**WESTCAS**
**2011 Fall Conference**
**"Fire and Water: Impacts on Western Water Quality"**

## General Session IV: Associates Focus

# "Treatment Technologies to Remove Organic Contaminants in Source Water from Forest Fires"

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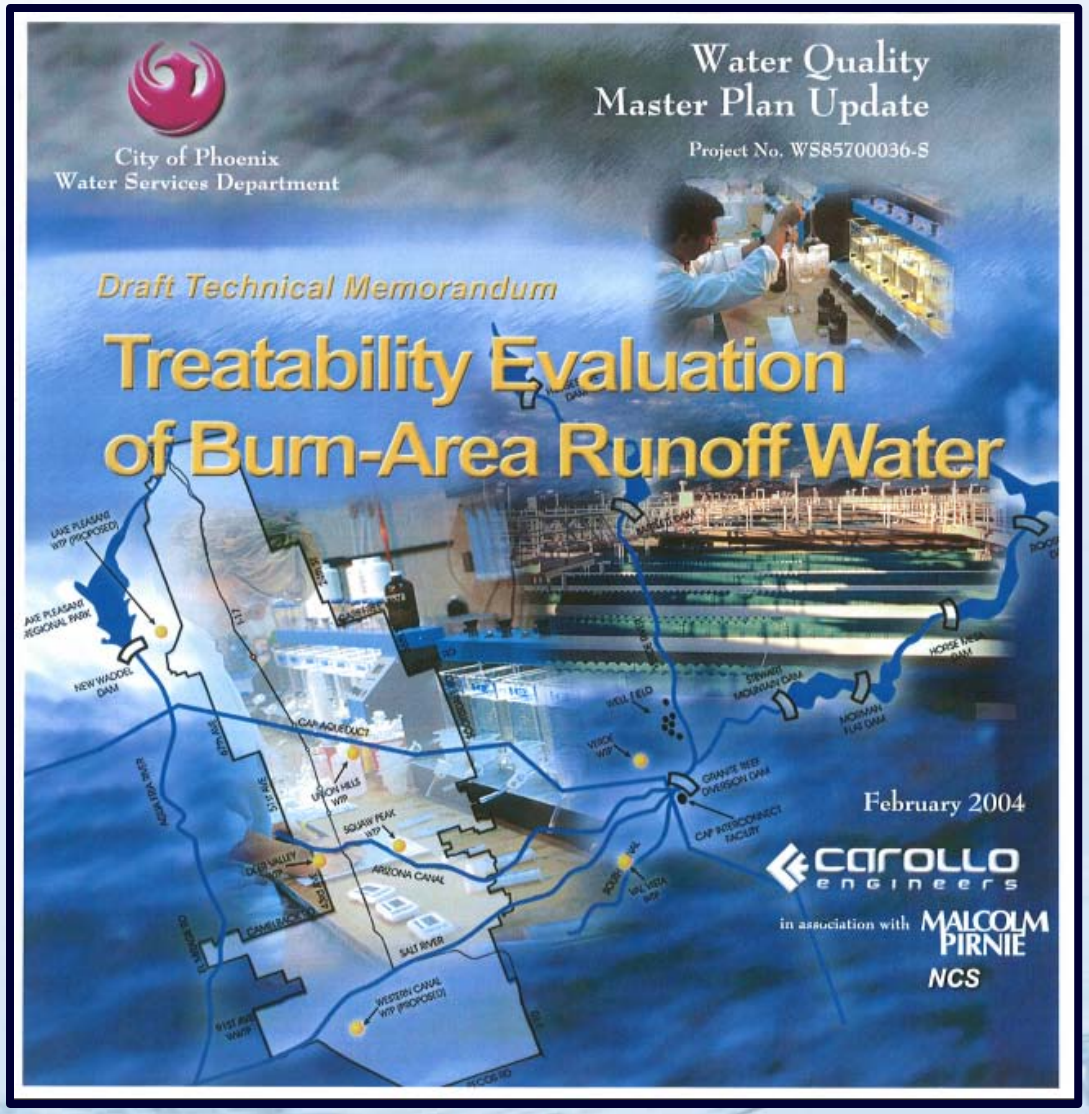
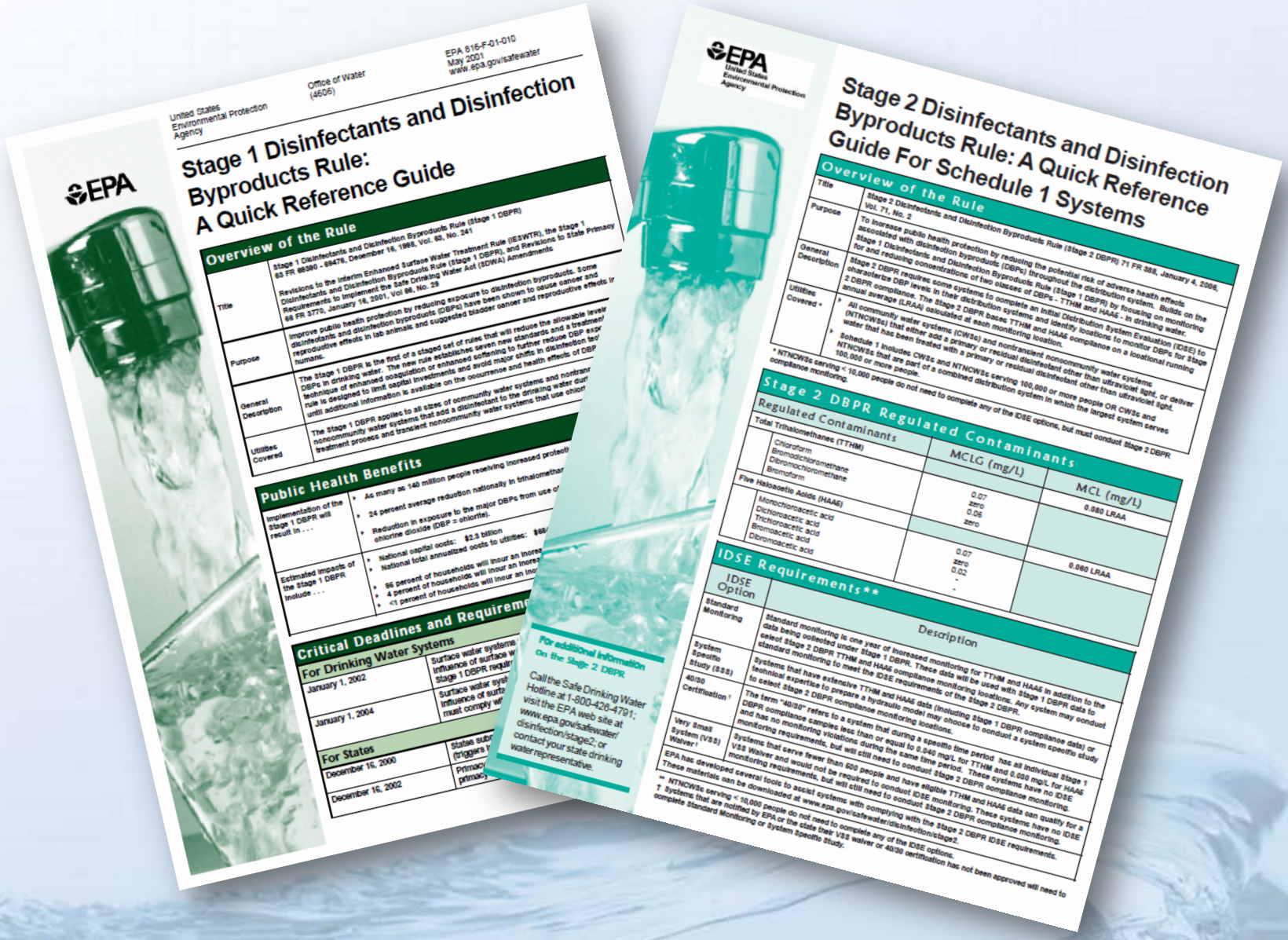
carollo
Engineers...Working Wonders With Water™

