

# Hazen



# Advanced Water Treatment Operator Training

Dave Jones, P.E.  
Vice President  
Hazen and Sawyer

## Discussion Topics

- Hazen and Sawyer
  - Overview
  - Reuse experience
- AWT operator training
  - Benefits to utilities and operators
  - Water Research Foundation project (Reuse-15-05/4772)
  - Training case study at IEUA

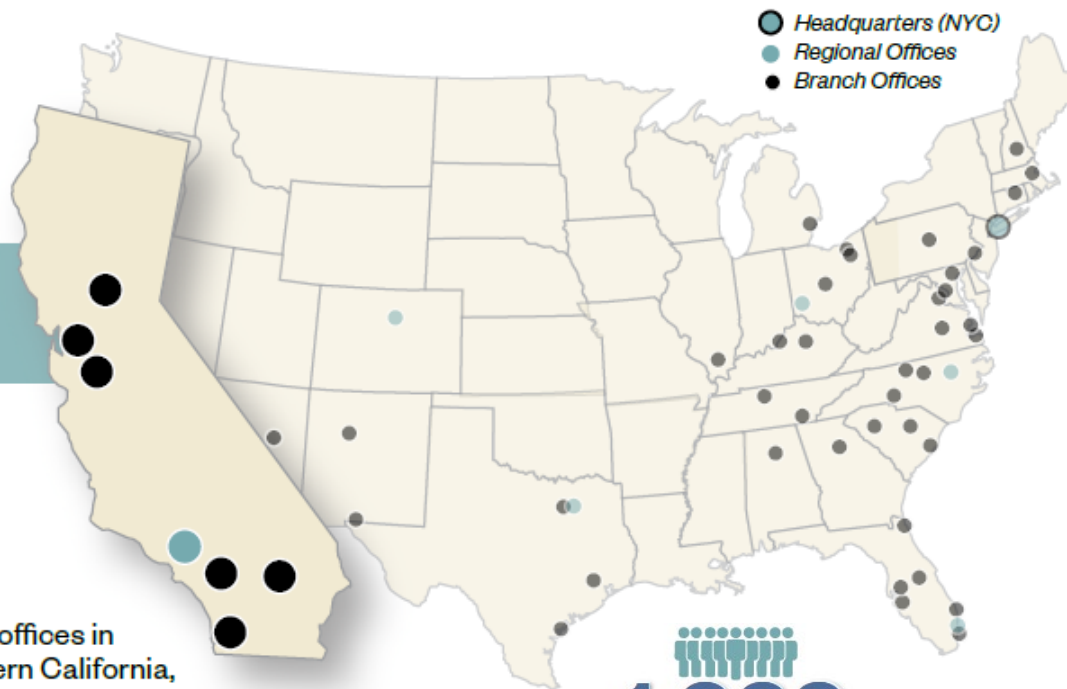
# Since 1951

Hazen and Sawyer has been  
focused on **all aspects of water.**

## Significant Resources in the West

- In California since 2011
- Grown to 70+ employees
- All discipline support
- Significant client base in Southern California

4 offices in  
Southern California,  
to better serve you.



  
**1,000**  
Employees

  
**52**  
Offices

## Areas of Service



Conveyance



Drinking  
Water



Recycle  
Water



Electrical



Storage



Permitting



Structural



Wastewater





# Hazen and Sawyer – Reuse Experience

Projects Nationwide



**1986**

**Loxahatchee  
River District, FL**

Master planning and implementation of the first regional reuse system in South Florida.



**2009**

**University of  
Connecticut**

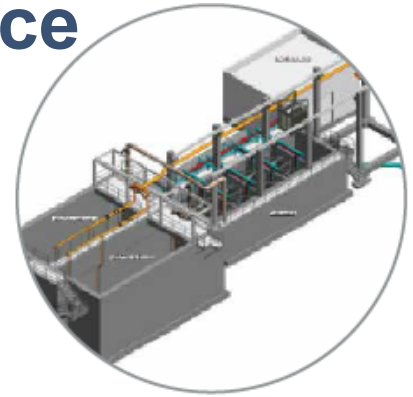
Design of UV system to provide recycled water to on-site cogeneration facility cooling and boiler feed water.



