

# **Delta Water Quality: Implications for Utility Compliance with the Safe Drinking Water Act**

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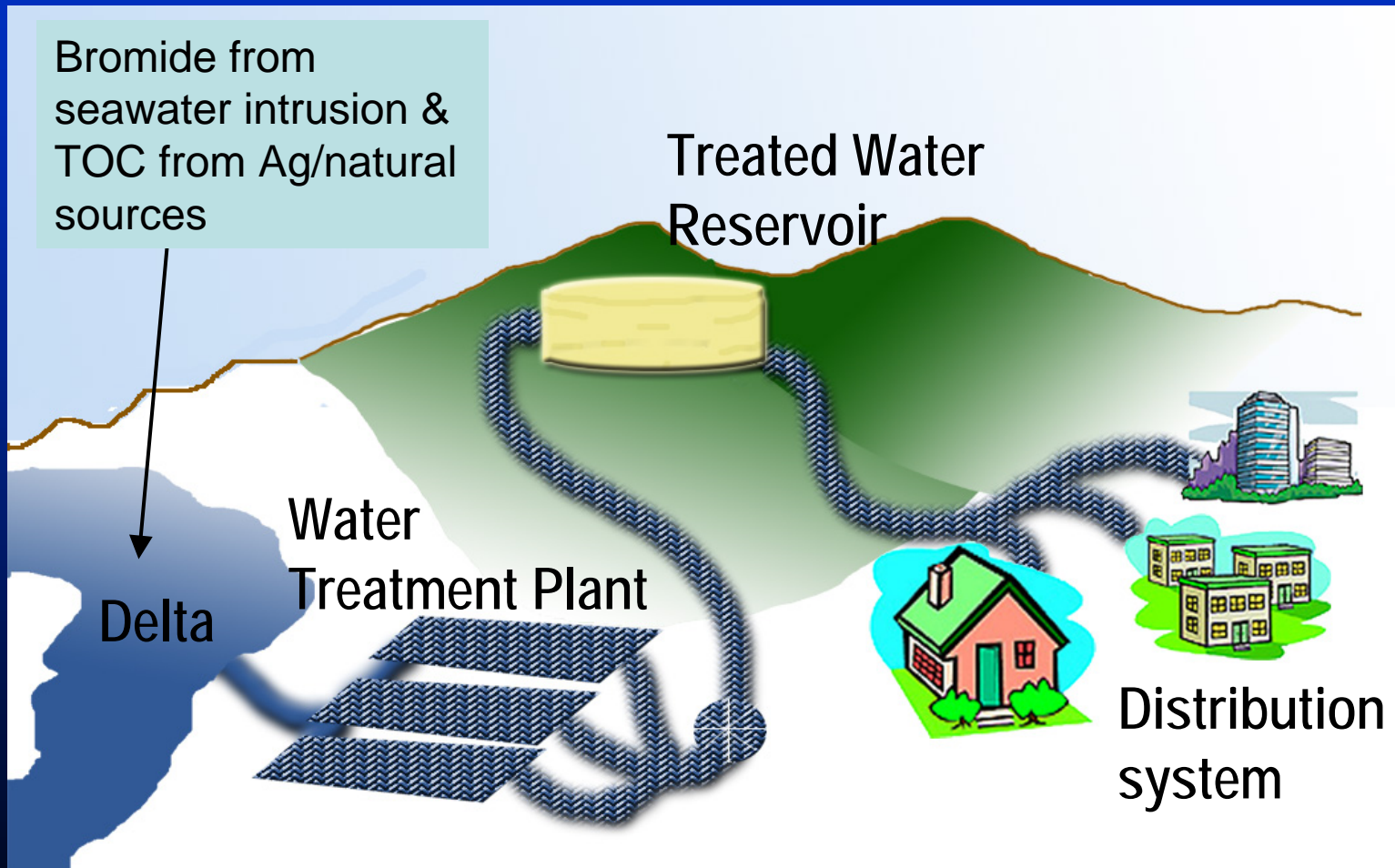
**(For Contra Costa Water District)**

