

Monroe County Waste Treatment Facilities Improve Reliability of Centrifuges and Odor Control Fans with Wireless Vibration Monitoring

RESULTS

- Improved reliability of sludge centrifuges
- Improved reliability of odor control fans
- Over 10 hours per month saved in maintenance time



APPLICATION

Vibration monitoring of sludge de-watering centrifuges, odor control fans

CUSTOMER

Monroe County Pure Waters, Van Lare plant in Rochester NY and the Northwest Quadrant (NWQ) plant in Hilton, NY. These wastewater plants are located on the south shore of Lake Ontario. Van Lare dates back to 1916 and is the largest treatment plant in Monroe County with a rating currently at 135 million gallons a day with a capability of handling 660 million gallons a day.

CHALLENGE

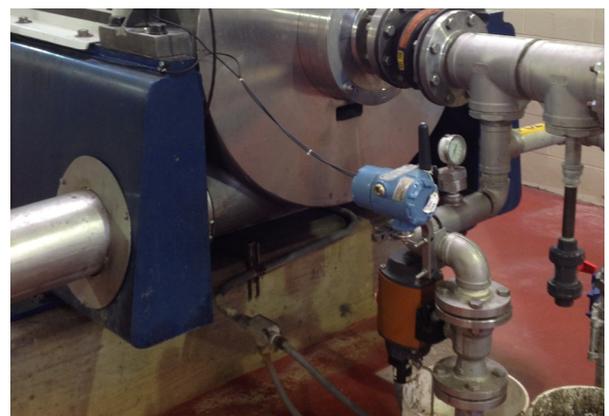
Back in 2011 Jeff Helfer, Instrument Technician and Level 2 Vibration Analyst, recognized a need to monitor some critical points on centrifuges at both the FEV Treatment Plant in Rochester and the NWQ plant in Hilton, NY. Centrifuges spin sludge to de-water it, after which it is trucked to landfill where methane gas, a byproduct of waste sludge, is collected to power generators. "It's called our 'Waste to Watts' program," said Helfer. "These centrifuges are the ONLY way to get the sludge out the door. They have to be incredibly reliable."

Instrument technicians monitored a total of six centrifuges at the two plants, which are 12 miles apart, on a routine basis. "We monitored the centrifuges every three months," said Helfer, "by attaching portable sensors to the bearings. The data was collected with a handheld device and downloaded to a database where a spectrum analysis was generated." Unfortunately, as the bearings wore, once every three months became once a month, and then once a week. If something abnormal was found, manual monitoring had to be done at that centrifuge every day for a couple of hours each day. "We needed a permanent system that would give us on-line information

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Jeff Helfer

*Instrument Technician and Level 2 Vibration Analyst
Monroe County Pure Waters*



Wireless online vibration monitoring on a sludge de-watering centrifuge.

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that I could view on my laptop,” said Helfer. “We were spending up to 10 hours a month just to monitor the centrifuge bearings.”

The biggest obstacle was the cost of wiring. The Van Lare plant is approximately one mile long from start to finish, and the four centrifuges are located about half a mile from the I&E office (and control room) located at the front of the plant. Another problem was lack of room in the PLC for more analog points. “We did not have room in our PLC to accommodate the points for vibration monitoring,” said Helfer. “That, combined with a cost of wiring and conduit, made a wired solution too expensive to consider.” The municipal wanted a cost-effective solution that would eliminate manual monitoring for centrifuges at both plants and bring spectrum analysis to the laptop of the certified vibration analyst.

SOLUTION

The municipal purchased two Smart Wireless Gateways and six CSI 9420 Wireless Vibration Transmitters that deliver insight on the health and performance of the centrifuges. The application includes the patented PeakVue™ technology that uses demodulated data with 2 accelerometers each, which utilizes a patented peak value analysis method. PeakVue uses demodulated data for vibration analysis, which picks up defects that cannot be shown on normal vibration readings.

The gateway was mounted outside the solids building, centrally located at the facility. “The transmitters and gateway were started up and linked within minutes,” said Helfer. “I was shocked they could communicate over 300 feet through steel reinforced concrete and glass.” A second gateway was installed at the NWQ facility to communicate to two wireless vibration transmitters on centrifuges in that facility.

The transmitters are set to come on once per hour to provide a spectrum if called upon or just an overall reading. Trigger levels are set to prevent taking spectrums on machines that aren't running. Helfer is able to sit at his desk and receive vibration spectrums on demand from any sensor in the network, including those at the NWQ facility. A fiber optic network that ties the two facilities and multiple pump stations together ensures the information is available at any municipal location.

Helfer continued, “We are catching problems earlier now. This is about reliability; about keeping the centrifuges running.” For one vibration analyst covering two plants 12 miles apart, having on-line information available upon request is invaluable. “I can now respond to calls immediately, regardless of my location” he said. “Time constraints are no longer an issue. If I am 20 miles away at a pump station, spectrums can be built with current data on my portable laptop and I can remotely analyze the problem.”

The wireless network was strengthened as other applications were added, including stranded chemical flow measurements and totalizations, eye wash stations and asset monitoring for critical odor control fans. “If the motor on the fans in our odor control tower fail, our community is not happy,” said Helfer. When the fan bearings caused a fan to go down, it was an easy decision to add three more wireless vibration transmitters for the scrubber fan in the solids room and both fans in the odor control tower.”

Although the odor control tower is 200 yards past the solids room, over 1000 yards from the gateway, the new instruments joined seamlessly. On-line monitoring gives early warning of bearing wear, giving readings once per hour instead of once every 3-6 months. It also eliminates the time required to plan and take manual readings. “PeakVue is great” said Helfer. “We have a lubrication and oil program that requires us to constantly check to see if bearings are lubed properly. We now use PeakVue to indicate when to lubricate the bearings on our centrifuges and fan motors.”



Wireless transmitters communicate to a Smart Wireless gateway 300 feet and more through reinforced concrete and glass.



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RESOURCES

Emerson Process Management Water/Wastewater Industries

<http://www2.emersonprocess.com/en-US/divisions/power-water/Pages/powerwater.aspx>

Emerson Smart Wireless Gateways

<http://www2.emersonprocess.com/en-US/brands/rosemount/Wireless/Wireless-Gateways/Pages/index.aspx>

Smart Wireless Gateway 1420

<http://www2.emersonprocess.com/en-US/brands/rosemount/Wireless/Wireless-Gateways/Wireless-Gateway/Pages/index.aspx>

CSI 2140 Wireless Vibration Transmitter

<http://www2.emersonprocess.com/en-US/brands/csistechnologies/vt/csi9420/Pages/CSI9420WirelessVibrationTransmitter.aspx>



Rosemount Smart Wireless Gateway 1420.

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