

Dedicated to the World's Most Important Resource[™]

Water Sector Approach to Manage Risk & Resilience

Intelligent Water Networks Summit

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Risk & Resilience ⇔ All-Hazards Approach



Role for Standards & Guidance



- ANSI/AWWA G430-14: Security Practices for Operation & Management
 - Information protection and continuity is requirement



ANSI/AWWA J100-10: RAMCAP[®] Standard for Risk & Resilience Management of Water & Wastewater Systems

Cyber is required threat domain

ANSI/AWWA G440-11: Emergency Preparedness Practices

Consideration of key business & operating system recovery

Business Continuity Plans for Water Utilities

Cyber recovery plan is required action item

Process Control System Security Guidance for the Water Sector

Supports voluntary adoption of NIST Cybersecurity Framework

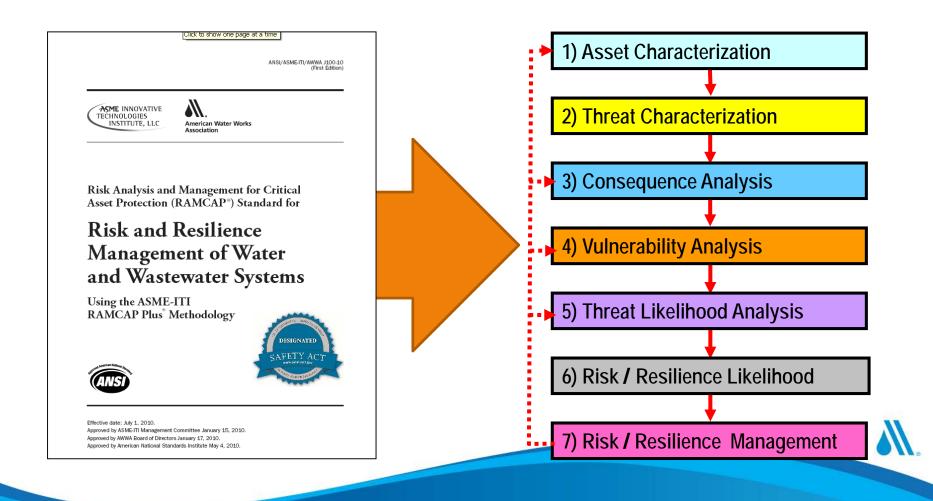
ANSI/AWWA G430-14:

Security Practices for Operations & Management

Requirements:

- Explicit Commitment to Security a)
- Security Culture b)
- Defined Security Roles and Employee Expectations C)
- Up-To-Date Assessment of Risk d)
- Resources Dedicated to Security and Security Implementation Priorities Access Control and Intrusion Detection e)
- **f**)
- Contamination, Detection, Monitoring and Surveillance
- g) h) Information Protection and Continuity
- Design and Construction Threat Level-Based Protocols
- Emergency Response and Recovery Plans and Business Continuity Plan Ŕ)
- Internal and External Communications **I**)
- m) Partnerships
- Verification n)

ANSI/AWWA J100-10: Risk Analysis and Management for Critical Asset Protection (RAMCAP[®]) Standard for Risk and Resilience Management of Water and Wastewater Systems



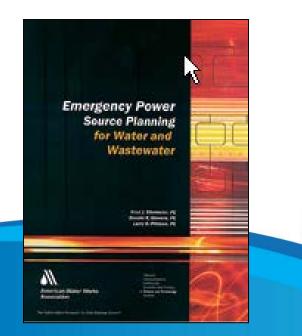
Early J100 Adopters

- DC Water
- Washington Suburban Sanitary Commission
- City of Richmond (VA)
- Gwinnett County (GA)
- City of Chicago, Dept of Water Management
- Long Beach Water Department
- American Water Delran System (NJ)
- ➤ Minneapolis
- Sacramento, CA
- Chattanooga, TN



Emergency Power

- Key limiting factor in water sector recovery
- What is current capability to support full load operations with generators?
- Partnership with local power on critical customer and priority for recovery
- Key Info?
 - Voltage
 - Single of Three Phase
 - Connection requirements



Emergency Water Supply

- Nation is unprepared to scale
- Where and how to distribute

Drought	Emergency Water Supply Planning Guide			Gal/Person/Day	
Preparedness	for Hospitals and Health Care Facilities	Population	25 Million	1	3
and Response	DOWNERS COLD WAILE				
	ALD THE	Bottles	8 oz	400,000,000	1,200,000,000
	2 DESCRIPTION		12 oz	266,666,667	800,000,000
Separation Series Series			16.9 oz	189,349,112	568,047,337
		Trucks	8 oz	5,342	16,026
Anados Water Works Anados Planning for a Drinking Wate	In Emergency Ir Supply	53' Trailer	12 oz	5,088	15,263
	Association Works		16.9 oz	4,215	12,644
	1 1 1 m				