# Delta Source Water Quality

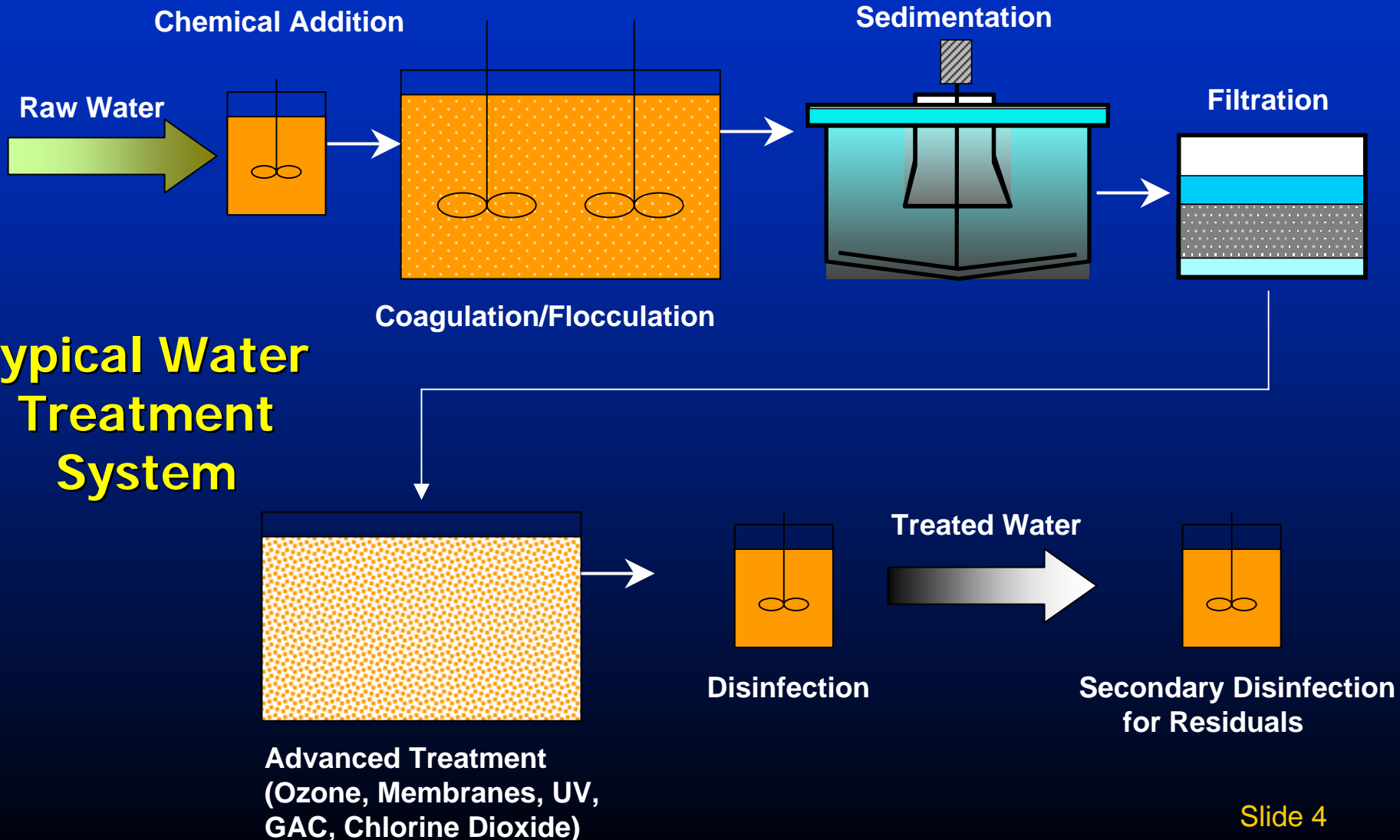
## *Primary Findings . . .*

1. Disinfection Byproducts (DBPs) are a greater public health issue than in 1991. Additional DBPs likely to be regulated in future and DBP regulations will become more stringent.
2. Will be more difficult and expensive to comply with drinking water regulations.
3. There is an even greater need for improved source water in the Delta – Need a multi-barrier approach, consistent with CALFED drinking water goal.

# Source Water Quality Affects Drinking Water Quality and Public Health



# Utilities Must Disinfect Water To Protect Public Health



# How Disinfection By-products Are Formed

*DBP precursors react with disinfectants to produce by-products of human health concern . . .*

<b>Precursors</b>	<b>+</b>	<b>Disinfectants</b>	<b>=</b>	<b>Byproducts</b>
<b>Bromide</b>		<b>Ozone</b>		<b>Bromate</b>
<b>Organic Carbon</b>		<b>Chlorine</b>		<b>Trihalomethanes</b>
		<b>Chloramines</b>		<b>Haloacetic Acids</b>
		<b>Chlorine Dioxide</b>		<b>Other DBPs</b>

