Water & Wastewater Successes
Global References & Case Studies
GE Digital has more than 3,250 customers in the Water/Wastewater industry – including some of the largest municipal departments in the world.

While we serve water/wastewater departments of all sizes, below is a small sampling of large water utility customers. All customers are using a solution from GE Digital that includes our HMI/SCADA, Proficy Historian, and IGS. Often, customers are also using other products such as Proficy Webspace.

SABESP
4th largest water and sewage company in the world based on the number of customers. It serves more than 27 million clients in 373 cities in the state of São Paulo, which is the most populated state in Brazil. SABESP is responsible for about 30 percent of the Brazilian investments in sanitation.

Korea Water Resources Corporation
22.3 million people, daily drinking water supply of 17.6 million cubic metres and daily sewage of 12.3 million cubic metres

Mekorot, Israel National Water Company
8 million people including under treaties to the Palestinian Authority and the Kingdom of Jordan, 1.5 billion cubic metres of water annually.

West Coast USA Metropolitan Area
4+ million residents, over 140 billion gallons of drinking water.

Berliner Wasserbetriebe
Supplies over 3.7 million people in Berlin and surrounding areas with drinking water and treats the wastewater of 3.9 million people, 210 million cubic metres of drinking water.

Dubai Electricity & Water Authority
3.4 million people / 1 million customers, annually 126,000 MIG (Million Imperial Gallons).

East Coast USA Metropolitan Area
3+ million people, dispersed geographical area, more than 185 million gallons per day of drinking water, 300 M gallons per day of sewage.

Singapore Public Utilities Board, National Water Agency
Changi Water Reclamation Plant, one of the world’s largest and most advanced reclamation facilities. Treating about half of Singapore’s wastewater, serving approximately 2.85 million people. 202 million gallons of wastewater per day and expanding to 246 million gallons of wastewater per day in 2022.

Major Australian Region
1.5+ million people, extremely dispersed geography, more than 200 billion litres of water each year.

Metropolitan Sewer District of Greater Cincinnati
850,000 people, 160 million gallons of daily wastewater.

SES Water (Surrey, Kent, south London)
735,000 people, 160 million litres of water.

Kommunale Wasserwerke Leipzig GMBH
660,000 people, 37.9 million cubic metres of drinking water and 30.6 million cubic metres of wastewater annually.

Canadian Metropolitan Area
250,000 people, treats more than 1 billion litres of drinking water each day.

Northwest USA Metropolitan Area
1.5 million people, 150+ million gallons per day of drinking water at a single water treatment facility.
Welcome to the modern HMI/SCADA system—where machines, data, insights, and people are connected. See how GE Digital customers have improved operator response, adhered to regulations, and reduced costs by implementing proven automation, industrial data management, and analytics solutions—based on decades of water and wastewater experience.

**Bloomington-Normal Water Reclamation District**
Plant of the Year award from the Illinois Association of Water Pollution Control Operators

**Formellino Wastewater Treatment**
Improved water purification process and 30% energy saving

**Borås - Water and Sewage**
Easy-to-learn, integrated operator and information system

**iFIX HMI/SCADA and WIN-911 Combine to Babysit Wastewater Treatment at Night in Iowa City**

**WIN-911 and iFIX help Carmel’s Wastewater Utility Maintain Award-Winning Service**

**City of Haverhill Water and Wastewater Division**
Meeting critical needs and maintaining high quality

**City of Chandler and Carollo**
Decreased time and labor with faster, easier reporting

**Korea Water Resources Corporation**
K-water works with GE to realize the optimal solution for the global water industry, providing the highest efficiency and quality

**Metropolitan Sewer District of Greater Cincinnati**
Cincinnati’s “Smart Sewer” reduces overflows and cuts costs from $0.23/gallon to $0.01/gallon
MPGK Krosno Improves Reliability with SCADA and Historian Intelligent City Solution

Herning Vand gathers valuable knowledge with their historical data

Mekorot High availability, connected control solution virtually eliminates downtime

City of Orangetown
GE solution lowers costs, increases control capabilities at municipal sewer department

Sanasa Reduces Maintenance with 24/7 Remote Access to iFIX SCADA System

City of San Luis Obispo
The City of San Luis Obispo improves efficiency and productivity with iFIX

City of Peoria: Upgraded Alarm Notification Prevents Problems

City of White Rock’s Investment Brings Dramatic Improvements in Water Quality

Sabesp Modernizes SCADA Using iFIX and Remote Desktop Protocol (RDP)

City of San Luis Obispo
The City of San Luis Obispo improves efficiency and productivity with iFIX

Vandmiljø Randers
Optimized IT processes management and power consumption

Region of Waterloo Streamlines Water System to Ensure Highest Quality
Improving availability and reliability
Aging infrastructures and growing water supply demand make increasing availability and reliability crucial. Our HMI/SCADA, industrial data management, and analytics facilitate the corrective action to remediate a potential problem and ensure the right response.

Minimizing risk
Managing security and risk remains a top concern for utility operators. Our High Performance HMI/SCADA systems alert operators to out-of-spec events with superior alarm management and guides them through the right actions to take — whether routine or in an emergency.

Reducing cost
Operator errors, equipment failures, and excessive maintenance or chemicals all impact bottom line. Our HMI/SCADA allows utility operators to respond appropriately to events, such as storm warnings, and quickly resolve situations—minimizing additional costs.
Smooth Sailing at Bloomington/Normal Southeast Wastewater Treatment Plant

This story originally appeared in Treatment Plant Operator.
Photography by Bradley Leeb
Bloomington-Normal Southeast

When the Bloomington-Normal Southeast Wastewater Treatment Plant won a 2018 Plant of the Year award from the Illinois Association of Water Pollution Control Operators, team members were ecstatic.

Randy Stein, executive director and sports fan, likened it to winning the “Stanley Cup of wastewater.” On its way to the award (in Group 1 for plants larger than 7.5 mgd), the plant racked up 12 consecutive Gold Peak Performance Awards from the National Association of Clean Water Agencies.

The Bloomington-Normal Water Reclamation District was formed in 1919 and serves Bloomington, Normal, and the Village of Downs and subdivision of Crestwicke in central Illinois, with a total population of 134,000. The award recognizes safety, permit compliance, operations staff knowledge, and cleanliness and maintenance. A long-standing habit of excellence and effective planning set the plant up for the award.

Caitlin Raasch monitors secondary treatment air flows by way of the plant GE Digital’s SCADA software
Conventional activated sludge plant

The Southeast plant (7.5 mgd design) began operating in June 2005. Jake Callahan, director of operations, describes it as a “conventional activated sludge plant.” Preliminary treatment includes Spiralift screw pumps (Evoqua Water Technologies) and a Waste Tech Model 1300 bar screen with three-eighths-inch separation (Kusters Water, division of Kusters Zima Corp.) followed by a grit trap (Smith & Loveless) and grit washer (Parkson Corp.). The lift stations to the two primary clarifiers use three 125 hp Pentair - Fairbanks Nijhuis pumps. Each clarifier has a Toshiba sludge density meter.

Anoxic tanks are upstream of the five aeration tanks. “They help control the filaments in the activated sludge process,” Callahan says. “We run a higher solids retention time and get good nitrification in winter when the biology slows down. And we don’t observe any settling issues with the biological floc in our secondary clarifiers.” The anoxic tanks have Environmental Dynamics International FlexAir mini-panel fine-bubble diffusers. Blowers are 300 hp Turblex Model KA105V-GL210 operated with dissolved oxygen control.

Flow then goes to the two 115-foot-diameter center-feed secondary clarifiers for settling. Tertiary treatment consists of a traveling bridge filtration system. Media is anthracite coal on top, followed by coarse and then fine sand. Final effluent is disinfected by a TrojanUV UV4000 system. “This system has worked well, has been stable and is easy to maintain,” Callahan says. Final effluent is discharged to the Little Kickapoo Creek.

Solids are anaerobically digested to Class B standards, thickened and dewatered. Employees apply the material to farmers’ fields within about 30 miles of the plant. “We haul it and we spread it,” Callahan says. “That way they know where it’s been applied and the application rate is correct. Things are going pretty smoothly.” One reason is the GE Digital SCADA software interfaced with WIN-911: “A lot of thought was put into our WIN-911 software, which dials out to the on-call operator when there’s a problem.”

The plant also has a unique post-disinfection treatment stage: An experimental constructed wetland removes nutrients from about half of the plant’s discharge. The wetland has hiking trails and bird-watching sites that make it a getaway for area citizens.

Plant managers sent Jon Outlaw, operator, and Tom Anderson, chief mechanic, to run the plant when it started up in 2005. Stein notes that the plant was designed to run with just one operator and two maintenance people. The operator and maintenance person sent to run the plant in 2005 are now nearing retirement.
Critical training

In 2019, the district began rotating three of its experienced operators to the Southeast plant two weeks at a time so they could learn the process. Six operators cover the Southeast plant and West plant, the larger of the district’s two plants.

The West plant site has two treatment plants that discharge to Sugar Creek. One is a two-stage fixed-film plant with rock filters for BOD removal, nitrifying towers for ammonia removal, deep-bed sand filters and UV disinfection. The other is a conventional activated sludge plant with low-head traveling bridge sand filters, UV disinfection and post-aeration.

The district’s operations and maintenance team, in addition to Outlaw and Anderson, includes:

- Josh Stevens, West plant chief operator
- Mason Willis, operations foreman, and wastewater operators Ian Magerl, Caitlin Raasch, Jason Beach, Matt King and Matt Mink
- Brian Romine, solids foreman
- Southeast plant maintenance staff members Brant Ladick and Tyler Graf.

The Southeast plant is a one-operator, five-days-a-week, eight-hours-a-shift gig. It has an advanced SCADA system — GE Digital — that talks to the West plant via radio telemetry. Operations and maintenance staff are always on call for extreme weather or upsets. The SCADA system can alert the on-call operator when the plant is not staffed, and operators can respond to many alarms via their cellphones without having to report in.

In the first six months of 2019, the district hired three new operators and amped up its training. “We're trying to get some of the younger staff exposure at the Southeast plant,” Callahan says. “We want them to become familiar with the treatment systems there and have more opportunities to make decisions on their own.” This is where the two-week rotations help.

Coaching them up

The rotations and cross-training also help with communication and information transfer among operators. “Communication and collaboration have been important to our success,” Callahan says. “They've taken ownership and strive to find information and work together. With three new operators hired in six months, our senior operators have taken the initiative to coach up new operators.”

