

Special Treatment

The residents of Orlando and nearby communities are more likely to see lightning strike than to have their toilets run dry. Extensive high-tech upgrades, including new Siemens automation and control systems, at Orlando's three advanced wastewater treatment plants have assisted city staff in its quest to process more sewage and gray water more effectively and reliably than ever before.

As growth continues to put more demand on Florida's fresh water supplies, more communities in and around Orlando are counting on reclaimed water to meet many of their residential and business needs. Water shortages, stringent environmental protection laws, surging sewer service demand, fewer

qualified workers, and a virtual rate freeze are the big challenges being tackled by a smaller but smarter wastewater management team.

"It's expensive and tough to find experienced and qualified people in this business. Automation has solved that issue for us," explained industrial automation manager, Bill Wood, as he walked the southern end of the city's Iron Bridge Regional Water Reclamation Facility. "It used to take a dozen or more operators to run this plant alone. Even though the operation has grown significantly in scope, running the plant is now more manageable and precise thanks to the vision of Orlando's public works and environmental leadership." The Iron Bridge plant was originally built in the 1980s to treat about 5 million gallons of wastewater per day. After several modifications and upgrades, it can now treat and reclaim up to 40 million gallons in that same 24 hours.

"The automation simplifies operators' decision making. All the information they need to run the plant is at their fingertips no matter where they are," said Wood, whose team has installed a totally integrated Siemens automation and energy system to assist in the operations and power distribution throughout the plant.

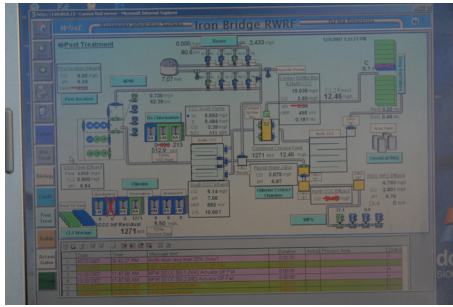


Orlando works with Siemens automation to achieve reliable, cost-effective wastewater treatment and recycling.

Siemens Energy & Automation, Inc.

SIEMENS

Reliable, cost-effective wastewater treatment and recycling.



Standardized on the Siemens S7-300 programmable logic controller (PLC) and Siemens PROFIBUS and Industrial Ethernet networks, the automation platform controls everything from the flow of electricity to the amount of reclaimed water being safely discharged from the plant. Treated water is sent to the Little Econ River and the Orlando Wetlands Park, while pipelines also deliver purchased reclaimed water to residential neighborhoods, golf courses, citrus groves and other customers as far as twenty miles away.



"Our daily objectives focus on keeping the toilets flushing and meeting the growing demand for wastewater treatment and reclaimed water across the region," Wood noted. "We can't reach those goals without the reliability and flexibility provided by Siemens automation and communication systems."

The Eyes and Ears of the Plant

Iron Bridge is a 320-acre operation – a series of treatment processes that must be closely monitored and managed. A Siemens PLC at the master pumping station reads real-time intake levels and signals variable frequency drives (VFD) when to speed up or slow down the eight

400-horsepower pumps designed to handle peak loads of wastewater rushing into the facility through an 84-inch pipe.

Halfway across the plant, Siemens flow meters are measuring the air being pumped into aeration tanks where organic waste is consumed by bacteria. A PLC controls the air flow, records and stores data produced during the intricate, five-stage biological process known as Bardenpho.



Siemens human machine interface (HMI) touch screens located inside every process station and linked to the facility-wide Industrial Ethernet network offer operators a real-time view into every layer of the plant. Siemens' WinCC supervisory control and data acquisition (SCADA) software offers that same vantage on the laptops, desktops and kitchen countertops of authorized plant and city personnel.



"It used to be a real juggling act for an operator to ensure that water leaving the plant through three separate exits met a variety of strict environmental standards for the river, wetlands and irrigation," explained Wood, as he clicked on the latest plant discharge readings on his office computer. "Now we trust Siemens automation to handle this once intimidating task with web-based WinCC SCADA software integrated over our S7 platform that provides reliable snapshots of our operation status and water

conditions anytime, anywhere. Coupled with the operator's expertise, the PLCs have become the eyes and ears of the plant and they have changed the way we do business," Wood noted.

