PA AWWA
SOUTHEAST DISTRICT
WWOAP SPRING TECHNICAL CONFERENCE

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Practical Applications & Operational Benefits of Online Water Quality Monitoring in the Water Distribution System

Presented By:
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Overview

- OWQM Project Mission & Objectives
- Water Quality Monitoring Instrumentation
- Practical Applications
  - Operational & Dual Use Benefits
- Case Studies
Project Mission

To provide “real-time” continuous water quality data at key entry points and throughout the water distribution system to gain a better understanding of system hydraulics and diurnal and seasonal variations.
Project Objectives

Continuous Improvement

- Streamline Water Quality Data Review
- Develop New Instrumentation Applications
- Test and Apply Emerging Technologies
- Outreach Initiatives: Public/Private Partnerships
On-line Water Quality Monitoring

Network of 45 remote monitoring locations

- Entry points
- Storage facilities
- Pump stations
- Police & Fire stations
- Private stakeholders
On-line Monitoring Panels

Water Quality Parameters

- Chloramine residual – redundant sensors
- pH
- Turbidity
- Conductivity
- ORP
- UV 254
- Alarm triggered automated refrigerated samplers

Communications

- 3G Verizon Wireless

Alarms

- Water quality
- Communication failure
- Power failure
Largest OLWQM Station
Practical Applications

• Tracking Chlorine Residual Attenuation
• Monitor Water Travel Times
  • Fluoride Tracer Studies
  • Conductivity (road salt)
• Residence Times in Reservoirs & Tanks
• Improved Customer Complaint Response
• Water Security – Contaminant Detection
Benefits

Develop a better understanding of the distribution system

- WQ Patterns (Seasonal, Daily, etc.)
- Chlorine Die-Off
- Treatment Plant Multi-Source Water Mixing
- Pumping and Tank Operations

Help identify and track main breaks, closed valves, and flushing operations

Provide early warning of sensor malfunctions
Case Studies

Distribution Reservoir Chlorine Die-off

Major Commercial Customer Experiences of Turbidity Spikes
Distribution Reservoir Chlorine Die-off

The distribution system reservoir has a cover and liner.

The liner is made of 36 mil black Hypalon and the cover is 45 mil tan over black Hypalon.

An underwater inspection in 2001 showed the liner to be intact.

BLS reported chlorine residual fluctuations in July 2005 which led the Pumping Unit to investigate using an underwater ROV w/camera.

The inspection revealed tears at the influent structure and liner separation.
OWQM Indicators

- Chlorine values fluctuated between two sampling points.
- Increased turbidity occurred at times.
- A significant chlorine loss across the basin was observed.
- Correlation with grab samples confirmed it.
- These data showed the need to get into the reservoir and find the cause.
Elevated Turbidity Complaint

A commercial customer reported elevated turbidity levels resulting in shut-down of production that required flushing operations.

WQ samples were collected and the results were negative.

OWQM unit was notified and met with company QA managers and offered to install a portable RDM on their service connection.
On-site Findings

Distance from meter to beginning of processed was in excess of 800 feet.

Premise plumbing was “not” a dedicated supply line for the processes.

Water supply line ran through a warehouse and a loading dock area, and severe water hammer of service line was observed.

Customer was operating hydrants in order to flush their plumbing system’s source water.

Turbidity spikes were occurring within the facility rather than coming from the source water of the distribution system.
Rapid Deployment Module
Future Applications?

World Meeting of Families

2015

Philadelphia

2016 Democratic National Convention

Obamapedia

Philadelphia
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