The staff is active in professional organizations. Stevens is past president of the Illinois Association of Water Pollution Control Operators; Magerl is president of the Central Illinois Professional Wastewater Operators organization. Stein and Callahan regularly attend meetings of the Illinois Association of Wastewater Agencies, a manager-level organization.

The district regularly sends operators offsite and even out of state for advanced training. “We encourage taking advantage of educational opportunities,” Stein says. “We send people out all the time, including to the University of Wisconsin-Madison. Their programs typically last four to five days and cover topics of interest to the district. We’re not afraid to spend money on education.”
Nutrient removal

The Southeast plant was designed with a nutrient-removal-ready footprint. “We expect the Illinois EPA to issue a new permit in August 2020 with a compliance date of 2030,” Callahan says. “Not as much construction will be required at the Southeast plant as at the older West plant to enable it to meet permit; it’s newer and more ready to host new processes.”

One useful new capability is an Orion 420 weather station (Columbia Weather Systems) at the Southeast plant and another at a pump station about 10 miles upstream. These stations record rainfall intensity and duration. The district has integrated real-time weather data into the SCADA system; that helps operators predict impacts on plant operations. Having weather data interfaced between SCADA and lab data software helps in post-event analysis and eliminates hand entry of data.

The staff has also reduced the electric power bill at the Southeast plant. As the local electric utility’s largest customer, the district has worked with utility staff to find a win-win on high-demand summer days when power consumption for air conditioning is high and the electric utility wished the treatment plant would use less power.

The district tied a 2 MW, diesel standby engine-generator (Caterpillar Inc., Electric Power Division) into its SCADA system. When the electric utility tells the district to shed the treatment plant’s electric load for the next four hours, an operator enters the changeover times into the SCADA system.

Rate savings

At the appointed moment, SCADA fires up the generator and performs a closed-transition transfer of demand to it. At the predetermined time to switch back, SCADA returns the power draw back to the electric utility and shuts the generator down.

Using the standby generator for primary power for those four-hour peak demand periods gets the district a substantial electric rate reduction throughout the year. The district had to modify the standby generator to produce lower emissions and comply with air-quality regulations affecting primary power sources.

The district is considering a new blower system for the Southeast plant that will use less horsepower and allow operation with lower dissolved oxygen values. The flow train through the secondary process will also change. “We’re parallel plug flow now, but we’re capable of serpentine flow in series,” Stein says. “We could possibly have a split serpentine flow through five aeration basins.”

There are also plans to nitrify and denitrify in the aeration tanks.

“We’re already investigating the software our SCADA system will require to do this,” Stein says. Some methods that might be used to remove phosphorus at the Southeast plant have been piloted at the West plant.

An innovative measure is in place to control influent at the Southeast plant. Although the plant’s collections system is a separate sanitary sewer system, excessive inflow and infiltration during sustained wet weather has shown the potential to flood the plant grounds.

To prevent that, a 54-inch interceptor lies in a mostly flat grade approaching the plant for temporary influent storage. Flow travels from the three communities about 6 miles to the plant, and there are virtually no connections in the final 3 miles.

With the aid of a highly accurate electrohydraulic actuated sluice gate (REXA) for surge control in the almost-flat interceptor, roughly 1.23 million gallons of influent can be stored there and throttled slowly into the plant. “It works well,” Callahan says.

Stein observes, “When we have a 3-inch rain overnight, I don’t get nervous about flooded pump stations.”

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Borås - Water and Sewage

New SCADA system for the town
The operators carry on as normal

Novotek took the challenge to bring the configuration from the old system into the new iFIX operator system from GE Digital.

“At Novotek we have developed an efficient method to treat the old configurations and transfer them from the old system to the new. The accurate migration has among other things meant that it has not been necessary to test each and every signal, a great advantage,” says Magnus Linnér who was responsible for the architecture at Novotek.

All information present in the plant was migrated into a new error free configuration. At the same time the old base for the communication with all the control systems was replaced with a modern and easy to maintain Ethernet based communication.

The new process pictures and operator screens are very similar to the old ones. This means that the operators can work in a similar manner as they used to. All operators in the different plants can see each other’s plants. They have also been able to trust the information in the pictures all from the start.

Continuity and future proofing

The SCADA system installed by ABB many years ago started to create problems.

• The capacity was too low according to Lars Jonasson
• But there was another side too. The system started to get outdated and the number of people that could master it was greatly reduced. We wanted a new system that could preserve old well working functions and at the same time add new technology and be open towards the future

Solutions

• Operator and SCADA system
• Alarm distribution
• Logging of historian data
• Environmental reporting
• Remote diagnostics

Products

• 2 iFIX SCADA servers
• 2 iFIX main work stations with double screens
• 2 iClient Terminal servers for up to 20 simultaneous logged in users
• New network

Advantages

• An integrated operator and information system
• Fast to learn
• Environmental reporting according to legal requirements
• Standard communication over Ethernet, easy to maintain
• Increased capacity and expansion possibilities
• Open system that gives flexibility when choosing supplier
• One of the world’s largest SCADA system suppliers means future proof

The town of Borås has a population of 100,000 people. Drinking water is produced in 8 water treatment plants that produces 8.8 million cubic meters of water every year. Nine sewage treatment works takes care of 15 million cubic meters of sewage water per year.
An extension project with a continuation

The new system handles a great number of different functions. It consists of the SCADA and HMI system iFIX and Proficy Historian for archiving of signals. The system handles all start and stop of equipment, all control loops, alarm distribution via text messages to mobiles, remote diagnostics from all connected PCs, reporting of environmental data to the authorities, logging of trends, own analysis in Excel, etc.

The personnel have become more flexible since they now can log in via Internet and web-interface where ever they are. They can see the same operator screens if they are at home on call or if they are at work.

“Novotek got the assignment since they were able to show us how they could migrate data in a secure way from the old system and because they could provide us with an open and future proof solution,” says Lars Jonasson.

“We can now maintain the system much on our own. If we have an emergency we can always contact Novotek who provides us with a 24/7 service agreement. Usually if there is a problem or there is something we want to have done this can be done over an Internet VPN-connection.”

Borås W&S worked out a future proof solution that preserves past experience and combines it with new technology.
WIN-911 and iFIX help Carmel’s Wastewater Utility Maintain Award-Winning Service

- 50% Faster response
- No code configuration - Plug-and-play integration
- High reliability - SCADA and alarm management
Introduction

Municipality
City of Carmel, Indiana

Products
• iFIX HMI/SCADA
• WIN-911

Sewage treatment that’s best in class at Carmel, Indiana: One of America’s top 10 places to live

You may have heard of Carmel, California, the seaside resort where Clint Eastwood once was mayor. But there’s another Carmel in Indiana that’s recently been attracting attention. For two years running, this growing city of 90,000 has made Money Magazine’s 10 Best Places to Live in America.

What’s behind the accolades? Besides a picturesque downtown, a thriving economy, and being America’s roundabout capital (there’s over 100), Carmel is a leader in wastewater treatment. It goes back to when the city won an Engineering Excellence Award for being the first in the US to implement a Bio-Pasteur process for its biosolids.

Today that innovation continues with the city’s ongoing drive to optimize its water and wastewater processes, including implementing iFIX HMI/SCADA with WIN-911’s software for remote alarm notifications.

Challenge

Modernizing the plant’s control and communication systems

Previously, the city’s water department used an aging dial-out system with paging and analog voice calls to alert staff when its 12MGD wastewater plant equipment or one of 22 lift stations would go into alarm mode. That changed when they upgraded to GE Digital’s iFIX SCADA system along with WIN-911 for in-app and SMS alerts.

The team uses iFIX for monitoring and control, sending alarm events to WIN-911 on:
• Lift station levels
• Blower & pump failures
• Phase power failures
• Flow and pressure meters
• Chemical meters, clarifiers, aeration feed rates and levels
• Communication failures
The utilities department currently operates two manned shifts on weekdays, and one on weekends, with the late-night hours being unmanned. In-plant alarms are routed to plant staff, lift station alarms go to lift station personnel, and a hodgepodge of miscellaneous alarms need to go out to a range of different people, depending on the alarm type and severity.

Buhmann says that WIN-911’s flexible scheduling and escalation engine was a key to relieving overlap and confusion when it came to alarm response. “It works great for grouping alarms for both in-plant and off-site staff, and accommodating our changing shifts and schedules.”

Results

Alarm response has improved

Buhmann notes that the new system saves time and money because of improved efficiency in response, both during and after regular work hours.

Our response time has improved because we can let people know specifically what the alarm is and in what status condition. No one has to go to our monitoring computers to see the alarms and where they are at.

— Kevin Buhmann - Senior Wastewater Technician, City of Carmel, IN

As one of the people responsible for installing new IT systems and PLC programming, Buhmann knows how complexity in implementing automation projects can be a show-stopper. He pointed to WIN-911’s direct connects to iFIX as a major advantage. “It’s [plug and play configuration] works great ... and is easy to set up.”
City of Chandler, Arizona, and Carollo

Decreased time and labor with faster, easier reporting
City of Chandler, Arizona, and Carollo

Challenge

Action
Implemented Dream Report with GE’s CIMPLICITY HMI/SCADA for easy setup of report templates for EPA compliance and internal reviews. One-button web portal setup.

Result
• Faster, easier reporting – saving time and labor
• New reports created in minutes versus days
• Short learning curve with fast technical support
• Anywhere, anytime access – even from smart phones – for improved collaboration and decision making
Cincinnati’s “Smart Sewer” reduces overflows and cuts costs from $0.23/gallon to $0.01/gallon
Metropolitan Sewer District of Greater Cincinnati

The Metropolitan Sewer District of Greater Cincinnati (known as MSD) protects public health and the environment through the safe and efficient collection and treatment of wastewater for 43 of the 49 political subdivisions in Hamilton County, Ohio, and small parts of Butler, Clermont, and Warren counties.

MSD’s service area encompasses 290+ square miles and serves a population of more than 850,000. MSD maintains about 3,000 miles of sanitary and combined sewers and operates seven major wastewater treatment plants, more than 100 pump stations, two package treatment plants and several high-rate treatment facilities. About 160 million gallons of wastewater is treated daily.

Challenges

Compliance with federal mandate

Increase existing sewer system efficiency to address Consent Decree (federal mandate) to keep raw sewage mixed with stormwater out of waterways when it rains.

