprimers in a completely open system without the need for suction or discharge check valves - and with the pump casing only partially filled with liquid and a completely dry suction line.

The city's new trailer mounted Silent Pump is a sound-attenuated engine-driven pump unit. Its fuel capacity allows for a minimum of 24 hours of continuous operation, and all units feature a light-weight, corrosion-resistant aluminum enclosure that is acoustically treated to maintain noise levels as low as 63 dBA while operating at full load. This was an important feature during construction as the nearest house was directly across the street from the construction site.

No Substitution for Sewer Smarts

The city's systems are not only designed to last, but have been constructed with ease of use in mind. In addition to the Auto-Start pumping system, each pump station has also been installed with a small building generator for lighting and heat. "Some people tell us we're spoiled," laughs Breznal. "That's fine -but you tend to get a better job when you're dry and warm rather than standing in lightning, thunder and rain."

Further, with the goal of keeping the people of Eastvale happy, the

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design also called for an anti-septic timer. There are times throughout the course of any given night during a dry summer that the pumps wouldn't run because of insufficient sewage flow. However, if the community complains of a sour smell or slight odor, the timer can easily be adjusted to run the pumps more frequently, preventing the stored sewage from becoming "septic". "Our pump stations are designed to work for the entire community – even in something as small as the smell. It may not seem like a big deal, but if we keep just one person happy, it's worth the investment," shares Breznal.

"It's not rocket science, but I don't know anyone else that offers that in the standard control panel option," adds Place. "As we push out into these unsewered areas we're having more and more odor problems. In the time that sewage travels through a remote system to the last station, it often times has been in the system for a week. Yet, when we install an anti-septic timer and sometimes a supplemental aeration system, you can often get through even the hottest of dry summers with no odors and no complaints."

An added benefit of the Eastvale pump station is that the timer also functions as freeze protection during extremely cold weather, forcing flows across the exposed forcemain mounted on the bridge periodically to limit ice buildup.

gauge. Since the start of the project however, no such overflows have been recorded, which was one of the goals of the project.

A digital cellular monitoring system provides the staff and engineering consultants with real time operating data including run times, wet well levels and discharge flows. Alarm conditions are reported on a secure website as well as to their digital cell phones.

Keeping Maintenance At Home

Because energy and maintenance are the two highest cost categories of any plant, the city worked to create a solution that was not only smart, but cost effective. In all, Beaver Falls maintains approximately \$20 million worth of equipment and keeps and inventory of spare parts and equipment onsite. Further, to offset a plant's second highest line item – labor – Beaver Falls has implemented additional controls. And right behind labor is maintenance cost. Breznal and his maintenance team are very proactive about maintenance and with only three people to maintain the plant equipment and the outlying pump stations, they have to work smart.

"In a way, this city kind of died with the steel mills," confesses Breznal. "We came to this plant, and have been able to bring the skills we've acquired to the betterment of the communities. This work ethic, in fact, changed our maintenance outlook from the start." In fact, the city's preventative maintenance program has saved the community countless investment dollars. By taking advantage of the day-to-day maintenance that most operations neglect – such as lubing and minor adjustments – the maintenance staff has uncovered the key to keep the city flowing.

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smoothly.

As a result, Breznai and his staff conduct their own monthly and quarterly preventative maintenance, avoiding surprises. Doing so saves on overtime and catastrophic failure costs, and allows Breznai and his team to better understand what's broken down when downtime does occur, and why it's broken down – and a reasonable expectation as to how quickly it can come back on line. As a result, this lean maintenance team has been minimized to two to three individuals at any given time, with the need for outside contractors virtually eliminated.

"Thanks to this new technology, we've eliminated 99.9% of our costs," boasts Breznai. "We give a lot of that credit to the Gorman-Rupp stations, too. It's a best-case scenario that works well for us. However, Mark Place and the entire organization of John P. Place, Inc. is the real reason we're successful. I can't give him enough credit for what he does for this city."

About The Gorman-Rupp Company

Gorman-Rupp is a leading manufacturer of pumps and pumping systems for the municipal, water, wastewater, sewage, industrial, construction, petroleum, fire and OEM markets. Pumps include self-priming centrifugal, centrifugal, submersible, trash, priming assist, rotary gear and air-driven diaphragm pumps. In addition, Gorman-Rupp manufactures a complete line of packaged lift stations and booster stations, which include pumps, motors, controls, piping, accessories and enclosures. The company prides itself on manufacturing and delivering the right pump for the job.

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The station also features a magnetic flow meter and recorder to monitor pumped flows, an Area Velocity meter to measure and record any pump station overflows to the Beaver River and a rain
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