Setting the Standard for Automation™

Water/Wastewater Industry Division

Calendar of WWID Events

Aug 7-9, 2012	**2012 ISA Water/Wastewater and Automatic Controls Symposium** Orlando, Florida, USA
Sept 22-23, 2012	**Fall Leaders Meeting** Orlando, Florida
Sept 24-27, 2012	**ISA Automation Week** Orlando, Florida

In this Issue

Summer 2012 Newsletter

Director's Welcome

Welcome to our Summer WWID newsletter. Things are really heating up in our Division…

Our 2012 Water/Wastewater Automatic Controls Symposium is just a few weeks away (August 7-9, Orlando, FL). In this issue, you'll find the bios and abstracts for our speakers who are going to deliver a top-notch technical program. There's still time to register at http://isawwsymposium.com/register/.

In addition to these great programs, we're offering a pre-conference training course; Introduction to Industrial Automation Security and the ANSI/ISA99 Standards. The importance of this issue was highlighted by a recent report from the U.S. Department of Homeland Security. It reported that companies that operate critical infrastructure systems have reported a sharp rise in cybersecurity incidents over a three-year period. The most frequent target of these attacks – 41 percent of them – is the water sector.

I'm sure you'll enjoy our spotlight article that details wastewater treatment plant upgrade and our in-depth coverage of ISA100.

Jon DiPietro
WWID Division Director

Newsletter Editor's Welcome

In our Summer 2012 newsletter you will find breaking news on our upcoming 2012 WWAC symposium. Held Aug 7-9, in Orlando, Florida the symposium is a focused event that specifically caters to the water and wastewater instrumentation, automation and SCADA professional As of July 1st, we are proud to report we have over 110 people already registered for the symposium. I encourage you to register to attend.

In this issue you will find a mix of division news, symposium information and technical articles. One of our technical articles is an in-depth overview of the ISA100 standard, and the other is a long-format article about a $58-million plant upgrade in Oakville, Ontario, Canada.

For our upcoming WWAC symposium, you will find an article from our program chair Joe Provenzano. Included at the back of the newsletter is a copy of all the speaker abstracts and bios for our symposium presenters. Feel free to read through them to find out more about this year's speakers. In particular have a look at our keynote, invited and guest speakers. I invite you to get involved with this year's WWAC symposium!

Graham Nasby
WWID Newsletter Editor

Message from your Director-Elect

The best part of being part of a team is seeing the fruition of a common goal start to take shape. Our 2012 Water/Wastewater and Automatic Controls Symposium is a perfect example.

Back in September of last year when the planning committee met for the first time, we knew we wanted to put on a successful symposium but we didn't know exactly what we wanted to do. As the months went by, a plan took shape and then we started assembling the many resources and pieces together to make it happen. Well, I'm happy to report it's now happening.

As of our last check on the numbers, we now have over 120 people preregistered for the symposium. Our cybersecurity training course has over 25 attendees signed up. Two of the largest water-orientated organizations in our sector, WEF and the AWWA, have guest speakers at our symposium. We have a nationally recognized keynote speaker, and two invited speakers giving talks on timely/interesting topics in our sector. We are also on track to turn a healthy surplus that we can reinvest into next year's symposium. I would say that the plan is coming together very nicely indeed.

How did we get here? The answer is we listened, we discussed, and we shared. Our committee members spent many hours talking with people in sector, other related technical associations, and the many equipment/service providers who provide the products that make our sector work. We also made sure to talk to the end users, the operators, facility owners and technicians that ensure our plants run smoothly on a daily basis. By taking the time to listen to what the sector was asking for, we were able to develop a symposium that caters to the needs of automation, instrumentation and SCADA professionals across the industry. For this I am thankful.

In this newsletter, you will find the results of what has been the group effort the 2011/2012 WWID executive and the symposium committees to produce our 2012 WWAC symposium. Our technical program is top-notch. Our exhibit hall is well represented, and we have wonderfully supportive sponsors and media partners. We also have begun to develop relationships with related associations like the Water Environment Federation (WEF), Florida Section of the AWWA, Florida Water Environment Federation, National Rural Water Association, and many more organizations.

Now is the time to take advantage of the symposium that your WWID has built. I personally encourage you to register to attend our 2012 Water/Wastewater and Automatic Controls Symposium. You won't be disappointed.

Graham Nasby, P.Eng., PMP
WWID Director-elect &
General Symposium Chair for the 2012 WWAC Symposium

WWAC Symposium Registration Now Open

Registration is now open for our 2012 WWAC Symposium! ISA members can register for only $300 for the 3-day event.

Register online at:

www.isawwsymposium.com/register/

Taking place 7–9 August in Orlando, Florida, USA, the 2012 ISA Water/Wastewater and Automatic Controls Symposium is a three-day event that focuses on the challenges associated with automation and instrumentation in the water and wastewater sectors. It features two full days of technical speakers/presentations, a tour of a local water treatment plant, a general reception, networking events, a poster session and a supplier showcase. This highly focused symposium has a long tradition as an event that caters to the needs of automation professionals in the water and wastewater sectors.

"The 2012 ISA WWAC symposium offers a full program of over 25 technical papers and presentations that will be of interest to the water/wastewater automation professional," says ISA Executive Director and CEO Pat Gouhin. "The symposium offers a focused event that caters to the needs of individuals who are involved with SCADA, automation and instrumentation technologies as part of their daily jobs in this important sector of our municipal infrastructure."

We have selected the August timeslot for several reasons. First of all this is "low season" for the area which translates into better airline and hotel rates – we know that many of our attendees come from public utilities where every training dollar counts. We also selected the August timeslot so that participants can bring their families – in August school is out and Walt Disney World is just around the corner.

2012 ISA Water/Wastewater and Automatic Controls Symposium

7-9 August 2012….Holiday Inn Castle Resort Hotel….Orlando, Florida

Presented by the ISA Water/Wastewater Industries Division, in collaboration with the Florida AWWA and the WEF Automation and Information Technology Committee, the WWAC Symposium offers affordable professional development opportunities for SCADA, automation, and instrumentation professionals in the water and wastewater sectors.

2 full days of Technical Speakers and Presentations

Track 1 – Instrumentation, System Integration, Automation, Plant Case Studies, New Technologies, Optimization, Project Management

Track 2 – SCADA, HMI, Human Factors, Alarm Management, Process Data Reporting

1 full-day ISA Training Course on SCADA & Automation Cybersecurity

Tour of Orange County's new Southern Regional Water Supply Facility

Trade Show, Reception & Networking Event

Affordable Professional Development for

Plant Operations/Maintenance Staff, Plant Managers, Instrumentation Technicians, Plant Designers, Engineers, PLC/HMI/SCADA Programmers, System Integrators

CEUs – Continuing Education Units & **PDHs** – Professional Development Hours

For more information visit: **www.isawwsymposium.com**

American Water Works Association AWWA FLORIDA Florida's Water Professionals
Technical co-sponsor

Water Environment Federation the water quality people
Technical co-sponsor

WWAC Symposium Enjoying New-found Popularity and Interest

From official ISA news release issued on July 10, 2012

The ISA is pleased to announce that preregistration activity for the 2012 ISA Water/Wastewater and Automatic Controls Symposium (WWAC Symposium) has been brisk. As of July 1st and five weeks in advance of the symposium, over 100 automation professionals have already preregistered for the symposium. Also the symposium's optional full-day short-course on cybersecurity now boasts over 20 preregistered participants.

Taking place 7–9 August in Orlando, Florida, USA, the 2012 ISA WWAC Symposium is a three-day event that focuses on the challenges associated with automation, instrumentation and SCADA (supervisory control and data acquisition) in the municipal water and wastewater sectors. It features two full days of technical speakers/presentations, a tour of a local water treatment plant, a general reception, networking events, a poster session and a supplier showcase. This year's symposium offers over 30 technical talks on a variety of topics which include cyber security, plant automation techniques, operational effectiveness, advances in instrumentation, plant case studies, and techniques for developing effective plant control rooms.

Focused Event

Now in its seventh year, the symposium is experiencing a new-found growth in popularity thanks to newly-formed alliances with the Water Environment Federation (WEF), the Florida Section of the American Water Works Association (FSAWWA), and the National Rural Water Association (NRWA). By forming strong partnerships with other associations, the symposium has been able to reach out to automation, instrumentation and SCADA professionals across the industry. For members of these associations, the symposium represents targeted professional development and training opportunities that they could not find elsewhere.

"Our secret is our focus," says Bob Lindeman, the 2012 President of the ISA. "Our annual WWAC Symposium specifically caters to the needs of professionals involved with automation, instrumentation and SCADA in the municipal water and wastewater sectors. It is a niche event and we are proud of its increasing popularity. There is no other event like it in North America."

Training & Professional Development

Training and professional development is major focus of the symposium. Thanks to the ISA's alliance with the FSAWWA, the symposium is able to offer 2.0 CEUs (Continuing Education Units approved by the Florida Department of the Environment) to Florida-state licensed water and wastewater operators. Florida Engineers can also earn 20 PDHs (professional development hours) towards their state-issued engineering licenses. Additionally, attendees from outside of Florida can also earn 20 PDUs certified by the ISA to use for their continuing education needs as applicable. The optional short-course on cyber security offers an additional 2.0 CEUs for both Florida and out-of-state attendees.

New Products & Services

In additional to the technical program, attendees will also have access to the automation, instrumentation and SCADA-themed supplier showcase that is part of the symposium. "The WWAC Symposium is an event that speaks directly to the water or wastewater professional who is involved with automation, instrumentation and SCADA on a daily basis as part of their jobs. Technology has a major impact on the smooth running of our public water infrastructure, and this is why we are proud to be involved with this year's symposium," says Mark Leinmiller, Water/Wastewater Segment Manger of Schneider-Electric who is the platinum sponsor of the symposium.

Other partners of 2012 symposium include Gray Matter Systems, Phoenix Contact, Honeywell, Eramosa Engineering, Malcolm Pirnie/ARCADIS, and Kenexis. A full listing of symposium exhibitors and sponsors can be found on the symposium website.

Registration Now Open

More information about the WWAC Symposium can be found at www.isawwsymposium.com On the symposium website visitors will find the full-color symposium brochure, complete technical program, full abstracts and bios for all speakers, and information on discounts for ISA, AWWA, and WEF members. Registration is now open at www.isawwsymposium.com/register/ .

About the 2012 ISA Water/Wastewater and Automatic Controls Symposium

Presented by the Water and Wastewater Industries Division of ISA, the 2012 WWAC Symposium helps professionals in the water and wastewater sector understand how automatic control applications affect processing and distribution of water treatment. It also provides an opportunity to gain valuable technical information and training.

The three-day symposium focuses on the challenges associated with automation and instrumentation in the water and wastewater sectors. It features two full days of presentations (two speaking tracks), a tour of a brand-new OCU water treatment facility, a general reception, networking events, a poster session and a supplier showcase. The 2012 ISA WWAC Symposium is being held from 7–9 August 2012 at the Holiday Inn Castle Resort Hotel in Orlando, Florida. More information about the 2012 WWAC symposium can be found at www.isawwsymposium.com.

Symposium Program Finalized

By Joe Provenzano, Symposium Program Chair

It is my pleasure to announce that the technical program for this year's symposium is now finalized. In this newsletter you will find the complete speakers schedule, and abstracts and bios for each of our speakers.

Pages 7 and 8 of this newsletter provide the complete speaking order for our symposium. The first day of speakers brings with a welcome from ISA President Bob Lindeman, and then proceeds directly into the technical content. Keynote speaker Celine Hyer kicks off the technical program with a talk on effective asset management and how to cope with the growing infrastructure funding gap.

After Ms. Hyer's keynote address, Brian Singer who is the founding chair of the ISA99 cybersecurity standards committee takes the podium. He will present a talk about cybersecurity best practices and the opportunities that the ISA99 family of standards offer today's automation professional.

The first day of speakers then follows a comprehensive program of cybersecurity, process hazard analysis and various SCADA integration techniques. In all there are 14 different speakers on the first day of the symposium.

The first day is then rounded out with a poster session from 2:45 to 4:00pm, and a General Reception that evening.

On the second day of the symposium, we start off with some opening remarks from Bob Reinhart, who is president of one of our local Florida ISA Sections. This is followed by our second invited speaker, Bill Hollifield, who is presenting a talk on how to design high performance HMIs.

Following Mr. Hollifield's talk, we have two guest speakers from the Water Environment Federation (WEF) and the Florida Section of the American Water Works Association (FSAWWA). Tom DeLaura, who is the chair of the WEF Automation and Info Tech committee, will be giving a short talk on automation trends in the wastewater industry. Kim Kunihiro, a trustee with the FSAWWA, will also be giving a talk on automation trends but it will be from the perspective o of the Florida Drinking Water Sector.

Our second day then proceeds with 12 more technical speakers, plus a technical presentation on how ISA standards can be used in the water/wastewater sector.

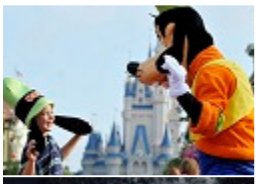
We have a comprehensive, yet focussed, technical program this year. I know you will appreciate the breadth of topics and the opportunity to learn from so many of your peers. I look forward to seeing all of you in Orlando next month!

Joe Provenano
Program Committee Chair, 2012 WWAC Symposium

What there is to do in Orlando, Florida

from the Visit Orlando tourism bureau

Lots! In addition to Disney World, Universal Studio's and Sea World, there is a lot to do and see in Orlando as part of your trip.



Theme Parks

Explore what's new and exciting at Walt Disney World® Resort, Universal Orlando® Resort, SeaWorld Parks & Entertainment and Orlando's other world-famous theme parks.

Attractions

Fill your days and nights with unique experiences outside of the theme parks. From rockets to acrobats, Orlando's attractions will take your vacation to new heights.

Golf

Tee off in one of the world's largest golf destinations. Orlando's famously beautiful golf courses, top-ranked instructors and luxurious resorts cater to the most discerning golf enthusiasts.

Arts, Culture, & History

Discover what inspires a city built on imagination. Live music, theater, dance, galleries, museums and festivals are just a taste of Orlando's arts and culture scene.

Shopping

Whether you're looking for a splurge or a steal, Orlando's collection of malls, outlets, boutiques and galleries, all within a fifteen-minute drive, will indulge every retail whim.

Spas

Whether it's a quick rubdown or a head-to-toe rejuvenation, find your inner (and outer!) glow at one of Orlando's award-winning spas.

Sports, Recreation & Outdoors

Get moving and experience Orlando's unexpected thrills. Whatever your passion, there's an activity for you.

Dining

Whether you're looking for a neighborhood café or a kid-friendly eatery, Orlando's restaurant scene has grown into an eclectic mix of dining experiences at a variety of price points.

Nightlife & Entertainment

Orlando is just as fun after dark as it is during the day. Visit one of our unique entertainment complexes, take in a show at a dinner theater or crack up at an all-ages comedy club.

For more information see: **www.visitorlando.com**

2012 ISA Water/Wastewater and Automatic Controls Symposium

7-9 Aug 2012.....Holiday In Castle Resort Hotel.....Orlando, Florida - www.isawwsymposium.com

Presented by the Water and Wastewater Division of ISA, in collaboration with the Florida AWWA and the WEF Automation and Information Technology Committee, the WWAC Symposium helps professionals in the water and wastewater industries understand how instrumentation, SCADA (supervisory control and data acquisition), and automatic control applications affect the processing and distribution of water treatment. It also provides an excellent opportunity to gain valuable technical information and training.

This 3-day symposium is focused on the challenges associated with automation and instrumentation in the water and wastewater sectors. It features 2 full days of presentations (two speaking tracks), a tour of a local water/wastewater facility, a general reception, networking events, a poster session, and a supplier showcase.

KEYNOTE SPEAKER

Facing Utility Challenges: Managing Risk and Addressing Aging Infrastructure Needs

Celine Hyer, Principal, Malcolm Pirnie/ARCADIS

INVITED SPEAKER

The High Performance HMI - Better Graphics for Operations Effectiveness

Bill Hollifield, Principal HMI Consultant, PAS

INVITED SPEAKER

An Overview of ISA99 for the Water or Wastewater SCADA Specialist

Bryan Singer, Principal Consultant, Kenexis Security

GUEST SPEAKER

Florida Drinking Water Trends and Automation Trends

Kim Kunihiro, Trustee, Florida Section of the AWWA & Water Quality & Production manager, Orange County Utilities

GUEST SPEAKER

Automation Technology Trends in the Wastewater Sector

Tom DeLaura, Chair, WEF Automation and Info Tech Committee & VP, Eramosa Engineering International

GENERAL SYMPOSIUM CHAIR

An Overview of Applicable ISA Standards to the Water and Wastewater sectors

Graham Nasby, Director-elect, ISA Water/Wastewater Division

Technical Program Announced

Over 25 technical presentations and papers on a wide variety of automation, cybersecurity, instrumentation, plant optimization, and system-integration topics.

2 full days of Technical Speakers and Presentations

Instrumentation, System Integration, Automation, Plant Case Studies, New Technologies, Optimization, Project Management, SCADA, HMI, Human Factors, Alarm Management, Data Reporting

Two major themes this year are creating high-performance human machine interfaces (HMIs) to improve operational effectiveness, and developing supervisory control and data acquisition (SCADA) systems and automation cybersecurity best practices. The symposium also continues with its traditional strength of sharing new ideas and lessons learned from recent plant upgrades and new-builds.

The Symposium Program Also Includes:

Tour of new Orange County Utilities Southern Regional Water Supply Facility

Trade Show, Reception & Networking Opportunities

Continuing Education for

Plant Operations/Maintenance Staff, Plant Managers, Engineers, Instrumentation Technicians, Plant Designers, System Integrators, Facility Owners, and PLC/HMI/SCADA/DCS Programmers

Earn CEUs & PDUs

The Florida AWWA, Florida WEA, and WEF Automation and Info Tech Committee have joined the symposium as technical co-sponsors. Attendees will receive 2.0 Florida DEP-approved CEUs (issued by the FSAWWA) that can be used to for continuing education requirments for Flroida state water operator and wastewater operator licenses. The FSAWWA "course number" for the FDEP-approved CEUs is 05134001.

Florida Engineers can also receive 20 PDHs (issued by the FSAWWA), and ISA members and out of state attendees can receive 20 PDHs from the ISA.

CEUs – Continuing Education Units (FDEP & IACET approved)
PDHs – Professional Development Hours (FDEP & ISA approved)

Affordable Professional Development

Early-bird registration for the 3-day ISA WWAC Symposium is only $400. Discounts available for FSAWWA, FWEA, AWWA, WEF and ISA members. Includes breakfasts, lunches and evening reception.

Course on SCADA & Automation Cybersecurity

The symposium offers an optional full-day short course on SCADA & Automation Security. Entitled "Introduction to Industrial Automation Security and the ANSI/ISA99 Standards", it gives an overview of why automation security is needed and how to identify and manage risks. Attendees receive 0.7 FDEP-approved CEUs (FSAWWA course#05134002) or 0.7 IACET CEUs.