Solutions

A wet weather operational program for monitoring and control

Using iFIX HMI/SCADA and Proficy Historian from GE Digital in a Wet Weather Operational Optimization system, Greater Cincinnati MSD monitors flow levels and controlling gates and valves to direct flows, allowing the utility to store flows inside large interceptor sewers, storage tanks, and high-rate treatment facilities in different parts of the sewer system. The software also delivers the visibility for operators to make informed decisions and optimize the use of the interceptors, avoiding overflowing systems that are at capacity.

Results

“Smart Sewer” optimizes operations

- Reduced costs to about $0.01/gallon of overflow volume, as compared to about $0.23/gallon for green stormwater controls and about $0.40/gallon for larger pipes and storage tanks
- Reduced sewer overflows by more than 400 million gallons per year
- Decreased new capital projects needed to reduce the overflows, such as larger sewers and storage tanks
- Anticipated to save tens of millions of dollars in capital investments in projects to control sewer overflows
Formellino Wastewater Treatment Solutions for the Water Industry

Results

• All plant data is collected and used for predictive calculations and for optimizing process efficiency
• Improved water purification process and 30% energy saving
• Improved water quality and better control of crucial river habitat parameters

“We used [GE Digital] products in this plant for the first time, and despite the complexity of the logics and the installations, we encountered no problems at all.”

Alberto Tabanelli, Novanet Technical Manager

The Formellino plant purifies 1000 m³/hour of water, diverting it from water flowing to the Lamone river.
The purification treatment process

The Formellino Wastewater Treatment plant diverts the water flowing into the Lamone river, splits the flow onto two parallel lines, and directs the two flows to the treatment tanks. The water is pumped back downstream into the river after the purification treatment process. The activated sludge purification system is a biological type where organic substances and ammonia are oxidized in the presence of oxygen by the activated sludge. The nitrate products, typically eutrophying nutrients, are later removed in absence of oxygen. Consequently, the oxygen content, the active sludge concentration, the nitrates, and the ammonia are key data inputs of the plant process control system. The first steps upon entrance into the plant are grit removal and deoiling (not managed by the control system). The first active step of the plant follows: the equalization and primary decantation tanks form a vessel for controlling the sewage flow rate into the various tanks by means of sluices (a simple level gauge is used for this).

Then sewage reaches the oxidation and pre-denitrification tanks where the level of oxygen in the slurry is measured at the inlet and at the outlet. The nitrates and suspended solids are also measured in these tanks (by means of turbidimeters, which are designed specifically for measuring turbidity by implementing optical techniques), along with the phosphorous and ammonia contents, the level of decanted sludge, and the inlet and outlet water flow rate. Some of the output sludge is recirculated back to the inlet and reintroduced to improve the biological processes. After oxidation, the water flows to the secondary decantation tanks where the sludge deposited on the bottom is collected and conveyed to the thickener. Here, the sludge is prepared for drying and disposal. The clarified water is instead released into the river.

Water is cleaner with GE Digital

The Formellino Wastewater Treatment plant at Faenza is managed by Hera Imola—Faenza S.r.l. It is a medium-sized installation, which purifies 1000 m³/hour of water and runs 24 hours a day, seven days a week. The plant must ensure that all of the water produced by the purification treatment process meets or exceeds the required quality regulations.
Plant criticalities

The water treatment plant is, due to its intrinsic nature, subject to seasonal variations determined by rainfall. Consequently, one of the process criticalities is that the quality of the water to be treated cannot be determined beforehand. Furthermore, the plant collection basin includes a number of industries, which introduce large amounts of waste, thus the water chemistry and flow varies greatly. Another criticality of a plant like this, with such an extensive coverage, is that it is always on. This is essential to prevent the risk of releasing polluted water into the river and to prevent being fined by the water quality monitoring authority.

Before and after

The old plant was run according to a fixed time logic. This consisted of making the sewage water stand in the various vessels for a predetermined length of time and controlling the operation of the process-related machines (aerators, blowers, pumps, etc.) according to dissolved oxygen measurements and laboratory test data only. The goal set by Giovanni Tedioli, Water Treatment Manager of Hera Imola—Faenza, was to use the data collected by various sensors to control the transit times of the sewage in the tanks and machine operation according to the values of oxygen, ammonia, suspended solids, and nitrates to improve plant processing and energy efficiency. Furthermore, the new control system had to allow an operator to work at the plant as well as relaying data to the control room from where all Hera plants are monitored. The plants are manned during the day, but the control room alone monitors the operation of all water treatment plants during the night.

Massimo Zanoni, Electrical Maintenance, Automation and Remote Control Manager of Hera Imola—Faenza S.r.l., recollects the project start-up: “When we decided to refurbish the plant, we asked ourselves how to make sure that the new automation system would guarantee our peace of mind. The water treatment plant releases water into our own rivers and this implies additional responsibilities towards society: we need to guarantee faultless operation, for ourselves and for our environment.”

The “peace of mind” Zanoni mentions was then to be translated into high plant availability and reliability, data access by operators, and improved process management in terms of better results and more efficient use of energy resources. In order to reach these goals, Hera called Pastorelli’s Environmental Engineering firm to establish the project guidelines. The system was made by Novanet, a company based in Emilia-Romagna, Italy, with major expertise in the construction of large control and automation systems. Hera asked Novanet to use GE products for implementing the control system. These products are standard at Hera Imola—Faenza plants because they are reliable, competitively priced, the construction technology is good, and assistance in case of need is prompt and conclusive.
The control system

The “brain” of the system is a PACSystems RX3i (now available from Emerson) in redundant hot backup configuration, which interfaces with all the field instruments on a Profibus network (part optical fibres and part copper wires); there are several new and old sensors in total, amounting to approximately 600 controlled tags. The two redundant CPUs ensure the high plant availability required by the application criticality. The PAC Contoller establishes the standing times of the slurry in the various stages of the plant. By means of a direct Modbus/TCP link, the PAC communicates data to the Hera control room, where they are stored in a SQL database and concisely displayed so that the operator (present 24 hours a day) can be warned of faults and act accordingly.

At the Formellino plant, a local computer running CIMPLICITY from GE Digital, part of the HMI/SCADA suite, monitors and displays information and data in the form of trend or log, in addition to alarms, which may be silenced or not by the users according to their access levels. Ten profiles corresponding to ten different operative and data access levels have been created according to the privileges established for each user class.

The application allows for set up and program control parameters (the plant has been running only for a few months and the control logic is still being fine-tuned). Many fault detecting functions have been implemented in program running at the water treatment plant today to signal measurements deviating from expected values and to collect and use self-diagnostic data from the field sensors.

Novanet, the company who implemented the water treatment control process, was new to GE, despite having made control and automation systems for years.

“We used [GE Digital] products in this plant for the first time and, despite the complexity of the logics and the installations, we encountered no problems at all,” said Alberto Tabaneli, Novanet Technical Manager. “The PLC hot backup function provided default hardware redundancy, which avoided us further complications, and the system performance allowed us to introduce a predictive control, which has greatly improved plant performance.”

Intuitive displays show the plant status to operators at any given time.

The data collected from the field is used to carry out a predictive control and therefore optimize machine use.
The results

The new system collects plant data for constantly monitoring everything in detail. Predictive control, sensor data collection, and use and control system response rapidity have been exploited to optimize machine running times and consequently decrease energy consumption while keeping the water quality high. Before installing the new system, for example, the water was over-oxygenated, and this was pointless from a microbiological point of view. The Formellino Water Treatment plant automation system has been running for only a few months and the implemented logics are still being optimized. After only 50 days, an energy consumption of 30% has already been observed. The plant was shut down for approximately half an hour to allow the new system to be installed. Personnel training was swift, thanks to intuitive, self-explanatory graphic displays, and was carried out over several shifts to account for staff turnover.

Future developments

New actuators, which will be controlled continuously instead of in steps, will be added in the future. They will be installed on the Profibus field network and controlled directly by the PACSystems Rx3i. These improvements will provide the best results where the processed matter is kept moving: i.e., in oxidation and sludge recirculation tanks.

About Hera

The Hera Group was established in 2002 following the merge of eleven public utility companies from Emilia-Romagna. Other companies were acquired during the merging process, including Agea, based in Ferrara in 2004, and Meta in 2005. This completed the first Italian merge of listed stock multiutility companies. The Hera Groups works in approximately 180 towns in the provinces of Bologna, Ferrara, Forli-Cesena, Modena, Ravenna, Rimini, and in some towns in the provinces of Florence and Pesaro-Urbino. It is split into seven Local Operative Companies, one of which is Hera Imola Faenza, which is responsible for managing water, gas, electricity, remote heating systems, and environmental hygiene over an area of 23 towns.

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About Novanet

NOVANET is a system integration and engineering firm specialized in building automation, management, supervision, remote control, and home automation.

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iFIX HMI/SCADA and WIN-911 Combine to Babysit Wastewater Treatment at Night in Iowa City

- **Lower costs** - Night-time monitoring & alarms
- **Faster response** - Alarm notifications
- **Less risk** - Reliable SCADA & alarm management
Introduction

Municipality
Iowa City, Iowa

Products
• iFIX HMI/SCADA
• WIN-911

Challenge
Resting Easy with Automation

The municipal treatment plant for Iowa City, Iowa has 15 mgd (million gallons per day) of treatment capacity between two plants. The system serves a population of 67,000, a wastewater treatment plant (WWTP) population equivalent of 120,000 since the system services all of Iowa City and small town of University Heights as well as the University of Iowa with a student population of almost 30,000.

The City had been staffing their WWTP system 24/7, but could see that with the upgrade to GE Digital’s iFIX HMI/SCADA, the night operator was unproductive and bored. The overnight position was difficult to keep staffed and if a dramatic event occurred at either facility, the night shift operator would likely be unable to handle it himself.

Solution

“Once we upgraded our SCADA, we were close to letting the SCADA handle the plant at night, but we didn’t have the key pieces. We needed to work out a system for reliable notifications, that’s where WIN-911 came in,” said Dave Elias, Wastewater and Landfill Superintendent for Iowa City.

“We have been relying on the WIN-911 system and staffing our facilities only 10 hours per day for years now. It’s a computer babysitter.”

