

# Waste Treatment Facility Realizes ROI and Improves Odor Control with Emerson™ Wireless Networks

## RESULTS

- ROI was immediate, based on wiring costs alone
- Reduced operating costs
- Improved odor control
- Reduced ongoing maintenance
- Fast, easy installation



## CUSTOMER

The Stamford Water Pollution Control Authority (SWPCA) of Stamford, Connecticut, operates a 24 MGD wastewater treatment plant serving 20,000 ratepayers with a drainage area of 12,000 acres through a total of 275 miles of collection system pipelines. The plant is installing a new supervisory control and data acquisition (SCADA) system as part of a 5-year, \$47 million capital improvement plan.

## CHALLENGE

The facility is being made more energy and process efficient, leading to lower operating costs. Upgrades to the treatment process conform to new state discharge requirements. An existing SCADA system will be replaced, and distributed control units and associated communications equipment will be replaced or upgraded.

“SWPCA was looking at a cost-effective way to improve odor control and reduce operations costs by improving efficiency of key process areas,” said Dan Capano, Vice Chair of the SWPCA and President of Diversified Technical Services, a water and wastewater consultant.

Examination of the existing plant wiring and conduit system showed that some wiring and supports were in various states of disrepair and deterioration mostly due to the aggressive environment of the plant. These conditions ranged from broken and generally deteriorated metal and PVC conduit and junction boxes, to overfilled conduit and damaged wiring. The low-voltage systems, including communication and instrumentation, were most damaged.

The plant had to find another way to connect process instrumentation to the new controllers, and the main problem was cost. Installation costs for low-voltage wiring at the facility ran nearly \$150 per foot. “A simple 330 ft underground cable with conduit was close to \$35K, just for the communication (not power),” Capano stated.

SWPCA needed a cost-effective way to replace the failed wiring as well as bring new measurements online for the new blower and upgraded aeration system. Unfortunately, this industry is slow to adopt new technologies and an industrial wireless solution is uncommon. Reliability and security would be key factors in making a decision.

**“Not only did the wireless network pay for itself immediately, it has assisted the plant staff with isolating and resolving issues with the odor control system. Maintenance time has been significantly reduced, and people are much more efficient.”**

Dan Capano  
President, Diversified Technical Services



*This initial project was a proof of concept for wireless technology in a wastewater plant at both the instrument and plant level.*

### SOLUTION

Several wireless and instrumentation vendors were considered for inclusion in the project. The selection criteria were based on equipment reliability and capabilities, availability, ease of management, and conformance to open standards.

#### Wireless network design and installation

“We installed a *WirelessHART*® instrument network and a wireless plant network to provide secure, reliable measurements and communications across the plant,” said Capano. “This was a small project that was basically a ‘proof of concept.’ We wanted to validate the security and reliability of the *WirelessHART* and Wi-Fi solutions as well as the cost position in a municipality.”

SWPCA purchased five Smart Wireless THUM™ Adapters to bring existing measurements, like pH and ORP on the scrubbant recirculation line, back to operators. New wireless transmitters were also purchased:

- Two Rosemount® 3051S DP Transmitters for DP on the scrubber bed and level measurement on the scrubber sump level
- Two CSI9420 Vibration Transmitters with two accelerometers to monitor the new blower motor
- Two Rosemount 702 Dual-Input Discrete Transmitters that provide blower, pump, and pressure switch on/off statuses

The *WirelessHART* instrument network communicates with an Emerson Smart Wireless Gateway, which can be connected to a variety of hosts. At SWPCA, the Gateway is wired to a wireless access point and integrated into a new Wi-Fi network. “We will be doing asset tracking, mobile worker, and other things with our new plant Wi-Fi,” said Capano. “We also use it as a backhaul network to get our instrument data back to the control room.”

#### Business results

The installation cost (not including cost of instruments) was only \$5,000 for wireless networking devices compared to the estimated cost of \$32,000 to replace wiring. “ROI was almost immediate because of the drastic savings in copper and labor,” said Capano. “We saved money because the wiring would have had to be replaced otherwise. In my opinion, the wireless instrument network was paid for even before installation.”