**2015**

**Big Spring, TX**

Process review of direct potable reuse facility including microfiltration, reverse osmosis, and advanced oxidation.



**2017**

**West Basin  
Municipal Water  
District, CA**

Design of a unique tertiary membrane bioreactor to reduce ammonia levels in tertiary effluent for use in cooling towers. The design of a universal membrane filtration system for reverse osmosis pretreatment.

# Hazen and Sawyer – Reuse Experience

## Project Versatility



### APPLIED RESEARCH SPOTLIGHT

**2015**

#### Direct Potable Reuse Research

Adoption of the critical control point method for water quality safety, development of O&M framework, and operator training curriculum.



### DESIGN SPOTLIGHT

**2017**

#### Hampton Roads Sanitation District, VA

Design and startup of a potable reuse demonstration facility using biological activated carbon and granular activated carbon.





# Hazen and Sawyer – Reuse Experience

## Project Versatility



### PILOT STUDY SPOTLIGHT

**2015**

**Hollywood, FL**

Pilot studies to investigate reuse options to meet Florida ocean outfall legislation. The pilot tested alternative technologies to reverse osmosis.



### OPERATIONS SUPPORT SPOTLIGHT

**2018**

**West Basin Municipal Water District, CA**

Operations support for advanced membrane treatment systems, non-potable reuse, and recycled water distribution systems.



# AWT Operator Training





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# AWT Operator Training

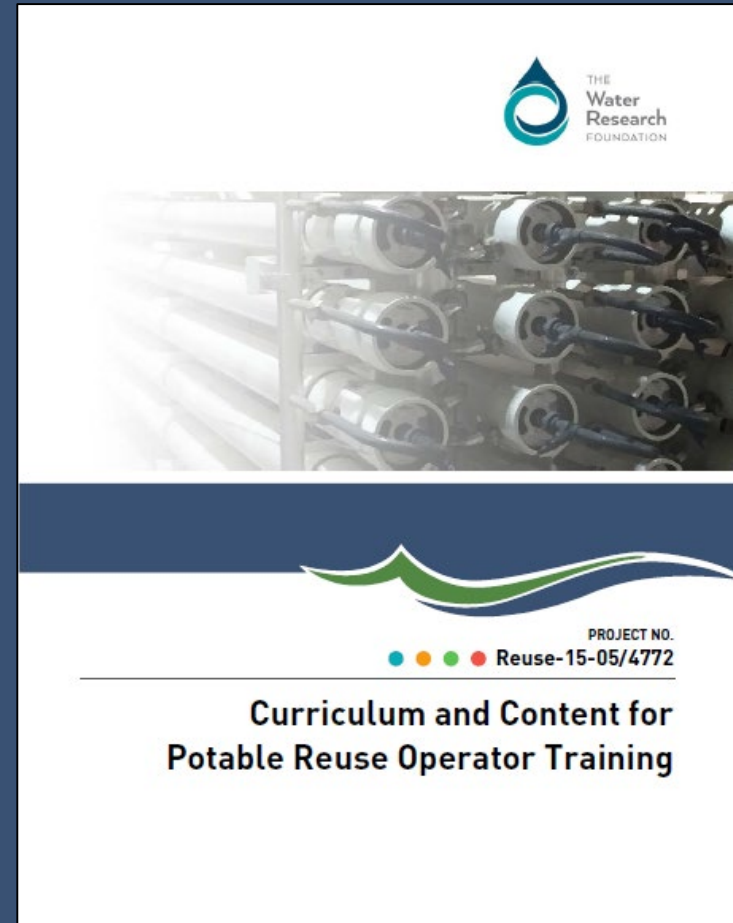
- Why consider AWT operator training?
  - Voluntary certification program starts this year
  - Training can help bridge the knowledge gap between DW and WW certifications and AWT certification
  - Familiarize operators with processes so they can provide input during project development
  - Build public trust with third-party training and certification





# AWT Operator Training

**Curriculum and Content for  
Potable Reuse Operator Training  
(WRF Reuse-15-05/4772)**



# Curriculum and Content for Potable Reuse Operator Training (WRF Reuse-15-05/4772)

- Goal of teaching process understanding and safe operation
- Resource for organizations without in-house training programs
- Build on existing training resources
- Many project partners and stakeholders participated