— Dave Elias
Wastewater and Landfill Superintendent, Iowa City

iFIX HMI/SCADA and WIN-911
Alarm Notification

Iowa City runs an iFIX SCADA system with three nodes operating in three different locations via a local area network. In combination with iFIX, WIN-911 is set to run 1900 alarms ranging from monitoring tank levels and flow failures to building temperatures and rises in plant conditions. To ensure full coverage, the municipality runs a back-up copy of WIN-911 on a separate PC in another location.

The WWTP facility’s two plants are five miles apart, with one operator on duty on the weekend. With WIN-911 on alert, that operator can be more productive, monitoring plant conditions in one location while at another.

“It’s helpful for operations to be away from the computer system to respond to any alerts but still see if any other conditions are raised while they aren’t near the computer,” said Albert Figueroa, Senior Treatment Plant Operator.
Results

Early Warnings and Fast Response

Based on the iFIX A&E data, WIN-911 was called into action when a waterline broke in the basement of one of the WWTP buildings, triggering an alert. "WIN-911 sent us cell phone notifications and we had early warning to respond," said Elias.

WIN-911’s intelligent decision matrix also allows the City to categorize alerts, recognizing urgent responses from less immediate concerns. The urgent alerts are sent as text messages to the maintenance staff on-call cell phone, where WIN-911 makes it easy for that employee to call for additional assistance, if needed. The less urgent alerts are sent to the maintenance supervisor’s computer station, where items are evaluated and prioritized for action.

"WIN-911 sends different levels of response based on the issue," added Figueroa. "We also receive early warnings, which allow us to start investigating before issues become big problems."

"WIN-911 has given us the ability to respond early. It’s robust as a warning system. If one alarm doesn’t get your attention, the next ten will."

Dave Elias - Wastewater and Landfill Superintendent, Iowa City
The City of Haverhill Water and Wastewater Division

Meeting critical needs and maintaining high quality
The city of Haverhill, Massachusetts, keeps a close watch on its water infrastructure, operating both Water and Wastewater Divisions.

The city’s Water Division provides drinking water to 58,000 Haverhill residents and businesses, and produces two billion gallons of water on average each year. The plant itself is manned 24 hours a day, seven days a week, to ensure the highest quality water is delivered each day to the city’s residents. Water quality is constantly monitored to make sure that it meets both state and federal drinking water quality standards at all times. Water treatment processes include conventional surface water treatments such as coagulation, flocculation, sedimentation, filtration, disinfection, and pumping.

The city’s Wastewater Division maintains the wastewater treatment plant, which provides both primary and secondary treatment for the city’s wastewater. Within the Wastewater Division there are two groups—one monitoring wastewater collection, and the other overseeing wastewater treatment, which includes bringing water and routing wastewater into various facilities from multiple points across the city.

As part of its duty to safeguard the city’s water supply, the Water Division is also responsible for monitoring, water maintenance, and water treatment, which includes protecting water resources. The city of Haverhill is currently supplied with water from Kenoza Lake, Millvale Reservoir, Round Pond, and Crystal Lake.

The facilities themselves are 32-years-old, however, the control strategies they have in place today have put them well ahead of other facilities of similar size and operation—thanks in large part to tools becoming more readily available, accessible, and connected.

Benefits of working with GE Digital

- GE Digital has put the city of Haverhill’s Water and Wastewater Divisions well ahead of other facilities of similar size and operation
- They now have the ability to use advanced analytics to model high-flow scenarios—and better prepare the plant for potential weather-related issues
- Plant’s knowledge base was captured, reducing training overhead
John D’Aoust, Plant Manager for the city of Haverhill’s Water Division, has been with the city for 18 years, and has been leading the charge to harness the power of the Industrial Internet. He began many years ago by teaming with GE Digital to automate many of the processes that his team had manually documented in order to follow standard operating procedures (SOPs), including state-mandated emergency response plans (ERPs).

D’Aoust’s first step was to implement GE Digital’s iFIX. It quickly became a real asset in maintaining water quality. Next, the Haverhill team added GE Digital’s Proficy Workflow, a software platform for measuring and managing the efficiency of plant operations. It was an immense performance improvement over their documented processes. Moving to a computerized process environment allowed D’Aoust and his team to have a cohesive system to follow procedures, and respond to events in a consistent and sequenced manner.

He took his connected environment even further, and purchased Dell Latitude laptops for his on-call operators. Allowing them to be untethered from the facility, but still access GE Digital’s software to maintain control of operations from any location. The on-call people are the first responders for after-hour issues—maintaining pumps, monitoring chemical levels in the treatment plant, and even keeping a watchful eye on the plant itself as the post-9/11 era raised awareness for new safety concerns. "With GE Digital's iFIX you can connect to the plant—get it set up and you don’t have to watch it as closely. It was all manually controlled before—all hardware based, and it took a lot of attention by the team to maintain," he said.

The laptops were equipped with GE Digital’s software and cellular dongles to access water facility operations. Each laptop had to be maintained and manually updated. The benefits of being remote and still being able to access iFIX were clearly visible. So much so that D’Aoust put GE Digital’s mobile app to work and swapped out his pool of laptops for a single Apple iPad connected over wireless LTE. The plant’s team is alerted to any issue through a series of alarms that have been established, and they can use related products, such as troubleshooter programs to conduct flow chart decision-making for their wastewater operations. "They have all the features of the control room in their hands."

John D’Aoust, Plant Manager for the city of Haverhill’s Water Division
According to John D’Aoust, “The upside of moving from three laptops to an iPad is that there’s only one machine to maintain, and the price per iPad is considerably less than having to purchase multiple laptops. There’s a time savings, and it lowers the complexity of our system.”

The one technical hurdle that he had to overcome in his move to become more mobile was to ensure the security of the network. In order to get the iPad onto their internal network, they had to reevaluate their VPN connection. Ultimately that involved a change of provider.

One of the unanticipated benefits of this newly-connected world was the ability to capture and transfer knowledge easily between senior members of this staff and new hires.

“One of the biggest project benefits of putting the data model together has been capturing our knowledge base,” said Fred Haffty, Wastewater Facility Manager. “We have people who have been here since the plant started more than 30 years ago, and when they retire, they take that experience with them. So when new operators come in, they are able to know how the system works—to be able to adjust the treatment process for swings without impacting quality.”

The move from a manually-intensive operation to a much more efficient software-based mobile operation has afforded the plant with much more flexibility, and resulted in cost savings. The team is able to see everything that’s happening at the plant from a remote location, and be alerted to changes in the water operations without a strain on human capital.

Just recently, the team started using advanced analytics to model data for high flow situations—such as potential threats brought about by severe weather. Using GE Digital’s Proficy CSense, a powerful analytical tool that utilizes leading-edge techniques to extract knowledge from historical processes and plant data, the team is able get a real sense of how the plant will perform under certain conditions.

For example, if the plant exceeded X-number of gallons a day, what is the likely result? Previously, the team had to refer back to historical data that was fixed and not fluid. Information was logged into an Excel spreadsheet—it was a very manual process with no modeling capability. Now they have five key performance indicators to monitor operational performance much more effectively. GE Digital’s Proficy CSense can have a fundamental impact on present time.

It’s been 12 years since John began working with GE Digital to transform the city of Haverhill’s water operations from a fixed hardware-based manual operation to one that’s leading-edge in his industry. His experience continues to be a positive one.

“We’ve been working with [GE Digital] for the past 12 years now, and it’s been a great relationship,” said John D’Aoust. “We’ve made those 2 a.m. calls to our reps, and they’ve been right there to answer—whatever we’ve needed. Our philosophy is that you pick a good company up front to meet your needs, and you stick with them. We haven’t been disappointed.”
Korea Water Resources Corporation

K-water works with GE to realize the optimal solution for the global water industry, providing the highest efficiency and quality.
Since its establishment in 1967,

The Korea Water Resources Corporation (K-water) has worked toward more efficient development and management of Korea’s water resources. To that end, they are continuing the aggressive pursuit of change and innovation in water management practices as the next big step towards becoming “a global water environment specialist.”
K-water started a journey with GE to develop a centralized and integrated water solution for all over the world as Water-K, an OEM brand name for GE Digital’s iFIX HMI/SCADA for the automation of water supply facilities and the standardization of water treatment process, and K-water renamed it as iWater and exports to the companies in the water industry across all over the world.

K-water has managed 56 water control facilities including 20 multi-purpose dams, 16 multifunctional weirs, and the Nakdong River Estuary Bank, to provide a clean and stable water supply. In addition, K-water has built 48 wide-area and industrial water supply facilities with a daily supply capacity of 17.6 million m³ and currently supplies drinking water to 22.3 million Koreans.

K-water has been entrusted to operate the water supply systems for 23 local governments, starting with Nonsan and most recently Cheongseong by using iWater.

K-water supplies industrial water of various quality of levels, customized to the needs of customers, and is becoming Korea’s leading supplier of water for industrial purposes thanks to the development of high-efficiency, low-cost water treatment process and the optimized automation and centralized integration of its data by using our system.

Lastly, K-water treats 12.8 million m³ of sewage per day to improve the water quality of streams and enhance public hygiene, thereby creating a better living environment. K-water is managing the entire country by dividing into 3 regions along with the rivers such as Hangang River Regional Head office, Nakdonggang River Regional Head office and Geumgang, Yeongsangang & Seomjingang Rivers Regional Head office.

By using iWater, K-water has moved beyond the simple management and utilization of water and achieved integrated water resources management of these regions’ water supply systems and local water supply system throughout the entire South Korea by applying ICT to the management of water quality and ecology. Thereby it allows equal distribution of the benefits of water to everyone, everywhere.

Success of the integrated water management system is the key to national water safety and public water welfare. K-water promises to provide healthy water circulation for all to protect citizens from disasters such as flood and drought and ensure greater happiness through the sharing of water.

The company is working tirelessly to develop and manage water resources in an environmentally friendly and efficient way.

- Drinking water for 22.3 million Koreans
- 56 water control facilities
- 20 multi-purpose dams
- 16 multifunctional weirs
- 48 wide-area & industrial water supply facilities
- Daily drinking water supply of 17.6 million m³
- Daily sewage of 12.8 million m³
- 23 local governments
Their goals include:

• To promote the integrated management of water-related facilities
• To establish seamless flood control and irrigation systems by leveraging information technology
• To produce and supply the world’s safest and best tasting tap water
• To further expand into international water markets
• To increase their social responsibilities as a government-run company
**Long-Term Partnership with GE**

To fulfill their goal of being a global company specializing in water resources, K-water wanted to find the best business partner for a specialized software application to offer as an OEM solution in the water industry.