View the complete technical program and register at www.isawwsymposium.com

Water Environment Federation® the water quality people® — Technical co-sponsor

Florida Water Environment Association — Technical co-sponsor

FLORIDA WATER RESOURCES JOURNAL — Media Partner

Orange County Government Florida — Technical tour co-sponsor

American Water Works Association AWWA FLORIDA Florida's Water Professionals — Technical co-sponsor

Symposium Program at a Glance

The Symposium program committee is pleased to announce the full technical program for the 2012 WWAC Symposium:

Day 1 - Tuesday, August 7

8:00am-3:00pm **Automation & SCADA Security Short Course**

3:00pm-3:45pm Badge Pick-up for Tour Attendees

3:45pm-6:30pm **Tour of Orange County Utilities Southern Regional Water Supply Facility**
hosted by Orange County Utilities

6:30 pm Free Evening

Day 2 - Wednesday, August 8

7:15am Registration & Breakfast

7:45am Opening Remarks

8:00am Welcome from ISA President Bob Lindeman

8:15am *Keynote Speaker*
Facing Utility Challenges: Managing Risk and Addressing Aging Infrastructure Needs
Celine Hyer, Principal, Malcom Pimie/ARCADIS

8:45am *Invited Speaker*
An Overview of ISA99 for the Water or Wastewater SCADA Specialist
Bryan Singer, Principal Consultant, Kenexis Security Corporation

9:15am **Securing Critical Control Systems in the Water Sector – Where Do I Begin?**
Don Dickinson, Phoenix Contact

9:45am **Using Cyber Security Evaluation Tool (CSET) for a Wastewater Treatment Plant**
Bob Dusza, Manchester Water & Sewer Dept. - Manchester, CT

10:15am Coffee Break & Exhibits

10:30am **Wastewater Plant Process Protection: Process Hazard Analysis**
Thomas McGovern, Broward County Water and Wastewater Services - Broward County, FL

11:00am **Improving Water and Wastewater SCADA Cyber Security: Based on Work Performed for Large and Small Utilities**
Bill Phillips and Norman Anderson, CH2M HILL

11:30am **Mobile Devices for SCADA Integration and Beyond: Considerations, Security and Applications**
Pavol Segedy and Brandon Erndt, Brown & Caldwell

12:00pm Lunch & Exhibits

1:15pm **Solar Powered Wireless Sensors & Instrumentation**
Michael Macchiarelli, Imagine Instruments

1:45pm **HMI Testing of Multiple PLCs using Simulations on Virtual Machines**
Marcelo Avendano and Kevin Patel, CDM Smith

2:15pm **High Fidelity Extended Period Dynamic Simulation in Development and Testing of Control Systems for Water Treatment and Distribution Facilities**
Creig Wilson and Jared Thorpe, CH2M HILL

2:45pm Poster Session, Coffee, and Exhibits

4:00pm **Successful SCADA specifying and Implementation for Water and Wastewater Projects**
Robert Reinhart, ControlsLink

4:30pm **FOUNDATION Fieldbus Provides a Unified Solution for Remote Operations Management**
Larry O'Brien, Fieldbus Foundation

5:00pm **Developing an Integrated Business Solution with Telemetry and GIS**
Michael Waddell, CDM Smith and Isabel Szendrey, Puerto Rico Water Authority

5:30pm General Reception with Cash Bar

Day 3 - Thursday, August 9

7:15am Breakfast

7:45am Opening Remarks

7:50am **Welcome from ISA Tampa Bay Section**
Bob Reinhart, President, ISA Tampa Section

8:00am *Invited Speaker*
The High Performance HMI – Better Graphics for Operations Effectiveness
Bill Hollifield, PAS

8:45am *Guest Speaker*
Automation Technology Trends in the Wastewater Sector
Tom DeLaura, Chair, WEF Automation and Info Tech Committee

9:00am *Guest Speaker*
Florida Drinking Water Trends and Automation Trends
Kim Kunihiro, Orange County Utilities, on behalf of the Florida Section of the AWWA

9:15am **Common Pitfalls that Affect Water and Wastewater Instrumentation, Control and Automation Systems**
Francisco Alcala and Tim Wiley, CDM Smith

9:45am **Integrated Process Control & Management Systems: Creating More Effective Working Environments**
Mark Presti, Gray Matter Systems

10:15am Coffee Break & Exhibits

10:30am	**Hybrid RO & Softening Water Treatment Plant Process Design** *Ali Farahmand, Nassir Gifani, and Mohsen Farivar, ToosAb Consulting Engineers Co., Iran*
11:00am	**Flowmeter Challenges in a Multi-Pass Reverse Osmosis System** *Chris Caglioti and Andrew Fenske, City of Cape Coral, and David Ramsey, AMJ Equipment Corp.*
11:30am	**Should we Keep DO for Nitrification Control? The Proof is the Ammonium Electrodes** *Robert Lagrange, Lagrange Consulting; Sue Baert, Wheaton Sanitary District; Amanda Poole and Dave Green, Baxter &Woodman Inc.; Nick Camin, Endress+Hauser*
12:00pm	Lunch & Exhibits
1:15pm	**Modernization and Improved Operations: Process Automation Upgrade of the Gilder Creek WWTP** *Scott Whitmore, CDM Smith and Blake Visin, Renewable Water Resources (ReWa) – Greenville, SC*
1:45pm	**Efficient Control of Potable Water Distribution** *Raed Al Nuaimi, Rajendra Kumar Ramakrishnan and Mohammed Barghothi, AECOM (United Arab Emirates)*
2:15pm	**Optimization of Wastewater Lift Stations for Reduction of Energy Usage and Greenhouse Gas Emissions** *David Wilcoxson, MWH Americas and Travis Crane, JEA*
2:45pm	Poster Session, Coffee Break & Exhibits
3:30pm	**The Role of Rugged HMIs in Water and Wastewater Plants** *Jeff Hayes, Beijer Electronics*
4:00pm	**SCADA Upgrades to Otay Water Treatment Plant** *Noune Garounts, MWH Global*
4:30pm	**So you have SCADA, what's next?** *Grant Van Hemert, Schneider Electric*
5:00pm	**Asset Tracking and Revision Control for Automated Water/Wastewater Control Systems** *Blair Sooley, Trihedral Engineering*
5:30pm	**An Overview of Applicable ISA Standards to the Water and Wastewater sectors** *Graham Nasby, Eramosa Engineering*
6:00pm	Closing Remarks

Symposium Technical Co-Sponsors

Water Environment Federation – the water quality people

American Water Works Association AWWA FLORIDA Florida's Water Professionals

Florida Water Environment Association

Orange County Government Florida

Symposium Sponsors

The symposium organizing committee would like to thank the following sponsors who have come on board for this year's WWAC symposium:

Platinum Sponsor

Schneider Electric

Gold Sponsors

Gray Matter Systems, LLC

Honeywell

Phoenix Contact

Silver Sponsors

Eramosa Engineering Inc.

Kenexis

Malcolm Pirnie | Arcadis – The Water Division of Arcadis

PAS

Media Partners

InTech

Florida Water Resources Journal

Read-out Instrumentation Signpost

WaterWorld

AutomationWorld

Industrial WaterWorld

WE&T water environment and technology

WEF Highlights

How to Become a Sponsor

For more information on how to become a sponsor of the ISA Water/Wastewater and Automatic Controls Symposium, please refer to our 4-page full-color sponsorship opportunities brochure: www.isawwsymposium.com/exhibit-sponsor/

Now is the time to consider sponsoring WWAC 2013! Contact our general symposium chair for more information.

Welcome to Our Symposium Exhibitors

The symposium organizing committee would like to extend a welcome to the exhibitors who have already signed up to participate in this year's symposium:

Schneider Electric
GRAYMATTER SYSTEMS, LLC
PHOENIX CONTACT
Trihedral VTS SCADA SOFTWARE FOR MONITORING & CONTROL
ISA Tampa Bay Section
SCOTT SAFETY A Tyco International Company
Water Environment Federation the water quality people
Beijer ELECTRONICS
American Water Works Association AWWA FLORIDA Florida's Water Professionals
FLORIDA WATER RESOURCES JOURNAL
BECKHOFF
Florida Water Resources Conference FWRC FS/AWWA • FWEA • FWPCOA
PFS Primary Flow Signal
Florida Water Environment Association
DCR Engineering Services, Inc.
MOTOROLA Authorized Value Added Reseller
ICL Industrial Control Links, Inc.

Exhibit Booth Information

Exhibitor booths at the 2012 WWAC symposium are sold out!

Exhibitor tables at the 2013 ISA Water/Wastewater and Automatic Controls Symposium will be priced at $850 each which includes:

- one six foot table with skirting, 2 chairs, duplex electrical outlet
- two vendor passes, which include ID badges and full conference access (an $800 value)
- additional vendor passes can be purchased for $200/each
- breakfasts, coffee breaks, and lunches on Aug. Day 2 & 3
- admission to the general reception with cash bar on the evening of Day 2
- exhibits room hours: Day 2 & 3 (8:00am-5:00pm), and during Aug. 8th evening reception
- exhibit setup: Day 1 (1:00pm-4:00pm); exhibit take down Aug. 9 (5:00pm-8:00pm)

How to Sign up as an Exhibitor

For more information on how to exhibit at the symposium please refer to our 4-page full-color sponsorship and exhibitor opportunities brochure: www.isawwsymposium.com/exhibit-sponsor/ Now is also a good time to start thinking about WWAC 2013. Reserve your spot today!

Symposium CEUs and PDHs

Thanks to our partnerships with the Florida Section of the AWWA, (FSAWWA), the Florida Water Environment Association (FWEA), and the WEF Automation and Info Tech Committee, symposium participants will earn valuable Continuing Education Units (CEUs) and Professional Development Hours (PDHs) by attending the symposium. Participants will receive their choice of CEUs or PDHs from one of the following organizations:

<table>
<tr>
<td colspan="2">2.0 CEUs or 20 PDHs
water operators
wastewater operators
engineers

American Water Works Association
AWWA FLORIDA
Florida's Water Professionals</td>
<td>Florida state licensed water operators and wastewater operators can earn up to 2.0 Florida Department of Environmental Protection approved CEUs by attending in the symposium.

Florida state licensed engineers can also earn up to 20 Florida DEP-approved PDHs by attending the symposium.

As part of the partnership between the ISA and the Florida Section of the AWWA, official certificates for these CEUs and PDHs will be issued by the FSAWWA.

These CEU credits can be used by both water operators and wastewater operators.

Florida Statutes require anyone who operates a drinking water treatment plant or a domestic wastewater treatment plant to be licensed by FDEP. Beginning May 1, 2011, licensure for Water Distribution System Operators became mandatory. CEUs and PDHs that attendees receive at the symposium can be used to satisfy the continuing education requirements for their licenses.</td>
</tr>
<tr>
<td>Symposium
20 PDHs</td>
<td>Attendees also have the option of receiving a certificate for 20 Professional Development Hours (PDHs) from the ISA.

These PDHs can be used towards your ISA CAP or CCST certification, or towards continuing education requirements in other jurisdictions as applicable.</td>
</tr>
<tr>
<td>0.7 CEUs</td>
<td>0.7 CEUs</td>
<td>For the optional full-day training course on SCADA & Automation Security, attendees can receive either:
• 0.7 CEUs certified by the Florida DEP (issued by the FSAWWA)
• 0.7 CEUs certified by IACET (issued by the ISA)</td>
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Symposium Tour: Orange Count Utilities Southern Regional Water Supply Facility

Attendees will have the option of attending of the Orange County Utilities Southern Regional Water Supply Facility on (Aug 7) in the late-afternoon as part of the symposium.

"Located approximately 20 minutes from the Orlando, Florida symposium hotel, the tour promises to be a unique look at a state-of-art ozone-based water treatment facility," says the OCU's SCADA Administrator Robert Doyon. Doyon looks after the plant's automated SCADA (supervisory control and data acquisition) system, as well as managing the automation systems at several other OCU facilities. Doyon, a long-time ISA member, is a certified ISA Level III CCST (Certified Control Systems Technician).

The plant, which was brought online in 2012, uses a highly optimized process for removing the naturally-occurring sulfide that is present in much of Florida's groundwater. Its fully automated and redundant control system ensures that the plant is able to continuously provide a reliable source of water for both drinking and fire-protection needs in Orange County. The tour will give symposium attendees a glimpse at how leading edge automation is being used in the municipal water sector to minimize costs, increase efficiency and offer enhanced reliability.

Registered attendees will be contacted two weeks before the symposium via an email-based invitation so that they can sign up and confirm their participation in the tour.

The tour is being organized courtesy of the Orange County Utilities Water Division. Special thanks to Robert Doyon, Kim Kunihiro and the staff of Orange County Utilities for hosting this year's symposium facility tour.

Transportation from the hotel to the plant, and back is being provided courtesy of Schneider-Electric. A bus will be leaving from the hotel late Tuesday afternoon and then returning attendees back in time for dinner.

For security reasons, all attendees must pre-register for the tour beforehand. Tour attendees will be able to pick up their WWAC symposium badges earlier on the Tuesday afternoon.

ORANGE COUNTY GOVERNMENT FLORIDA

Tour sponsor & Tour host

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2012 WWAC Symposium Online Registration is now Open!

Attendee registration is now available online!

Visit www.isawwsymposium.com and click on "Register"

Registration for the symposium (Aug 7-9, 2012) includes:

- 2 full days of papers and presentations
- poster session
- networking events
- tour of a local water/wastewater facility on Aug 7
- admission to supplier showcase
- light breakfasts on Aug 8 and Aug 9
- full buffet lunches on Aug 8 and Aug 9
- evening reception on Aug 8, with cash bar and 2 free drink tickets
- name badge
- list of symposium attendees with contact information
- printed onsite program booklet
- printed copy of symposium proceedings

Registration Fees

- Regular Rate: $400
- ISA Member: $300
- WEF or FWEA Member: $350
- AWWA or FSAWWA Member: $350
- Student Registration: $110

Note: If registering after June 15, 2012: add $25.

The regular rate includes a complementary 1-year full ISA membership. Not yet an ISA member? Join at www.isa.org

When registering, you will also have the option of signing up for the optional full-day short-course on Automation & SCADA Security on Aug 7 for $630 ($495 for ISA members).

Hotel Accommodation

The symposium is being held at the Holiday Inn Castle Resort in Orlando, Florida. **We have arranged a special discounted hotel rate of $79/night** for symposium attendees for the Mon, Tues, Wed, and Thurs nights. Please mention "ISA WWAC Symposium" when booking.

Holiday Inn Castle Resort
8629 International Dr. Orlando Florida 32819
www.thecastleorlando.com
info@thecastleorlando.com
1.877.317.5753 (toll free)
407.248.8181 (fax)

The symposium website has an online hotel reservation link.

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1. Opportunity to learn from others and "talk shop" with people who understand the challenges of your sector
2. Get to compare experiences and lessons learned
3. Learn about new technologies, products and services
4. Earn PDH (professional development hours)
5. Earn CEUs (continuing education units)
6. Be actively involved in your professional development
7. Establish contacts in the industry
8. Share Ideas/Experiences with others in the sector
9. Learn Something
10. Have Fun

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August 7-9, 2012
Tuesday - Thursday

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Symposium Full-Day Short Course – Aug 7
SCADA & Autoimatin Security

Security for Automation, SCADA and DCS systems is a hot topic in our sector. Seeing this as an important issue we have selected a course on control systems security as the optional full-day short course for this year's symposium:

Full Course Title: Introduction to Industrial Automation Security and the ANSI/ISA99 Standards (IC32C)

Date:..... Tues, August 7, 2012
Instructor:..... Bryan Singer
Length:..... 1 day
Course Hours: .. 8:00 a.m. – 3:30p.m.
CEU Credits: 0.7
Register at:..... www.isawwsymposium.com/register/
Cost: ..... $630 ($495 for ISA members)

The course covers

- **Understanding the Current Automation, DCS and SCADA Security Environment:** What is Electronic Security for Industrial Automation and Control Systems? | Trends in Security Incidents
- **How IT and the Plant Floor are Different and How They are the Same**
- **Current Security Standards and Practices**
- **Creating A Security Program:** Critical Factors for Success | Understanding ISA99 Part 2: Establishing an Industrial Automation and Control Systems Security Program
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About the Course Instructor

Bryan Singer, CISM, CISSP is a principal consultant with Kenexis Consulting Corporation and vice-president of Kenexis Security Corporation. He has over 15 years of experience in information technology security including 7 years specializing in industrial automation and control systems security, critical infrastructure protection, and counter-terrorism. Mr. Singer's background focuses on software development, network design, information security, and industrial security. Industry experience includes healthcare, telecommunications, water/wastewater, automotive, food and beverage, pharmaceuticals, fossil and hydro power generation, oil and gas, and several others. Mr. Singer has specialized in process intelligence and manufacturing disciplines such as historians, industrial networking Power and Energy Management (PEMS), Manufacturing Enterprise Systems (MES), Laboratory Information Management Systems (LIMS), Enterprise Resource Planning (ERP), Condition Based Monitoring (CBM) and others.

Mr. Singer is the founding chairman and now co-chairman of ISA99, Industrial Automation and Control Systems Security Standards Committee, a standards body focusing on the security issues of the control systems environment. He is also a US Technical Expert to multiple IEC standards bodies, a representative to the Idaho National Labs Recommended Practices Commission, a previous board member to the US Department of Homeland Defense's Process Control Systems Forum (PCSF), and is active globally as an industry advocate in industrial security and critical infrastructure protection. Mr. Singer has experience working in industrial automation and critical infrastructure sectors – such as Power & Energy, Oil & Gas, Transportation and Water. Mr. Singer has a Bachelors' Degree in Computer Information Systems from Phoenix University, and holds the CISSP and CISM certifications. He is chairman of the ISA99, Manufacturing and Control Systems Security Standards Committee.

FSAWWA Course #05134002

0.7 CEUs

Through our partnership with the Florida Section of the AWWA (FSAWWA), we are can offer course attendees 0.7 CEUs that are approved by the Florida Department of Environmental Protection. The CEUs will be issued by the FSAWWA to attendees.
Florida State Licensed water operators and wastewater operators can earn 0.7 FDEP-approved CEUs by attending the training course. Florida State licensed Engineers, can also earn 7.0 FDEP-approved PDHs by participating.

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- Online Registration for the Symposium and Hotel
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This year's WWAC Symposium is being held at the Holiday Inn Castle Resort in Orlando, Florida, USA

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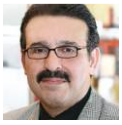

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ISA publishes new edition of: *Good Tuning, A Pocket Guide, 3rd Edition*

Our friends at ISA headquarters have published a new edition of the popular technical book, *Good Tuning, A Pocket Guide, Third Edition,* by Gregory K. McMillan

Every practicing instrument, process and process control engineer will want to have this practical and to-the-point pocket guide on good tuning. *Good Tuning: A Pocket Guide, Third Edition* is a portable, concise summary of all the practical considerations for tuning loops.

It includes step-by-step descriptions of the three best field-proven tuning procedures, a table of typical tuning settings, a summary of valve performance problems, logic diagrams for troubleshooting and more than 70 "rules of thumb." Wherever you have data and tuning access, you can estimate the settings for configuring new loops to review and improve the tuning of existing loops.

The Proportional-Integral-Derivative (PID) controller has an incredible number of options and parameters besides tuning settings. Most of the power of the PID remains untapped. This third edition provides process dynamic responses, a PID checklist and simple equations to estimate loop performance from tuning settings to take advantage of the full capability of the PID.

The understanding of the interrelationship between the process, tuning, performance and PID features enables automation and process engineers to work together to improve process efficiency and capacity.

Also featured are methods for reducing valve backlash and sticktion and for preventing excessive sensor lag and noise. Finally, this edition includes adaptive controls and the application recommendations and considerations for batch control, boilers, crystallizers, columns, dryers, evaporators, extruders, neutralizers, reactors and many other types of process equipment.

TECHNICAL ARTICLE

Overview ISA100 Wireless Systems for Automation and its First Standard – ISA100.11a for Wireless Sensor Network

Penny Chen, Ph.D. Yokogawa Corporate of America

INTRODUCTION

Wireless technologies have long been used as a niche technology that has been used for a special application or to solve a particular problem for industry automation. There are two major causes. One is wireless technology luck of reliability that is one of the key fundamental requirements for industrial automation applications. Another reason is luck of wireless standard that suitable for plant wide wireless applications.

Based on market need, International Society of Automation (ISA) established an ISA100 Wireless System for Automation committee in 2005. The ISA100 committee worked on its first wireless standard – ISA100.11a. On December 2011, the American National Standards Institute (ANSI) has approved ISA100.11a-2011, "Wireless Systems for Industrial Automation: Process Control and Related Applications," as an American National Standard. This has become a significant milestone for using wireless technology for Industrial Automation.

ISA100 FAMILY OF STANDARDS

ISA100 Wireless Systems for Automations committee is one of subdivisions under the International Society of Automation (ISA). The mission of ISA100 is to establish standards and related information that will define procedures for implementing wireless systems in the automation and control environment with a focus on the field level. The committee is made of over 400 automation professionals from nearly 250 companies around the world representing end users, wireless suppliers, DCS suppliers, instrument suppliers, PLC suppliers, technology suppliers, system integrators, research firms, consultants, government agencies, and consortiums. It is open standard organization.