Santa Clara Valley  
Water District



Hazen



UF TREEO Center  
UNIVERSITY of FLORIDA



THE  
Water  
Research  
FOUNDATION

SANITATION DISTRICTS OF LOS ANGELES COUNTY



EL PASO WATER UTILITIES  
PUBLIC SERVICE BOARD



SACRAMENTO  
STATE

THE UNIVERSITY OF ARIZONA  
WEST CENTER  
WATER & ENERGY SUSTAINABLE TECHNOLOGY



gwinnettcounty

TROJAN UV

xylem

Process  
Applications  
Inc



PROJECT NO.  
Reuse-15-05/4772

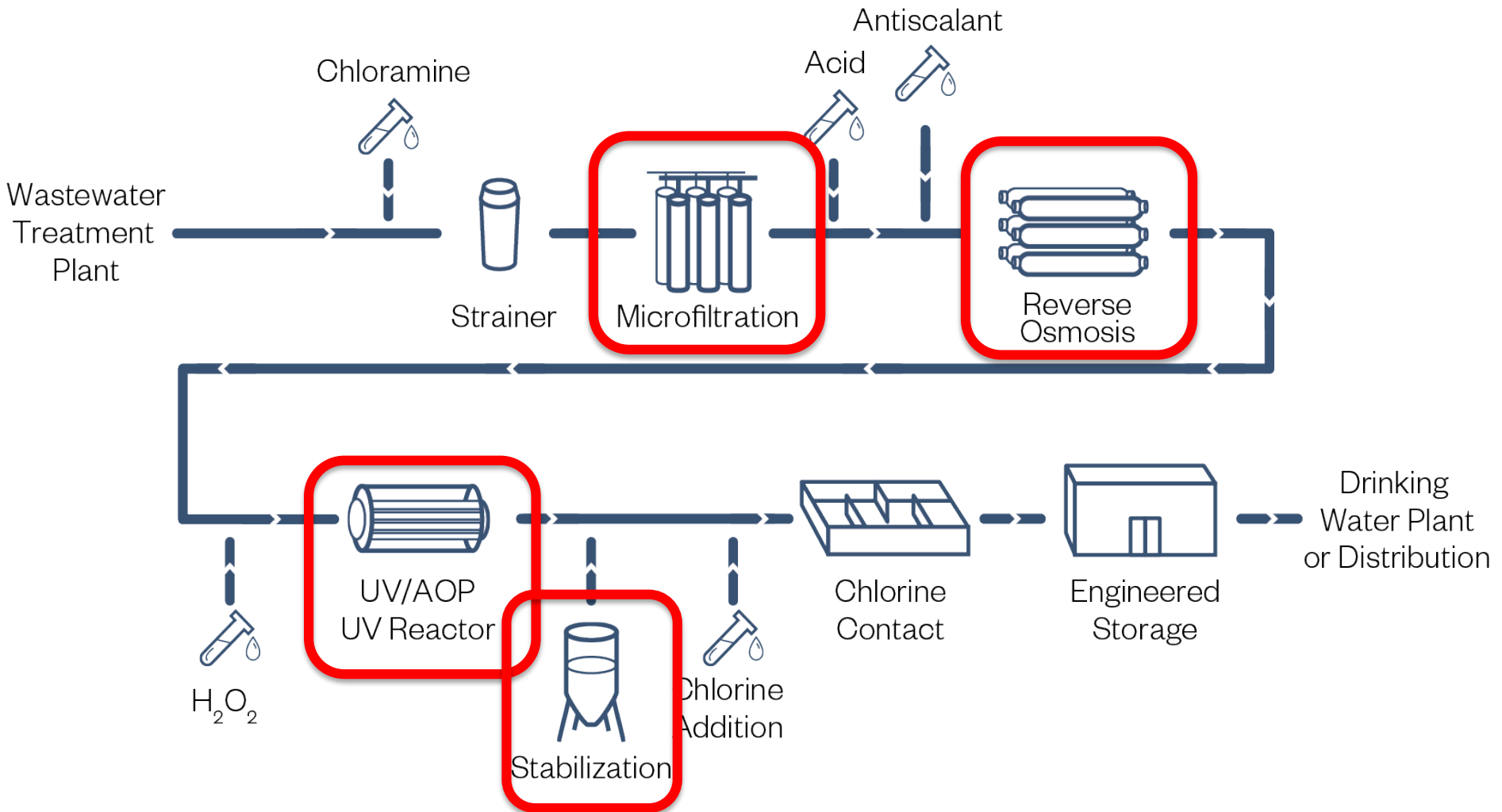
Curriculum and Content for  
Potable Reuse Operator Training

