



*Be Right™*

# SOURCE WATER MONITORING

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# SOURCE WATER MONITORING IMPORTANCE

- Nice to know something is changing before it gets into your facility
  - Early Warning Detection (Anticipate Changes to Treatment Process to react to changes storms, algal bloom, industrial discharges, chemical spills, reservoir stratification)
  - Risk Management Tool
  - Know your Raw Material Source Continuously
    - Improve Process Control by changing chemical feed system rapidly to baseline changes
    - Maybe change treatment or shut down plant
- You can communicate issues to other neighboring facilities
- An ounce of detection can save a lot of money in remedies
- Many area groups are doing this- such as SRBC (Central), RAIN (west)- to protect watersheds

# KNOW WHAT IS UPSTREAM OR YOUR POTENTIAL ISSUES

- **Have you identified potential threats/proximity to Source Water?**
  - Chemical facilities
  - Oil terminals
  - Bridge from highway or rail transport
  - Drilling in area
  - Runoff from a farm
- **Do you have a source water protection plan?**
  - Response & Mitigation
- **Where is the best place to monitor?**
  - Provide Max Response Time to changes in baseline conditions
- **Will you have access to the unit? Is it protected from outside influences**
- **How will you communicate the results?**

## NOW YOU NEED TO LOOK AT BUDGET AND NEEDS

- Many options, varying price and varying operational items to consider
- How much expertise do you have?
  - Online Gas Chromatography Monitor Need Chemist
- Do you want specific results or guide that something is changing?
  - Establish a baseline guide for Raw Water Conditions to a specific finished water quality
- *Instruments answer questions- the key is matching the proper instrument to the question needing answered*

# DETECT CHANGES IN WATER QUALITY



- Dissolved organic matter
- Intrusion of another source
  - Spring
  - Municipal or industrial waste
  - Acid mine drainage
  - Produced water from oil and gas drilling operations
  - Algal blooms
  - Reservoir stratification
- Storm events
- Malicious contamination of source water (Bio-Terrorism – Post 9/11)



- **Monitor Source Water for**
  - Potable water treatment
  - Industrial processes
  - Food and Beverage
  - Municipal or industrial wastewater discharge

# SELECT THE SENSORS YOU NEED

## FOCUS ON CHANGES IN WATER QUALITY

- Select up to 6 sensors to connect to the versatile SC1000 Controller

### Recommended

- pH probe
- LDO - Dissolved Oxygen probe
- Conductivity probe
- UVAS - UV Organic probe
- ORP probe

### Optional

- Ammonia probe
- Solitax - Suspended Solids/Turbidity probe
- Oil in Water probe
- Nitratix – Nitrate probe

# RATIONALE FOR PARAMETER SELECTION

**Turbidity, High Range, SOLITAX™ t-line:** May indicate some chemical compounds or increased bacterial levels (can measure suspended solids as well). Turbidity measurement is used to optimize the solids removal process.

**Dissolved Oxygen, LDO:** Sudden change may indicate toxic conditions that effect algal respiration or increased levels of bacteria using up the oxygen. For the day to day running of a plant, DO can be directly correlated to water quality. Different water sources or even water at different depths within a reservoir can result in different water quality.

**Nitrate NITRATAX™ plus 5 mm:** Nutrient level within water; agricultural runoff. If the incoming water exceeds 10 ppm, the plant will need to treat the water through blending, ion exchange or membrane filtration.

**Oil n Water, FP360sc:** The FP360sc can detect and measure polycyclic aromatic hydrocarbons (PAHs) from 1 ppb to 5000 ppb. This is approximately equivalent to a concentration of mineral oil between 0.1 to 150 ppm. The FP360sc is impervious to interferences by turbid water or natural organic and biological matter.



# RATIONALE FOR PARAMETER SELECTION, CONT.

**pH sensor:** Acid/base relationships within water. pH is also critical to many processes within the plant including coagulation, flocculation, softening and disinfection. pH is a parameter that in many plants is adjusted at various points during the water treatment process. It is a common parameter for raw water testing because of the critical nature of this measurement.

**Conductivity, Inductive:** May indicate presence of ionic species; measures the total ionic concentration in water

**ORP Sensor:** May indicate sudden changes for oxidative or reducing species introduced into the water

**Organics UVAS probe, 5mm:** Useful for season changes and accidental spills of an organic nature such as diesel fuel. During periods of high rainfall, source waters may see an increase in decaying organic matter which will show up on the UVAS probe. Absorbance at 254nm may correlate with THM formation at chlorination, COD, BOD or TOC concentrations. When monitoring both at the source and after organics removal, UV254 may be used as an indicator of THM formation potential.

# SIMPLE INSTALLATION



- Plastic back plane
- Fiberglass struts
- PVC sample trough
- Single inlet, outlet
- Single power source
- Easy maintenance
- Level sensor to assure a sample is present

- Easy to install adapters speed installation of sensors



- Plug sensor positions when not in use



# TOC MONITORING

- TOC gives direct numbers if your organic is changing
- The organic can be any type to detect
- Will assist in help in determining THM potential
- Another tool to help know there is an issue before it happens.

# WHY TOC IN DRINKING WATER?

- In the drinking water industry, TOC is used as a measurement of water quality and given strict guidelines for removal of TOC through the Stage 1 DBPR



Table 2

Required Removal of Total Organic Carbon by Enhanced Coagulation and Enhanced Softening for Subpart H Systems Using Conventional Treatment<sup>1</sup>

Source Water TOC (mg/L)	Source Water Alkalinity (mg/L as CaCO <sub>3</sub> )		
	0-60	>60-120	>120 <sup>2</sup>
>2.0-4.0	35.0%	25.0%	15.0%
>4.0-8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

# DRINKING WATER TOC SOLUTION: B3500dw TOC ANALYZER

- Small footprint
  - 750mm x 500mm x 320mm.
- Low reagent usage
  - 19L reagents last 6 months
- Calculates % TOC removal
- Built in oxygen concentrator
- TIC & TOC results in 5.5 minutes
- Uptime > 99.86% (MCERT certified)
- Single & Dual Stream capability
- Range 0-25ppm,  $\pm 30$ ppb accuracy



# TOC MONITORING & WIMS FOR DISTRIBUTION & SOURCE WATER MONITORING

Integrated Monitoring Solution :

- Chlorine Analyzer
- Turbidity
- pH
- WIMS
- Biotector (TOC)



# HOW THE % REMOVAL WORKS

- Stream 1: influent to the Drinking water plant before any treatment
- Enter residence time
  - This is how the amount of time that it takes for the sample to get through the treatment plant
  - Allows plant staff to see how efficient their treatment process is
- Stream 2: effluent of the process at combined filter effluent

$$\% \text{ Removal} = (\text{Stream 1} - \text{Stream 2}) / \text{Stream 1} \times 100$$



# QUESTIONS ??

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