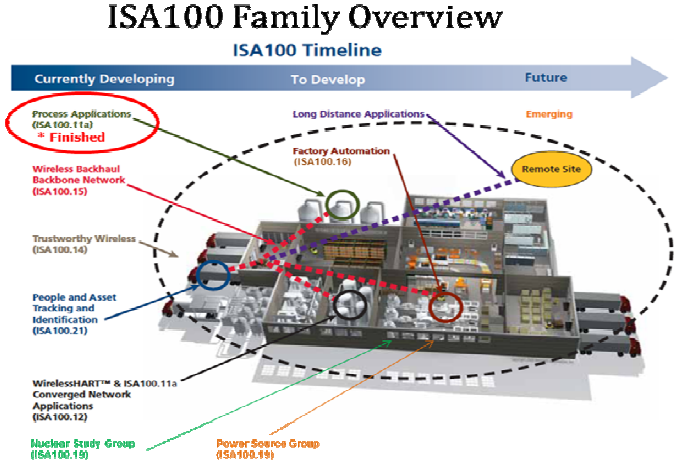

Figure 1 – ISA 100 Familiy of Standards

The ISA100 voting member includes about 42% users, 33% manufacture and suppliers, and 25% others such as consultants, academic researchers, government agencies, etc. The ISA100 is a complementary family of standards and recommendations that accommodate the plant-wide needs. Figure 1 shows the ISA100 family of standardization activities.

ISA100.11a USER REQUIREMENTS

ISA100.11a-2011 Wireless Sensor Network for Industrial Automation is a market driven wireless standard. It is designed with user and for user. Users from all over the world provide lots of use cases and requirements during the ISA100.11a standardization process. Those requirements can be categorized to eleven categories.

Table 1 – ISA100.11a User Requirements

Security	Ensure flawless application using proven cryptography and flexible to accommodates the future advance security integration
Reliable communication	24x7 operation with high data integrity
Good power management	Enable manage long and deterministic battery life
Open	Designed to ensure interoperability that allow users to buy instruments from multiple suppliers
Multi-speed	Able to support variety type of field devices with different type of applications such as report frequently
Multi-functional	One network support multiple and variety type of applications such as process control application, condition monitoring, etc.
Scalable	Scalable in device numbers, geographic space, and different rate
Global Usability	One technology legal everywhere
Quality of Service	Controlled latency, low error rate
Multi-protocol	Seamlessly integrate with traditional wired investment network and support existing application protocols
Control ready	The wireless network has designed to be control ready in order to satisfy variety user's needs on day one

ISA100.11a ARCHIECTURE

ISA100.11a architecture includes Routing Device, Non-routing Device, Handheld Device, Backbone Router, Gateway, Network Manager and Security Manager. See figure 2.

There are two types of field devices: non-routing device and routing device. Non-routing device also called I/O device. The role of non-routing device is consuming data. It doesn't route data from other devices. The role of routing device is capable to route messages from other devices operating in the wireless network. The routing device can also combine with I/O functions.

Backbone router routes data via the backbone. ISA100.11a defines backbone router based on the Open Systems Interconnection (OSI) model by International Organization for Standardization (ISO) reference. It defines distinct and independent layers to enable the independent evolution of communication functions and technologies. The ISA100.11a backbone enables device communications between sub-networks. It also enables wireless devices communicating with gateways to the host systems. ISA100.11a backbone doesn't constrain the user to any particular physical communication technologies. That also mean, ISA100.11a allows the user to select from the diversity of physical networks such as Wi-Fi, WiMAX, etc. in order to best meet the user's particular business needs. Another very important aspect of design ISA100.11a backbone is allowing user deploying a set of sub-network as an option. It provides large scale networking capability. Users can build one single large network with multiple sub-networks to easing network management. Backbone also provides clear segregates a large network in order to accommodate security policy, corporate policy, geography limitations, etc. Backbone enables direct peer-to-peer communication for distributed control purpose.

Gateway provides an application interface between the wireless sensor networks and the plane networks too.

System Manager is the "brain" of the networks. It manages the overall networks devices through set of policy-controlled configurations based on collection of performance parameters reported.

Security Manager enables, controls, and supervises the secure operation of all devices present in the network.

ISA100.11a KEY CHARACTERISTICS

ISA100.11a has designed with many special characteristics in order to fit into the industrial environment. The main characteristics of ISA100.11a can be summarized by following major areas:

Reliability – ISA100.11a incorporated large mechanisms to ensure the communications are highly reliable. For example, it has incorporated many methods to ensure co-existence such as Time diversity and determinism, collision avoidance, frequency diversity, Automatic Repeat-reQuest (ARQ), spectrum management through channel blacklisting and

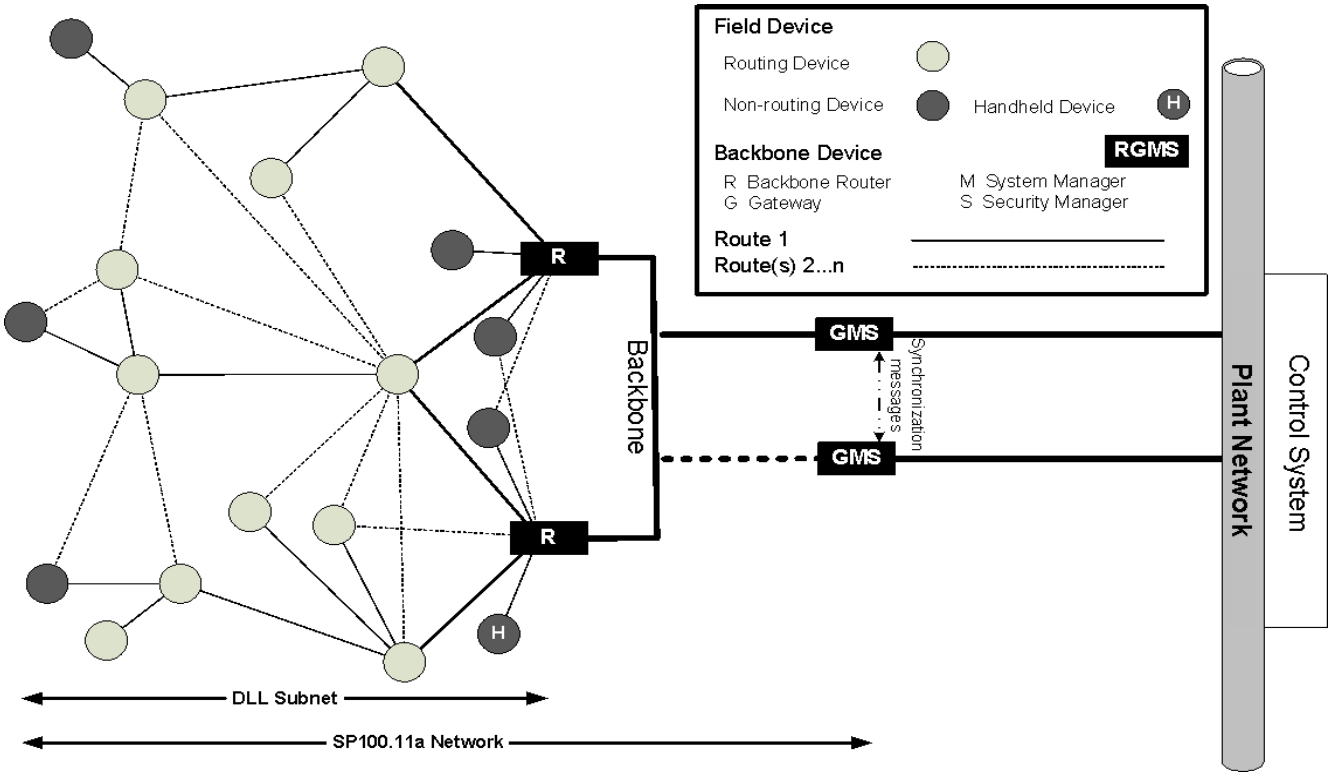

Figure 2: ISA100.11a architecture

adaptive hopping, etc. It has also incorporated Path Diversity such as using mesh topology, graph routing, etc. It has also used the Duocast technologies. Duocast is a mechanism through which a device sends a packet that is received and acknowledged by multiple devices within the duration of the same timeslot.

Scalability – ISA100.11a supports one single network infrastructure through its backbone allowing multiple sub-networks with a common network management and security management function. The network supports from a few to a ten thousands of sensors in the field. It is capable of support short and long radio ranges. It can coexist with other wireless technologies within the same frequency band and effectively transports small sensor data as well as accommodates the large data throughput such as waveforms or firmware updates.

Openness and interoperability -- ISA100.11a standard is based on stand-of-art technologies. It follows the OSI communication model by International Organization for Standardization. The solution's interoperability is well defined in its communication interface, allowing users to pick the best-in-class product in the market with global usability and leveraging existing well-approved communication models and protocols such as IPv6, UDP and 6LowPAN. It also ensures interoperability. It has defined backbone that agonistic to the wireless technology to ensure the best and flexibility to accommodate existing technologies such as Wi-Fi, WiMAX, etc. in order to lower the cost of ownership for the users.

Easy deployment – ISA100.11a network is self-organizing and self-healing system that continuously adapts to dynamic conditions. It ensures reliability are transparently configured and operated by the wireless field devices in conjunction with the network System Manager. It also ensures secure communication are transparently configured and operated by the wireless field devices in conjunction Security Manager. It is capable to support over-the-air provisioning for easy firmware upgrades, maintenance and operation. It also defined native support on the gateway high side interface for services, reports, alerts, and configuration primitives.

Multifunctional – The application layer of ISA100.11a is flexible, modular, extensible, object based, future proof, easily customizable, and able to accommodate a wide variety of applications. Multiple application protocols within a single wireless infrastructure such as HART, Foundation Fieldbus, Profibus, Modbus and OPC etc. can be supported, allowing easy integration with legacy systems. See figure 3.

Control ready – ISA100.11a has designed to support restricted latency and flexible timeslot to accommodate different application requirements. It is designed to handle from Class 1 for monitoring to Class 5 for close loop-control. See table 2 on the next page.

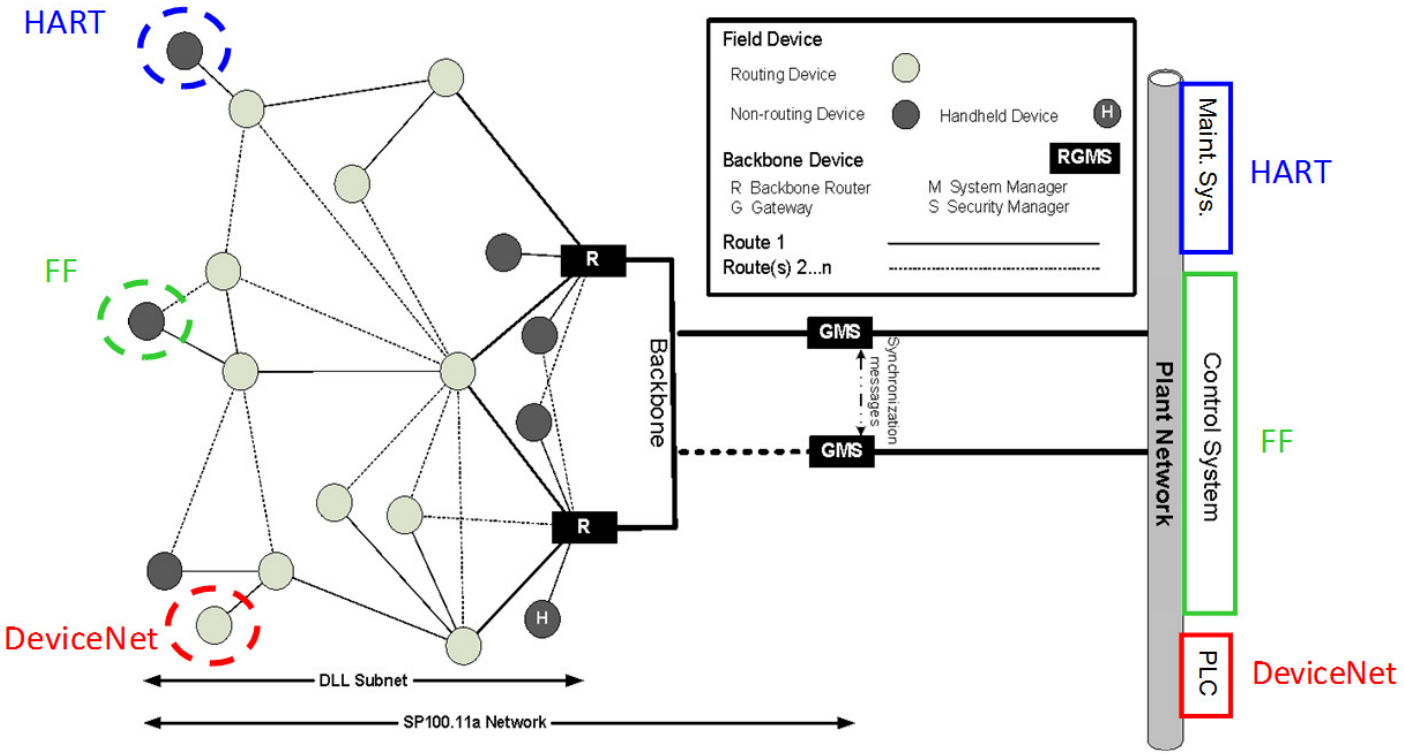

Figure 3: ISA100.11a architecture enables simultaneous, multi-protocols in devices and host

Safety	0	Emergency action	Always critical	Safety interlock Emergency shutdown Automatic fire control
Control	1	Closed loop Regulatory control	Often critical	Control of primary actuators High frequency cascades
	2	Closed loop Supervisory control	Usually non-critical	Low frequency cascade loops Multivariable controls Optimizers
	3	Open loop control	Human in the loop	Manual flare Remote opening of security gate Manual pump/valve adjustment
Monitoring	4	Alerting	Short-term consequences	Event-based maintenance Battery low indicator Asset tracking
	5	Logging Downloading/uploading	No immediate consequences	History collection Preventative maintenance rounds Sequence of events (SOE) reporting

Figure 4: ISA100.11a defined class 1~5 from monitoring to control.

Future proof -- Wireless radio technology changes over time. It requires that the wireless network decouple its network layer from the physical media to be flexible in order to adapt the new radio technology. ISA100.11a wireless standard has been designed with this concept in mind.

ISA100.11a wireless technology for process automation is designed to address the entire requirements list above. It is user driven wireless standard for the industry to enable a cost-effective network that support life cycle support and management.

CONCLUSION

ISA100.11a is an ideal wireless communication choice for industrial applications because it was designed with a self-organizing and self-healing capability; coupled with a flexible mesh and/or star network topology to ensure flexibility; optimize power consumption; along with the multiple communication-hopping technologies to ensure the reliability of communication.

With a single wireless network infrastructure, the ISA100.11a product is able to handle multifunctional sub-networks using the backbone infrastructure, which can support a large amount of sensor deployments. Additionally, it is easy to accommodate a variety of sensors for the entire plant's needs and can be integrated into an existing, wired network infrastructure to protect investments. The ISA100.11a standard-based wireless product solution has been implemented, certified, and deployed in the field for real application today.

ABOUT THE AUTHOR

Dr. Penny Chen is a Principal Systems Architect at Yokogawa Industry Automation Global Strategic Technology Marketing Center in US (USMK). She is responsible for technology standardization and marketing strategy focusing on wireless, networking and related security. Penny is actively involving in ISA100 (Wireless Systems for Automation) and ISA Wireless Compliance Institute (WCI). She is currently the Vice-Chairman of WCI and Co-Chair of the ISA100.15 Wireless Backhaul Network Working Group. Over the past thirteen years, Penny focused on wireless networking technologies and security solutions for a variety of wireless technologies include Bluetooth, Wi-Fi, and Mobile technologies. Penny received a Ph.D. in Electrical Engineering from Northwestern University. Contact: penny.chen@us.yokogawa.com

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AUTOMATION SPOTLIGHT

Oakville South West Wastewater Treatment Plant Upgrade

By Graham Nasby, Mike Di Iorio, Pete Samson and Stan Spencer

The year 2011 marked the completion of the $58 million dollar "Phase 3" upgrade to the Oakville South West Wastewater Treatment Plant located in Oakville, Ontario, Canada. Operated by the wastewater division of the Halton Region Public Works department, the plant provides wastewater treatment services for a population of approximately 52,000 and has a peak capacity of 180 MLD (million litres per day).

The project included replacing the influent pumping station, a new headworks facility, the installation of additional onsite storage to accommodate higher wastewater flows during periods of wet weather, and a significant capacity increase. Also included were an upgraded electrical system and process train improvements. The project also involved the wholesale replacement of much of the plants instrumentation and a significantly expanded SCADA system.

Coordinated by Canadian engineering firm Stantec Consulting Inc., the project team involved a multitude of design and construction professionals covering a wide variety of skill sets. The plant's new SCADA system was designed and programmed by Eramosa Engineering, which has offices in Guelph, Calgary, and Detroit. Eramosa is a specialist consulting engineering firm that specializes in electrical engineering, system integration, data visualization, web-based reporting, and SCADA master planning.

The upgrade project was so large that was actually comprised of a number of distinct projects which were undertaken as a series of carefully orchestrated phases. The plant also had to remain in full operation during the entire upgrade, so all site work had to be carefully coordinated and scheduled. During the 3-year construction project, the project team was able to ensure that the plant's constant inflow of sewage was always treated before being discharged to Lake Ontario.

Aerial shot of the Oakville Southwest Wastewater Treatment Plant.

NEW BAR SCREEN BUILDING

Unlike traditional wastewater plants, the plant's bar screen is located ahead of the lift station. A new dual bar screen chamber was installed on the incoming 1350 mm gravity sewer leading into the plant. The idea is that any debris entering the plant is screened out before it has a chance to clog the plant's lift station pumps. The net result has been a significant decrease in maintenance work associated with clogged pumps. The screens are fully automated and cycled based on several operator-selectable control strategies, depending on time intervals and the characteristics of the incoming raw sewage flow. As the screen building is located in close proximity to a residential area, the building was architecturally designed to fit in with the neighborhood.

New Bar Screen Building, which is located within sight of an established lakefront residential area.

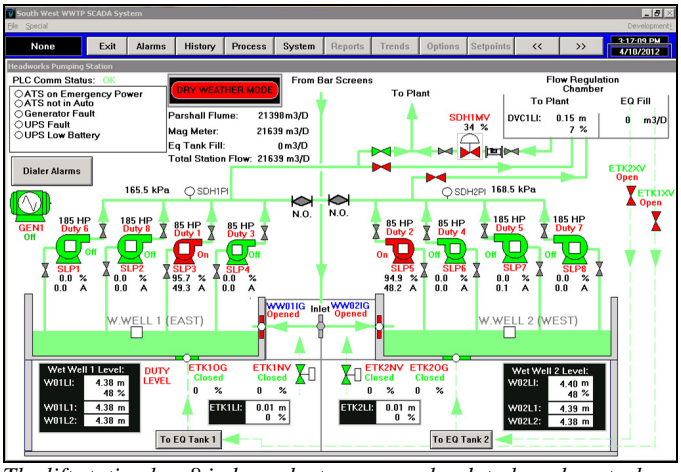
NEW LIFT STATION & EQUALIZATION TANKS

Part of the upgrades was to construct a new sewage lift station to replace the aging W18 facility which was located on the corner of the plant property. The new lift station features two large tandem wet wells, and two 4000 m^3 onsite equalization tanks. The equalization tanks are designed to reduce the effect of weather-related high flow rates on the plant by offering short-term storage. Fed by a single 1350 mm gravity sewer, giant automated sluice gates are used to feed one or both wet wells depending on service requirements.

The pumping station itself features a total of 8 pumps – four rated at 17.3 MLD (million litres per day) at 13.9 mTDH (meters total dynamic head) and four rated at 56.3 MLD at 13.9 mTDH. The plant's fully automatic control system, using Allen-Bradley ControlLogix PLCs and Wonderware InTouch HMI software, controls the VFDs for the pumps in response to wet well levels and the rate at which the wet wells and equalization tanks are filling/emptying over time.