Lowering Operating Costs

Orlando has three advanced wastewater treatment facilities and 210 lift stations, which pump sewage away from the homes and neighborhoods to Iron Bridge or one of two other plants, Water Conserv I and Water Conserv II. Orlando, like most municipalities, treated and operated each facility autonomously for decades. To reduce costs and increase efficiency, the plants were integrated using Siemens automation, WinCC and PROFIBUS and Industrial Ethernet networks.

"Rate freezes and infrastructure, inventory, and labor requirements put a real squeeze on productivity, so we had to find a solution that would benefit all of our facilities," Wood explained. "Instead of having staff dedicated to a single plant, we now share our resources across the entire enterprise using Siemens automation."

"As the treatment plant grows with the city, we simply can't continue to staff up. It's too costly," noted Guy Mecabe, wastewater systems manager, who has been instrumental in the deployment of the Siemens automation system and the PROFIBUS and Industrial Ethernet networks. "The reach of our networks has grown ten times over in the last two years, as we've expanded our ability to monitor and manage the whole system 24/7 from just about anywhere using WinCC SCADA software."



Authorized managers, operators and technicians can view the Iron Bridge plant

Reliable, cost-effective wastewater treatment and recycling.

from any one of ten onsite Siemens HMIs or a remote computer. They can also monitor and control operations at Water Conserv I, Water Conserv II or the lift stations throughout the city without leaving the Iron Bridge plant. "Secure remote monitoring means I can respond to a trouble call in the middle of the night by simply tapping into any of the treatment facilities from home or wherever I am. It's amazing," said Mecabe. "And we couldn't do any of it without the reliability of Siemens."



"Because we can't physically push the buttons that start, stop and reset processes, we've called on the best technology to do it automatically and reliably. It's just one of many new cost-cutting practices we've initiated that are really making a difference on the bottom line," said Wood.

Powerful Savings

"A lightning strike could instantly cut power to this plant, but all the Siemens PLCs and networks feature UPS (uninterruptible power supply) redundancy. The controllers signal an outage, the generators come online and the plant never misses a beat," explained Wood, noting that Iron Bridge has been struck before because of its location in a central Florida region known as the "lightning capital of the U.S."

While Siemens automation is assisting in the operation of Orlando's wastewater treatment system, a full suite of Siemens generator switchgear, including breakers and protective relays, is standing by to make sure three 2800 megawatt generators never fail during emergency operation.

The Iron Bridge plant is a big consumer of power with a monthly Progress Energy bill that averages \$180,000. But the question of the bill's accuracy long nagged Wood and his counterparts. As part of a re-rating plant upgrade, Siemens 9600 and 9330 utility-grade power meters were installed at the plant's power intake and at each of the facility's switchboards and MCCs (motor control centers).



"Until now, we had no way to verify the accuracy of the electric bill. The Siemens metering, linked to our networks, offers real-time consumption data and monthly peace of mind, as well as an effective way to identify the equipment power hogs in the treatment process," noted Wood, referring to the PLC-based system's ability to monitor and enhance power consumption at the device level. "That's a powerful capability that we fully plan to leverage in the months and years to come."



Code to Success

There's no secret to the successful control evolution at the Iron Bridge plant. There's no hidden blueprint. It's more like an open book. Bill Wood, Guy Mecabe and the team are more

than happy to share their experience with other industry professionals like Pat Brechbill, a wastewater treatment specialist with the Cobb County system near Atlanta who recently toured Iron Bridge.

"I'm most impressed with the amount of system information and feedback reports available and how it's easily and quickly displayed using Siemens HMIs and WinCC," said Brechbill. "A single purple PROFIBUS network cable has made wiring, maintaining and troubleshooting the plant easier and faster than a conventional facility. All in all, Orlando has one of the most innovative and efficient systems I've ever encountered."