“When we selected the software for the water system, we considered who had the largest number of installations and who had the best reputation in the water industry throughout the world,” explained the IT Manager for K-water’s Water Supply Division.

K-water determined that they needed specialized software to eliminate the concern for water-related disasters and environmental issues while also promoting the fair distribution of benefits from clean, safe water.

“GE has provided stable and sustainable solutions for many years without any defects for K-water,” Water Resources Management Division Manager said.

In the result of the company’s effort to develop and manage water resources in an environmentally friendly and efficient way, K-water’s integrated water management system, iWater, is widely used not only in Korea but also in other countries such as Algeria, Indonesia and Thailand.

K-water is taking the experiences and wisdom built up over the past 50 years as a precious resource. K-water will take the lead in solving the water issues, which are urgent matters in Asia and around the world.

**Integrated Water Monitoring System**

Considering all factors influencing water management in each basin, K-water carries out water resources management through the integration and intelligent management of water quantity, quality, ecology and environment, which were previously managed separately.

K-water, as Korea’s only organization with the capability to deal with all fields of water resource surveys, including surveys of sluices, basins and groundwater, provides to the public all water-related data collected in real-time through iFIX as its main HMI/SCADA system for iWater, as the company’s water resource management system. Also, the company is building an intelligent water operation system that collects operation data on the whole water supply process, from the intake source to the tap, and carries out real-time monitoring and control.

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**Technology Supported Projects**

- Georgia
- Pakistan
- Solomon Islands
- Philippines

**Investment Projects**

- Uzbekistan
- Peru
- Bolivia
- India
- Laos
- Cambodia

**ODA Projects**

- Uganda
- Indonesia
- Equatorial Guinea
iFIX is part of the Proficy family of automation software products, a single intelligent production solution that works with existing multi-vendor hardware and software solutions to gather and analyze data. Solutions can connect to equipment across the entire physical enterprise to deliver both on-line monitoring for rapid operational response as well as collect historical data as the foundation for continuous improvement. So, K-water can implement many other useful programs by using the third-party interface of iFIX.

“Compared to other HMI, it is possible to operate a wide range of operations from the perspective of the operator and system integrator. iFIX provides a friendly development environment for the engineer so that we can easily customize and use it. It supports various interfaces such as VB Script, .NET API, Dynamo functions and AlarmQ functions so that we can develop complex requirements of operating personnel,” Hong Jintaek, System Integrator developer for K-water, said.

iFIX offers canned functionality to drill into tag details, instantly trend variables, view enterprise data through hosted portal displays and deliver thin client connectivity to SCADA nodes through terminal services. Graphic tools deliver a variety of drawing productivity tools and advanced capabilities for 3D piping and connected object management.

“iFIX supports Standard Dynamos. Using Dynamos, various objects such as pumps, valves, and tanks used in K-water are developed in the form of a ‘standard dynamo’ and delivered to operator and developer to design the screens based on this. Even though many people design various screens, it looks like one person designed them because of Standard Dynamos. The biggest advantage is that operators can work without a hand-over even if the workplace is changed,” Hong Jintaek, System Integrator developer for K-water said.

iFIX is ideal for use in Water/Wastewater facilities and is installed in some of the largest plants around the world. And, Proficy is a proof point of GE’s lean strategy by delivering a customer solution that simultaneously improves a customer’s operating and environmental performance.
Water, Water Everywhere

The iWater system interfaces with water treatment equipment management systems, application computers that need to forecast the system, and real time water management DB servers. It has the flexibility to communicate with other third-party software even though local PLC and DCS systems are included.

GE provides customer-focused OEM contact to achieve great customer satisfaction and has stepped forward as a long-term business partner with a win-win strategy. K-water developed many efficient applications as well as mobile monitoring system and included in the iWater brand as part of its business master plan.

An integrated operating system, the iFIX-based GIOS has many redundant features and is functionally distributed for the highest level of reliability and performance. Identical servers run in parallel, so if one fails, the client can switch to the other server automatically. And, the file server contains recovered process values, messages, and data from the failure time period that can be automatically updated from the archives. In addition, the iFIX server controls the data processing of all events from RTUs and SCADA in the RDAC system. GE technology can also help K-water to secure new water resources by building more small and mid-sized environmentally friendly dams and by building a society free from worries about water stress with technologies for alternative water resources such as deep ocean water, groundwater and desalination.

“We provide a wireless tablet environment by using iFIX’s option of Proficy Webspace and multi-sessions. It enables K-water’s operators to check data at sites when they fix some equipment failures, so that operators’ maintenance work is getting quicker and more efficient.” Hong Jintaek, System Integrator developer for K-water said.
MPGK Krosno Improves Reliability with SCADA and Historian Intelligent City Solution
Introduction

Company
MPGK Krosno

Products
iFIX HMI/SCADA

Faster response
Easy, intuitive system

Better decision making
Reliability data for "intelligent business"

Lower risk
Increased security and reliability

Janusz Fic, Prezes Zarządu (Chairman of the Board), MPGK Krosno:
MPGK Krosno conducts business activity in the field of municipal and urban engineering in the area of Krosno city and its neighborhood. The employment in the company is above 300 people. Our mission is to work for the local people and environment. Therefore, the high standard of our services is of great importance to us. Over the last years, we have managed to improve ourselves, mainly thanks to cooperation with VIX Automation Company and our collaborative work on the implementation of control and process programming area. Optimization of technological processes had a big impact on security improvements and enhanced reliability of provided services. Economical effectiveness of those processes has also been improved.

Automation for Distributed Assets

Janusz Fic, Prezes Zarządu (Chairman of the Board), MPGK Krosno:
If we want to manage our company in a responsible way and to be socially useful, it is necessary to meet the expectations and take the challenge. The solution is to implement intelligent business, which makes decisions based on reliable data, reduces loss, predicts future needs of the clients, increases security, and reliability of services. MPGK Krosno took such steps together with VIX Automation company. In the last few years, it implemented technologies created by the leading global brand, GE. Thanks to this, in a significant way, we have improved effectiveness of different processes, and what is more, we have become one of the best municipal and urban engineering companies, which is proved by many awards. I recommend VIX Automation company as a reliable and credible partner.

About VIX Automation

VIX Automation is an Authorized Distributor of GE Digital in Poland.
They are one of the leading suppliers of comprehensive IT solutions for production on the Polish market. 15 years of experience, qualified engineers and knowledge of the specificity of the Polish industry allows them to provide their clients the highest quality services.

The VIX Automation offer includes: SCADA and MES systems, production archiving and reporting systems, production scheduling, production efficiency analysis (OEE), software consultations and audits, implementation services, optimization and updating of existing systems.
MPGK Krosno has a multi-branch distributed structure spread out on mountainous area. Thanks to Procy software, the company is able to analyze data from all objects and predict a possibility of danger.

One of the main elements of the system is iFIX SCADA control and visualization software. The whole control and archive is gathered in the plant control room. The system runs about 2000 variables.
Herning Vand gathers valuable knowledge with their historical data

Based in Denmark, Herning Vand strives to efficiently deliver clean water to its customers

**Going Beyond Big Data**

“Big Data” has become a buzzword and everyone agrees that it is worthwhile to explore the large volumes of data. Herning Vand has invested in an advanced calculator that can help to interpret their process data and already in the first project they came across particularly valuable knowledge.
For years, Herning Vand has recorded and saved a large amount of process data that is collected online from Herning Vand’s 14 purification plants. The data is logged with the clear intention to make Herning Vand wiser and therefore better equipped to optimize processes and the overall operations. However, for that to happen the large volumes of data must first be sorted, analyzed, processed, evaluated and thoroughly compared so that the important correlations and trends can be localized.

“We have achieved some excellent results with our first project and we see a great future optimization potential with the tool.”
—Jan Ravn, Chief Operating Officer at Herning Vand

However, Proficy CSense shall, just like other simulation tools, be used shrewdly and Herning Vand, together with process consultants from COWI who were responsible for the initial consultancy, gained some valuable experience. COWI assists Novotek, a GE Digital partner, with process technical advice in connection with the use of Proficy CSense.

“A spreadsheet can be used to handle relatively large amounts of data, but it will not work when there are too many parameters in play simultaneously. Therefore, last spring we invested in Proficy CSense software solution, which is dedicated to finding and using mathematical correlations of large amounts of data,” — Jan Ravn
Is there a connection?

“I see Proficy CSense as a closed box that is filled to the brim with advanced calculation routines. We just feed the box with the data we want it to compute and then we tell it what parameters we want to observe.

Proficy CSense finds the right mathematical description of the data stream and can then show two curves of the same data stream. One curve contains the actual data and illustrates the process as it was in reality. The other curve is generated by the mathematical model that Proficy CSense has set and therefore shows a simulated process.

When the program is fed with multiple data streams at once, it automatically locates the possible relationship that exist between the different data and that is exactly what we are after.”

— John Sorensen, Senior Project Manager for water and wastewater at COWI.

When CSense has found the mathematical models and correlations, the user can then determine which parameters to focus on and what to look out for. Just like when you insert different values into an equation. Here it is just an automated solution to an almost unlimited number of equations.

Figure 1: Modeling of variations in ammonium concentration. Proficy CSense has generated a model where the result is shown by the blue line. The red line is the measured values.

Figure 2: Simple comparison of trend curves to get a quick overview of the situation. The figure shows the ammonium concentration in four process lines.
"We can find correlations that we did not know existed and our theories can be confirmed or dismissed. Once we have located the significant correlations, we can begin to optimize the process based on this new knowledge."

“If, for example, I want to have output A as high as possible, how should I then set inputs B, C and D?”

—Jan Ravn

*Figure 3: Proficy CSense has identified the parameters that have the greatest influence on a given run-off result.*
A savings of DKK 500,000

The first project, which was the optimization of the gas production that is based on sludge from the purification plants, gave an output improvement of as much as 20%.

The gas is used for electricity production and according to Jan Ravn the increase corresponds to an annual additional production of approximately 400,000 kilowatt hours, which earns Herning Vand approximately DKK 500,000.

Herning Vand is now engaged specifically in a series of small defined projects that will ultimately achieve the goal of making Herning Vand energy neutral.

“We knew roughly which buttons we had to press to achieve this gain and so CSense should not take all the glory. However, the tool makes it much easier for us to check the accuracy of our assumptions and it can also show us the way to the process-related correlations that we cannot find ourselves.”