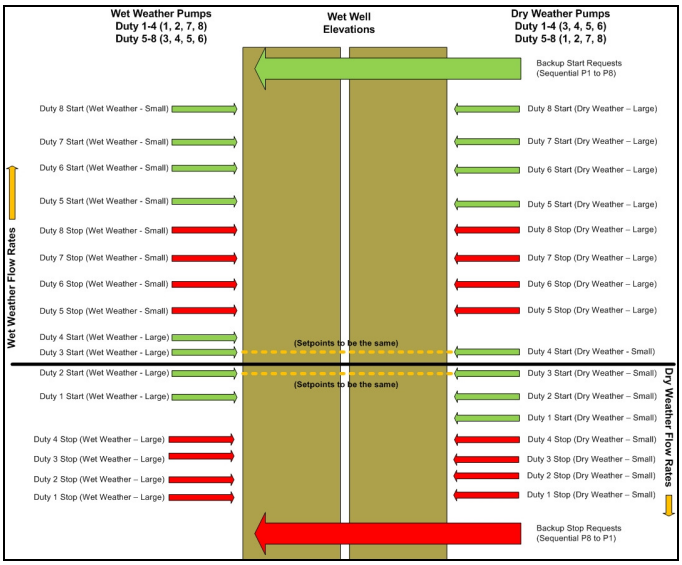
A "duty-based" approach is used for controlling the wet well pumps. Viable duty combinations for both low flow and high flow scenarios are available and the system is capable of sequentially switching between them based on influent measurements. This permits a higher resolution of control during low and high flow conditions while aiding in asset management by equalizing operating runtime across all

equipment. The system also automatically handles pump failures and when pumps are taken out of service for maintenance.



The lift station has 8 independent pumps under duty-based control.

Under normal operating conditions, the "duty table" can be updated manually by the operator to set designated pumps to start in a specific order as the incoming flow of sewage increases. To ensure that pump runtime is equally shared between the pumps, pumps are automatically rotated in and out of service on an operator-adjustable time interval.



Level-based control scheme for the lift station, using different duty configurations if the plant is responding to a wet weather event or not.

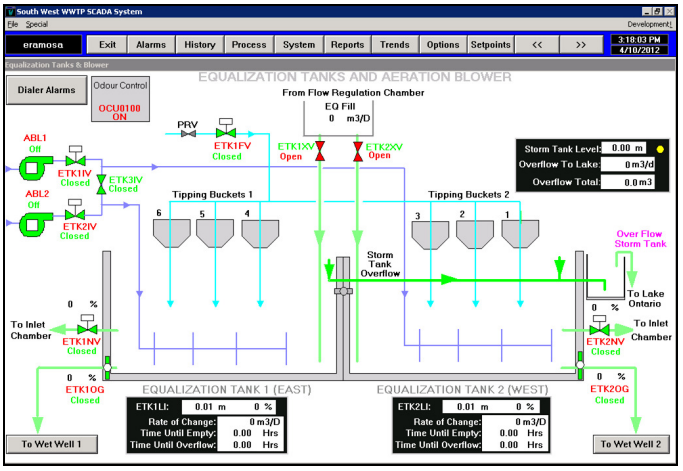
The plants eight pumps are typically set up in dry weather so the smaller pumps operate as Duty 1 through 4 and the larger capacity pumps operate as Duty 5 through 8. During a wet weather event, the duty-table is automatically switched around such that the larger pumps are assigned to duties 1 through 4.

Unlike many plants with onsite storage, the equalization tanks (EQ tanks) at Oakville South West are actually located at a higher elevation than the wet wells. This was done to accommodate the plant's small foot print, and to allow the EQ tanks to drain back into the wet wells using gravity flow alone. During a high flow event, a pinch valve is modulated such that incoming sewage is diverted from the wet wells into the EQ tanks through a metered regulation chamber. (The wet wells themselves are sized so that they can accommodate any incoming influent surges from the gravity sewer as needed.)

After a high incoming flow event has passed, the contents of the EQ tanks are then automatically drained back into the wet wells in a controlled manner. This is done using two large hydraulically-actuated sluice gates located in the bottom of each equalization tank.

Photo of the new wet wells and equalization tanks during construction. Note the size of the car on the bottom left of the photo.

In order to prevent the equalization tanks from going septic (and developing odours), the plant employs a small automated aeration blower system and water-fed tipping buckets. Under PLC-based control, the local aeration helps mitigate possible odours arising from septic conditions in the EQ tanks, and the water flushing system cleans the tanks after each EQ thank fill/empty operation. The Oakville South West plant is located in close proximity of a residential area so minimizing potential odours was an important design consideration.



Equalization tanks use tipping buckets and local aeration to help ensure retained sewage does not develop odours from going septic.

FLOW REGULATION CHAMBER

Another aspect of the lift station which is unique is that the lift pumps do not pump directly into the plant's grit removal system. Instead, they pump into an elevated flow regulation chamber. This chamber, by maintaining a constant head, ensures a constant flow into grit removal building. In addition to precisely controlling the speed of the lift pumps, a large pinch valve is also used to finely control the flow from the flow regulation chamber to the grit building.

Andrew Sachs, one of the project's SCADA integrators, standing beside the pinch valve which controls flow from the flow regulation chamber to the plant's grit removal system.

After passing through the grit removal system, a second flow splitting box is used to feed the plant's seven rectangular primary clarifiers. The primary clarifiers then use a series of sluice gates to distribute incoming flow to the aeration basins. A complex iterative control algorithm is used to constantly adjust the position of the gates. The net result is that each treatment train is fed at a rate to ensure maximum process efficiency.

SEVEN PARALLEL TREATMENT TRAINS

The treatment portion of the Oakville Southwest plant comprises of four separate "plants" which, in total, consist of seven parallel treatment process trains. A major component of the upgrade project was to build three completely new process trains for Plants 1 & 2, and upgrade the other four existing trains in Plants 3 & 4. (The original plants 1 & 2 which dated from the 1950s were demolished as part of the project.)

Each train consists of a square primary clarifier (with flights, scrapers and chains), an activated sludge aeration chamber, and a secondary clarifier (also with flights, scrapers and chains). Four of the existing treatment trains were upgraded, and three brand-new trains were added, bringing the total number of trains in the plant as whole up to seven.

During construction, the upgrades to the existing process trains were carefully sequenced so that the plant could remain in operations at all times.

Photo during construction showing 6 of the plant's 7 process trains.

ACTIVATED SLUDGE PROCESS

Referred to as an "activated sludge process," each treatment train uses an aeration chamber coupled with a secondary clarifier to break down the sewage. In the aeration chambers, aeration blowers are used to provide air (which contains oxygen) to the aerobic bacteria that break down the sewage. After the sewage has passed through the aeration chambers, it is then settled out in the secondary clarifiers.

At the bottom of each secondary clarifier, sludge collects which is then pumped by RAS/WAS pumps to two different destinations. The RAS (Return Activated Sludge) pumps transport part of the sludge back to the front aeration basin of the process in order to keep the bacteria healthy and active. The other portion of the sludge, the WAS (Waste Activated Sludge), is pumped to the digesters as a by-product of the process.

The key to a well-run activated sludge process is the precise control of aeration blowers and the RAS/WAS pumping system.

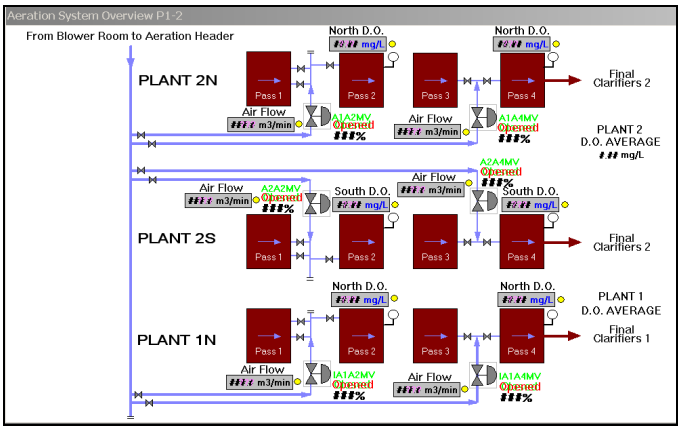
Photo of the plant's new control building under construction.

NEW AERATION CONTROL

As part of the upgrade, the automated logic to control the plant's aeration control valves and four blowers was completely rewritten.

Blower piping was rerouted and the existing aeration control valves were replaced with more appropriately sized units. A new strategy of using a common aeration header for the entire plant was also employed. In total, the blower system now uses a series of PLC-controlled blower and aeration-basin control valves, which allows the output of the blowers to be easily scaled/distributed to meet varying aeration demands.

Coupled with these mechanical/electrical changes, a modified form of the "most-open-valve" aeration control strategy was deployed with great success. The result was better DO (dissolved oxygen) control and reduced energy costs.



Screen shot of the common aeration header with control valves.

IMPROVED RAS/WAS CONTROL

In each process train, after the wastewater has been thoroughly aerated, it then flows by gravity into the secondary clarifiers. In the secondary clarifiers, the clarified treated effluent drains off at the surface and heavier sludge sinks to the bottom. The sludge is then gathered up by the each clarifier's chain/flights system.

Each clarifier is equipped with a pit at one end. This is where the chain/flights systems continuously gather the sludge as part of each clarifier's normal operation. From these pits, the sludge is then split into return and waste streams by the plant's RAS and WAS pumps.

For a clarifier to work well, the depth of the sludge at the bottom has to be carefully controlled. If there is too much sludge in the bottom of the clarifiers, the sludge could go septic which disrupts the process in the aeration tanks. If there is too little sludge, the sludge tends not to settle out properly and too much WAS is generated. A careful balance must be maintained.

As part of the upgrade, the control of the plant's RAS/WAS pumping system was fully automated. RAS pumping now uses VFD-controlled pumps and can automatically scale up and down in response to changing incoming flows to the individual treatment train. PID control is used in conjunction with magnetic flow meters to control pump speed.

Chain and flight system at end of the one of the new secondary clarifiers, showing how the flights are used to scrape up the sludge on the bottom and to gather up scum from the surface.

One nice feature of the plant's new RAS pumping system was the installation of new piping that pours RAS flow back into the head of the aeration basins from a nozzle mounted at waist level above grade. This allows the operators to visually check the color and consistency of the RAS flow as it re-enters the aeration tanks.

WAS pumping is now fully automated with several control schemes that the operator can select from. WAS pumps can be set to do most of their pumping during set times of the day, or WAS pumping can be automatically spread out into a user-selectable number of pump runs during each a 24 hour period. Overall, the WAS pumps can be controlled based on a total target WAS volume per day, a target total WAS pump runtime, or a target sludge blanket level in the secondary clarifier that is being serviced.

For the two new process trains that were added to the plant, a single bank of pumps is used to do both RAS and WAS pumping. On the outlet of the discharge header a series of motorized pinch valves are used to split the pumped sludge flow between RAS and WAS. The result is more fine control of the RAS and WAS ratio.

All seven treatment trains are controlled using standardized ladder logic code running on Allen-Bradley ControlLogix and CompactLogix PLCs. These PLCs in turn are interfaced with the plant's centralized SCADA system allowing operators to control the plant's treatment trains in both automatic and manual, as well as local, control as needed to meet operational targets. The entire system is designed to work entirely in automatic mode with minimal operator intervention required.

One of the maintenance tunnels below the plant's treatment trains.

PHOSPHOROUS CONTROL

Phosphorous in wastewater is a leading cause of poor surface water quality and algae blooms. Thus, Ontario Ministry of the Environment regulations require the Oakville South West Plant to remove phosphorous before any effluent is discharged into Lake Ontario.

At the plant ferric chloride is used for phosphorous control. A modified flow-based algorithm is used to add the ferric chloride to the wastewater as it travels through the plant. A large dose is added to the front end of the primary clarifiers to promote both coagulation and setting of sludge, as well as control free phosphorous. A second dose of ferric is also added at the tail end of each aeration basin to provide trim control of phosphates exiting the plant. The trim control is flow-paced based on the individual process train's effluent output.

Photo in one of the plant's new PLC Control Panels. Notice the extra space that has been allocated for future expansion.

UV TREATMENT

The Oakville South West plant uses UV as its final treatment stage to meet the stringent Canadian discharge requirements associated with Lake Ontario. Three parallel trains of UV lamps, running at 254 nm wavelength, ensure that any potential bacteria or microbes in the plant's effluent are inactivated prior to being discharged into Lake Ontario. The system is relatively maintenance free with the bulbs being equipped with automatic cleaning systems and UV intensity monitored by several fibre-optic intensity monitors.

The plant has one kilometer underwater outfall pipeline equipped with underwater diffusers to ensure that the plant's discharge does not interfere with shoreline activities.

DIGESTER BIOGAS USED FOR HEATING

For sludge treatment, the plant uses a pair of anaerobic sludge digesters. Biogas from the digesters is used to heat the digesters and to supplement heating at the plant's buildings, galleries and tunnels. The digesters use radar level transmitters and contain a full complement of instrumentation which allows the plant operations team to keep a close eye on digester performance. Mixing of the digester contents is accomplished by re-circulation pumps which can run 24 hours a day.

Sludge thickening is done off-site at a separate facility owned by the Region. Digested sludge is hauled using tanker trucks which are filled from a dedicated sludge hopper. Prior to a tanker trucks arriving the sludge hopper is slowly filled over a four hour period using positive-displacement transfer pumps. This intermediate sludge loading step prevents truck filling operations from creating negative pressure in the digesters themselves.

The sludge hopper also loads the trucks by gravity, which allows the trucks to be filled faster than by using the traditional pump-based approach. A radar level probe in the sludge hopper is used to calculate the volume of sludge that is loaded into each truck. When the plant is in full operation, digested sludge is trucked away from the plant several times a day.

One of the new Motor Control Centers (MCCs) at the plant.

NEW CONTROL ROOM

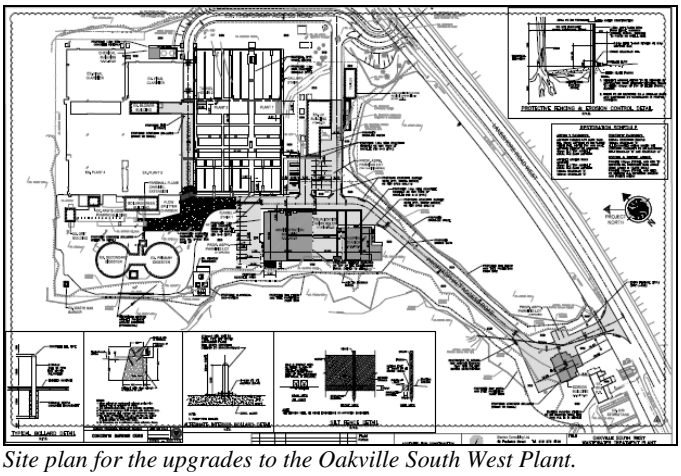
Part of the upgrade was building new plant control room located in the new centralized control and administration building. With the plant being fully-automated there is no need for a constant operator presence in the control room, but careful thought was put into the design of the control room to give operators the information they need during both normal and abnormal situations.

New control room complete with a large overview LCD display.

A large heads up display was installed so that additional personnel would not need to crowd around the operator workstations. Ample floor space was provided and the control room was placed so the operators have view of the entire plant via a window. Screens on the HMI were also developed with both normal and abnormal situations in mind.

PLANT FOOTPRINT

The Oakville South West Plant has been on the same site since the 1950s and a residential neighbourhood has grown up around it. This meant for the upgrade that the plant had stay within its existing footprint. As part of the project, the older less efficient "Plant 1 & 2" sections of the plant were removed and replaced with new state of-the-art Plant 1 & 2 sections.



Site plan for the upgrades to the Oakville South West Plant.

PROJECT CHALLENGES

Due the project's size and the cramped quarters of the site, there were numerous challenges associated with Phase 3 upgrade at the Oakville Southwest plant.
The project required a large number of design firms, contractors, vendors, and specialist personnel to be involved during the project's multi-year timeline. This meant that site activities had to be carefully coordinated and care taken so that long-lead items would be ready when it came for installation. Regular coordination meetings and detailed schedules were used throughout the entire construction effort. Both chain-of-command and direct lines of communication, including cell phones, were set up so that if unexpected site conditions arose, the project team could quickly and effectively respond to them.

Process design and SCADA design were made flexible so that improvements could be realized throughout the project. An open line of communication was used between the process design firm, system integrator, general contractor and the Region to ensure that any opportunities identified during the construction process could be effectively harnessed and put to positive use.

The plant's operations team was also extensively consulted during both the design and construction phases of the project to ensure they would be able to effectively control and operate the plant after construction was complete. The result was a finished plant that is easier to operate and maintain.

Photo of the plant during construction.

A NIGHT TO REMEMBER

One of the more time critical parts of the plant upgrade was cut-over of the main sewer to the newly installed plant bar screen and lift station. Though the actual cut-over task itself took only 8 hours to complete, the entire operation took many months of planning and preparation. The challenge was how to successfully take a portion of a fully-operating 1350 mm main gravity sewer out of service, cut out a 20 foot section of

the pipe, and replace it with a new piping configuration. The ultimate challenge was to be able to do it with minimal impact to the city's residents and to the surrounding environment.

To make the cut-over possible, temporary diesel-driven pumps were used to pump the incoming sewage around the section of pipe that was to be rerouted. A total of six diesel-driven pumps, along with three more waiting on standby, were used as part of the operation. The cut-over had to go smoothly with no leaks, as Oakville also gets its drinking water from Lake Ontario.

Timing-wise, the cut-over was scheduled to take place during the middle of the night when the plant has the lowest incoming flow. Preparations began months before with trenching being put in place and the new sewer piping all being installed except for the final 20 feet piping needed for the cut-over. The cut-over itself involved cutting into the old sewer, removing old sewer pipe, and installing the new rerouted 20 section of pipe.

Some of the preparations for the cut-over of new sewage line.

As the cut-over area was also beside a major street, the street was cordoned off by police the two days before so that all the hoisting equipment and temporary pumps could be brought to the site and setup beforehand. Temporary lighting was installed so that work could carry on throughout the night.

The actual cut-over activity took just under 8 hours, and then the control system tuning began. For the next 6 hours, the plant's operators, the project's lead process engineer, and the system integrator worked together to tune the new bar screens and new plant lift station to effectively handle the new incoming sewage feed. (Prior to the cutover, the plant's old soon-to-be-demolished lift station was still being used.)


The cut-over of the main 1350 mm sewer to the new bar screens and new lift station was done at 2:00 AM during the "low flow" period.

Careful attention was paid to "what if scenarios" and making sure that the plant could continue operating even if there were multiple pump failures, ensured the cutover was a success. After full day of testing, control of the plant was handed over to operations staff.

PROJECT OUTCOME

As a result of the upgrades, the Town of Oakville now has a modern wastewater treatment plant that can now effectively handle wet weather events and handle the growing population of West Oakville. The plant is also now considerably easier to operate and is considered a flagship facility for Halton Region's wastewater services department.

Funding for the project was jointly supplied by the Region of Halton infrastructure fund, the Ontario Provincial Government and the Government of Canada's Infrastructure Stimulus Fund.

ABOUT THE AUTHORS

Graham Nasby, P.Eng., PMP, works for Eramosa Engineering and is the Director-elect of the ISA Water/Wastewater Industry Division. Contact: graham.nasby@eramosa.com

Mike Di Iorio is the Operations Supervisor for the Oakville South West Wastewater Treatment Plant.

Pete Samson, B.Eng. is a system integrator with Eramosa Engineering and was the lead SCADA integrator for the Oakville South West project.

Stan Spencer, P. Eng. is a Principal with Stantec Consulting Inc. and was the Project Manager for this project.

ISA99 Cyber-Security Standards Committee Sets Development Timeline

From the ISA Standards "News" blog

The ISA99 Industrial Automation and Control Systems (IACS) Security met in May 2012 at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, to assess the current status of committee work products, and establish objectives and goals for the next 12 to 24 months. Several committee work groups expect to issue new or revised drafts for review, comment and a possible ballot by the end of 2012. To do this, the committee first needs to define, understand, and accept some Fundamental Concepts, addressing a few questions as the basis for the more detailed standards. Some of these questions include:

- How is the security of instrumentation and control system (IACS) security related to and different from "typical" IT security?
- What are the steps or phases in the lifecycle for IACS security?
- What are zones and conduits, and how do I define them for my networks?
- How are security levels defined and applied?