Hazen



# What Processes Were Considered ?

## RO-Based Treatment

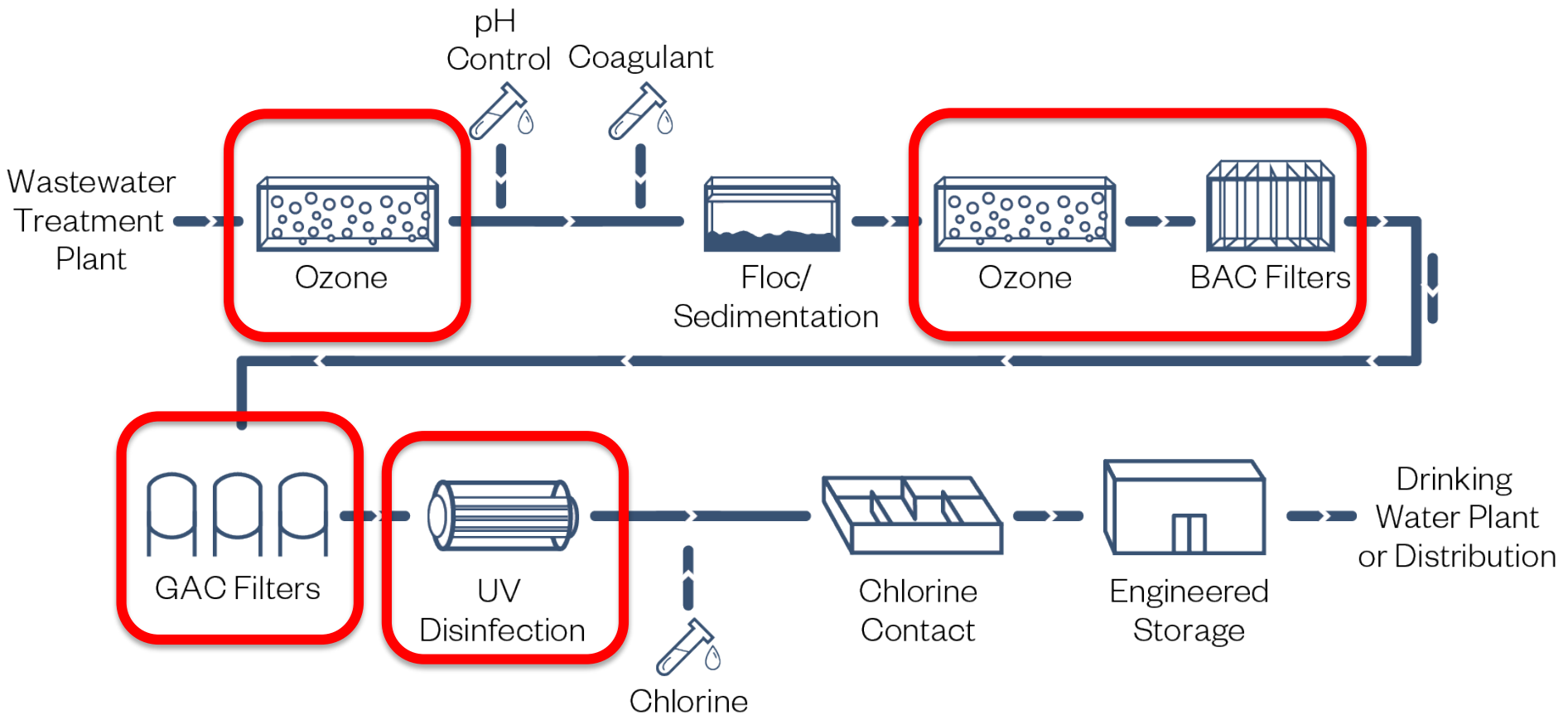






# What Processes Were Considered ?

## Treatment without RO



# Case Study



# Case Study – Inland Empire Utilities Agency



- IEUA background
  - Serves 875,000 people over 242 square miles in western San Bernardino County
  - Operates water reclamation plants
    - Produces recycled water
    - Upgrading one plant with membrane bioreactor (MBR) and UV disinfection
  - Sells imported water
  - Operates 14-MGD Chino I Desalter
    - Reverse osmosis
    - Ion exchange (nitrate)
    - Air stripping of VOCs
  - Planning for future potable reuse





