EPA

Water Quality Surveillance and Response Systems
For Distribution System Monitoring and Management

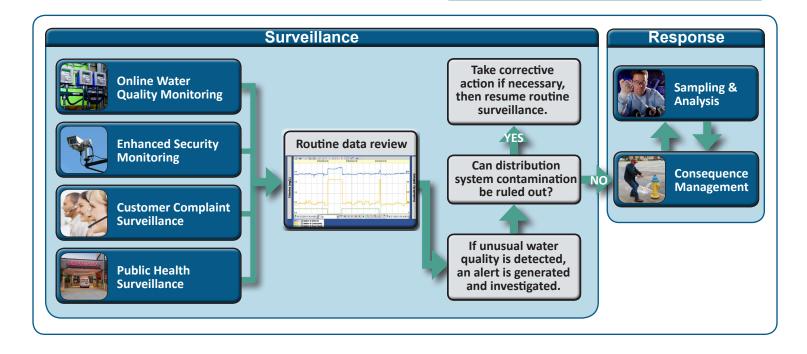## What is a Water Quality Surveillance and Response System?

A Water Quality Surveillance and Response System (SRS) is a framework designed to support monitoring and management of distribution system water quality. The system is comprised of one or more components that enhance a drinking water utility's capability to quickly detect and respond to water quality issues. Early warning and effective response to a deterioration in water quality can prevent it from becoming a more serious problem.

As illustrated in the figure below, the SRS components are grouped into two operational phases: surveillance and response. The surveillance components provide real-time data on conditions throughout the distribution system and include Online Water Quality Monitoring, Enhanced Security Monitoring, Customer Complaint Surveillance, and Public Health Surveillance. The response components provide a framework for making response decisions and include Consequence Management and Sampling & Analysis.

What are the benefits of implementing an SRS?

One application of an SRS is the detection of infrequent contamination incidents, but the system can also provide many benefits to routine utility operations. Examples of specific benefits that can be derived from SRS practices include:

- Improved understanding of the impact of distribution system operations and hydraulics on water quality
- Early warning of emerging water quality issues, such as low disinfectant levels, nitrification, taste & odor episodes, and rusty water
- Ability to detect and respond to distribution system contamination incidents
- Enhanced security at water distribution facilities
- Stronger relationships with partner agencies, such as public health, law enforcement, emergency management, and primacy agencies
- Improved customer service through timely response to customers' water quality concerns

Online Water Quality Monitoring involves continuous monitoring of water quality parameters at strategic locations in the distribution system. Data from these monitoring stations is automatically transmitted to a central information management system and analyzed to detect unusual water quality conditions. Measured water quality parameters include:

- Disinfectant residual
- Specific conductance and pH
- UV - Vis spectral absorbance

Customer Complaint Surveillance monitors customer calls to identify unusual trends in water quality complaints. Calls associated with an unusual trend are further investigated to determine if they are similar in nature and spatially clustered. Common datastreams include:

- Interactive Voice Response systems
- Work management systems
- Email and social media

Consequence Management consists of planning and procedures for responding to possible drinking water contamination incidents. It is operated in collaboration with a variety of local and state response partners, including law enforcement, public health, and emergency response agencies. Its primary functions are to:

- Establish the credibility of a possible contamination incident
- Minimize public health and economic consequences
- Guide the remediation and recovery effort

Enhanced Security Monitoring involves the use of equipment and procedures to detect and respond to security breaches at distribution system facilities that are vulnerable to contamination. It is operated in collaboration with local law enforcement to ensure timely response to alerts from security systems such as:

- Door and hatch contact switches
- Video monitoring systems
- Video analytics

Public Health Surveillance analyzes healthcare data in order to identify disease clusters that may be caused by contaminated drinking water. It is operated in collaboration with local public health partners to ensure timely detection of possible contamination incidents. Common datastreams include:

- Emergency department data
- Emergency medical services runs
- 911 and poison control center calls

Sampling & Analysis involves the collection and analysis of water samples from the distribution system. It is activated through Consequence Management to further investigate possible contamination incidents and identify specific contaminants, if present. Its primary functions are to:

- Perform field testing and sample collection
- Analyze samples for contaminants of concern
- Characterize the extent of contamination

How can a utility begin the process of implementing an SRS?

Design of an SRS is flexible and can include any combination of the components described above. It should be locally tailored to meet the specific goals and objectives of your utility and leverage existing capabilities and procedures. Follow the simple steps below to begin the process.

1. Determine the specific objectives your utility would like to achieve through SRS implementation.
2. Assess existing capabilities at your utility and determine how they can be leveraged to design an SRS that meets these objectives.
3. Visit the website below for guidance and tools you can use to design your utility's SRS and improve distribution system monitoring and management.

For more information

Visit EPA's Water Quality Surveillance and Response website at https://www.epa.gov/waterqualitysurveillance, or contact us at WQ_SRS@epa.gov