The committee has standards and technical reports in various stages of development, ranging from preliminary drafts to approved committee drafts and published documents. The committee's work plan includes provisions for sharing activities and results with other groups, including but not limited to the International Instrument Users Association (WIB), the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC). The intent is to draw on these relationships to produce a single set of standards, addressing the subject of IACS security.

Check the ISA99 standards committee Wiki site for more notes from the meeting, discussions of the above concepts, and detailed information about our plans and directions at http://isa99.isa.org. Visit the site often, review our materials, and submit questions or comments. We would love to hear from you!

ISA Standards

Setting the Standard for Automation™

What Becomes a Leader?

By Henry DeVries

How could becoming a better leader improve your career?

"Successful leaders don't rest on their laurels, because leadership is not a title on a business card," says author and leadership expert Ken Blanchard. "Leadership is a living process."

Blanchard, a champion of lifelong learning, is best known as the co-author of the parable *The One-Minute Manager,* a book that swept the business world three decades ago and since has sold 13 million copies in 27 languages.

Others know him for any of the 50 other books he has co-authored. Still others recognize him as the founder of the Escondido company that bears his name, an international training firm of 300 plus employees that helps companies improve performance and productivity. The Ken Blanchard Companies is a global leader in workplace learning, productivity, performance, and leadership training solutions. Helping people to continue to grow is a prime concern.

"The failure to grow sabotages the career of more leaders than anything else," says Blanchard. This is a subject he has written (you guessed it, with a co-author) an entire book about.

Mark Miller, who co-wrote an international bestseller with Blanchard called "The Secret," reteamed with his friend to write "Great Leaders GROW." Miller who, began his career at Chick-fil-A working as an hourly team member and rose to the position of vice president of training and development, was eager to share his advice on leadership.

"The story, because we write parables, is about a young guy just getting out of college," says Blanchard. "His father dies in the beginning of the book of a heart attack, but before he dies he tells his son you can be a leader but the son doesn't know what all that means. He meets Debbie at the funeral, a woman his dad had mentored, and she says she would be willing to help him."

Debbie teaches him the importance of the letters G.R.O.W. "GROW is an acronym that I think is a great personal growth strategy for individuals. Plus I think it is a good leadership development strategy for companies," said Blanchard.

G stands for gain knowledge. Leaders need to gain knowledge about themselves. "If you don't know about yourself, how can you lead somebody else?"

R is to reach out to others. "Because I think we all know that the best way to learn something is to teach it."

O stands for open your world. "This really ties in to having personal goals every year."

W is to walk with wisdom. "What that means is to really look for and find mentors, people who will be truth tellers for you and help you."

Blanchard, now in his seventies, no longer has an operational role in the company he founded ("I'm the CSO -- the chief spiritual officer," he says). Yet he continues to be what he has always been: a thinker, a motivator, and someone who strives to help better the world around him.

ABOUT THE AUTHOR

Henry DeVries, assistant dean for external affairs at UC San Diego Extension (San Diego California, USA), is co-author of the book "Closing America's Job Gap," provides career tips on CW6 television morning news and can be contacted at hdevries@ucsd.edu or followed on Twitter @goodjobs_forall .

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Looking for a Few Good Volunteers

By Graham Nasby, WWID Director-elect

In 2013 I will have the honor and privilege of starting my 2 year term as Director of the ISA water/wastewater industries division. As I have prepared this year for the symposium and for my upcoming role as director, it has made me think a lot of about what it's like to be part of a team and how to inspire others to bring out there best. Volunteer organizations are often said to run in cycles, and we are very fortunate to be on an "upswing" in the WWID at this point in time.

Great leaders and volunteers do not fall off trees. As Mr. Devries says in his article on the previous page, they have to GROW into these roles. This article was one I read in a newspaper when I was in San Diego last month for the ISA's Fall Leaders Meeting. I was so impressed by the article I contacted Mr. Devries, and he very kindly gave us permission to reprint it in this newsletter. I encourage you to grow as a volunteer and leader by getting involved with the division and our active symposium.

We have a strong team in the WWID division, but a few extra pairs of hands always helps. The division is a great opportunity to meet contacts in the industry, learn about new techniques and work on your "soft skills". It's an organization that will give back to you much more than you put in.

Some of the volunteer roles I am looking to fill in 2013 WWID executive include:

- Symposium Program Committee Members
- Symposium Organizing Committee Members
- Symposium Marketing Committee Members

- Division Secretary-Treasurer
- Assistant Newsletter Editor
- Technical Columnist for Newsletter

- Assistant Membership Chair
- Section-Division Liaison
- Community Colleges Liaison
- WebMaster

- LinkedIn & Twitter Account Coordinator
- Listserv & Email mailing list Coordinator
- Student Scholarship Committee Members

- Symposium Tour Coordinator
- Symposium Speakers Dinner Coordinator
- Symposium Program Booklet Designers
- Symposium Local Sections Liaison
- Symposium Exhibitor & Sponsor Committee

If any of these positions interest you, or you have any ideas for what the division should be doing, please do not hesitate to ask me, Graham Nasby, ay graham.nasby@eramosa.com

New WWID Members

Recently joined May to June 2012

The Water/Wastewater Industry Division would like to extend a warm welcome to our recently joined members.

May 2012

Mr. John David Wallace Alexander - Halfway House, 0, South Africa
Mr. Marvin T. Anderl - Richmond, VA, USA
Mr. Dhumal N. Aturaliye - Austin, TX, USA
Mr. Walter H. Boyes, Jr. - Aurora, IL, USA
Mr. Adrian Casey - Lethbridge, AB, Canada
Mr. Frank Cosentino - Mississauga, ON, Canada
Mr. Ron Curr - Cape Coral, FL, USA
Ryan Daniel - Kuna, ID, USA
Mr. Rob D. Dickson - Sarnia, ON, Canada
Mr. Joshua Gelman - Fairfax, VA, USA
Mr. Paul A. Hargrove - University Place, WA, USA
Mr. Jay Henderson - Evanston, IL, USA
Mr. Scott D. Kennedy - Boulder, CO, USA
Mr. Roger Labrecque - Bristol, CT, USA
Mr. Alan Laviolette - Marietta, GA, USA
William J. Murphy - Lincoln Park, NJ, USA
Mr. Steven F. Naoum - Bakersfield, CA, USA
Mr. Ken A. Pollock, CCST - West Jordan, UT, USA
Michael Rojic - Lakewood, CO, USA
Mr. Christopher Scott Roth - University Place, WA, USA
Mr. Narciso Santiago, CAP - Longwood, FL, USA
Mr. Paul Schwartz - Los Angeles, CA, USA
Mr. William F. Smith - San Diego, CA, USA
Mr. James W. Spitzer - Cambridge, MA, USA
Mr. Edward C. Stillwell - Wakefield, MA, USA
Mr. Carl E. Wadsworth, CAP - Bountiful, UT, USA
Mr. Mark Wagner - Omaha, NE, USA
Mr. Mark A. Waronker - Lansdale, PA,
Mr. Scott Whitmore - Maitland, FL, USA
Mr. Mark C. Wirfs - Beaverton, OR, USA
Mr. Srinivas Yeddula - Pittsford, NY, USA

June 2012

Mr. Aaron Evans - Richmond, VA, USA
Mr. Peter Hutwelker - Pipersville, PA, USA
Mr. Robert James Meharg, III - Portland, ME, USA
Eduardo MOntalti - Buenos Aires, 0, Argentina
Mr. Habib Ur Rahman, CCST - San Francisco, CA, USA
Mr. Quinten M. Shultz - Mitchell, SD, USA
Mr. Pavol Segedy - Willow Spring, NC, USA
Jose Manuel Fernandez Mas, Sr. - S S De Los Reyes / Madrid, Spain

ISA Water/Wastewater Industry Division

WWID is on LinkedIn

LinkedIn is a social media site that is geared towards professionals and business people. Located at **www.LinkedIn.com**, the site features online profiles, discussion groups and tools for identifying and keeping track of contacts. LinkedIn currently has over 120 million members and is still growing.

In an effort to provide the latest news and information relating to instrumentation and control systems in water and wastewater management, the Water and Wastewater Industry Division has created a LinkedIn group. We invite anyone affiliated with or interested in the water and/or wastewater industries to join the group and participate in the dialog.

You may use the following link to join the group **http://www.linkedin.com/groupRegistration?gid=2031271**

About LinkedIn

LinkedIn is an interconnected network of over 120 million experienced professionals from around the world, representing 170 industries and 200 countries. You can find, be introduced to, and collaborate with qualified professionals that you need to work with to accomplish your goals.

When you join, you create a profile that summarizes your background and professional accomplishments. Your profile helps you find and be found by former colleagues, clients, and partners. You can add more connections by inviting trusted contacts to join LinkedIn and connect to you.

Your network consists of your connections, your connections' connections, and the people they know, linking you to thousands of qualified professionals.

There are already many ISA members and automation professionals on LinkedIn, as well as several other ISA-related groups. If you'd like to learn more about LinkedIn, the article "100+ Ways to Use LinkedIn" provides many different perspectives on how the site can be leveraged. We hope you'll join us there and network with other ISA, water, and wastewater professionals.

Call for Newsletter Articles

The WWID newsletter is published four times a year (spring, summer, fall, winter) and reaches the WWID's over 1,700 members. Each issue is approximately 20-30 pages long. The newsletter is distributed electronically in color PDF format.

We are always on the lookout for good articles, and we welcome both solicited and unsolicited submissions.

Article submissions should be 500-1500 words in length and be written for a general audience. While it is understood that the articles are technical in nature, the use of technical jargon and/or unexplained acronyms is to be avoided. While not specifically required, we encourage authors to submit several photos and/or figures to go along with their article submission.

We actively welcome articles from all of our members. However, we do ask that articles be non-commercial in nature wherever possible. One or two mentions of company and/or product names for the purposes of identification is acceptable, but the focus of the article should be technical content and not just sales literature. We ask that authors keep this in mind when submitting articles/content. If you are unsure of whether your article idea would be acceptable, please contact our newsletter editor for more information – we are here to help. With this said, we have had many excellent vendor-written articles in the past, and we look forward to many more.

Some examples of the types of articles we are looking for include:

- Explanatory/teaching articles that are meant to introduce or explain a technical aspect of automation and/or instrumentation in the water/wastewater sector.
- Biographical stories about well-known personalities in the water/wastewater sector.
- Case Studies about plant upgrades and/or the application of new technologies and techniques. This type of article must include at least two photos along with the article text.
- Pictorial Case Studies about a plant upgrade consisting of 4-6 photos plus a brief 200-500 word description of the project undertaken. The article should ideally include one to two paragraphs about lessons learned and/or advice for other automation professionals.
- Historical reflections on changes in technology pertaining to specific aspects of instrumentation or automation, and how these changes point to the future.
- Discussions about changes in the water/wastewater sector and how these affect the automation professionals.

Once we receive a submission, we will work with you to edit it so it is suitable for publication in the newsletter.

Article submissions can be sent to the WWID newsletter editor Graham Nasby at graham.nasby@eramosa.com

WWID Newsletter Advertising

The WWID newsletter is an excellent way to announce new products and services to the water/wastewater automation community. With a circulation of over 1,700 professionals in the automation, instrumentation and SCADA fields, the WWID newsletter is an effective targeted advertising tool.

The WWID newsletter is published quarterly, on the following approximate publication schedule:

- Spring Issue – published in May/June
- Summer Issue – published in August/September
- Fall Issue – published in October/November
- Winter Issue – published in January/February

Advertising in the newsletter is offered in quarter page and eighth page formats. The eighth page size is approximately the size of a North American business card. Advertisements can be purchased on a per issue basis or for four issues at a time. The newsletter itself is distributed as a full-color PDF, so both color and black/white advertisements are accepted.

The current advertising rates are as follows:

Per Issue:
- Quarter page ad (3.5" W x 4.5" H): $100
- Eighth page, business card ad (3.5" W x 2.0" H): $50

Per year (4 issues):
- Quarter page ad (3.5" W x 4.5" H): $325
- Eighth page, business card ad (3.5" W x 2.0" H): $175

Other sizes of advertisements are available, but are priced on an individual basis. Please contact our newsletter editor for more information.

Please book advertising space as early as possible before the intended publication date. Artwork for advertisements should be submitted a minimum of two weeks prior to the publication date; earlier is always better than later. Artwork for advertisements can be submitted in EPS, TIF, PNG, JPG or GIF formats. EPS and PNG formats are preferred. Images should be submitted with at least 300dpi resolution if possible.

The ISA Water/Wastewater Industry Division is run on a non-profit basis for the benefit of its members. Monies raised from the sale of advertising in the newsletter are used to help offset the cost of division programming and events. Like its parent organization, the ISA, the WWID is a non-profit member-driven organization.

For more information, or to discuss other advertisement sizes not outlined above, please contact the WWID newsletter editor Graham Nasby at graham.nasby@eramosa.com.

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Symposium Details
Date: August 7-9, 2012
Location: Orlando, Florida, USA
Venue: Holiday Inn Castle Resort Hotel
Website: www.isawwsymposium.com

About the ISA Water/Wastewater Division

The ISA Water and Wastewater Industry Division (WWID) is concerned with all aspects of instrumentation and automated-control related to commercial and public systems associated with water and wastewater management. Membership in the WWID provides the latest news and information relating to instrumentation and control systems in water and wastewater management, including water processing and distribution, as well as wastewater collection and treatment. The division holds an annual symposium that features presentations by industry practitioners and published proceedings. See www.isa.org/wwid/

About the ISA

Founded in 1945, the International Society of Automation is a leading, global, nonprofit organization that is setting the standard for automation by helping over 30,000 worldwide members and other professionals solve difficult technical problems, while enhancing their leadership and personal career capabilities. Based in Research Triangle Park, North Carolina, ISA develops standards; certifies industry professionals; provides education and training; publishes books and technical articles; and hosts conferences and exhibitions for automation professionals. For more information see www.isa.org

Keynote Speaker for 2012 ISA WWAC Symposium
August 8, 2012 morning

Facing Utility Challenges:
Managing Risk and Addressing Aging Infrastructure Needs

Celine Hyer[1]*

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(*correspondence: celine.hyer@arcadis-us.com)

Facing utility challenges – managing risk and addressing aging infrastructure needs. Risks can include asset risk (all assets including SCADA systems), operational risk (people, data and or policies) and corporate risk (customer base, finances, governance).

Infrastructure management has been identified as a national issue due to the current lack of planning and funding for future renewal and replacements to maintain system reliability. The extremely high funding needs and poor infrastructure conditions have been documented over the last 10 years in various ASCE and AWWA publications. The overall age of infrastructure continues to increase across the United States, however in most areas additional funds are not being applied towards renewal and replacement and reactive work is most common. This is generally due to the poor economy and lack of funding, as well as the lack of data available to make effective decisions and manage risk.

Implementing a risk assessment framework can assist utilities in identifying risk, mitigating risk and determining where to apply their limited funds to achieve the most risk reduction. A complete risk framework includes the element of the probability of failure, or the asset condition, the consequence of failure, or the asset criticality to the system in terms of financial, social and environmental impacts, and a risk mitigation factor that can include redundancy, automation, communications, back-up power etc. Automation and communications can be a significant strategy to reduce overall asset risk as well as provide meaningful data to maximize asset life.

ABOUT THE SPEAKER:

Celine Hyer is a Principal Consultant with Red Oak Division of Malcolm Pirnie/ARCADIS in their Tampa Florida office where she leads their asset management practice for the South. She has a B.S. in Chemical Engineering and an M.S. in Engineering Management from Florida Institute of Technology. Celine has 23 years of experience in Engineering with 13 years that are directly related to Water and Wastewater Utility Management, including asset management, master planning, capital planning and strategic planning projects. She is currently leading asset management projects throughout the United States for medium and large utilities including New York City Department of Environmental Protection, Dallas Water Utility, Lee County Utilities, and Toho Water Authority.

Invited Speaker for 2012 ISA WWAC Symposium
August 8, 2012 morning

An Overview of ISA99 for the Water or Wastewater SCADA Specialist

Bryan Singer[1]*

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The move to using open standards such as Ethernet, TCP/IP, and web technologies in SCADA (supervisory control and data acquisition) systems exposes these systems to the same types of cyberattacks that have plagued the IT world. Worse, such attacks have previously been shown to cause physical impacts to the process including shutdowns, performance delays, and possibly even dangerous failures. Addressing these challenges is a complex task involving both IT and engineering skills, and the adaptation of engineering disciplines to assure the design, implementation, and maintenance of industrial systems is resilient to cyber attacks. This talk will provide a brief overview how the ISA99 "Industrial Automation and Control systems Security" standards represent a key tool in addressing these challenges, are and how they can be used by SCADA/DCS professionals in the municipal water and wastewater sectors.

Included in the talk will be an overview of the typical stakeholders in SCADA systems and how their interests and needs for SCADA system security can vary. SCADA system stakeholders usually include facility owners, onsite technical staff, hardware/software providers, and system integrators, as well as operations and maintenance personnel. The way that the needs of stakeholders can be addressed by applying the various individual ISA99 standards documents, and associated technical reports, will be covered. This includes the ANSI/ISA-99.00.01-2007 standard that covers control system security "terminology, concepts and models" as well as the ANSI/ISA-99.00.1-2009 standard that outlines how to how to set up a control system security program, and an overview of the additional ISA99 work products both published and under development

This talk is meant to act as a brief introduction to applying ISA99 standards to SCADA systems water/wastewater automation professionals. More detailed information about ISA99 can be found in the individual ISA99 standards and technical reports or by taking one of the ISA's two classroom-based training courses on the subject. One of the ISA's courses (course: IC32C) is being offered as an optional full-day short-course on Aug 7th in conjunction with the symposium.

ABOUT THE SPEAKER:

Bryan Singer, CISM, CISSP is the principal security consultant with Kenexis Consulting Corporation and vice-president of Kenexis Security Corporation. He has over 20 years of experience in information technology security including 11years specializing in industrial automation and control systems security, critical infrastructure protection, computer and ICS forensics, and counter-terrorism. Mr. Singer's background focuses on software development, network design, information security, and industrial security. He is the founding chairman and now co-chairman of ISA99, Industrial Automation and Control Systems Security Standards Committee, a standards body focusing on the security issues of the control systems environments. Mr. Singer has a Bachelors' Degree in Computer Information Systems from Phoenix University, and holds the CISSP, CAP, CISM certifications.

ABSTRACT for the 2012 ISA WWAC Symposium

Securing Critical Control Systems in the Water Sector – Where Do I Begin?

Don Dickinson[1]*

[1]Don Dickinson, Phoenix Contact USA, 586 Fulling Mill Road, Middletown, Pennsylvania, USA, 17057 (*correspondence: ddickinson@phoenixcon.com)

FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

SCADA, IT, Security, Cyber Event, Cyber Attacks, Stuxnet, Waterworks, Wastewater, Utility

ABSTRACT

Public health and safety are dependent on the availability and reliability of water systems. Cyber attacks on information technology (IT) networks are well known, but attacks on the control systems used to monitor and control plant processes are increasing in frequency and in their potential threat to public safety. The highly sophisticated Stuxnet worm discovered in 2010 was the first publicly known malware to specifically target industrial control systems. Stuxnet is proof that potential threats to critical infrastructure can no longer be ignored.

IT professionals are responsible for ensuring the availability and security of enterprise networks. However, protecting an IT network from a cyber attack can be very different from protecting an industrial control system. As a result, plant engineering and operations will need to take an active role in developing a security plan protecting critical control systems to minimize the potentially adverse impact of a cyber event on public health and safety. For many, the greatest challenge in developing a security plan is knowing where to begin.