# Case Study – Inland Empire Utilities Agency



- Training classes
  - 3 consecutive days (8 hours/day)
  - 21 participants (operators and operations managers)
  - Topics customized to fit IEUA's needs
    - MF/UF
    - RO
    - UV and UV/AOP
    - Ozone
    - Corrosion Control
    - MBR (added at IEUA's request)
  - Included exercises to test learning acquired during training
- More training planned after operators take AWT3 exam



**Thank you!**

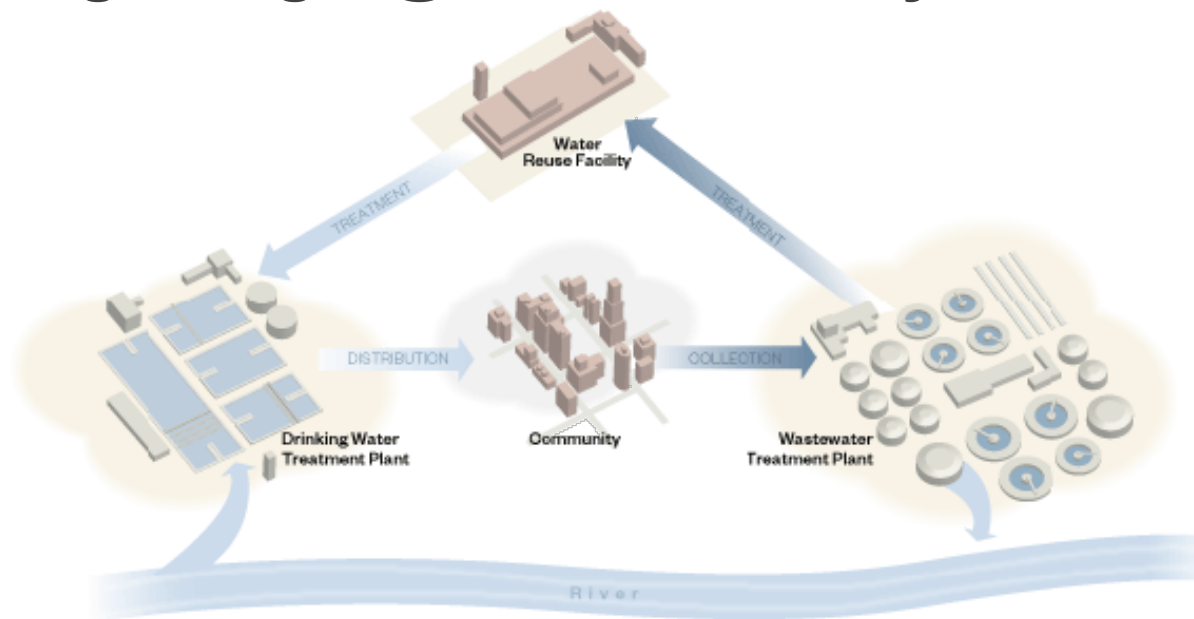
**Questions?**

**Fred Gerringer**

**West Region Water Reuse Practice Leader**

**Hazen and Sawyer**

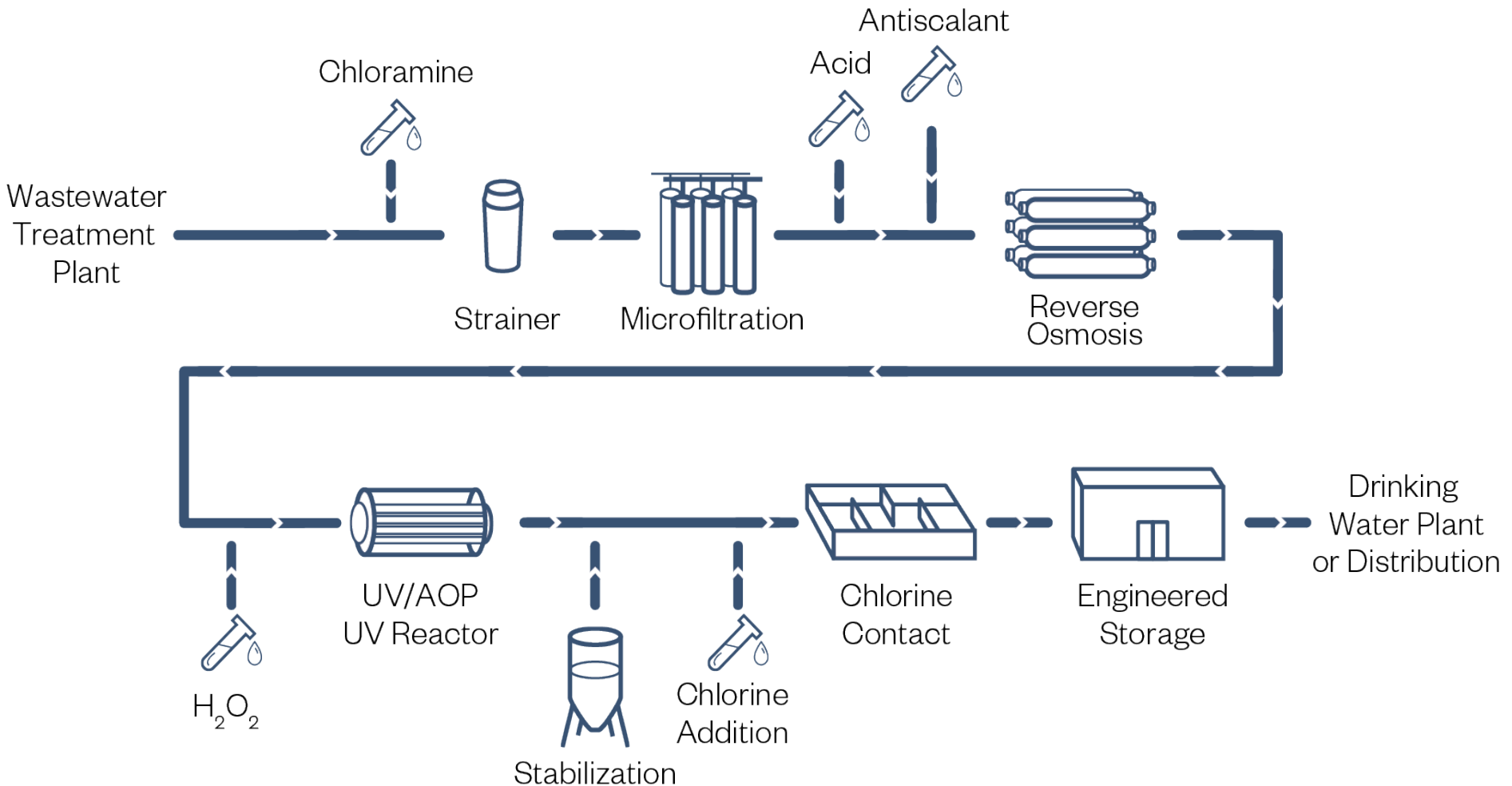
**[fgerringer@hazenandsawyer.com](mailto:fgerringer@hazenandsawyer.com)**





