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SCADA AND DRINKING WATER QUALITY

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Drinking Water Systems

- Very complex systems running 24/7 365 days a year
 - Critical infrastructure
 - Drinking water
 - Fire fighting
 - Manufacturing
 - Waste removal
 - Real vulnerabilities from malevolent attacks, upstream chemicals, ground water contamination and treatment failures

SCADA Roles at a Water Utility

- Infrastructure monitoring and control
 - Process monitoring an control
 - Communications
 - Water quality monitoring
 - Source and distribution system
 - Event Detection and management

Water Quality Monitoring

- Deployed electronic sensors for parameters like:
 - Chlorine residual
 - Pressure
 - Conductivity
 - pH
 - ORP
- More sophisticate instruments:
 - Spectral Scanners
 - Analytical Chemistry Instruments

Event Detection

- Major efforts since 9/11 to develop contamination Warning Systems
- Efforts led by USEPA and water utilities
- Develop sensors and software that can detect both malevolent and operational events





Logistical Challenges

- SCADA is a tool for the operators
 - Event detection requires extensive data process and analysis
 - Multiple people need access
 - For event detection SCADA is coupled with Middleware for analysis, reporting and decision making

Software

- Many middleware products
 - Server based
 - Cloud Based
 - Event Detection
 - Lots of candidates
 - Few work well
 - Currently working with:
 - CANARY (USEPA and Sandia)
 - Detector (Mind Set Tools progeny of Blue Box)

Detection Challenges

- In the past we did not know what contaminants we were looking for
- Using general measurements to identify contamination

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• The game has changed as of January 2014

Elk River Spill

- Charleston West Virginia
- January 9, 2014
- Over 10,000 gallons of Crude MCHM spilled into the Elk River from Freedom Industries
- 1.5 miles upstream of the raw water intake for the Kanawha Valley Water Treatment Plant
- 300,000 People without water for many weeks.

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Work on Deploying New Sensors

- Spectral Instruments
 - Biological Sensors
 - Gas Chromatogram
 - GC/MS

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Automate Data Collection

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- Continuous Monitors
- Automatic Samplers
- Tied into SCADA
- Working closely with Event Detection Systems
- Middleware to process Event Detection Outputs

QUESTIONS

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