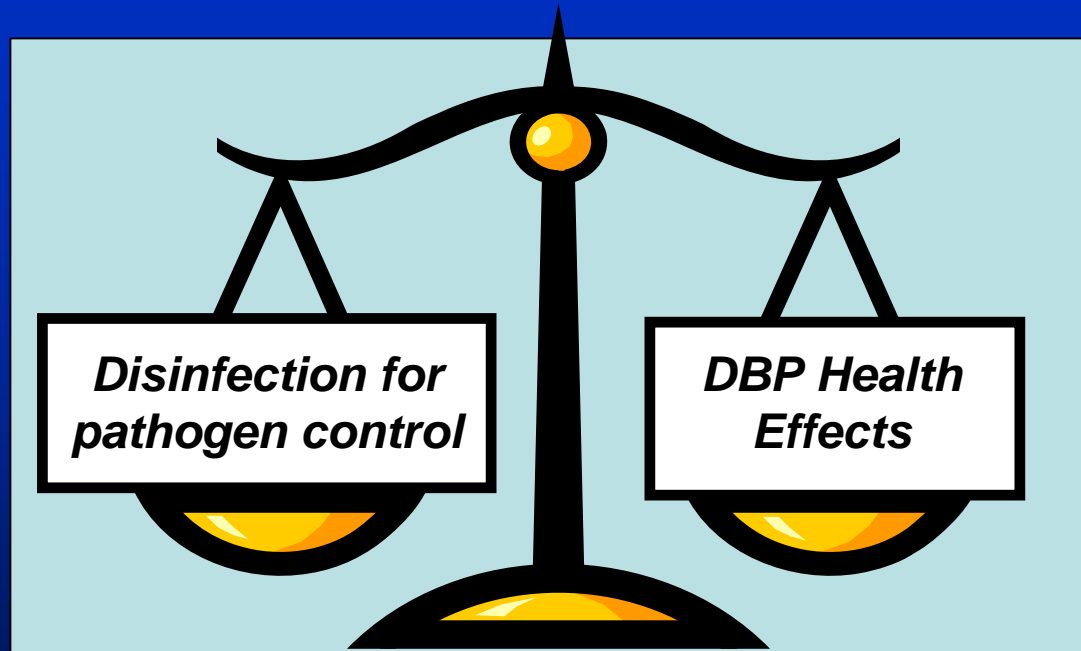
# Urban Agencies Must Meet Drinking Water Regulations

- USEPA regulates drinking water under the federal Safe Drinking Water Act.
- Source water quality is regulated under the federal Clean Water Act.
- Cal. DoHS has primacy (i.e. regulates CA systems)

# DBPs and Health Effects

- Some DBPs are suspected human carcinogens (chronic exposure).
- Certain brominated DBPs suspected to cause birth defects (acute exposure)
- Only a few of the hundreds of DBPs have been characterized with regard to health effects (e.g., only 8% of ozone DBPs)

# Utilities Must Balance Need to Disinfect with Need to Reduce DBP Formation



- **Enhanced Surface Water Treatment Rule** – requires disinfection
- **Disinfectants/Disinfection By-Products Rule** – places limits on TTHM, HAA5, & Bromate



