How do we keep the water flowing in our Cities – Utilizing Smart Technology

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Balancing Cost and Benefits

• Focus on balancing costs and benefits (triple bottom line) will increase due to high energy demands for many advanced treatment options

• Alternative selected for project implementation should support the most sustainable approach
Real-time Energy Optimization
Real-Time Energy Optimization

- Interfaces directly to existing SCADA with minimal equipment, instrumentation or hardware changes
- Operational tool to schedule pumps/valves to achieve lowest overall cost (without breaching constraints)
- Solves mass-balance first (i.e. must deliver water)
- Aims to minimize costs of energy (best use of off-peak rates)
- Aims to maximize energy efficiency of pumps (BEP)
- Can improve water quality by managing turnover
- Runs in real time – Like an autopilot
- Recalculates schedule (next 24-48 hours) every 1/2-hour, adapting to changing conditions of the day

Energy Management and Operations Optimization System
Take Advantage of Real-Time Energy Pricing
Real-Time Water Quality Monitoring
Traditional Practices in the Industry

• Approach to water quality complaints are often handled with a single grab sample and spot flushing
  • Did that really solve the problem or just move the problem downstream?
  • Regular system flushing and identifying hot spots for more frequent flushing significantly reduces customer calls
• Distribution system water quality is associated with weekly to monthly compliance grab samples
  • Does a single grab sample from a couple of seconds of flow really reflect what is happening between sampling events
  • Wouldn’t it be nice to understand what is happening throughout the day in key parts of your system?
Traditional Practices in the Industry

• When customers do not call and complain about pressure and quality is everything okay?
  • AWWA surveys suggest that at best 1 in every 100 customers will call about a problem. Why, people do not like conflict, but they will talk to their friends and use social media.
  • There are tools that allow social media mining that identifies key words associated with water problems.
The data revolution has arrived and is being driven by the Internet of Things (IOT)

Source: Cisco IBSG, 2011
Water systems become smarter with new disruptive innovations creating a new paradigm shift.

Traditional infrastructure funding is shrinking while needed investment continues to grow.

Smart systems will provide new information for focused replacement and system optimization.
Surveillance and Response System Architecture
Philadelphia Water Department Dashboard
Real-time Evaluation of System Water Quality
Dallas Water Utilities Dashboard
OWQM at a Quick Glance (Gauge View)
Transparency – Building Customer Trust and Respect

• Consumer Confidence Report
  – This can be an excellent marketing tool to talk about new programs that your organization is doing to improve or maintain water quality

• Distribution System Flushing Program
  – Turn this into a positive for your customers, even during periods of drought or water shortages: IRWD posted signs 24 hours in advance of flushing operations that read, “Flushing in your area - Keeping our water system clean to maintain the water quality that you deserve”

• Customer Portal
  – Develop an application that provides the latest water quality for things that interest the customers: Hardness, chlorine, others

Be proactive and bank the customer trust and respect
Summary

• In today’s world of increasing expectations, change from traditional practices is needed

• Integration of data and converting it into “actionable information” and “knowledge” provides new tools for improving distribution system water quality and customer satisfaction

• Spatial visualization and overlaying disparate data sources helps to create knowledge

• The cost of implementing a smart system does cost money upfront, but experience shows that the ROI can be very significant

• Start engaging your customers now and build the trust and respect…..you never know when you might need it.