— Jan Ravn

The Art of Definition

The advice from Jan Ravn and John Sorensen is that you have to be good at defining the amount of different data that CSense works with and you get the best and fastest results if you have relatively robust process knowledge.

The more data you put in means you get more answers out at the other end. However, there is of course an upper limit, and too many parameters in play can make it difficult to understand the results.

As Jan Ravn explained, “Our advice to new users is that you start simple and carefully consider both what it is you want to have answers to and also what parameters are likely to affect these answers. If you do not know exactly which parameters affect your focus area, you can gradually reduce the number using Proficy CSense as you test each one. When the data streams are recorded and analyzed they fit together mathematically, so when you adjust each parameter up and down with the mouse, you see how the other parameters are affected to either go up, down or remain unchanged. When you have isolated the relevant parameters there is the option to activate the tool to simulate towards an optimum process within a given framework.”

The first project is only the tip of the iceberg in relation to what we expect to achieve with Proficy CSense. We have an ambition that the tool will be used regularly for small and large projects, and therefore assist us to pick all the low-hanging fruit that would otherwise be missed during a busy working day,”

The findings are instantaneous and the application potential is great.”

— Jan Ravn
Mekorot: High Availability, Connected Control Solution Virtually Eliminates Downtime
Challenge

Mekorot, Israel’s National Water Company, provides 70% of all water, and 80% of the drinking water for the country. Mekorot sought to reduce production costs through improved energy efficiency and tighter process control.

By leveraging GE Digital’s software and GE’s hardware automation solutions, Mekorot is now using real-time data to automatically monitor and control devices from a single control room. This has created a connected environment in which minimal intervention by operational staff is required. Full redundancy was also employed to virtually eliminate downtime and to simplify controller backup.

Background

In an arid climate such as Israel, water is an especially valuable commodity. Frequent droughts and a dramatic increase in demand have made securing a reliable source of high-quality water a national priority.

Lake Kinneret, also known as the Sea of Galilee, is a key source of water for the Mekorot system. To improve the quality of the water pumped from Lake Kinneret and address Israel’s decades-long water shortage, Mekorot built a state-of-the-art filtration plant controlled by GE Digital’s state-of-the-art high-performance automation solutions. The Central Filtration Center at Eshkol in Northern Israel is currently the only one of its kind in Israel, and one of the largest in the world.

Lake Kinneret is 212 meters (695 feet) below sea level, so most of the water filtered at the Eshkol plant is pumped 152 meters (498 feet) above sea level, and then flows through pipes and open canals to the Eshkol Site. At the plant, it is treated and filtered before being distributed to urban, industrial, and agricultural customers.

“We aim to achieve high energy efficiency and process efficiency, so that we can facilitate cost reduction in the production of water. To achieve this, we have to leverage operations support systems and programming tools, which enable real-time decision-making. The GE control system at the plant performs automatic monitoring and control of the devices from a single control center.”

Nuriel Meraro, Command & Control Engineering Manager of Mekorot’s Jordan Valley Division
Solution

During the filtration center’s planning and construction, Mekorot worked with GE’s channel partner General Engineers, which specified and provided GE solutions to control and monitor the plant.

Mekorot chose GE’s process control products for their ability to meet three critical customer needs:

1. Efficient, connected operation with fewer shifts and personnel
2. High availability
3. High and proven reliability

Simplifying operations

GE Digital’s automation solutions monitor and manage the Eshkol plant from a single control center. Dozens of monitors visualize and track the plant’s systems with minimal intervention from operational staff, dramatically increasing operational efficiency and minimizing costs.

Securing water

As a critical system, the Eshkol filtration plant operates 24/7, except once a year, when water flow is stopped for maintenance and upgrades that can’t be performed when water is flowing. Otherwise, GE’s control system allows upgrades to the system while in process, allowing Mekorot to maintain a steady flow of water to its customers.

The control system installed at the Eshkol Filtration Center features the PACSystems High Availability solution (now available from Emerson), which provides true redundancy and enables full backup of the controller. The control and monitoring system has identical modules which work independently, and have full backup to help ensure the continuous and reliable operation that is of critical importance to Mekorot. Operations support system and programming tools enable real-time decision-making.

The system features 7 pairs of PACSystems RX3i controllers, controlling 6,000 I/O points with redundant architecture at all control layers—I/O to end devices, controllers, and HMI system. It is wired with fiber optic cables to ensure the fastest failover communication.

GE Digital’s CIMPLICITY HMI/SCADA software monitors the control system. The software was customized to the requirements of Mekorot, enabling optimal control of all facets of the filtration processes.

“PACSystems controllers along with [GE Digital] CIMPLICITY HMI/SCADA system provide the highest flexibility in their implementation, as well as cost reduction for the end customers.”

Hertzel Perry, Technical Manager for Control and Communication Systems of General Engineers
Benefits

With hardware controls and GE Digital’s software solutions, Israel National Water Company met its goals for the Central Filtration Center:

**High availability**
The plant runs 24/7, even during system upgrades

**Increased efficiency**
The connected plant can run with fewer shifts and personnel than similar-sized operations

**Reduced cost**
Less unplanned downtime and greater operational efficiency has reduced operational expenses

**High reliability**
True system redundancy enables continuous operation

Building on the success at the Eshkol Filtration Center, soon additional screens will control and monitor the plant’s sludge treatment process. This process cycles sludge created by the filtration process back through the system, saving water, enhancing the overall efficiency of the water filtration process, and reducing costs.

“Mekorot faced challenging targets in the last seven decades of the Israeli water market. We feel proud to be part of turning these challenges into reality with our advanced solutions and our engineering expertise.”

Zachi Stromza, Automation and SW Solution Division Manager of General Engineers
City of Orangetown

GE solution lowers costs, increases control capabilities at municipal sewer department
Getting Rid of Waste

Running, maintaining, and upgrading a sewer system is challenging enough when a municipality has the luxury of unlimited funding for such projects. However, when funding is tight and a manufacturer no longer supports the existing control equipment or can provide a reasonably priced alternative, the job is that much harder.

The Orangetown Department of Environmental Management & Engineering, which is responsible for the sewer system that serves about 50,000 people in New York's southern Hudson River Valley, faced this problem. Orangetown’s existing system was comprised of 41 remote sewage pump stations, only 11 of which it could afford to network via radio telemetry. After receiving a grant from the State of New York to upgrade the controls and connect all 41 stations, the municipality discovered that the supplier of its existing control and telemetry equipment no longer supported it, and the only alternatives from that company were much too expensive for Orangetown’s budget. Robert J. Beckerle, Director of the Orangetown Department of Environmental Management & Engineering, sought a reasonably priced solution with more robust capabilities that would integrate with the company’s LAN and that would be supported by the manufacturer throughout its lifetime. GE’s CIMPLICY HMI/SCADA and Emerson’s VersaMax PLC, integrated into the plant by Optimum Controls Corporation (OCC) of Reading, PA, emerged as the clear choice.

Results

• Cost-effective controls upgrade
• Zero downtime
• Easy installation and maintenance
• Greater data availability and documentation
• Scalable solution accommodates three differently sized pumping stations
• Highly reliable
• Outstanding service and support
• Integration with existing operating system

“The GE CIMPLICY solution gives us more complete information at a better price than our previous control system.”

— Robert J. Beckerle Director Orangetown Department of Environmental Management & Engineering
A Clean Performance

With the exception of a few pump stations that have not yet been incorporated into the network, the new control system is fully operational, and Beckerle has been pleased with its performance.

“We receive more complete information about each pumping station at a better price than we did with our previous solution,” he says. “And the system has been very reliable—we have experienced zero downtime since installing this equipment.”

The installation itself, according to Beckerle and Terry Campbell of OCC, was relatively easy, and the equipment is user-friendly.

But good technology doesn’t sell itself. Beckerle was very impressed with the knowledge and expertise of his GE representative, who explained, among other things, how Beckerle could upgrade from his existing software and hardware configuration to this new GE solution through a cost-effective upgrade program.

The next step that Orangetown Department of Environmental Management & Engineering is taking to further upgrade its pump station automation is the addition of a CIMPLICITY mobile notification system, which notifies a user when an alarm situation occurs, allowing faster response time.

With all of these features, the new system is paying off for Orangetown. The upgrade was cost effective, and the system has experienced zero downtime. Easy installation and maintenance have added to its benefits. At Orangetown, it looks like the grant from the state has been used well—without any “waste.”

Bringing CIMPLICITY to a Complex Project

With pump stations that run the gamut from small and simple (20 hp submersibles on float balls) to large and sophisticated (1000 hp, 4,250 Hp pumps) with VFDs and ultra sonic level controls), Orangetown can accommodate a tremendous range of applications.

However, for continuity and ease of maintenance, each of Orangetown’s 41 remote sewage pump stations are configured in a similar manner. Each station’s control logic and cabinet are designed in one of three ways, which vary greatly in size to accommodate the diversity of applications. One features two pumps with float controls, another incorporates three pumps with float controls, and the final is comprised of three pumps that receive analog signals from ultrasonic indicators. The pumps are controlled through variable speed AC frequency drives that match the pump speed to the inflow. The common component in each configuration is a VersaMax PLC, which monitors and controls such performance indicators as alarms, wet well levels, pump speed/inflow, and status points.

The PLC at each station transmits pump data via a wireless network to a CIMPLICITY SCADA system in the plant. Information received through the system is distributed to four stations through an internal LAN. One station features a CIMPLICITY server that provides the status of each pumping station and alarming functions. The other three stations are clients that enable plant personnel to monitor the pumping stations from their desks.
Sabesp Modernizes SCADA Using iFIX and Remote Desktop Protocol (RDP)

- 4 Million Water customers
- 22 Water and sewage treatment stations
- Improved efficiency
- Faster response
Introduction

Company
Sabesp, São Paulo, Brazil

Products
- iFIX HMI/SCADA
- Proficy Webspace

Modernization at Baixada Santista Business Unit
Sabesp is the fourth largest water and wastewater company in the world, responsible for assisting more than 27 million people in 373 cities in the state of São Paulo, the richest Brazilian state. Baixada Santista Business Unit is responsible for the services at 9 cities in the south coast of the state of São Paulo, assisting 1.8 million residents and up to 4 million people including tourists during summer season.

This business unit is developing a SCADA modernization project using iFIX, ThinManager and RDP protocol in a server-client architecture with 22 water and sewage treatment stations and one operational control center (OCC).