The paper, *Securing Critical Control Systems in the Water Sector – Where Do I Begin?* will review existing and emerging threats to critical infrastructure and the potential impact of cyber events on water systems. An overview will be provided of industry standards, guidelines and recommendations, and other available resources to aid in the development of a utility security plan essential for protecting critical assets

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About the Author:

Don Dickinson has more than 27 years of sales and marketing experience in Industrial Controls and Automation, involving the application of a wide range of products and technologies in various industry segments. He is a graduate of NC State University (BSEE). Don is the Senior Sales Development Manager – Water Sector for Phoenix Contact USA and is the current chair of the NC AWWA Automation Committee.

Using Cyber Security Evaluation Tool (CSET) for a Wastewater Treatment Plant

Robert J. Dusza, Jr.[1]*

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(* correspondence: Rdusza@manchesterct.gov)

FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Cyber, Security, CSET, Wastewater, SCADA, Evaluation, Tool, Water

ABSTRACT

This presentation will provide information on the assessment process and ultimate recommendations for the new SCADA system at the water treatment plant located in Manchester, CT. The assessment was completed in the Fall of 2011.

The current SCADA system is to be upgraded as part of a $60 million renovation project which is currently under way at the plant. The need for better cyber security was realized during an incident a few years ago that required the resources of plant staff and the Town Information Services (IS) Department. The presentation will focus on the resources utilized to complete the evaluation tool as well as discuss some issues that arose during the process.

About the Author:

Robert J. Dusza, Jr.: Project & Technical Support Manager for the Manchester Water & Sewer Department. 27 years experience in Water & Wastewater Treatment. Provide Project Management, programming and upgrades for Water and Wastewater Treatment Plant SCADA Systems. Education includes a B.S. in Marine Biology from University of New England, M.S. in Environmental Science & Technology from RPI, Hartford, CT. Class IV Water and Class IV Wastewater Operator Licenses for the State of Connecticut, Certified OPC Professional Certification, Level 2.

ABSTRACT for the 2012 ISA WWAC Symposium

Wastewater Plant Process Protection

Process Hazard Analysis

Thomas J. McGovern[1]*

[1]Broward County North Regional Wastewater Treatment Facility, 2400 N. Powerline Road, Pompano Beach, Florida, USA, 33069 (*correspondence: tmcgovern@broward.org)

FORMAT: 35 minute PowerPoint presentation

KEYWORDS

SCADA security, Treatment Process protection, Process hazard analysis

ABSTRACT

When it comes to a utility or process treatment plant, a security scheme is needed that goes beyond merely protecting the SCADA computers to one that protects the actual plant processes. This need notwithstanding however, utility plant operators have not applied their attention and expertise to this issue assuming that the Information Technology Department provided that protection. Unfortunately, even with the best intensions and employing the most up to date security tools; the Information Technology Department cannot guarantee that no disruptive intrusion will occur. This is especially true when considering "internal" threats.

Of course, most Operations people are not cyber security experts. How then can they contribute? Surprisingly, Operations can and must participate in the area that where they have the most knowledge and experience. But first, a basic question needs to be asked: what is it that needs protecting? Is it not the plant treatment processes? If that is the case, then what is needed is to extend the protection consideration beyond the boundaries of just the SCADA system. We need to consider how we might protect the actual treatment processes themselves irrespective of what any external control or computer is dictating.

The presentation will provide examples of weaknesses and process vulnerabilities in a typical treatment plant. It will show how to determine those weaknesses and how to provide counter measures to insure that the process is protected from all external threats. Explanations on how to analyze your plant using the methodology found within the "Process Hazard Analysis" standard will also be examined. Finally, the presentation will offer very practical and effective ways to secure your SCADA system to minimize its cyber vulnerabilities.

About the Author:

Thomas J. McGovern has spent over forty years in computer process control technology and the last twenty five years in wastewater SCADA. During the 1980's Tom was president of "Delcor Development Corporation" which provided consulting and system integration services for SCADA technology. Among his client projects was the development, integration and implementation of a distributed SCADA system at the Miami-Dade, Virginia Key wastewater treatment plant. Tom has been employed the last twenty years as a SCADA system analyst at the Broward County North Regional Wastewater Treatment Facility at Pompano Beach.

ABSTRACT for the 2012 ISA WWAC Symposium

Improving Water and Wastewater SCADA Cyber Security

Based on Work Performed for Large and Small Utilities

Bill Phillips[1]*, and Norman Anderson[2]

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[2]Norman Anderson, CH2M HILL, 3011 SW Williston Road, Gainesville, Florida, USA, 32608

FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Cyber Security, Supervisory Control and Data Acquisition (SCADA), Process Control Systems (PCS), Vulnerability Mitigation, Large Utilities, Small Utilities

ABSTRACT

Water sector Process Control Systems (PCS) such as Supervisory Control and Data Acquisition (SCADA) systems are inherently vulnerable to various types of well documented cyber attacks such as denial of service, SQL injection attacks, and DCOM exploit attacks due to the use of standard computer hardware, software, and network connectivity. In addition, standard process control hardware is unable to determine the integrity of information or commands that are received and provides little, if any, inherent security features. When a PCS cyber attack occurs, the damage to a water or wastewater utility's reputation in the community, revenue stream, and ability to deliver clean water can be even more severe than the results from a physical attack. There is no one way to completely stop or prevent cyber attacks, but much can be done to reduce the risk of a cyber attack and to be prepared in the event that a cyber attack occurs while maintaining control system functionality and operation.

This presentation is based on work improving PCS and SCADA cyber security with both large and small water and wastewater utilities. Assessment, planning, designing, and implementation strategies for cyber security vulnerability mitigation will be addressed. Examples presented include new build/replacement projects and incremental addition projects. One advantage of incremental addition projects is that they significantly reduce operations disruption and annual cash flow for modifications to existing PCS. Implementation of cyber security solutions were performed using recently published PCS and SCADA specific cyber security standards and network design guides which will also be discussed.

About the Authors:

Bill Phillips, PE specializes in delivery of secure and reliable process control and SCADA network and communications systems, cyber security vulnerability assessment, and facility automation and information system planning and implementation. Bill has over 30 years of process control and SCADA system experience and has focused on control system network and communications cyber security for the last decade. Bill has a BSEE from Clemson University.

Norman Anderson, PE has over 5 years experience in the design and commissioning of Process Control Systems for the Water Sector. Norman has provided secure and reliable PLC, SCADA, and Network hardware and software architecture designs and provided control system automation solutions for a range of facilities. Norman has an M.S. in EE from Iowa State University and an M.S. in Physics from the University of Florida.

Mobile Devices for SCADA integration and beyond: Considerations, Security and Applications

Pavol Segedy[1]* and Brandon Erndt[1]

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

SCADA, Mobile Device, Ethernet, Remote Connectivity, Wi-Fi, 802.11, Wireless, Integration

ABSTRACT

The use of mobile technology offers plant managers; instrumentation techs and operators secure access to critical process data from anywhere using smart phones or tablets. Mobile devices provide convenience and simplicity by bringing meaningful real-time data that can help both operators and executives make decisions and improve system operation.

Supervisory Control and Data Acquisition (SCADA) systems collect data from treatment plants and remote facilities. Historically, SCADA was designed to be connected in a private, hardwired network utilizing line communication. With the arrival of Internet Protocol (IP) in the industrial space, Ethernet and Wi-Fi use in SCADA communications has rapidly increased. This type of communication provides more access to real-time data, alarming, reporting, and trending from remote equipment. SCADA is conventionally setup in a private network not connected to the internet to isolating confidential information as well as the control to the system itself. As the scope of SCADA platforms become larger and mobile applications move from the consumer to industrial markets, mobile devices for SCADA integrations are becoming practical.

This presentation focuses on the primary considerations for implementing wireless solutions, security methodologies and provides a demonstration of some of the more popular SCADA applications currently being used in industry.

Topics include:

- Value proposition and information technology requirements for mobile applications
- Wireless infrastructure options
- Implementation options with real world successes and failures examples including security of Wi-Fi and 3G/4G required to support mobile applications. Wi-Fi technology is built on IEEE 802.11 radio standards, the WPA and WPA2 security standards and the EAP authentication standard. As of 2009, Wi-Fi technology has spread widely within business and industrial sites
- Applications deployed for SCADA such as iView, Ignition SCADA mobile module, mySCADA, ScadaMobile, C-more, PLCLink and more

Mobile devices have matured, making them suitable for many industrial applications. They provide many benefits for operations, such as replacing numerous costly industrial operator interface terminals (OITs)

with a few mobile devices and capturing information from multiple systems; such as SCADA, online electronic O&M manuals, CAD drawings and Key Performance Indicators, all in one location that can go wherever plant staff needs to be. Finally, safely connecting these devices to an already secure network is a critical, yet achievable, task that must be investigated whenever considering wireless access to industrial control systems.

About the Authors:

Pavol Segedy is a Senior Automation Engineer at Brown and Caldwell. Typical projects include design, specification, SCADA development, on-site startup, construction support and inspections. He also provides project management, consulting services, support for completed projects as well as troubleshooting services to resolve issues in established plants. He is a member of ISA, AWWA and IEEE, and serves as a membership chair at ISA Tarheel Capital Section and Section-Division liaison at ISA Water Wastewater Industry Division.

Brandon. Erndt is an Electrical I&C department manager, controls engineer, project manager with 16 years of experience. He is also a PLC programmer and SCADA/Human-Manchine Interface software developer. Mr. Erndt is registered Professional Engineer in control systems engineering in the State of Arizona. He is also trained in cyber security for industrial control systems by the Department of Homeland Security.

Solar Powered Wireless Sensors & Instrumentation

Michael A. Macchiarelli[1]*

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Solar Power, Energy Harvesting, Batteries, Wireless Sensors, Off-grid Power, Energy Storage, Instruments

ABSTRACT

The "Going Wireless" trend continues in both industrial and municipal installations. While there is a substantial reduction in installation labor cost associated with a wireless system over a hard-wired system, proper planning during equipment selection and installation must be done to avoid unforeseen maintenance expenses later. Most wireless sensors are powered by a limited-life power source; more often this is a low voltage lithium cell. Depending upon the transmission rate set for data to be sent to the receiving units the battery will over time deplete and require replacement. In applications where a continuous stream of data is needed the battery may last only a few weeks or even worse, a few days.

During this session we will learn about new solutions to this problem by using solar energy harvesting technology. Solar power is becoming the energy of choice to replace limited-life battery cells in remotely located wireless sensing applications. Energy from the sun is collected by photovoltaic cells and stored. In general, energy can be stored in a capacitor, super capacitor, or lead-acid, deep-cycle battery. Batteries leak less energy and are therefore used when a steady flow of energy over very long periods of time. The basic system can provide uninterrupted power for many years without the need of battery replacement. A typical system consists of a solar panel, solar charge controller, deep-cycle battery and a power supply/power conditioner. Sample system components and application examples will be presented. Attendees will leave this session with a comprehensive understanding of energy harvesting technology and the benefit and value of utilizing this new technology to reduce maintenance and operating cost.

About the Author:

Michael Macchiarelli is currently the President, CEO of Imagine Instruments LLC . Michael has 23 years of hands-on Product Development experience within the Process Measurement & Control, Automation and Scientific markets. Recently completed projects include a broad line of Industrial Wireless Sensors, Transmitters and Receivers. Prior to launching Imagine Instruments LLC in 2012, Michael worked at Omega Engineering in Stamford, CT for over 23 years as the Product Development Manager and Electronic Design Engineer . Accomplishments include 5 issued and 4 pending US patents, serves on the Technology Management Advisory Board at Central Connecticut State University and is a active member with The Institute of Electrical and Electronics Engineers (IEEE), The International Society of Automation (ISA) and The American Solar Energy Society (ASES).

ABSTRACT for the 2012 ISA WWAC Symposium

HMI testing of multiple PLCs using simulations on Virtual Machines

Marcelo R Avendano[1]* and Kevin Patel[1]

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Simulation, SCADA, Virtual Machines, HMI, Multiple PLCs

ABSTRACT

The ideal program is one that will not need any debugging after installation. However, this is usually not the case. Debugging is a programming process which is as important as programming itself. One of the challenges for an HMI programmer is to minimize the time and therefore the cost that is spent developing an SCADA application. To minimize the time spent debugging during the installation of an interface, it is necessary to have a simulation phase during the development process to solve some problems before the system is installed on site. This is an industry practice that usually provides a good result, and vendors nowadays offer developers different packages to simulate a PLC with the HMI system to test the logic and communications between HMI and PLC.

Nevertheless, larger systems require more than one or two PLCs, and the software capabilities limit the developers to the simulation of only one PLC at a time. This will only allow limited tests to the system that is being designed.

This study was part of an implementation project by CDM Smith for one of our clients, and takes advantage of the use of virtual machine environments to overcome that limitation by using several PLC simulator packages hosted in different virtual machines. With this approach a workstation will be able to simulate several PLCs connected to a single HMI. This will provide a faster, and potentially a cost effective, alternative to the current practice that includes either testing in a lab with several PLCs or fixing the issues in the field where the client will be expecting fast resolutions.

About the Authors:

Marcelo R. Avendano, EIT: graduated in Electrical Engineering from the Pontificia Universidad Católica del Perú in 2010 and is currently an Automation Specialist at CDM Smith where he develops SCADA systems for different projects in the Area.

Kevin Patel, P.E. has been working in the field of water/wastewater for over 9 years. Kevin's experience includes designing, integrating and programming instrumentation and control (I&C) systems primarily for water and wastewater treatment facilities. He is a current member of the ISA101, ISA105, ISA106 and ISA18 committees related to HMI, testing, automation, and alarming. He has a bachelor's degree in Computer Engineering from Texas A&M University in 2003 and completed his MBA from the University of Texas at Dallas in 2011. He is currently an automation engineer and project manager at CDM Smith's Dallas/Fort Worth, Texas office.

High Fidelity Extended Period Dynamic Simulation in Development and Testing of Control Systems for Water Treatment and Distribution Facilities

Creig Wilson[1]* and Jared Thorpe[1]

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Simulation, Modeling, Automation, Control, Process, SCADA

ABSTRACT

High fidelity extended period dynamic simulation can enable quick and thorough control strategy development during a facility's design, enhanced pre-startup testing of constructed control systems, cost-effective trainers and other benefits. This paper progresses through a series of example water treatment and distribution system projects that used high fidelity extended period dynamic simulation. Each successive example illustrates an increased level of model usage and benefits. The technologies enabling those incremental benefits are discussed. The paper concludes with a summary of benefits and modeling system features that are required for use in development of process control strategies and the testing of constructed control systems used in water treatment and distribution systems.

About the Authors:

Creig Wilson, PE has been involved in design, programming, startup, and troubleshooting of process instrumentation and control systems for thirty years. He is currently a Senior Technologist with CH2M HILL based out of their Gainesville, Florida, USA office.

Jared Thorpe is the CH2M HILL Global Leader for Software Applications and Integration, and has over 15 years of experience in development and application of advanced simulation and optimization tools. Mr. Thorpe is also recognized as an expert in fluid dynamics, control system design, control system testing and operator training for water and wastewater systems

Successful SCADA specifying and implementation for Water and Waste Water Projects

Robert K. Reinhart[1]*

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Div. 16 Spec, Statistics on what makes a successful project, Requirements Engineering, Process and Procedures, CSIA, Schedule, Budget, virus considerations protecting SCADA, front end loading, preliminary engineering

ABSTRACT

The goal for any SCADA system project should include assurances to meet desired budget and schedule. Yet statistics show that fully 2/3rds of all SCADA projects fail on both desired budget and schedule. As a system integrator with over 30 years-experience implementing SCADA, the author tries to explain how budget and schedule can be met through early considerations, including: 1) Requirements Engineering; 2) Successful Project Plan; and 3) Modern day architecture preferences and technologies specified, rather than simply brand name preferences, containing considerations for virus protected SCADA. The project quality also has an improved chance for success with these same three upfront considerations.

This power point presentation will explain further how to successfully implement front end loading projects along with requirements engineering, covering how to write better specifications with more meaningful milestones, how to include better engineering project measurements, and how to better anticipate project obstacles. Considerations will also show how industry standard practices and procedures, such as those advocated by CSIA (Control Systems Integrators Association) can help assure the success of a project; and such process and procedures are almost certainly necessary to meet project budget, schedule, and quality objectives.

About the Author:

Robert K. Reinhart is co-founder and Director of Engineering of Controls Link, Inc., a Pittsburgh, PA and Tampa, FL based control systems engineering firm, established in 1990. Typical projects include both specifying and implementing SCADA. Mr. Reinhart is past chairman of CSIA (Control System Integrators Association), past president of Pittsburgh ISA Section, and the current president of Tampa ISA Section.

ABSTRACT for the 2012 ISA WWAC Symposium

FOUNDATION Fieldbus Provides a Unified Solution for Remote Operations Management

Larry O'Brien[1]*

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SUBMISSION TYPE: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

FOUNDATION fieldbus, Remote Operations Management, Wireless, SCADA, DCS, Networks

ABSTRACT

Remote operations management – the management of automation assets and resources that are geographically dispersed – is one of the fastest growing segments of the process automation business. Today, the ROM segment is plagued with a high degree of customization, solutions that are not easily configurable, and a break and fix mentality when it comes to asset management. Beginning in 2007, the Fieldbus Foundation began a new project that would extend the functionality and infrastructure of FOUNDATION fieldbus out to remote applications through remote I/O and wired HART. We then expanded that project to include leading industrial wireless networks such as ISA 100.11a and WirelessHART. Today, our overall FOUNDATION ROM specification is nearly complete, and ready to extend our capabilities to manage data from a limitless range of devices in some of the world's most unforgiving applications.

FOUNDATION for ROM allows users to implement a true predictive and proactive maintenance strategy for remote assets that could not previously support one. Data from devices on multiple networks, both wired and wireless, can be brought into the FOUNDATION fieldbus infrastructure, which provides a single environment for management of diagnostic data, alarms and alerts, data quality, control in the field capability, and object oriented block structure.

FOUNDATION for ROM has the potential to address numerous applications in upstream applications, such as oil fields, offshore platform automation, oil and gas pipelines, water treatment centers and distribution networks, mining operations, and even OEM skid mounted applications found in in every industry from life sciences to brewing. Today, the upstream oil and gas and water and waste industries are the two fastest growing industries in process automation, and FOUNDATION for ROM is clearly targeted both of these.

About the Author:

Larry O'Brien: Larry O'Brien joined the Fieldbus Foundation as global marketing manager in April 2011. Prior to his job at the foundation, O'Brien was research director for process automation at ARC Advisory Group, where he began work in 1993. As an industry analyst and market researcher, O'Brien covered the topics of process fieldbus, distributed control systems, process safety, automation services, and intelligent field instruments. He has authored or co-authored numerous market forecast reports, strategic-level advisory reports and white papers for ARC and its clients, including all the major process automation suppliers. O'Brien has a bachelor's degree from the University of Massachusetts at Lowell.

ABSTRACT for the 2012 ISA WWAC Symposium

Developing an Integrated Business Solution with Telemetry and GIS

Michael Waddell*[1] and Isabel Szendrey[2]

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Telemetry, GIS, Integration, Decision Support, Data, Analysis, Web

ABSTRACT

SCADA and telemetry allow operators to maintain systems and manage processes. Instrumentation can require significant initial investments as well as on-going costs for what typically comprises a single, departmental purpose. Operational data often become "silos" that cannot be easily accessed or reused, missing a strategic opportunity to benefit the whole organization.

Between 2008 and 2010, CDM Smith and CDM Caribbean assisted the Puerto Rico Aqueduct and Sewer Authority (PRASA) in implementing an island-wide telemetry system, consisting of over 1,500 sites and 100,000 I/O points. It was one of the largest water / wastewater telemetry system projects in the U.S. The telemetry project was part of a multi-phase technology upgrade to deliver reliable real-time monitoring and control from both a central headquarters location and control centers in each PRASA region. The objectives were to improve efficiency, reduce operating costs, and comply with regulatory requirements.

While this project ensured compliance and control, PRASA and CDM Smith recognized an immediate opportunity for extending the business benefit by leveraging the telemetry data and integrating it with its existing web-based GIS. From concept through initial design and prototyping CDM Smith coordinated with the Telemetry Team and instrumentation vendor to build a rich, easy to use visualization interface that enabled faster decision making, strategic insights and broader information distribution.