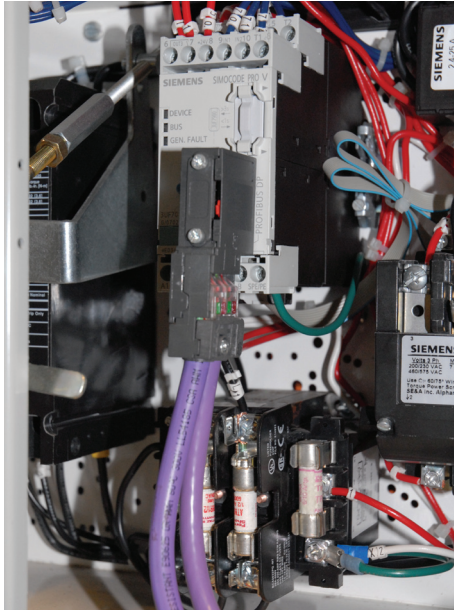
"I've seen too many treatment facilities spend lots of money on upgrades only to end up with outdated and patchwork solutions," explained Wood. "So if we can help steer a community in the right direction, why not offer them a good look at what we're doing here with automation using Siemens equipment."

What Wood and Orlando have done is design an upgraded treatment system with the future in mind. Every piece of Siemens automation and control equipment and software – from the PLCs and HMI touch screens to the WinCC that provides the graphical, insightful views into the plant – is modular in design so we can keep adding new functionality and applications along the way," explained Wood. "We could run this entire plant on two Siemens PLCs. But we've put a PLC in every process station to minimize our risk through a distributed architecture that's given us the ability to do whatever we need to do when demands change in the future."

Even the minimal hardwired functionality in the plant is future-proofed with a recent addition to the plant's automation platform – a multipurpose workhorse from Siemens called SIMOCODE. "SIMOCODE is a very flexible product," said Wood, opening a VFD cabinet in the Bardenpho process station. "We've actually changed our specifications to include a SIMOCODE in

Reliable, cost-effective wastewater treatment and recycling.

every starter bucket, so we can remotely check the status of smaller feeder breakers, as well as detect and reset faults over PROFIBUS."



Siemens SIMOCODE has dramatically reduced the wiring required in the motor control centers at Iron Bridge. "You can see how clean this cabinet is compared to the elaborate conduit chases with cables running back and forth in control rooms like this," explained Hester. "Instead a SIMOCODE has been placed in each bucket

as a piece of I/O that can easily be added and viewed on the network. It's all part of a totally integrated automation solution that works seamlessly."

"With SIMOCODE, I have very smart switchgear," said Wood, who is just beginning to see the power savings and preventative maintenance benefits that SIMOCODE can deliver each month. "SIMOCODE enables us to make better informed, accurate operational decisions that will help us dramatically reduce operational costs across the board. That's powerful."

Community-Minded Rewards

For Bill Wood, Guy Mecabe and the Orlando team, wastewater treatment is all about protecting the community and the environment. "Most people aren't



thinking about everything that goes into safely returning treated water back into the environment," said Mecabe. "It includes state-of-the-art automation that runs reliably for weeks, months and years enabling us to put clear, clean water back into the aquifer with confidence."



"This is the product of our treatment plant," Wood said, holding up a beaker full of clean water bound for the Little Econ River. "Siemens automation helps give us the confidence and information we need to secure the most important ROI of all – the return of clean water to our rivers, streams and irrigation systems across the region."

That's special treatment."



Siemens Energy & Automation, Inc.
3333 Old Milton Parkway
Alpharetta, GA 30005

1-800-964-4114
info.sea@siemens.com

©2008 Siemens Energy & Automation, Inc.
All Rights Reserved.
Siemens is a registered trademark of Siemens AG.
Product names mentioned may be trademarks
or registered trademarks of their respective
companies. Specifications are subject to change
without notice.

AMFL-COOWW-0708
New 5M0508XX Printed in USA

www.sea.siemens.com