Also, the project aims to replace a legacy portal with Proficy Webspace as the “OCC Portal” software tool and to implement Visual KPIs as a web-based tool for viewing Proficy Historian data in dashboards. The first tests using RDP in the SCADA architecture showed the need to upgrade the bandwidth of the Internet links used on the water and sewage treatment stations, so the system can function satisfactorily.

About the Speaker
Érico Soares Ascenção, Electrical and Automation Engineer, Sabesp

Érico Soares Ascenção is an Electrical and Automation Engineer with Sabesp, the fourth largest water & wastewater company in the world, being responsible for assisting more than 27 million people in 373 cities in the state of São Paulo. Érico holds an Industrial Automation MBA (PECE-Poli/USP - 2013) and Mechatronics Engineer (Poli/USP - 2010). He has nearly 10 years of experience in Electric, Industrial Instrumentation and Automation; working with maintenance, basic and detailed projects, development of automation systems (PLC and SCADA), commissioning and contract management in the following industries: chemical/petrochemical (Solvay), oil & gas (Petrobras), mining (Vale), cement (Brennand), nuclear energy (Brazilian Navy - CTMSP) and water & wastewater (Sabesp).

About Aquarius Software
Aquarius Software is a reference in technology, products and services for industrial automation and production management, with market-leading solutions and differentiated services, from the factory floor to the corporate environment. Continuously, Aquarius Software seeks the best technologies, mixes software and services with new approaches, creating many possibilities and innovations to provide a superior response to the challenges of each client. The Company has specialists in the areas of Automation and Operation Technology (TA / TO) and Information Technology (IT) and is able to accompany its customers on the journey of Digital Transformation.
Sanasa Reduces Maintenance with 24/7 Remote Access to iFIX SCADA System

- High availability - 24/7 control and access
- Less maintenance - Centralized system management
- Lower costs - Flexible, economical clients
Introduction

Company
Sanasa, Campinas, Brazil

Products
iFIX HMI SCADA

This is an excerpt of an article originally published in Portuguese by Carlos Eduardo Gurgel Paiola, Control and Automation Engineer, M.Sc., Aquarius Software; Alexandre Roberto Granito, IT Analyst / Process Automation, Sanasa - Society of Water Supply and Sanitation; Cláudia Souza Oliveira, Automation Analyst, Vale - Directorate of Ferrous Southeast - DIFS; and Diogo Lopes Gomes, Automation Analyst, Aquarius Software.

Background
Sanasa is the company responsible for water supply and sewage services in the municipality of Campinas in Brazil. Sanasa uses iFIX HMI/SCADA from GE Digital for supervisory control and works with GE Digital partner, Aquarius Software. For remote access, Sanasa employs iFIX in conjunction with Microsoft’s remote access solution, Remote Desktop Services (RDS), formerly called Terminal Services (TS). This combination facilitated the use of the supervision system, from operators to system administrators.

Overview

Remote SCADA access
All Sanasa process automation applications today use only GE Digital’s iFIX software as a SCADA system. As a result, the RDS Client remote access tool was implemented. The purpose of using the technology was to make it possible to integrate several SCADA systems into a single visualization and control platform, which can be accessed through Windows’ remote desktop feature.

Before the implementation of the Remote Desktop Session Host (Server), now used with iFIX to control the entire process, two other technologies were used. One was characterized using ordinary customers, each with its own screens and its own licensing. It was a simple configuration and with great availability from customers, but with difficult maintenance of the system, considering the large number of client machines, which caused difficulties in managing licenses and changes in the application. The second way was to use a tool for converting screens to HTML, a solution that required a lot of work to correct the distortions that occurred in the operation screens, which required many hours of engineering.

Another advantage found in the use of RDS was the ease of installation and exchange of machines, since in the old operation solution (common customer) there was a need to install the supervision software on each machine, whereas in the current situation, the installation is only on the server. Taking the number of existing customers, which today total 17, the tool brought a great advantage to the company.
**Remote Operation**

The remote access tool via RDS with iFIX provides a real-time visualization of the process variables and allows the realization of a remote control with the process control elements, maintaining the reliability and security of the system.

The tool is used in Sanasa’s CCOs (Operational Control Centers) in the raw water collection, water treatment, reservoir and treated water distribution sectors. In addition, this tool is also used in the sewage removal system, with the forecast to be used in sewage treatment units in the future.

Access is available to a wide variety of users, including management personnel and other work groups, such as the project sector group, which uses the tool to verify and analyze real-time data and historical data for the elaboration of new projects, which will be integrated into the existing system.

Through access to this information, it is possible to streamline the process of field survey and validation to fulfill the prerequisites of a new project.

In the case of system maintenance, it is also very useful to be able to access the SCADA system from any point in the Sanasa network, enabling changes to screens, databases and other system settings. The Sanasa network can be accessed locally or remotely (where access is made through a broadband ethernet radio link system).

**Overview and Demonstration**

**Sanasa’s implementation**

Sanasa’s automation system is extremely important for the operation of the water collection, treatment, reservoir and distribution system in the metropolitan region of Campinas. In this way, we can consider it as a system that requires high availability and that operates twenty-four hours a day, seven days a week. As a result, remote access to the supervision and control system (SCADA) is often required. This remote access is carried out via VPN between Sanasa and the remote connection point (for example: home), using a broadband link, or even a connection from a mobile vendor.

The RDS Client system has also been used in some events, to demonstrate the automation system and data acquisition system. At the ASSEMAE sanitation fair, a CCO was simulated in the middle of the booth, where the operating personnel of the water reservation and distribution system performed the monitoring and control of the Sanasa process in the event, through the definition of the set control and alarm points, remote activation of control elements, such as pump sets, valves, etc.

**Conclusion**

It can be concluded that the technology presented in this article makes the routine of the administrator of the supervision system very comfortable, since he/she only has one machine to manage. The immediate result is less time for system and application maintenance and control. In addition, there is also a reduction in equipment costs for the company, which only needs a good machine to be the application server.

At Sanasa, the use of the RDS Client platform with iFIX provided gains in TCO (Total Cost of Ownership or Total Investment Cost) because it is a license with a more affordable cost compared to the value of the same number of conventional customers.

In addition, there is a greater flexibility of setting the access level for each user of the system, which can be visualized, operated or even administered by the system, enabling application engineering.

Another advantage observed is that the server can be allocated in a data processing center, where it can share some other operational advantages, such as: use of automatic backup routines, better availability of the network, greater availability of bandwidth, power and adequate air conditioning, resulting in a gain in the useful life of the equipment and, consequently, an increase in the availability of the system.

The City of San Luis Obispo Improves Efficiency and Productivity with iFIX
The City of San Luis Obispo

The City of San Luis Obispo’s Water Department consists of five divisions that move water to and from the city. The divisions consist of a water treatment plant, wastewater treatment plant, wastewater collections, water distribution system, and a reservoir.

Challenges

**Five divisions, five separate SCADA systems**

The city was managing its water divisions in siloed systems that weren’t capturing all the necessary data needed on how the water equipment is running. The systems also did not include any alarming or trending capabilities, so the city often relied on its customers to notify them of any issues.

Results

**Real-time monitoring for immediate operator response**

The City of San Luis Obispo was able to increase operator efficiency and improve reliability, as it serves residents and businesses with clean, safe water with GE Digital’s iFIX HMI/SCADA solution.

Solutions

**Standardizing iFIX for optimal plant processes**
Vandmiljø Randers

Optimized IT Processes Management and Power Consumption
Vandmiljø Randers

Challenge

- Replace aging HMI/SCADA system
- Improve their way of working
- Optimize IT process management and power consumption

When Vandmiljø Randers (The Department of Water, Randers Municipality) decided four years ago to replace their aging HMI/SCADA system, they were not aware that the project would lead to both positive technical and personal changes.

“We deliberately sought to get away from the old way of working, and the decision to change our HMI/SCADA system was taken, among other things, because our old system could not be forced, by hook or by crook, to work in the new way. But neither of us had anticipated that the change would be so total and so positive for the whole company. And if I am to be honest, I am extremely proud of everything we’ve achieved so far”, says Michael Sønder Jensen, Production Manager at Vandmiljø Randers.

Action

- Novotek, a GE Digital partner, proposed iFIX from GE Digital, a proven and innovative HMI/SCADA solution that enabled Vandmiljø Randers to generate all needed reports without manual data entry
- Provide the right tool to generate KPIs, improve decision making by being closer to the processes, and optimize processes

There are calculation tools installed in iFIX that can combine automatically logged and manually entered data in order to generate reports.

“We have received a solution configured so that we ourselves can generate all the reports we want, with or without manually entered data, and that option is worth a lot of money for us,” says Michael Sønder Jensen.

“For example, if we want to optimize the aeration in our tanks, we need to know how many cubic metres of water that run through the plant and how many kilowatt hours we use on our compressors. In less than ten minutes, iFIX can create a report that shows how many kilowatt hours we use per cubic meter of water, and in that way we can work efficiently to optimize that specifically.”

“Having acquired the right tool to generate the KPIs we need, enables us to see exactly what happens when we push the different buttons. In that way, we have moved much closer to the processes that we are responsible for managing and optimizing at Vandmiljø Randers. It is something that can really be seen on the bottom line.”

Result

- Increased efficiency of working methods and managing processes more effectively
- Optimizing processes continuously and reducing power consumption

“The shift to our new iFIX HMI/SCADA solution has in many ways been like moving from one reality to a new and better one. In our new reality, we get more good process optimizing ideas than we did in the old one. At the same time, the ideas are much easier to realize, which is not least due to our new HMI/SCADA solution.”

The list of benefits, efficiency improvements and new opportunities that Vandmiljø Randers has achieved with their new HMI/SCADA solution is long. Most importantly, however, iFIX has brought the employees in closer contact with the processes that need to be managed and, if possible, optimized.

“Our goals are now evident to everyone, and this has helped us to constantly improve and, among other things, continuously use less and less power”, says Michael Sønder Jensen.
Region of Waterloo
Streamlines Water System to Ensure Highest Quality
The Problem
The Regional Municipality of Waterloo’s Water Services department is working with GrayMatter, a GE Digital partner, to develop and implement an iFIX SCADA upgrade program designed to modernize the Region’s infrastructure and operating methods. In some cases, equipment manufacturers have phased out hardware or software. Other systems lacked industry-standard features or the ability to leverage best practices from industry standards bodies such as ISA. The Region pursued the project to maintain or improve regulatory compliance and provide water that meets the highest quality standards for its service area.

