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.

Areas of Service

Conveyance  Drinking Water  Recycle Water  Electrical  Storage  Permitting  Structural  Wastewater

1,000 Employees  52 Offices
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.
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
AWT Operator Training

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  • 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)
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- 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
What Processes Were Considered?
RO-Based Treatment

Wastewater Treatment Plant

- Chloramine
- Acid
- Antiscalant

Strainer → Microfiltration

UV/AOP UV Reactor

Stabilization

H₂O₂

Chlorination Addition

Chlorine Contact

Engineered Storage

Drinking Water Plant or Distribution
What Processes Were Considered?

Treatment without RO

Wastewater Treatment Plant → Ozone → Floc/Sedimentation → Ozone → BAC Filters → Drinking Water Plant or Distribution

- pH Control Coagulant
- GAC Filters
- UV Disinfection
- Chlorine Contact
- Engineered Storage

Chlorine
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
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Chlorine
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?

Define Overall DPR Operator Job

Process Area (Ozone)

- General Competencies
- Regulatory Competencies
- Core Competencies
- Process Specific Competencies
Training Now Available to Subscribers

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)