The network installation and setup took less than two days. A comparable wired installation and setup would have taken two weeks. Smart Wireless THUM Adapters provided cost-effective replacement for deteriorated and failed wiring. Wireless transmitters were quickly installed and easily integrated into the Gateway web interface for new applications.

Capano noted that *WirelessHART* added a layer of digital communications and diagnostics that wasn’t available before. “Now we can see health of devices from anywhere. The Gateway web interface gives us a lot of good data. We can walk around the plant and pull up the Gateway web browser for any device and interrogate the wireless instruments.”

In fact, wireless transmitters immediately brought a problem to light. “When wireless transmitters were added to the existing pH and ORP sensors, on-line trending became available,” said Capano. “The trends clearly showed inconsistent readings, which prompted a closer look. We discovered the velocity on a pump was too high, causing problems with the sensors that had previously gone undetected.”

The advantages of a wireless network didn't stop there. The reliability of the wireless network was highlighted when all the site's electrical fuses were blown at once, taking down wired instrumentation. Wireless was the only instrumentation available. Capano noted, “Wired instruments are more vulnerable. It is easy to short a loop and blow a fuse. And when they go down, they take much longer to bring back up – several orders of magnitude higher than for a wireless system.”



*Smart Wireless THUM Adapters provided cost effective replacement for deteriorated and failed wiring.*



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Plant operators were shown how the technology worked, then shown the possibilities through an instructional video. “We showed them seamless and robust wireless coverage over the whole area, including asset tracking and mobile worker,” Capano said.

Wireless enables an operator to access detailed information for the repair or adjustment of equipment without leaving the equipment location. Capano highlights that “Eliminating lost time creates greater efficiency and cost savings. Asset tracking and real-time inventory control are benefits that also will translate into long-term savings.”

### Summary

After six months of operation, Capano considers this ‘Proof of Concept’ to be a success. “Not only did the wireless network pay for itself immediately, it has assisted the plant staff with isolating and resolving issues with the odor control system. Maintenance time has been significantly reduced, and people are much more efficient.” This was good for community relations and for the environment.

Wireless instrumentation is an enabling technology that gets the right information to the right people at the right time. Future site upgrade plans (SCADA, new blower and aeration system) will utilize wireless to control costs, as well as maximize process efficiency, which in turn, benefits ratepayers.

“The Emerson wireless solution provides solid, reliable, secure communications,” Capano concluded. “It was easy to set up, and any problems were quickly resolved. Data was available on the web page with very little effort. The instruments are 100% reliable, even when they are covered in snow. This network is solid as a rock.”

## RESOURCES

### Emerson Process Management Water & Wastewater Industry

<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>

### Rosemount 702 Wireless Discrete Transmitter

<http://www2.emersonprocess.com/en-us/brands/rosemount/wireless/702-discrete/pages/index.aspx>

Standard Terms and Conditions of Sale can be found at: [www.rosemount.com/terms\\_of\\_sale](http://www.rosemount.com/terms_of_sale).

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#### Global Headquarters

##### Emerson Process Management

6021 Innovation Blvd  
Shakopee, MN 55379, USA

+1 800 999 9307 or +1 952 906 8888

+1 952 949 7001

RFQ.RMD-RCC@EmersonProcess.com

#### Europe Regional Office

##### Emerson Process Management Europe GmbH

Neuhofstrasse 19a P.O. Box 1046  
CH 6340 Baar, Switzerland

+41 (0) 41 768 6111

+41 (0) 41 768 6300

RFQ.RMD-RCC@EmersonProcess.com

#### Middle East and Africa Regional Office

##### Emerson Process Management

Emerson FZE P.O. Box 17033,  
Jebel Ali Free Zone - South 2  
Dubai, United Arab Emirates

+971 4 81 18100

+971 4 8865465

RFQ.RMTMEA@Emerson.com

#### Asia Pacific Regional Office

##### Emerson Process Management Asia Pacific Pte Ltd

1 Pandan Crescent  
Singapore 128461

+65 6777 8211

+65 6777 0947

Enquiries@AP.EmersonProcess.com

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