Critical Parts and Equipment

Resource Typing Asset Management



WATER & WASTEWATER MUTUAL AID & ASSISTANCE RESOURCE TYPING MANUAL



American Water Works Association

AWWA WITAF Project #508

- 24 standardized resource teams developed per FEMA Guidance
- Mission Ready Package Cost development worksheet
- Mutual Aid Accommodations Checklist
- EMAC recognized

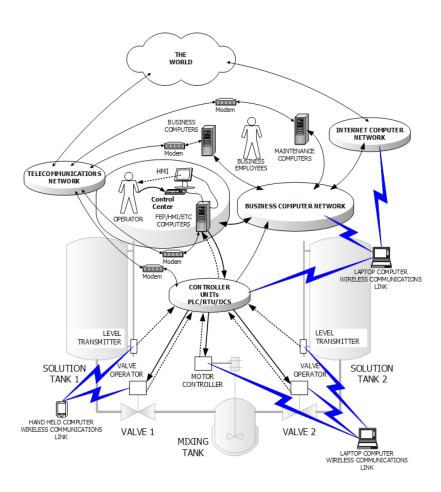
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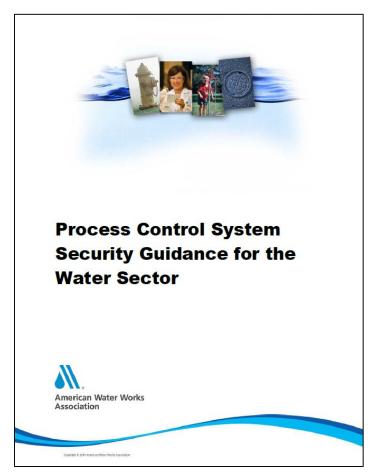
Connectivity = Exposure



Source: ICS-CERT

- Process Control Systems
 - SCADA
 - AMR/AMI
 - Telecommunications
 - HVAC
- Enterprise Systems
 - Employee Payroll
 - Service Contracts
 - Customer Billing
 - LIMS etc

Utility Driven



AWWA WITAF Project #503

- Organized based on HOW the utility uses or operates their process control system
- It does **NOT** evaluate current security profile
- Generates prioritized list of controls that empowers utility to consider appropriate actions to reduce potential vulnerabilities

One Step at a Time

Cyber Security Evaluation Tool (CSET[®])

Assessment of policy & procedures relative to NIST 800-52 & NIST 800-53

Design Architectural Review (DAR)

Evaluates network access/egress, design, configuration, applications and rules.

Supported by ICS-CERT

Network Architecture Verification and Validation (NAVV)

Baseline network architecture, communication protocols, discover rogue connections, & identify configuration errors.

AWWA Guidance & Use-Case Tool

Aligns w/NIST Cyber Framework

USEPA Statement

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Michael Daniel The White House D.C. 20500	
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....American Water Works Association has issued "Process Control System Security Guidance for the Water Sector" and a supporting "Use-Case Tool." This guidance identifies prioritized actions to reduce cybersecurity risk at a water or wastewater facility. The cybersecurity actions are aligned with the Cybersecurity Framework. This tool is serving as implementation guidance for the Cybersecurity Framework in the Water and Wastewater Systems sector.

- USEPA, May 2014

ANSI/AWWA G440-11: Emergency Preparedness Practices

Requirements:

- 4.1 Explicit Commitment to Emergency Preparedness
- 4.2 Preparedness Culture
- 4.3 Defined Preparedness Roles and Employee Expectations
- 4.3 Risk Assessment
- 4.4 Preparedness Plans
- 4.5 Internal and External Communications
- 4.6 Training
- 4.7 Partnerships
- 5.0 Verification



WARN in Action

CalWARN

Northridge Earthquake, 1994 El Nino Storms, 1998 Sonora Fires, 2001 Southern California Fires, 2007 Baja Earthquake, 2010 Napa Earthquake, 2014 Wildfires, 2015

UTWARN

Diesel Fuel Contamination 2015

FlaWARN

HurricanesKatrina, Wilma & Rita, 2005 Tornadoes, 2007 Hurricane Irma, 2017

NYWARN, NJWARN, PAWARN, MAWARN

Hurricane Sandy, 2012

NCWaterWARN, PAWARN

Hurricane Irene, 2011

IDWARN

Power Outage, 2015

SCWARN

Hurricane Joaquin Flooding, 2015

TxWARN

Hurricane Humberto, 2007 Hurricane Dolly & Ike, 2008 Drought, 2012 Hurricane Harvey, 2017