# Forest fires in watersheds that supply our drinking water can be a significant issue.


# Not to worry…it's been studied!



# However, it is more about……

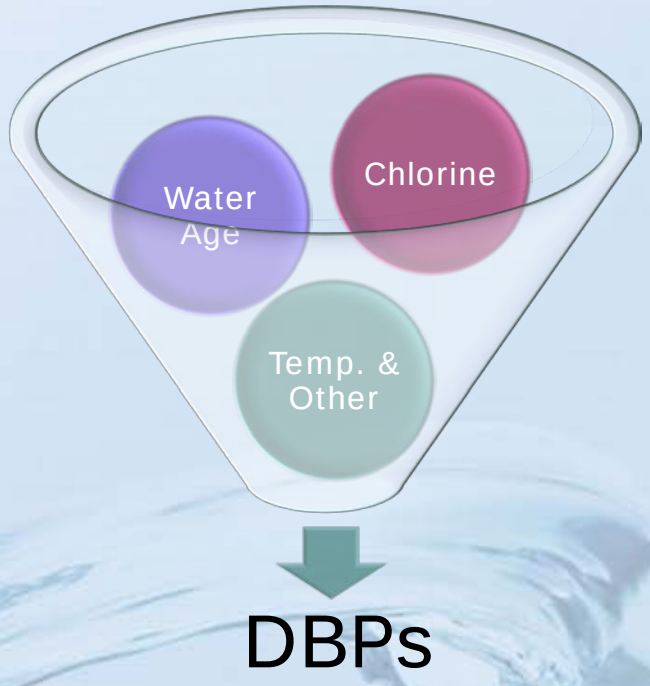


# Stage 2 D/DBPs Rule is a "Game Changer"

- Stage 1 compliance based on system running annual average
- Stage 2 compliance based on a locational running annual average (LRAA)
  - The > system size, the > # of monitoring points
- Must be proactive to meet compliance
- For Valley of the Sun: TTHMs are the challenge

# Today's Focus – TTHM Compliance

1. TTHMs result from a reaction between TOC and chlorine (the Valley's primary disinfectant)
2. TTHMs are impacted by TOC levels, chlorine dosage, time, and temperature
3. Fires have increased Raw Water TOC levels