# What Processes Were Considered ?

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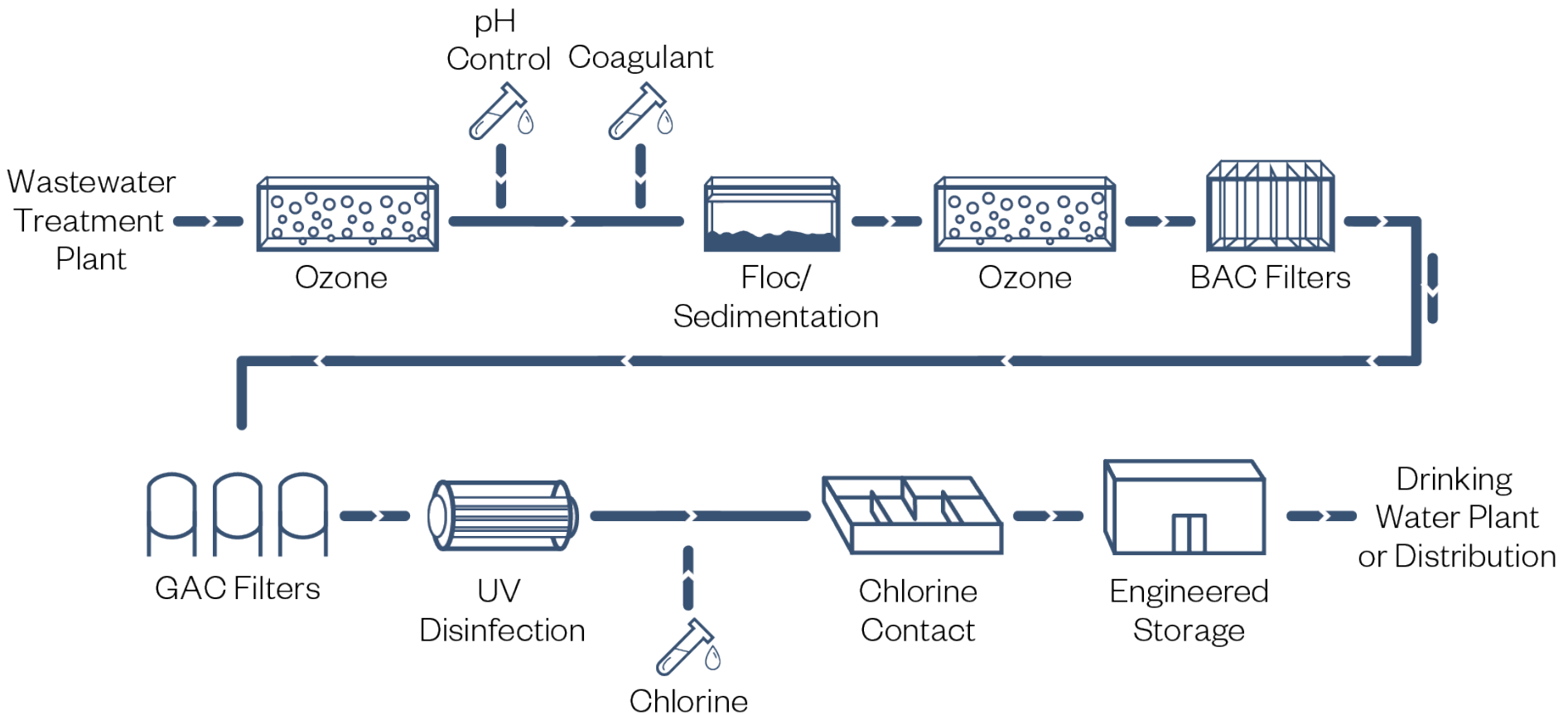






