

# **Water/Wastewater and Automatic Controls Symposium 2016 (WWAC 2016)**

ISA Volume 515

Orlando, Florida, USA  
2 – 4 August 2016

ISBN: 978-1-5108-3849-9

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2016) by International Society of Automation - ISA  
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact International Society of Automation - ISA  
at the address below.

International Society of Automation - ISA  
67 Alexander Drive  
Research Triangle Park, NC 27709 USA

Phone: (919) 549-8411  
Fax: (919) 549-8288

[info@isa.org](mailto:info@isa.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

<b>Centralized Control System Architecture .....</b>	1
<i>H. Ajami, A. Gosine</i>	
<b>Integrated System Architecture: A Utility Success Story.....</b>	10
<i>B. Saparia, H. Ajami</i>	
<b>What Are We Going to do with All this Data...? Capture the Benefits of the Stable and Capable Moment.....</b>	19
<i>J. Black</i>	
<b>Calibration Evolution and Revolution: Case History: City of Cape Coral FL Drinking Water Production Plants .....</b>	29
<i>C. Caglioti</i>	
<b>The Lego Principle: Modular Approach to Water Processing Control &amp; Automation.....</b>	44
<i>C. Correia, S. O'Grady</i>	
<b>Asset Management - What it Means to Automation Professionals.....</b>	50
<i>T. Delaura</i>	
<b>Cybersecurity, Going Beyond Protection .....</b>	90
<i>D. Dickinson</i>	
<b>It's Not Just a Job...It's Your Passion! Leveragign for the Future.....</b>	102
<i>S. Drew</i>	
<b>Fieldbus Implementation at a Wastewater Treatment Plant .....</b>	120
<i>R. Dusza Jr.</i>	
<b>Network Architectural Design for Cybersecurity in a Virtual World.....</b>	130
<i>K. Frische</i>	
<b>Cyber Security: How Much is Enough .....</b>	139
<i>M. Firstenberg</i>	
<b>What I Learned About Firewalls: A Decade of ICS Firewall Management .....</b>	148
<i>M. Firstenberg</i>	
<b>CASE Study For: Replacement of a Distribution SCADA.....</b>	159
<i>D. Foote, J. Mogavero</i>	
<b>Applying the Automation Competency Model: Taking Advantage of the ACM in Developing the Future Workforce.....</b>	174
<i>D. Ford</i>	
<b>SCADA is DEAD: The Case for Rethinking Your Approach to Automation.....</b>	186
<i>D. Ford</i>	
<b>Operational Blind Spots: Why Securing Critical Infrastructure Starts with Improved Visibility .....</b>	198
<i>M. Gandelsman</i>	
<b>Energy Savings while Elimination of Fugitive Emissions: A Surprising Twist on a Control System that Wasn't Expected to Work .....</b>	216
<i>T. Hoven</i>	
<b>Alarm Management and Reliable Architecture Needed for Utility-wide SCADA Systems: Achieving Effectiveness, High Availability, Subsystem Autonomy, and Centralized Administration .....</b>	224
<i>A. Hudson</i>	
<b>ISA 101: What It Is and Why It Is Needed – Status Update and Current Activities .....</b>	233
<i>G. Lehmann</i>	
<b>Trends in Cybersecurity in the Water Industry: A Strategic Approach to Mitigate Control System Risk .....</b>	246
<i>S. Liebrecht</i>	
<b>Leveraging Ethernet And Process Control Technology Advancements To Extend Critical Asset Life .....</b>	263
<i>S. Liebrecht</i>	
<b>Practical SCADA Cyber Security Lifecycle Steps .....</b>	284
<i>J. McGlone</i>	
<b>Meeting the Requirements of NFPA 820: The Standard for Fire Protection in WW Treatment and Collection Facilities.....</b>	295
<i>P. McGuire</i>	
<b>Lowering Lifecycle Costs with Intelligent Motor Control Centers.....</b>	315
<i>J. Miller</i>	

<b>Embracing Change: High Performance Graphics to Improve Operations: Water/Wastewater Case Study</b>	333
<i>J. Mitchell</i>	
<b>Designing a Control Strategy to Automate a Solids Handling Process in a Municipal Wastewater Treatment Plant (WWTP)</b>	351
<i>B. Mitchell, S. Lalgudi</i>	
<b>The Water Sector Approach to Cybersecurity</b>	368
<i>K. Morley</i>	
<b>Data Diode Cybersecurity Implementation Protects SCADA Network and Facilitates Transfer of Operations Information to Business Users</b>	378
<i>R. Mraz</i>	
<b>Measuring Gravity Sewer Flow Accurately</b>	389
<i>A. Royster</i>	
<b>Wireless Flexible Peer- To-Peer SCADA DNP3 County Wide Well System</b>	419
<i>R. Shull</i>	
<b>Demystifying Cyber Attacks on ICS: How They Work and How to Use Engineered and Cyber Layer of Protections</b>	437
<i>B. Singer</i>	
<b>System-Wide SCADA Documentation to Prepare for Disaster Recovery</b>	447
<i>M. Stoup, M. Skrzypek</i>	
<b>AWWA Current Trends and News</b>	459
<i>M. Sweeney</i>	
<b>Cybersecurity: What Do I Need to Do?</b>	465
<i>R. Witucki, J. Miller</i>	
<b>Using Data Analytics to Monitor and Reduce Energy Consumption: WWTP Case Study</b>	481
<i>S. Wortendyke</i>	
<b>Author Index</b>	