# DBP Formation Needs to Be Controlled Through a Combination of Efforts

*Source Water*

*Treatment Plant*

*Distribution System*

Source Water  
Change or  
Management

Precursor  
Removal

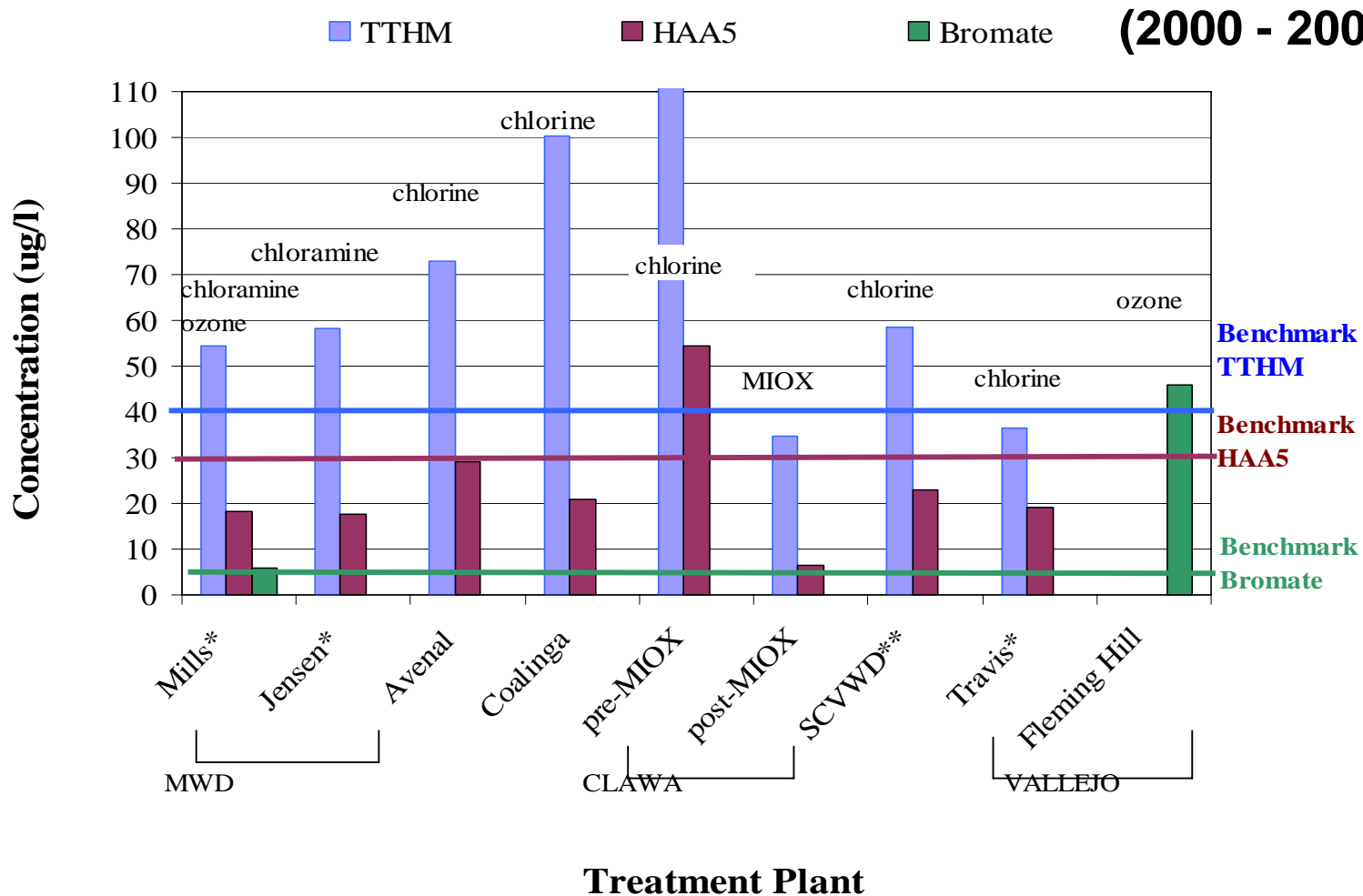
Change Disinfectant  
or Application Point

Distribution  
System  
Modifications

# Water Quality Variability is Problematic

- Delta water has higher levels of bromide than 90-95% of all national drinking water sources
  - Bromide in the Delta ranges from 0.1 - 0.5 mg/L
  - TOC in the Delta ranges from 3 - 7 mg/L
- High bromide & TOC in Delta water requires urban agencies to use complicated treatment processes to ensure compliance with safe drinking water act regulations
- Treatment strategy used affects the types and concentrations of DBPs produced

# Treatment Process Affects the Type and Concentration of DBPs Produced



Mills Treatment Plant - ozone 4<sup>th</sup> quarter 2003. \*Some missing data  
 \*\*Planned switch to ozone

# Source Water Goals for Delta Water

- **SWRCB 1991 Water Quality Control Plan**
  - Found that agencies should “strive to obtain bromide levels of 0.15 mg/L or less (about 50 mg/L chloride in the Delta).”
- **CALFED Water Quality Goal (CALFED ROD)**
  - 50 µg/L of bromide (equivalent to <20 mg/L chloride)
  - 3.0 mg/L of TOC
  - Or Equivalent Level of Public Health Protection
  - Based on the 1998 CUWA expert panel recommendations

# Delta Source Water Goals (continued)

- **SWRCB 1995 Water Quality Control Plan**
  - 250 mg/L chloride is about 850 µg/L bromide
  - 150 mg/L chloride is about 520 µg/L bromide
  - Nowhere near CALFED's 50 µg/L bromide goal
- **SWRCB has not yet adopted water quality objectives for drinking water protection**
  - e.g., disinfection byproduct precursors, or pathogens

# **Proposed Stage 2 DBP Rule Sets**

## **Locational Running Annual Average for Compliance**

- **Promulgation expected in Summer 2005**
- **System-wide averaging will no longer be allowed**
- **Creates less room for error in process control for agencies treating Delta water**
- **Creates more compliance risk with prolonged source water quality swings**
- **Regulation phases in through about 2011.**

# Conclusions

1. Disinfection Byproducts (DBPs) are a greater public health issue than in 1991. Additional DBPs likely to be regulated in future and DBP regulations will become more stringent.
2. Will be more difficult and expensive to comply with drinking water regulations.
3. Utilities cannot rely on treatment alone – need a multi-barrier approach, consistent with CALFED drinking water goal
  - 50 ug/L bromide and 3 mg/L TOC or an equivalent level of public health protection.