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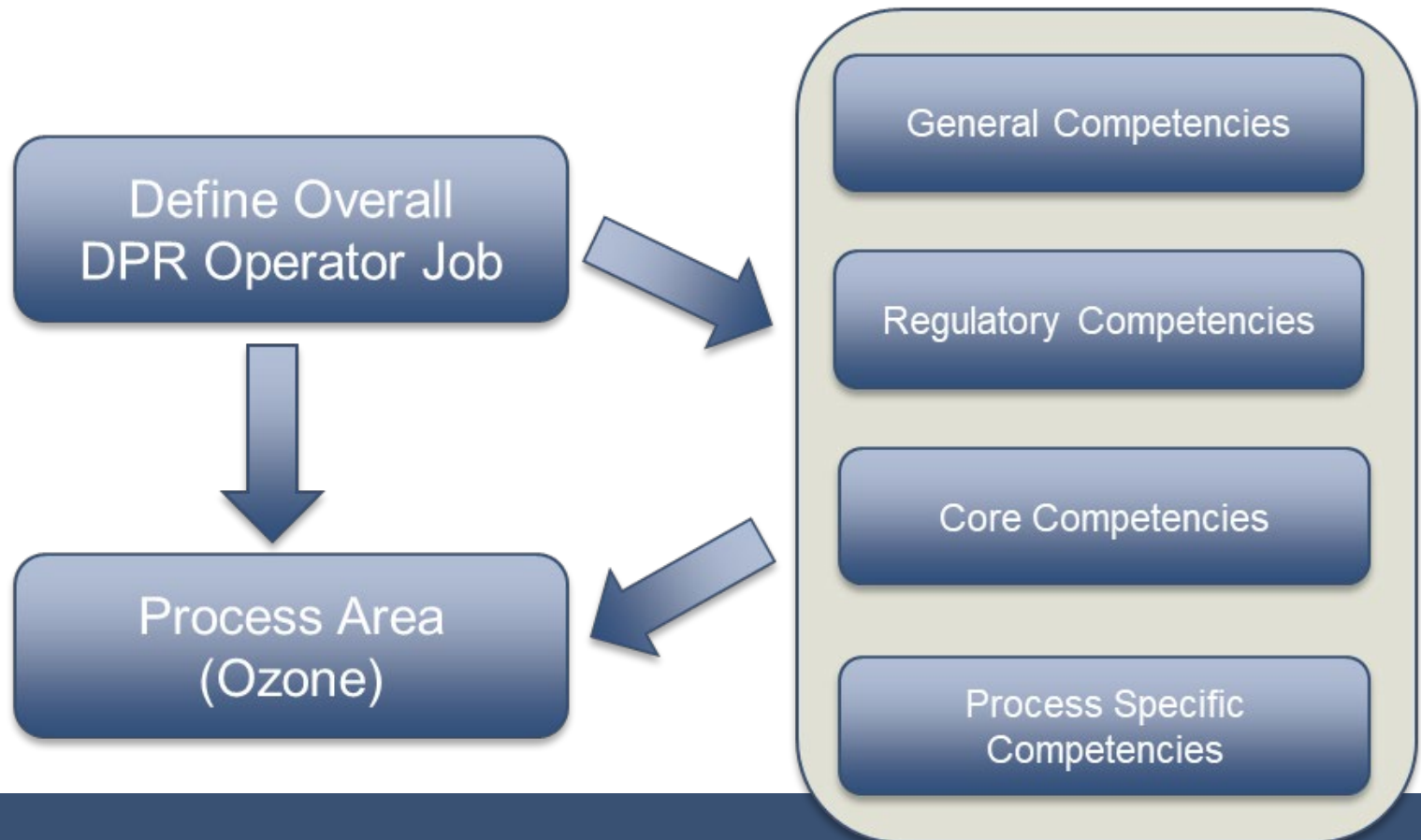


# Hazen and Sawyer



# Developed Key Technical Modules

- Who is this training for?
- What do they need to know?
- What do they need to be able to demonstrate they can do?







# Training Now Available to Subscribers



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## SEARCH RESULTS

**TITLE:** CURRICULUM AND CONTENT FOR POTABLE REUSE OPERATOR TRAINING

**PROJECT NUMBER:** Reuse-15-05

**PROJECT MANAGER:** Justin Mattingly  
The Water Research Foundation  
[jmattingly@waterrf.org](mailto:jmattingly@waterrf.org)

**PRINCIPAL INVESTIGATOR:** Troy Walker  
Hazen and Sawyer, P.C.  
[twalker@hazenandsawyer.com](mailto:twalker@hazenandsawyer.com)

**STATUS:** Completed

**LAST UPDATED:** 8/1/2018

**REPORT DESCRIPTION:**

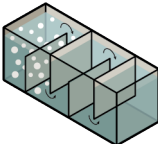

This project features a series of eight Powerpoint training modules designed to educate operators on operations and maintenance procedures for components of a potable reuse system. These modules cover technologies and topic areas that are not typically found in wastewater and drinking water treatment systems. These materials can be used by utilities and other educational organizations to train operators based on the specific needs of a utility. Modules include information essential to the understanding of the unit treatment processes and other issues that are paramount to the safe operation of a potable reuse facility. Published by WRF. 14 pages. Online PDF. (2018)

Hazen can provide training in any of the modules listed.

Material in part to support AWT certification.



# Reuse-15-05/4772 Training Modules

- Introduction to DPR Operator Training
- Microfiltration and Ultrafiltration Membranes 
- Reverse Osmosis Membranes 
- Ozone Disinfection 
- Granular Activated Carbon 
- Biofiltration 
- Ultraviolet Disinfection and Advanced Oxidation 
- Corrosion Control (Product Water Stabilization) 