

APWA

Cyber-Informed Engineering for Public Works





Water/Wastewater Focused

- 215 staff
- Across 19 states



The Evolution of Engineering







At First: Analog Only

Now:

Digital designs, monitor, connect, and control analog elements





What haven't we been asking our Engineers?

How bad of a day could we have if a malicious cyber-actor owns our control system?





Cyber-Informed Engineering

What does CIE look like when fully implemented?

"Engineers incorporate cybersecurity practices into their body of knowledge, including engineering minimum requirements and specifications, for physical [...] infrastructure systems that incorporate digital controls."





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Principles of CIE

DESIGN AND OPERATIONS	ORGANIZATIONAL
Consequence-focused design	Interdependency evaluation
Engineered controls	Digital asset awareness
Secure information architecture	Cyber-secure supply chain controls
Design simplification	Planned resilience with no assumed security
Resilient layered defenses	Engineering information control
Active defense	Cybersecurity culture
Set 1	







Design to <u>"Assume Breach"</u>

Cyber-Physical Protections

- Water main overpressure concerns
- Pressure switch downstream of each pump, wired to pump controller







Recover the Lost Art of Manual Operations

Problem:

How do we operate our plant without automation?

Result:

Identified procedures and resources needed to operate their system manually.







Let's Redefine Expectations







Resources

- Cyber-Informed Engineering <u>www.inl.gov/cie</u>
- AWWA Cyber Resources <u>www.awwa.org/cyber</u>
- National Cyber-informed Engineering Strategy – <u>https://bit.ly/3z2yI3F</u>
- Join the CIE work group at <u>cie@inl.gov</u>







What's next for CIE?

- The cross-sector CIE Implementation Guide is under development
- This will define more of "what" CIE is
- The individual sectors to define the "how"
- Adoption by critical infrastructure!





Let's Revisit Our Original Question:

How bad of a day could we have if a malicious cyber-actor owns our control system?







Thank you!



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