This paper explains the benefits and techniques for integrating data from disparate systems. Using PRASA as a case study, it demonstrates the enhanced business value that supports longer-term monitoring insights, managerial analysis and decision making. Likely audience members are program managers, project managers, planners and owners.

About the Authors:

Michael Waddell has led application development projects specializing in data integration to realize organization-wide benefits. He is Applications Development Practice Leader at CDM Smith and has been in the industry over 22 years.

Isabel Szendrey is the Auxiliary Director of Planning at PRASA. She is responsible for developing fully integrated solutions that support the Authority's daily operations. Ms. Szendrey has been working in the water/wastewater sector for over 10 years.

Invited Speaker for 2012 ISA WWAC Symposium
August 9, 2012 morning

A High Performance HMI – Better Graphics for Operations Effectiveness

Bill Hollifield[1]*

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Almost all industrial processes are controlled by operators using dozens of graphic screens. The graphic designs are typically little more than P&IDs covered in hundreds of numbers. This traditional, "low performance" Human Machine Interface (HMI) paradigm is typical in all processes controlled by DCS and SCADA systems, including the water and wastewater sector. It has been shown to be lacking in both providing operator situation awareness and in facilitating proper response to upsets. In many industries, poor HMIs have contributed to major accidents, including fatalities.

HMI improvement has become a hot topic. The knowledge and control capabilities now exist for creating High Performance HMIs. These provide for much improved situation awareness, improved surveillance and control, easier training, and verifiable cost savings.

This talk will cover:

- HMIs Past and Present
- Common but Poor HMI Practices
- Justification for HMI Improvement – What Can You Gain?
- High Performance HMI Principles and Examples
- Depicting Information Rather Than Raw Data
- The Power of Analog
- Proper and Improper Use of Color
- Depicting Alarm Conditions
- Trend Deficiencies and Improvements
- Display Hierarchy and the Big Picture
- The High Performance HMI Development Work Process
- Obstacles and Resistance to Improvement
- Cost-effective Ways to Make a Major Difference

Implementation of proper graphic principles can greatly enhance operator effectiveness. A High Performance HMI is both practical and achievable.

About the Speaker:

Bill Hollifield is the Principal Consultant at PAS who responsible is for all the company's involvement Alarm Management and High Performance HMIs, which includes consulting, work processes, products, system design, human factors research, and software development. He is a member of the ISA-18 Alarm Management committee, the ISA-101 HMI committee, the API-1167 Alarm Management committee, and is a co-author of the Electric Power Research Institute's (EPRI) Alarm Management Guidelines. Bill is also co-author of The High Performance HMI Handbook and the Alarm Management Handbook. Bill has international, multi-company experience in all aspects of Alarm Management and effective HMI design. He also has over 25 years of chemical industry experience with focus in project management, chemical production, and control systems. Bill holds a Bachelor's Degree in Mechanical Engineering from Louisiana Tech University and an MBA from the University of Houston. He's a pilot, and builds furniture (and the occasional log home in the Ozarks) as a hobby.

Guest Speaker for 2012 ISA WWAC Symposium
August 9, 2012 morning – 15 minutes

Automation Technology Trends in the Wastewater Sector

Tom DeLaura[1]*

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This presentation examines how such factors as diverse and seemingly unrelated as global economics, climate, legislated regulations, shrinking budgets, workforce demographics, and aging infrastructure are actually combining to impact the way automation is conceived, deployed, and used in the wastewater sector. More and more, automation is providing increasing abilities for wastewater personnel to make better decisions, increase efficiency, improve internal/external customer service, collaborate, and lower costs. Today, "automation" is present at some level in every aspect of the wastewater business, but what does the future hold for its use? From expanding a utility's capabilities, to enabling an integrated wireless workforce, facilitating real-time capital management, enhancing security, managing knowledge, and so much more, automation is going to play an increasingly important role in the sustainability of the business itself. This talk highlights the trends we should all be aware of, so that we can be positioned to take advantage of them, as informed players in the ever changing wastewater technology business.

ABOUT THE SPEAKER:

Tom DeLaura, PE is an active member of AWWA and WEF at the national and local levels, currently serving as Chair of the WEF Automation & Information Technology Committee.

He has extensive experience with water utilities, and has worked in all facets of automation associated with water/wastewater systems, from pipe and plant to the boardroom. He has written and presented on numerous topics of interest to the water and wastewater industry, been involved in industry research projects, and has received awards from the industry for his dedication and service.

Starting with a decade as an end user and manager of information and process control computer systems with a major water/wastewater utility, Tom's 38 years of experience with automation have been focused on how business and technical issues must combine for success. This background includes roles in management, engineering, construction, operation, and maintenance of utility businesses as integrated enterprises.

Guest Speaker for 2012 ISA WWAC Symposium
August 9, 2012 morning

Florida Drinking Water Trends and Automation Trends

Kim Kunihiro[1]*

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During today's trying economy water suppliers continue to do more with less. Water purveyors are actively involved with improving their communications and automation systems to be able to operate facilities remotely or through a centralized location with fewer staff and limited funds. Likewise maintenance activities are being performed by a core team with knowledge of all plants and systems. Automation works most effectively when there is consistency in hardware, software and communication protocols. Some utilities are forward thinking and have begun to standardize PLC's and controls in all their facilities. This saves both time and money in spare parts inventory and employee training. This talk will discuss how some utilities in Florida have achieved this goal and how they are enhancing their operations through automation. In addition, utilities that are embarking on the path to automation and standardization will be discussed.

ABOUT THE SPEAKER:

Kim Kunihiro holds a B.S. degree in Chemistry from the University of Hawaii at Manoa and an M.S. degree in Environmental Engineering Sciences from University of Florida and has worked in the water sector for more than 30 years. She is the Water Quality & Water Production Manager for Orange County Utilities, a large Water and Wastewater Utility that serves over 300,000 customers in Orlando, Florida.

Her current responsibilities include management and supervision of the water production section which operates and maintains 20 water supply and pumping facilities for Orange County Utilities and project management of a variety of analytical and research projects.

In addition, she coordinates the activities of the water quality staff including backflow and cross connection, field sampling and water quality research. She prepares reports and monitors regulatory compliance for the Water Division. Her experience includes 24 years of laboratory management, data management and quality control in the public and private sector. She has specialized expertise in sampling plan development, data evaluation and laboratory design.

Kim is a trustee on the board of Florida Section American Water Works association and is the past Chair of the Technical and Education Council. At the national level she is a member and past chair of the Water Quality Laboratory Committee of AWWA as well as a member of the Emerging Issues committee and Distribution Water quality committee. She serves as a member of the project advisory committee for several drinking water and water reclamation projects at both the Water Research Foundation and Water Environment Federation.

Common pitfalls that affect Water and Wastewater Instrumentation, Control and Automation Systems

Francisco Alcala[1]* and Tim Wiley[1]

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SUBMISSION TYPE: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Instrumentation Control and Automation projects, Management, Planning, Life Cycle, Cost/Benefit, Delphi methodology

ABSTRACT

It is a general belief that plant Instrumentation Control and Automation projects (ICA) will deliver powerful, flexible, and user-friendly technology that more than meet the specific requirements of any particular project while offering a wide range of tools and capabilities. However, the measurement of the cost/benefits of an ICA is generally difficult to determine (Olsson, 2005). The open question that remains is whether these benefits will translate into improved performance and reduction of operational cost. Often, plant managers and executives are unpleasantly surprised to find that a newly installed system does not perform as expected or reinvestment will be needed to update a SCADA system or other component of the ICA. Many factors contribute to project failure. Reviewing some of the most common mistakes can help facility executives reduce risk.

The general objective of this paper is to summarize the most common pitfalls that can affect an ICA system. The paper will evaluate the aspect of design, project implementation, and system operation and maintenance. To achieve the planned objectives, a Delphi methodology (Wechsler 1978) will be designed and implemented in order to develop and execute structural surveys and group discussion that will allow the use of information from the experience and knowledge of the I&C experts and end users.

The specific objectives of this paper are the following:

- Describe the phases of the ICA project and it correspondent effect over the life cycle of an ICA system.
- Explain the correlation between the factors that affect the ICA project execution and overall ICA system lifecycle.
- Describe the methodology of research and survey design.
- Conclude about the major ICA mistakes and strategies to avoid or minimize the impact over ICA project and system lifecycle.

References

1. Olsson 2005: Instrumentation, Control and Automation in Wastewater System By Olsson, Nielsen, Lynggaard-Jensen, Yuan and Steyer

2. Wechsler 1978: There is agreement that Delphi is an expert survey of two or more 'rounds' in which, in the second and later rounds of the survey the results of the previous round are given as feedback (Cuhls 1998).

Therefore, the experts answer from the second round on under the influence of their colleagues' opinions, and this is what differentiates Delphi from ordinary opinion surveys. Thus, the Delphi method is a 'relatively strongly structured group communication process, in subjects on which naturally unsure and incomplete knowledge is available, are judged upon by experts', write Häder and Häder (1995, p. 12). Giving feedback and the anonymity of the Delphi survey are important characteristics. Wechsler describes a 'Standard-Delphi-Method' in the following way: 'It is a survey which is steered by a monitor group, comprises several rounds of a group of experts, who are anonymous to each other and for whose subjective-intuitive prognoses a consensus is aimed at. After each survey round, a standard feedback about the statistical group judgment calculated from median and quartiles of single prognoses is given and if possible, the arguments and counter arguments of the extreme answers are fed back...' (Wechsler 1978, pp. 23f.). (Source http://forlearn.jrc.ec.europa.eu/guide/2_scoping/meth_delphi.htm#Pros_Cons)

About the Authors:

Francisco Alcala is a member of ISA and an Automation Specialist for CDM Smith. He has a BSEE from Universidad de Oriente Venezuela and an Operation Management MBA from IESA Venezuela. Francisco has 20 years of experience in Instrumentation and Control design, integration, and maintenance in the water/wastewater, petrochemical, and beverage industries. Contact: alcalaf@cdmsmith.com

Tim Wiley is an Automation Specialist for CDM Smith. Tim has been in automation for 16 years working in the automotive, medical manufacturing, and process industries. Tim has a BSEE from Rose-Hulman Institute of Technology and is a member of ISA. Contact: wileytg@cdmsmith.com

Integrated Process Control & Management Systems Creating More Effective Working Environments

Mark Presti[1]*

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

MES, CMMS, SCADA, Manufacturing Execution Systems, Integration, Water, Wastewater, Workflow Management

ABSTRACT

Most Utility and Municipal Water Departments are faced with the difficult challenges of aging infrastructure, workforce attrition and financial restraints while being held to regulatory accountability. As systems are becoming more automated and the workforce generation is changing, the physical exposure to field equipment is becoming less frequent. These two coupled events create a landscape where the need to integrate Operational and Maintenance systems is apparent to ensure sustainability, compliance and awareness. Entering the realm of Manufacturing Execution (ME) Systems to accomplish this has created complexity and inconsistency to business management.

ME systems have evolved extensively in the past decades becoming enterprise solutions containing corporate modules for financial systems, contract administration, time and attendance systems, etc. The added features and development of a one stop corporate solution typically inflate the cost of implementation, usually require additional staffing to support, significant customization and lose sight of operational needs.

Based on the need for a simpler and more operational effective solution to provide the tools for sustainability, the implementation of automated workflow tasking technology was developed. It has been utilized by several industries across North America and supports the integration of disparate data silos into one common interacting user interface without customized integration. This system provides true operational consistency ensuring that; all alarms are responded to correctly by any staff, digital Standard Operating Procedures are followed and users are held accountable to best practices. The advantage of seamless integration with other applications such as Computerized Maintenance Management (CMM) Systems is the reduction of work response time and ensuring common protocols are used. Due to the modeling capability and flexibility of configuration, directly linking items between SCADA and CMM systems enables Reliability Centered Maintenance practices. Applying the example of SCADA system pump runtime hours triggering a CMMS work order, positions staff wrench time on equipment that requires it and minimizes the intervention of a user to do so.

The ability to provide an end user with a single interface without customized integration has enabled a more stable and reliable platform without the complexity of traditional ME Systems. Utilities have streamlined consistency to staff during training, remote site inspections, alarm response management, equipment maintenance and many other workflows procedures.

Our Water Utilities implementations have proven that a more operational, embedded approach to their business has added value to their delivery. The ability to direct work to problem areas more-timely and effectively resulting in increasing equipment lifecycles has allowed them to do more with less when it comes to manpower and finances while maintaining regulatory compliance.

About the Author:

Mark Presti, M. Eng. D., P. Eng. is a Sr. Automation Consultant, Gray Matter Systems Canada, Inc. He has over 15 years of experience in automation ranging from food processing, printing and water & wastewater treatment. Prior to joining Gray Matter, he was part of the Niagara Region Water and Wastewater Division where he spent seven years as the SCADA Engineer (2 yrs.) then Manager of Technical Trades (5 yrs.). When he was with Niagara, he built professionals that allowed the Region to implement state of the art technologies in all of their 12 treatment facilities along with wide area solutions for management and information distribution. He has extensive experience with both SCADA and Computerized Maintenance Management Systems (CMMS). Mr. Presti has a diploma in Electronics Engineering Technology from Mohawk College, as well as a BSEE and MSEE from McMaster University. Mr. Presti is also a licensed professional engineer in the province of Ontario, Canada.

ABSTRACT for the 2012 ISA WWAC Symposium

Hybrid RO & Softening Water Treatment Plant Process Design

Ali Farahmand [1]*, Nassir Gifani[1], and Mohsen Farivar[1]

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Reverse Osmosis, Softeners, Ground Water, Water Treatment, Hybrid softener, Automation

ABSTRACT

Hybrid membrane & Pellet softening is a local solution for a common problem of ground water desalination. Desalination of a ground water in dry area raised many concerns about environmental aspect also water losses through membrane brine.

City of Birjand located in east center of Iran, in a warm dry area with a minimum water resource almost all of city's potable water demand providing from deep wells with fully enrich water with minerals. 640 LPS from the overall water demand of this city are planned to be provided from these wells, mostly containing high concentration of hardness, heavy metal and salt.

Hybrid membrane & pellet reactor process was proposed in order to reduce side effects of Ro desalination also making a flexible process which would be adapted with seasonal and annual fluctuation of resource water quality. RO water treatment would be applicable here in order to remove heavy metals, slats and hardness while it had some basic disadvantage of highly losses of water through RO-Brine, environmental impact and high energy consumption.

In this treatment process the overall influent flow of 640 LPS firstly divided into two parallel streams of 220 LPS membrane desalination and 420 LPS capacity of pellet softening process. The partial flow of 420 LPS pumped into pellet reactor softening process where the main objective of hardness reduction would be reached while the heavy metal reduction would be achieved at the same place. Turbidity reduction and PH adjustment other process designed in this configuration.

Considering to the hybrid design of the plant many disadvantages of the latest RO desalination has been covered while the initial investment was decreased using this method.

Environmental aspect is the other important issue in this design, as the overall brine of the site was decreased in this configuration. Financial review has been done in this paper in order to compare proposed hybrid design and conventional water treatment methods.

About the Authors:

Ali Farahmand has been involved with water supply projects for much of his career. He began his career at Azad University (Mashad, Iran) with a degree in fluid-mechanical engineering, followed by winning a World Bank JJ Program scholarship which allowed him to study water supply engineering at UNESCO-IHE (Delft, Netherlands). He currently provides

research and consulting services for a wide variety of water treatment and water supply projects. Throughout his career, he has spent over 10 years working in the water/wastewater sector. Mr. Farahmand is an engineer with Toossab Consulting Engineers Co.

Mohsen Farivar graduated from Azad university of Shahrood (Iran) with a degree of MSc in chemical engineering at 2009. So far, he was engaged in Water treatment design of Sistan and Bojnoord water treatment plant. Currently he's working as water treatment process expert. Mr. Farivar is an engineer with Toossab Consulting Engineers Co.

Nassir Gifani has been engaged in Water consultancy for over 16 years , at 1996 graduated from Ferdosi university(Iran) with a Master of science degree . At 1987 graduated from the same university with a degree of Bsc in Mechanical engineering. Over these years he is responsible for Water treatment and transportation design consultancy and Engaged in the Water treatment design mostly located in Iran's capital and other eastern city of Iran. Mr. Gifani is an engineer with Toossab Consulting Engineers Co.

ABSTRACT for the 2012 ISA WWAC Symposium

Flowmeter Challenges in a Multi-Pass Reverse Osmosis System

Chris Caglioti[1]*, Andrew Fenske[2], and David Ramsey[3]

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Magnetic flow meter limitations, transit time flow meter applications, process stream stability

ABSTRACT

The City of Cape Coral water production staff discovered that a typical mag-meter could not provide a stable measurement in a process stream of clean demineralized water consisting of two blended streams which possessed differing conductivity. This process application was used in a PID control loop which controlled process recovery of demineralized water. Without accurate, stable measurement, the system would not function as designed. Despite the fact that the overall conductivity of the process stream was well above the manufacturers minimum requirements, at the point of flow measurement the conductivity was not homogenous. This resulted in the inability of the magnetic flow meter to be able to provide constant and stable return of the pulsed field signal to the transmitter.

We needed to look at viable alternatives which would be suitable in the existing footprint and provide a usable process control. With the City having success using a large install base of clamp-on ultrasonic transit time flow meters for several years, an action plan was implemented to pilot test this technology.

After successful results due to the ability of the transit time meter to provide a stable process control signal independent of the fluid characteristics, units were specified and installed for the permanent application and are providing the required output for stable process control.

About the Authors:

Chris Caglioti has over 23 years of experience as a "Class A" licensed drinking water treatment plant operator in the state of Florida, USA, and 7 years serving as a certified ISA CCST Level 1 instrument and Controls Technician for the City of Cape Corals' water production department. Contact email: nroinst@gmail.com , telephone: +1 (239) 242-3427.

Andrew Fenske has served the City of Cape Coral (Florida, USA) for over 24 years. He holds dual water and wastewater licenses. Andrew has served as the chief operator at the South Cape RO Plant and is currently the Chief Operator at the North RO Plant. Contact: afenske@capecoral.net

David Ramsey is the municipal territory manager for AMJ Equipment Corp and also holds ISA CCST Level 1 certification. David has been in the industry for over 15 years and specializes in process application for all aspects of municipal and industrial process treatment systems including flow, level, pressure, analytical measurement and SCADA systems. Contact: dramsey@amjequipment.com

Should we keep DO for nitrification control ?

The proof is in the Ammonium Electrodes

Robert Lagrange[1]*, Sue Baert[2], Amanda Poole[3], Dave Green[3] and Nick Camin[4]

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SUBMISSION TYPE: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Process Control, Optimization, Nitrification, Ammonium, Dissolved Oxygen, Energy Consumption, Compliance, Instrumentation

ABSTRACT

Aeration often is the process that consumes the most energy in a wastewater plant. At the same time it is an essential process to maintain compliance for BOD and Ammonia limits. It thus deserves a lot of attention.

The use of dissolved oxygen measurement to control aeration is widely accepted. The literature has many examples of excellent return on investment in wastewater plants that have implemented this control. There are even theories that a concentration of 2 mg/l is the perfect value. But a DO sensor only tells how much oxygen has not been used in the process and at times this measurement may not bring the expected results. The effluent may end up out of compliance or too much energy can be spent. Examples are available.

As one of the main objectives of the aeration tank is nitrification the measurement of the concentration of ammonium or ammonia provides much better information than dissolved oxygen. Ion Selective Electrodes installed directly in the tank eliminate the need for sampling line and insure an easier integration. Their selectivity, accuracy and lower maintenance make them an attractive solution. As demonstrated at Wheaton and Colorado Springs additional energy savings and compliance are possible when using either ammonia in a cascade loop with DO control or in direct control of the air flow. Direct control either in feed-forward or feed-back provide faster and better response when spikes are present.

The return on investment is very good even on smaller plants and compliance is achieved.

Dissolved oxygen concentration remains an important factor as it affects the quality of the sludge. The control strategy has to maintain it within limits.