The Solution
The Region project team broke down all of the systems in the water division’s SCADA environment, qualifying and prioritizing the most challenging tasks such as removing and replacing discontinued hardware components. Leigh McDermott, senior project manager at the Region, said the most significant enhancement has been the improved clarity and precision of the iFIX high-performance graphics HMI/SCADA screens.

The Region of Waterloo is a regional municipality in Southern Ontario, Canada with a population of 535,154.

The Region’s water supply system has more than 80 facilities and supplies water to seven communities the City’s of Cambridge, Kitchener and Waterloo; and the Township’s of North Dumfries, Wellesley, Wilmot, and Woolwich.

Big Wins

- Standardized high-performance graphics
- Empowered operators to quickly act on data
- Anticipate significant reduction in training time for new operators
“It is truly the interface to everything we do. We’re really trying to streamline the way that all of our staff interact with our systems. GrayMatter has been involved in the screen development process from the start.”

— Leigh McDermott, Senior Project Manager, Region of Waterloo

Wins
According to McDermott, the new high-performance graphic interfaces, which are in the process of being implemented, allow operators to quickly spot adverse or non-standard conditions in the water system.

Operators can intuitively navigate the SCADA system, understand the system’s status, and most importantly see what is going on quickly. The HMI-SCADA screens are following the ANSI/ISA-101.01-2015, Human Machine Interfaces for Process Automation Systems Standard. Colors indicate an alarm and unique shapes can pinpoint a developing issue.

Examples of adverse conditions include: overflowing tank, high pressure in the distribution system, chlorine pump failure and high turbidity. Unique gauge styles are used to help create a familiarity with instrument types. Operators can recognize a parameter without needing colors or titles to identify them.

Over time, these efficiencies will produce significant savings for the system.

There are further savings to be achieved through the reduced time required to identify an upset condition in progress before damage or downtime ensues, not to mention reducing risks faced by the water supply system.

The new iFIX system configuration will also allow the Region to eliminate the redundant programming of local operator interfaces at their remote stations by using a single graphic repository and scalable thin clients.

All of the changes are intended to optimize and streamline the water system.

“We’re standardizing the way we display data. It’s working. We had an operator comment that they better understood what was going on compared to our original screens.”

— Leigh McDermott, Senior Project Manager, Region of Waterloo
City of Peoria: Upgraded Alarm Notification Prevents Problems

Peoria, AZ., learns first hand how WIN-911 software reduces response time and mitigates service disruptions
Peoria, Arizona

Founded in 1886 and incorporated in 1954, this desert city sits in the Salt River Valley and extends into the foothills of the mountains. As a major suburb of Phoenix and the sixth-largest city in Arizona, residents and visitors enjoy a wide-variety of activities, including serving as Spring Training home to the San Diego Padres and Seattle Mariners. The city also boasts 34 neighborhood parks, three public pools, two large community parks, five dog parks, and more than 26 miles of mountain and multi-use trails.

Water Infrastructure

Ensuring safe, clean water for residents, businesses and visitors is critical to the city’s utilities department, which provides water, wastewater, and solid waste services to almost 60,000 residences and businesses. This includes two water treatment and four wastewater plants, over 70 wells, substations and PRVS at remote sites.

Alarm Notification

Remote monitoring software allows fewer people to monitor many more assets using devices that people already have, such as smartphones and tablets. Uninterrupted remote availability is essential to ensuring that systems can be continuously monitored.

The city knew that an automated alarm notification system would help them effectively monitor the plants, wells and equipment, and to respond quickly to any emergencies. After thoroughly reviewing numerous options, the City of Peoria invested in WIN-911, a software alarm notification system running on the GE Digital’s iFIX SCADA platform. These systems allow monitoring of all pertinent equipment and water quality parameters with room for expansion.

Business Systems Analyst Ron Schmidt recently joined the City of Peoria Water Department SCADA Group and oversees the water department’s IT. Peoria’s SCADA Group provides the system to run the water and wastewater collection sites, which includes chemical treatment, flow controls, well site monitoring and basic water production monitoring.

“WIN-911 ensures that our team doesn’t have to devote time to alarm screening. We receive notification that lets us know when equipment isn’t working and then a technician is sent to verify and fix the situation,” commented Schmidt.

“The GE Digital’s iFIX and WIN-911 Interactive platforms expedite alarm changes, save time and mitigate the potential disruption of service”

—Ron Schmidt, Business Systems Analyst, City of Peoria Water Department SCADA Group

Aeration Basin Flow Control Gate: controls the pressure and flow of air for treatment ponds and promotes biochemical oxidation of wastewaters.

Grit Chamber, grit pump and grit seal water pump: The grit chamber primary catches inorganic solids such as sand, gravel, glass, corn, and soil.
Upgrade Prevents Problems

Schmidt has been involved with a software upgrade of the latest release, WIN-911 Interactive, to push critical plant alarm and event details to remote workers via SMS Text Message. The upgraded software seamlessly integrates with the GE Digital’s iFIX SCADA platform while improving safety, reducing worker response times and quickly delivering information.

Two recent incidents have proven the value of the alarm notification software. An inlet water pumping station lost power and while the backup generator started, it quickly shut down, too. The team received notification about the initial power loss and received notification of the subsequent generator failure via WIN-911. These alarm notifications allowed Schmidt and his team to know about the power losses before an overflow occurred or untreated sewage became a problem. They were able to respond quicker and send the right people.

WIN-911 also alerted the team about another incident involving a power outage to a critical site that brings eight different wells into a reservoir. The alarm indicated there was a loss of communication. The team was able to respond within seconds of receiving the alarm and resolve the issue within one hour.

“The GE Digital’s iFIX and WIN-911 Interactive platforms expedite alarm changes, save time and mitigate the potential disruption of service,” Schmidt added.
City of White Rock’s Investment Brings Dramatic Improvements in Water Quality

WIN-911 software with iFIX HMI/SCADA helps water services avoid unanticipated risks during pandemic
White Rock is a city in southwestern British Columbia, Canada, near Vancouver. It borders Semiahmoo Bay to the south and is surrounded on three sides by South Surrey.

Water Infrastructure Overview

For 40 years, the almost 20,000 residents depended on private utility companies that owned and operated the city's water infrastructure. After realizing more transparency and greater investments were needed, the city acquired the utility in 2015. Since then, White Rock has taken many steps to improve the water quality, including increasing water storage capacity by 33 percent, investing nearly $12 million to construct a water quality treatment plant, and completing a health-mandated secondary disinfection throughout the entire distribution system.

White Rock’s water system is comprised of seven deep water wells, one water treatment plant – utilizing ozone as a pre-oxidant and a filtration system for the primary removal of manganese and arsenic – two booster pump stations, three reservoirs and three PRV stations. Water Services provides water treatment and distribution for all of the City’s drinking water. The team also monitors water quality, chemical treatment, flow controls and pressure points throughout the distribution system.

"We needed a modern software notification system that could dependably monitor the city’s water quality, levels, pump stations, electrical components and flow controls."

—Chris Zota, IT Manager, City of White Rock

Challenges with the Old System

For many years, the utility operated on an old SCADA platform utilizing an outdated hardware auto-dialer alarm notification system. This caused many problems, including providing inaccurate telemetry and overflowing reservoirs. The system was limited to eight inputs, which presented challenges in deciding the most crucial aspects to monitor.

Water Services knew they needed an upgrade and installed GE Digital’s iFIX and WIN-911 alarm notification software that allowed them to monitor all pertinent equipment and water quality parameters with room for expansion.

"We needed a modern software notification system that could dependably monitor the city’s water quality, levels, pump stations, electrical components and flow controls," commented Chris Zota, IT manager City of White Rock.

SCADA and Alarm Notification Upgrade

White Rock began by implementing a Water Master Plan that coincided with the water quality treatment plant construction. City leaders knew this was the perfect time to once again upgrade the SCADA platform and integrate a more robust remote monitoring and notification software system. After thorough research, the city selected GE Digital’s iFIX Dual SCADA and WIN-911 Interactive as a solution, to push critical plant alarm and event details to remote workers via SMS Text Message.

Implementing the latest alarm notification platform, WIN-911 Interactive, has provided a centralized and unified system that integrates well with the SCADA platform. Additionally, it improves safety, reduces workers response times and delivers information quickly.

Two recent incidents have proven the value of alarm notification software. The after-hours, on-call operator received notification from WIN-911 that a ‘VFD Fault’ alarm was active. Receiving this notice allowed the operator to remotely intervene, assess the situation and correct the issue in a timely fashion.

WIN-911 also alerted the on-call operator to an early morning hydro power outage that affected the WTP and one booster pump station. After being notified that the emergency generators were running at their respective locations, the operator was able to remotely login to SCADA and confirm that all systems were running, and that the emergency back-up power system was operating smoothly.

"WIN-911 assures users of receiving timely alerts that could potentially affect customers’ service. The quick notification means operators can immediately respond to issues like monitored water quality parameters, equipment, or possible water main breaks occurring during or after hours,” commented Dean Brown, WDII, WTII operator City of White Rock. "This saves time and can mitigate the potential of service disruptions due to slow response and the escalation of an otherwise unknown situation," Brown added.
Software During the Pandemic

State-of-the-art digital technology helps avoid unanticipated risks. These innovations can drive significant economic and environmental improvements, and ensure continuity in service when staff are working remotely, like during this pandemic.

Under increased and unprecedented pressure to do more with less, and to find new means of paying for infrastructure, water owners and operators recognize that it is essential to understand and optimize the capacity of their assets. One way they can do this is through the use of remote monitoring and notification software, which allows fewer people to monitor many more assets using devices that people already have, such as smartphones and tablets. Uninterrupted remote availability is essential to ensure that systems can be continuously monitored, even without staff onsite or with very few people working at the facility.

“COVID-19 forced all of our workers offsite from March through June”, Zota added. “Because of WIN-911, we received important notifications via our tablets or smartphones and were able to fix any problems remotely, ensuring emergencies didn’t occur and avoiding any unplanned downtime.”

“WIN-911 assures users of receiving timely alerts that could potentially affect customers' service. The quick notification means operators can immediately respond to issues like monitored water quality parameters, equipment, or possible water main breaks occurring during or after hours.”

—Dean Brown, WTII Operator, City of White Rock

—Chris Zota, IT Manager, City of White Rock
About GE

GE (NYSE: GE) is the world’s Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry.

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