# What does this mean in terms of water treatment?

# The 1st Tool out of the box is…

**“Planning”**

# The next Tools are…

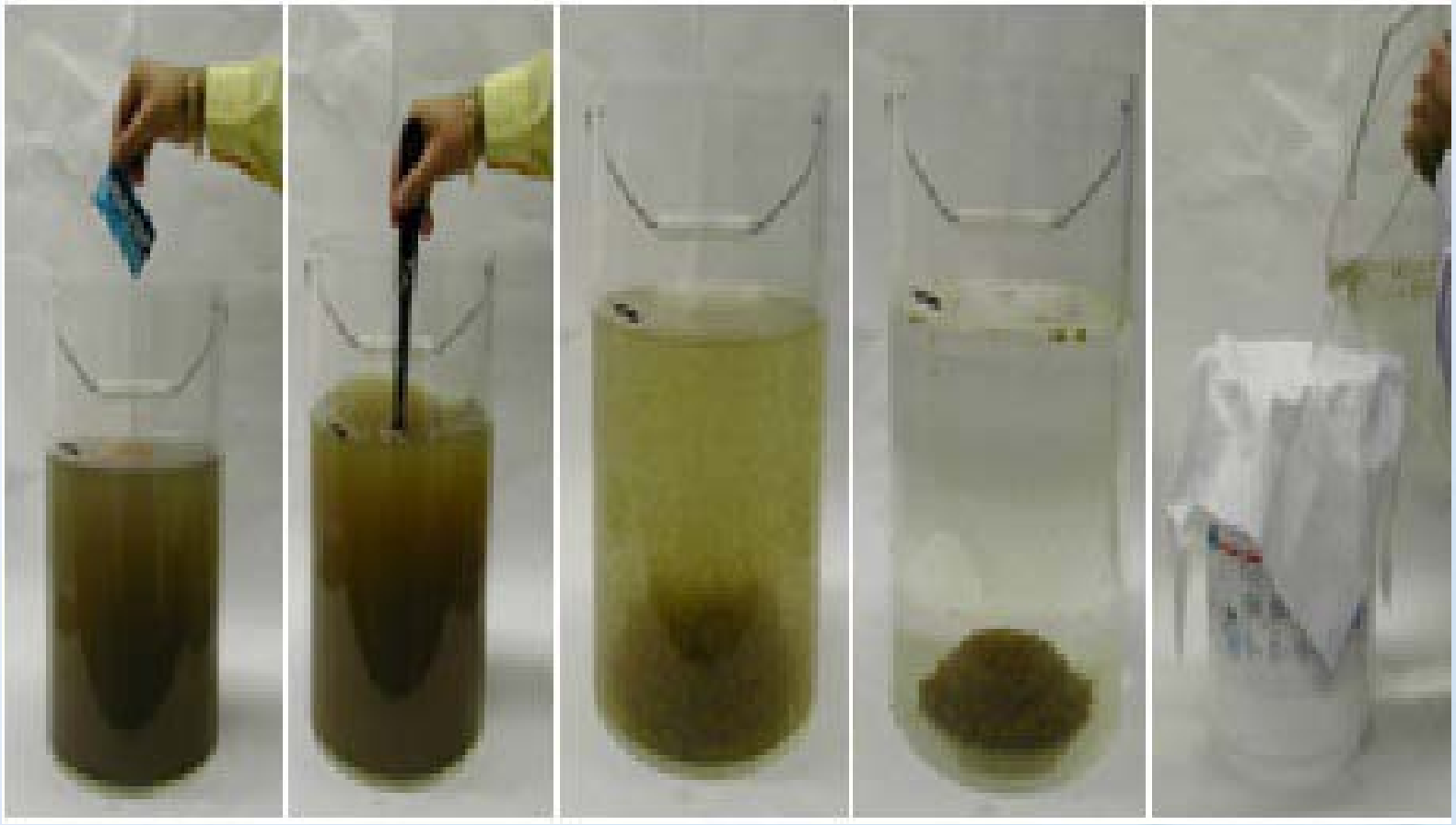
## Pre-chlorination

- Chlorine Dioxide
- Ozone
- PAC

# The next Tool out of the box is..

## Enhanced Coagulation

# Enhanced Coagulation



- Alum vs. Ferric
- w/ pH Control
- Biggest bang for $