About the Authors:

Robert Lagrange, PhD is a Doctor in Physics from the University of Grenoble, France. After 11 years with Endress+Hauser as Business Manager Water and Wastewater Robert is now working part time as a consultant. Robert presented multiple times at the ISA WWACS and is a member of WEF and AWWA instrumentation and control committees

Sue Baert, B.Sc. is the Plant Superintendent at the Wheaton Sanitary District where she started as a chemist became the Lab Manager and wrote the Quality Assurance Project Plan for the stream water quality project, collected, analyzed and submitted the data. She has a degree in Biology/Chemistry from the UW-Lacrosse. Sue is involved with the DuPage Salt Creek watershed group as Vice-President. She is an active member of WEF through the local MA Central States Water Environment Association (CSWEA). She was President of the Illinois section of Central States for a one year term, and then Illinois Trustee to the Executive staff for two years. In all, her career in the water/wastewater section has spanned over 22 years.

Amanda Poole, M.Eng. is an environmental engineer at Baxter & Woodman, where she focuses on energy reduction and generation measures at wastewater treatment plants. Amanda has been involved in numerous wastewater treatment plant energy audits and aeration energy reduction projects throughout the Chicago area. Amanda received her B.S. and M.S. in Environmental Engineering from the University of Illinois in Urbana – Champaign. She has been working in the water/wastewater sector for the past 3 years and awaits her P.E. licensure in December 2012. She is an active member of the Central States Water Environment Association.

David Green, AAS EET joined Baxter & Woodman in 2008 as a Senior Systems Integrator. Dave's passion for automation and innovation led him to become the Automation Technical Director. He brings over 16 years of experience designing and providing unique solutions to Automated Systems Integration projects. He has quickly become a technical leader in the organization, and has a hunger for learning new technology and finding the best solutions for automation problems.

Nick Camin, BSEE, MBA has worked in the instrumentation field for over thirteen years specializing in environmental industry applications for over ten of them. Nick is a graduate of Purdue University with a bachelor of sciences degree in electrical engineering and he also holds a master of business administration degree from Indiana Wesleyan University. With Endress+Hauser he has held the positions of application engineer, project manager, municipal business manager, regional sales manager and currently he is marketing manager for the environmental industry. Nick is a member of WEF and AWWA instrumentation and control committees.

ABSTRACT for the 2012 ISA WWAC Symposium

Modernization and Improved Operations: Process Automation Upgrade of the Gilder Creek WWTP

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SUBMISSION TYPE: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

Upgrade, Automation, SCADA, Control Panels, Schedule, System Integrator, Qualification, Construction Sequence

ABSTRACT

Renewable Water Resources of Greenville, South Carolina (ReWa) is in the process of a major controls upgrade at its Gilder Creek Wastewater Treatment Plant. This upgrade will serve not only to modernize the Gilder Creek facility and relieve growing operation and maintenance difficulties, but also as a model for the similar upgrade of ReWa's other facilities and the ultimate networking of all facilities for supervisory control and data acquisition (SCADA).

The project, currently in the design phase, consists of retrofitting and replacing local control panels; replacing a PC-based virtual logic controller (VLC) system and obsolete local input/output (I/O) nodes with a distributed programmable logic controller (PLC) based system; and upgrading to a new scalable software solution for SCADA and operator interface. By utilizing existing plant network infrastructure and carefully sequencing construction, impact on facility operation will be minimized. The development of selection criteria for control system integrator candidates and a curriculum of ReWa personnel training will provide for optimum operations at Gilder Creek and at other ReWa facilities in the future. The project is expected to be executed in 2012.

This paper will explore the reasons for the upgrade, the broad scope and the technical details of the upgrade path, and the challenges encountered in selection of hardware and software, integrator qualification, and construction planning.

About the Authors:

Scott Whitmore, PE, is an Automation Engineer working out of CDM Smith's Southeast Regional Design Center in Maitland, Florida. He graduated as Bachelor of Science in Mechanical Engineering from the University of Central Florida, and has 15 years of experience in the design and construction of instrumentation and control systems for water and wastewater treatment facilities. Scott has been an ISA member since 1994.

Blake Visin, MPA, is the Information Systems Director at Renewable Water Resources (ReWa). As the Director since 2008, Mr. Visin is charged with directing three departments: Information Technology (IT), Instrumentation and Electronics (I&E), and Geographical Information Systems (GIS). He graduated with a degree in Production Operations Management from the University of Wisconsin–Whitewater and has recently completed his Masters in Public Administration from Clemson University.

ABSTRACT for the 2012 ISA WWAC Symposium

Efficient Control of Potable Water Distribution

Raed Al Nuaimi[1]*, Rajendra Kumar Ramakrishnan[1], and Mohammed Barghothi[1]

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

DCS, VFD, SCADA, District Metering Area, Flow Control

ABSTRACT

Service providers struggle to control potable water pump stations that are distributing to public consumer networks with varying demands while maintaining pumping efficiency, especially while the consumer points are physically located at different elevations. Many service providers have tried to introduce Variable speed drives to control the pump discharge and thereby trying to achieve energy efficient operations.

A DCS pumping station control system was designed based on flow; it utilizes local control system at selected points of the network (District Metering Areas) where a flow control valve is installed to control flow in addition to logging of other data like water quality parameters.

Utilizing mass balance were the summation of the actual flow at each DMA is used to manipulates the speed/number of running pumps so that the station outlet pressure is always kept at the exact value required depending on the demand at that instant of time regardless where the pumped water is consumed.

The system eliminates the need for different pressure head discharge headers in areas where consumer points are at different elevations and provides a built-in leak detection capability. Model Driven control can be achieved utilizing logged data collected from the network.

This efficient control system optimizes energy usage, limits water consumption and helps for faster detection and rectification of water leakage.

About the Authors:

Raed Al Nuaimi has been in design, construction and commissioning of control systems serving refineries, power plants, water and waste water facilities for over 25 years. He is currently heading the Instrumentation and Control Department at AECOM Middle East Ltd. in United Arab Emirates. He is also the Honors & Awards chair of ISA UAE section.

Rajendra Kumar Ramakrishnan has over 22 years of experience in project design, site execution including commissioning of water and waste water treatment, transmission and distribution projects. Rajendra is currently heading the Mechanical Department of AECOM Middle East Ltd, Al Ain in the UAE.

Mohamed Barghothi has been in design of water and drainage systems for almost 8 years. He is currently working as a Senior Design Engineer AECOM Middle East in the United Arab Emirates for water supply systems at AECOM Middle East in the United Arab Emirates. Mainly responsible for hydraulic and surge studies for various potable water and reclaimed water pressure and gravity systems.

Optimization of Wastewater Lift Stations for Reduction of Energy Usage and Greenhouse Gas Emissions

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

SCADA, Research, Hydraulic modeling, Lift stations

ABSTRACT

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) demonstrates a clear relationship between increasing greenhouse gas (GHG) concentrations and higher global temperatures (IPCC, 2007). One key component of sustainable water and wastewater infrastructure is the mitigation of indirect GHG emissions resulting from off-site energy providers. One of the major sources of GHG emissions from wastewater utilities is energy use caused by lift stations operation, especially in flat topographic regions where hundreds of such pump stations are required.

This project includes a new control system featuring new generation SCADA configurations allowing data communication directly from the lift station to the wastewater central control room eliminating aging radio, telephone and hardwired copper networks utilizing data concentrators located miles away from the central control room.

The research team conceptualized a revised operational control method for the lift station system utilizing hydraulic modeling results generated from specific site conditions. This method of operation will reduce operating pressures, reduce the energy demands of the pumping units and stabilize the influent flow entering a wastewater treatment facility.

The final product of this study is a guidebook for utilities that details how wastewater lift stations can be optimized using advanced hydraulic modeling and new generation SCADA systems.

This project was funded under the WERF-USEPA cooperative agreement Innovation and Research for Water Infrastructure for the 21st Century (Project No. INFR3R11). MWH Americans Inc. is leading this research project with collaboration from Jacksonville Energy Authority (JEA), a water, wastewater and electric utility located in northeast in Florida.

About the Authors:

David Wilcoxson is a Principal I & C (Instrumentation & Controls) Engineer with MWH in Walnut Creek, California. Mr. Wilcoxson has over 30 years of experience in various instrumentation and control environments. He has worked in the pharmaceutical, chemical, biotech and water and wastewater industries, working with all types of pneumatic and electrical instrumentation as well as computer controls. He has extensive experience with both DCS and PLC based systems, including specification, installation, troubleshooting, programming and start-up of computer based SCADA systems for all types of water related facilities including a high purity water treatment plant, and many potable and reclaimed water and wastewater pumping, treatment and aquaculture facilities.

Travis Crane is the Water Wastewater Reliability Specialist for JEA, Jacksonville Florida's municipality. Mr. Crane has spent the last 6 years as JEA's sewer hydraulic modeler. He is responsible for modeling of the over 3,000 miles of sewer piping as well as over 2,400 pump stations throughout the JEA territory. He holds a BS degree in Mechanical Engineering from the University of Florida.

The Role of Rugged HMIs in Water/Wastewater Plants

Jeff Hayes[1]*

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

HMI, SCADA, Control Panel, Human Interface, Rugged, Challenging Environments, Robustness

ABSTRACT

How do vibrations, heat, sunlight, ice, wind, rain, hose discharge and chemicals impact the control aspect of a water/wastewater treatment plant? Which operator interface designs provide the access as well as the necessary information required by the plant technicians? Are the knobs, dials and switches adequate for the task at hand? With fewer operators doing more work, do they have the necessary tools to be as effective at their jobs as they need to be?

There have been many advances in human machine interface (HMI) designs over the past few years. What has become a normal user experience on smartphones and tablets is now becoming mainstream with modern HMIs. Touch panels from 4" to 24" coupled with sharp graphics now provide a whole new way of displaying and performing critical tasks.

This presentation will describe the advantages of using modern, smart terminals to monitor and control certain aspects of water/wastewater plants. It will describe some of the issues certain technologies need to address when deployed outside, in the elements. Having the right controls at the right place can now be accomplished with the right technologies. The presentation will also focus on the issues and the solutions, not on specific manufacturers or solution providers. The takeaway from attending is that those involved in designing and managing water/wastewater plants will gain a better knowledge of what to consider and specify when selecting and deploying HMIs.

About the Author:

Jeff Hayes works for Beijer Electronics in Business Development. He specializes in the water/wastewater industry. He has over 20 years of experience in various roles in a variety of technology-oriented companies.

SCADA Upgrades to Otay Water Treatment Plant

Noune Garounts[1]*

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Plant Upgrade, SCADA, Integration, Automation, Lessons Learned

ABSTRACT

This presentation will provide information on the technology that was used to upgrade the existing SCADA system at the water treatment plant location in San Diego, California. The Otay water treatment plant (WTP) filters were originally built in 1979 and the plant was last upgraded and expanded in 1986.The current process improvements were designed and implemented during the Otay WTP Upgrades Phase 1 and Phase 2 project.

The Otay WTP Upgrades Phase 1 and Phase 2 project included the construction of a new chlorine dioxide feed system and contactor, Powdered Activated Carbon (PAC) feed facility, a new third flocculation and sedimentation basin, filter upgrade improvements (pumped backwash, filter-to-waste, new media and underdrains), additional chemical feed systems, and major SCADA system upgrades.

The PCS Architecture Diagram was developed to support all the existing and planned plant expansion systems. The architecture focused on new PLC and remote I/O panels, a Fiber Optic communication system backbone, and other communication equipment upgrades. The block diagram included the existing plant PLC system network with the new upgrades. A redundant PLC was installed, replacing relays for backwash control for the new filter operations and existing plant facilities. In addition, new package system PLCs were also installed for the PAC and chlorine dioxide generator feed systems. Signals to the existing antiquated plant Main Control Board were integrated into the new PLC system and incorporated into the new plant SCADA system. The old Main Control Board and strip charts were replaced with new Operator Workstations. The water treatment plant remained in continuous operation throughout construction, except for short, allowable shutdowns scheduled in advance.

About the Author:

Dr. Noune Garounts is the Instrumentation and Control Engineer for MWH Global Company. Ms. Garounts has more than thirteen years of electrical engineering experience working in Generating stations and electrical substation from 500kV to 4kV, electrical power transmission & distribution, substation & industrial automation projects. She has completed several water/wastewater projects that include design, engineering, and contraction support.

ABSTRACT for the 2012 ISA WWAC Symposium

So you have a SCADA, what's next?

Grant Van Hermert[1]*

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FORMAT: 6-12 page paper plus 30-minute PowerPoint presentation

KEYWORDS

SCADA, AMR, GIS, CMMS, Water, Wastewater, Integration, Historians, Data Visualization

ABSTRACT

SCADA systems, AMR systems, GIS systems, Maintenance Systems, Historians, and other systems generate a huge amount of data. However, it has been difficult for utilities to combine, correlate, and verify this data into easy to use reports to enhance utility operation. Decreased tax revenue, increased pressure from unstable energy costs, and the ever growing regulatory environment, is making this level of operation a necessity.

To overcome this, many utilities have developed procedures to manually correlate this data. The result is usually a labor intensive process with questionable accuracy.

This presentation looks how to effectively develop software tools to coordinate these seemingly disparate sources of data. Often called a water management suite or integrated software environment, this overarching tool can fit over a utilities existing including SCADA, Historians, and other systems. A water management suite gathers data from all of a water utility's various systems and contextualizes the data to create usable reports on efficiency and effectiveness. The output is verifiable results with just a few clicks. The result is a more efficient operation, and greater savings in energy and other forms of efficiency.

One utility saw dramatic improvements in their ability to mass balance their distribution system. Before their custom-built water management suite was implemented, the task mass balancing took weeks of manual labor to calculate it for just a single fixed point in time. Afterwards once the new software system was installed, system mass balances could be ready within an hour, and after just a few clicks. This utility also had verifiable data to confirm and contradict various 30 year old operational assumptions. This led to changes in the way the system operates, and as a result they could optimize their operations. Also, efficiency statistics have led this utility to understand what chemicals are best for flocculation and filtration. Their new system also gave the data so they could purposely optimize when sources of water to use depending on the time of day. This paper is presenting in a how to format that emphasizes what features a utility should consider when developing a software based water management suite.

About the Author:

Grant Van Hemert, PE is a water and wastewater applications specialist for the Schneider Electric Water and Wastewater Competency Center. He has 17 years of experience in water and wastewater automation, power, and efficiency. Mr. Van Hemert is the past chairperson for the AWWA Instrumentation and Control Committee.

Asset Tracking and Revision Control for Automated Water/Wastewater Control Systems

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Utilities, Water, Wastewater, SCADA, Asset Management, Revision Control, Maintenance/Operations

ABSTRACT

Utilities realized years ago the value of maintaining good records. Systems run for decades, yet many changes will inevitably occur during their natural lifespan. Historically, these changes were managed with paper systems or in the minds of key employees. Information was stored across multiple systems again linked by the living-knowledge of staff. As the amount of information expanded and key personnel moved on, gaps appeared which resulted in costly "discoveries" as older systems were modified.

Today the common solution for dealing with physical assets is to deploy a GIS system. This tracks assets and key properties, but what about changes to the SCADA system? These systems also undergo change to reflect the physical systems they monitor. Over time, many people will work on the application both internal and external. Yet the reality is that this is not typically tracked in an auditable and recoverable fashion. There may be the shoebox of past versions after an upgrade, but they do not detail what changes were made; only that new and old versions exist. This is somewhat inconsistent with how the utility may manage changes to its other assets, but is the accepted norm until a new technology offers substantial improvements.

It is now incumbent on SCADA suppliers to accept the challenge and develop integrated tools to records all incremental system changes. Ideally, this audit trail will also facilitate a rollback to a previous version of the application. This will provide the benefits of stability and the ability to manage accidental or deliberate internal sabotage of an existing system. As more systems become networked, there is a challenge in managing complex applications while guaranteeing system integrity. System maintenance and maximizing uptime will be the next challenge facing the SCADA world.

About the Author:

Blair Sooley is an Account Manager/Pre-Sales Engineer with Trihedral Engineering Inc. He holds an engineering degree from Dalhousie University in Halifax, an MBA from St. Mary's University and has sat on the board of the Consulting Engineers of Nova Scotia. Blair has worked in the automation and controls industry for 17 years and has led projects in the United States, Canada and Southeast Asia. He holds SCADA seminars and webinars annually across North America.

ABSTRACT for the 2012 ISA WWAC Symposium

Overview of Applicable ISA Standards to the Water and Wastewater Sectors

Graham Nasby[1]*

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FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Standards, ISA, Design, Specifications, Water, Wastewater, Instrumentation, Automation, Best Practices

ABSTRACT:

The ISA has a wealth of knowledge to offer the water and wastewater sectors in the form of ISA standards. Included in the ISA standards portfolio are technical reports, recommend practice documents, and the standards documents themselves. This talk will provide an overview of which ISA standards are frequently used in the water and wastewater sector. In total the ISA has over 180 standards, recommended practices and technical reports, not including those that have been adopted as ANSI and IEC standards. The talk will begin with a synopsis of the 20 most commonly used standards, and discuss common applications were they can help the process plant designer, operator, maintenance manager and facility owner. In addition to the commonly used standards, some of the more specialized standards will also be covered in terms of the special situations that they relate to. The presentation will conclude with a short discussion of how the various ISA standards relate to each other. A handout will be provided to all attendees listing the major ISA standards, what they contain, and how they can be used for both water and wastewater applications.

About the Author:

Graham Nasby, P.Eng., PMP currently designs automated control and monitoring systems for the municipal water/wastewater sector at Eramosa Engineering Inc. He received his B.Sc.(Eng) in systems engineering from the University of Guelph and has a certificate in project management from the University of Waterloo, and has worked in various industries in addition to the water/wastewater sector in his career. Graham is a contributing member of the ISA18 “Alarm Management”, ISA101 “Human Machine Interfaces” and SCC/IEC-TC65 standards committees, and director-elect of the ISA’s Water/Wastewater Industries Division. Graham has over 8 years of experience with automated control and water treatment systems. In 2011, he won 2011 ISA Keith Otto award for his article on “SCADA Standardization” in the May/June 2011 issue of InTech magazine and was recently named in Control Engineering magazine’s “Leaders under 40, Class of 2011” award program. Contact: graham.nasby@eramosa.com

Planning and Designing SCADA Systems for Wastewater Collection Optimization

Norman Anderson[1]*

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FORMAT: 3 foot wide x 4 foot high large format poster

KEYWORDS

Collection System, Liftstation, Network, Optimization, SCADA, Security, Wastewater

ABSTRACT

Wastewater collection systems are often vast networks of interconnected lift stations having varying contributions to the overall collection system due to local weather conditions and customer usage. With increasing demand on existing collection systems and the difficulty faced in increasing wastewater treatment plant capacity due to space and cost constraints, optimization of wastewater collection systems and proper coordination of pumping and diversion of wastewater flows is of great importance. Central to this optimization is a Supervisory Control and Data Acquisition (SCADA) system that can monitor pumping and storage activities and control major pump stations within the collection system. Trending, reporting, alarming, operations and maintenance, and standard operating procedures are additional tools that require access for proper operation and optimization of the collection system.

This paper discusses the planning and design of a wastewater collection SCADA system and process control network using an example project that consisted of an approximately 450 lift station collection system with four physically separated control rooms. Approximately half of the liftstations in the example are existing requiring heavy retrofit work while keeping the process operational which presented construction sequencing and scheduling challenges. The use of digital cellular communications for lift station monitoring and control as well as remote user access to the central SCADA system will be detailed. Additional topics include methodology for selecting fault tolerant and secure process control and communication solutions and securing network communications using software monitoring, network segmentation, access control lists, and virtual private network tunnels, as well as other methods and industry standards. SCADA software and hardware redundancy will be discussed as well as communications failover strategies for disaster recovery. This paper provides an understanding of the options for collection system process control systems, selection of components and solutions, and design considerations for collection system SCADA.

About the Author:

Norman Anderson, PE has over 5 years experience in the design and commissioning of Process Control Systems for the Water Sector. He has provided secure and reliable PLC, SCADA, and Network hardware systems, as well as software architecture designs for a wide range of both water and wastewater facilities. Normal has experience providing complete control system automation solutions for plants, collection, and distribution systems. He has an M.S. in Electrical Engineering from Iowa State University and an M.S. in Physics from the University of Florida. Norman works for CH2M Hill out of their Gainesville, Florida, USA offices.