CoWARN

Salmonella outbreak, 2008 Flooding, 2013

TNWARN, INWARN, KYWARN

Ice Storm, 2009

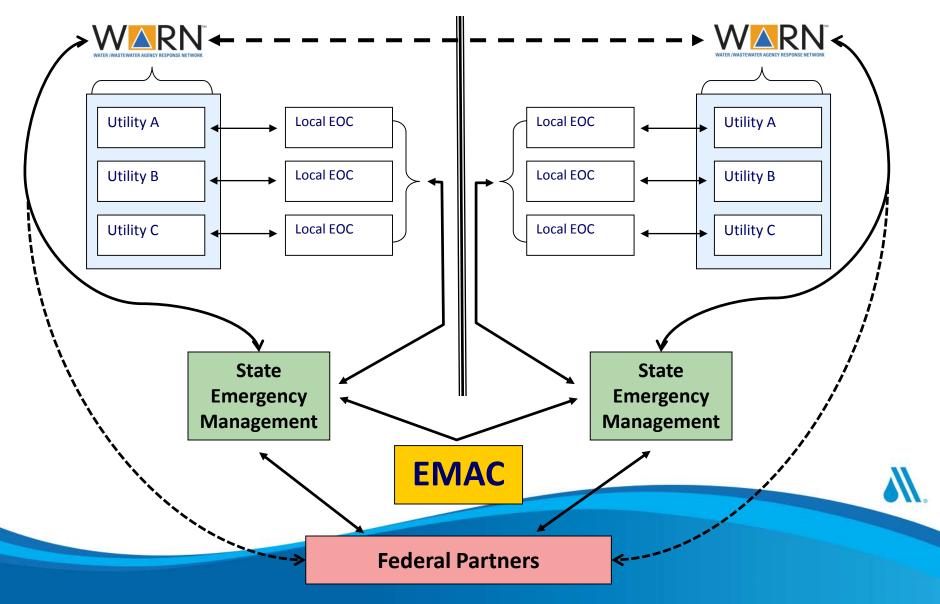
IAWARN, MNWARN

Flooding 2010, 2011, 2014

SDWARN

Missouri River Flood, 2011 City of Bison Water Outage, 2012

Coordination & Communications... in ALL Directions as Partners



Common Operating Picture

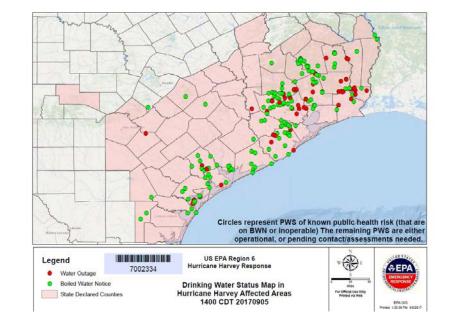


DRINKING WATER / WASTEWATER Puerto Rico.

Puerto Rico Drinking Water Status

- · PRASA PRASA reports that 7.09% of clients are without drinking water service.
- 1 of the 115 drinking water treatment plants (WTPs) operated by PRASA are out of service.
- 75 WTPs are working on alternate power and 39 on primary power.
- Plant out of service: Indigra Alta (0.5 MGD) Raw water pump station flooded.
- Non-PRASA Water Treatment Systems.
 - EPA, CEPD, and USACE conducted assessments of privately-owned community drinking water systems (not operated by PKASA) in rural areas in the West and South Branch for infrastructure repair needs.
 - Seven non-PRASA systems have been inspected and a report will be prepared for incident command review
 - Urasdo Municipality William Lugo DW-PR-912 (assessed 12/7) The system is producing water for the communicy, but the current capacity is below original pre-hurinence acapacity. The original 12:00 gallons cement that was destroyed by the hurricane and was replaced with tank that have a total capacity of 1,250 gallons. Team conducted a vaual inspection of the chlorinsting system that was donated by Samarina Purse and the operator is using the system correctly. Recommendation: The system needs additional tank capacity.
 - Pennelos Municipality Sec Balleza DV-PR-0092 (assessed 12/7). The team spoke with system uses and they stated that repairs to the water delivery system were performed. The community is presently being system, but the operator has declared if for non-potable use. A non-potable sign was placed on tank and a letter was sent to be users. Samarian Pare has distributed a filter bucket to system users. Recommendation. A chlorinating system should be added to system to ensure it is potable.

VS.



Resilience & Data Analytics

- Situation Awareness/Common Operating Picture
- Access/Reentry Coordination
- Communications/Interoperability
- Etc...

?? Questions ??

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<u>www.awwa.org/CYBERSECURITY</u> <u>www.NationalWARN.org</u>