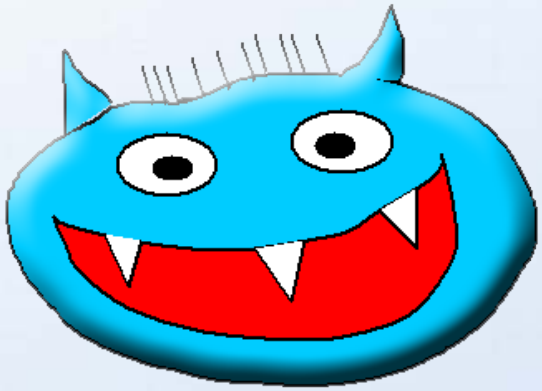
# The next Tool is…

**Granular Activated Carbon (GAC)**

# GAC works by “adsorbing” Organics

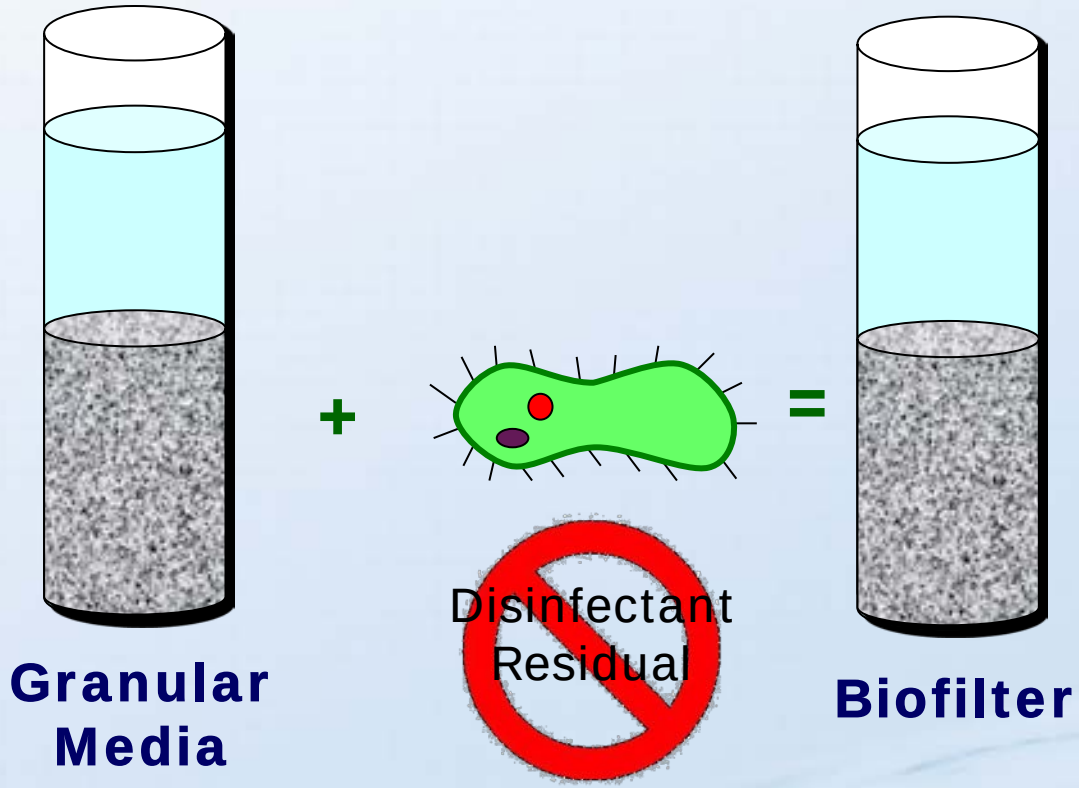
- GAC
- Po
- Dep
- Virg
- $$$

# The next Tool out of the box is…

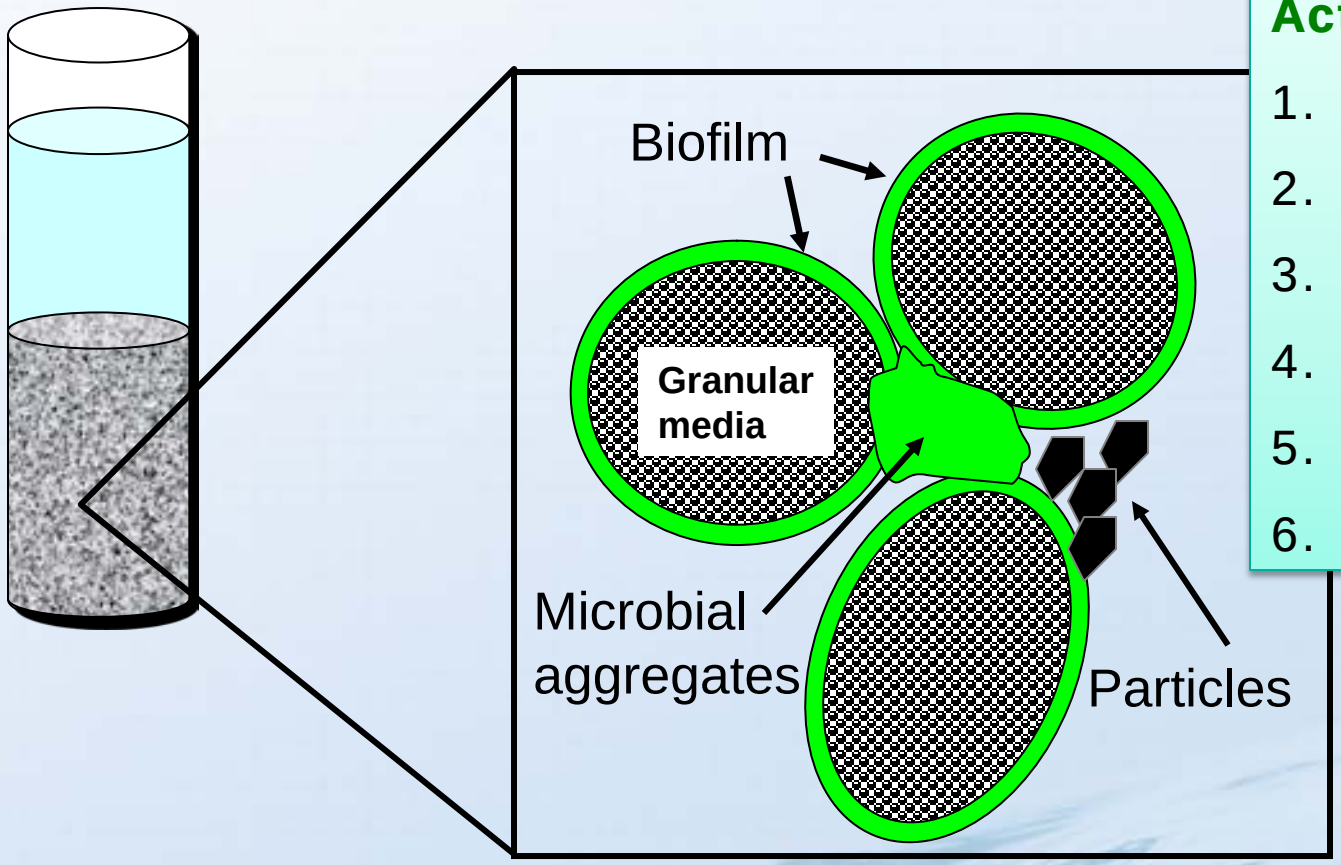


**Biologically Active Filtration**

# Biofiltration is modified conventional granular media filtration



# Biofiltration is modified conventional granular media filtration



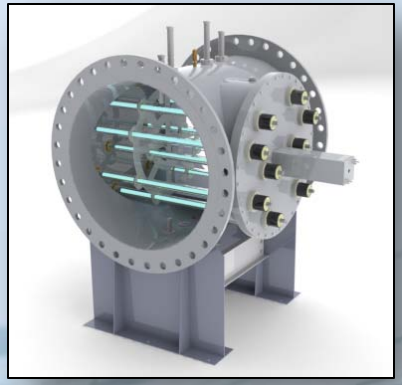

**Active Processes**

1. Growth
2. Decay
3. Attachment
4. Detachment
5. Biodegradation
6. Filtration

**Engineered BAF**

# The next Tool out of the box is…

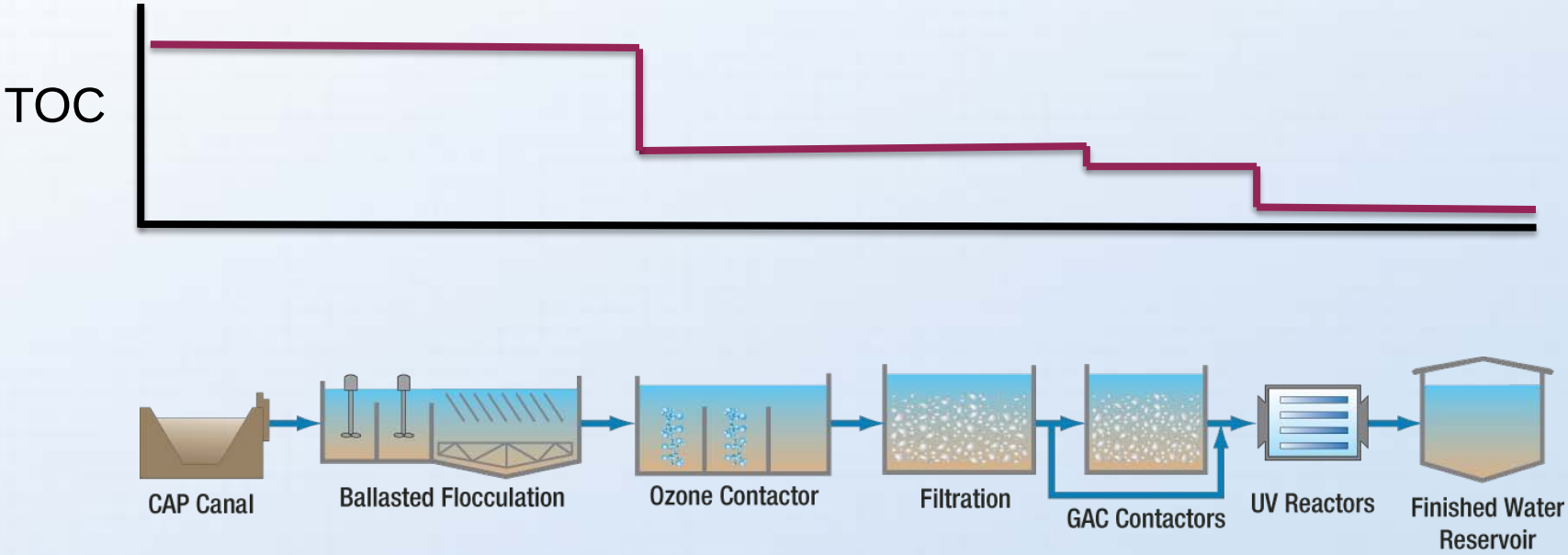
## UV Disinfection



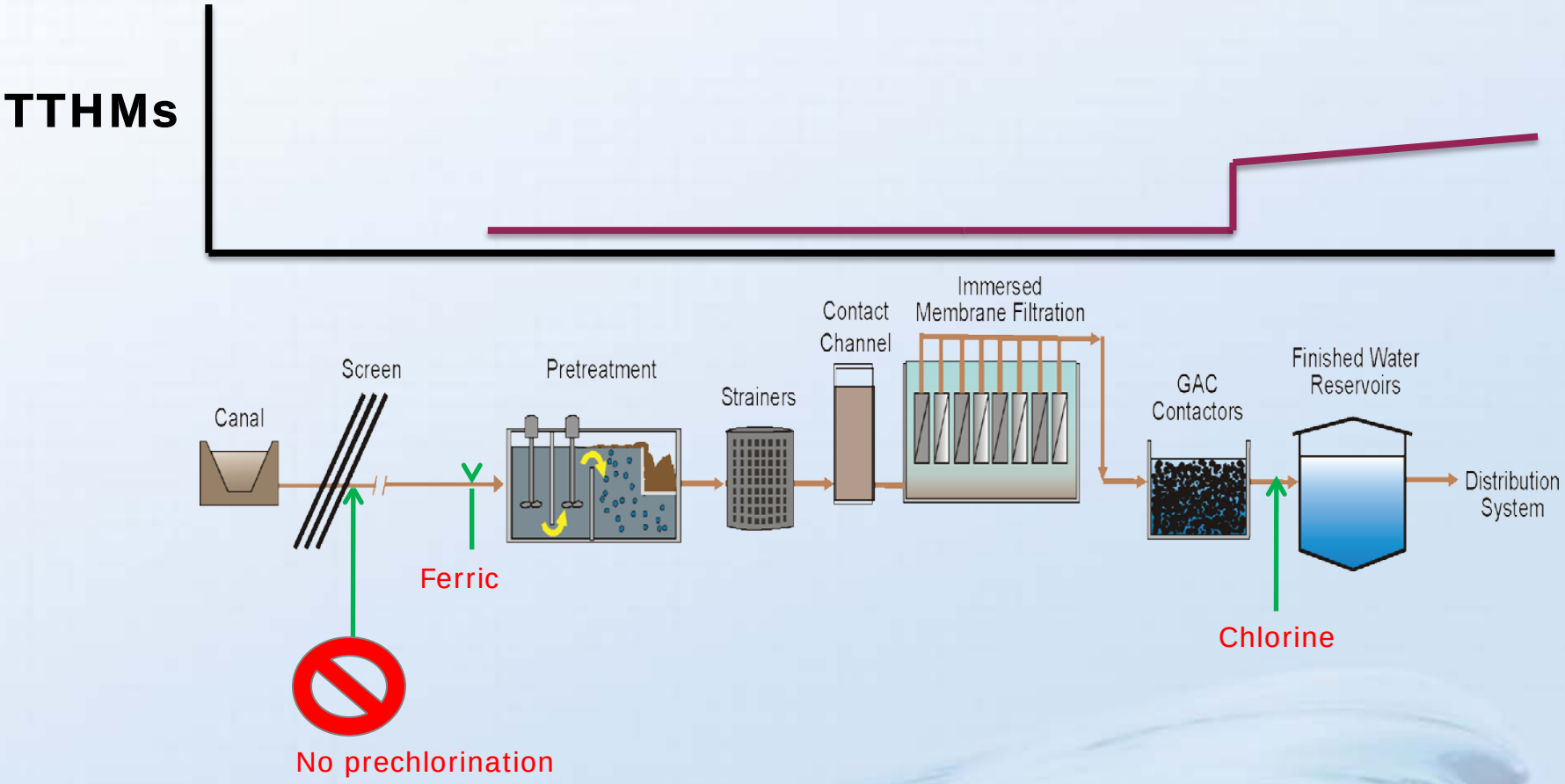
# Post-Treatment Techniques

- Distribution System Flushing
- Reservoir Aeration
- Hotspot Treatment

# Individual Treatment Processes Remove Different Amounts of TOC



# TTHM Formation in WTP Impacted by Chlorine and TOC



# One technique that shouldn't be overlooked…..

# Acknowledgements

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# Questions?