



Area-Wide Optimization Program (AWOP) Approach to Maintaining Distribution System Water Quality

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Area Wide Optimization Program (AWOP)

- Optimization program encourages drinking water quality beyond compliance levels, to increase public health protection through:
 - Enhanced process monitoring and control
 - Use of existing staff and facilities
 - Measuring performance relative to optimization goals
 - Technical tools and implementation approaches focus on improving and/or maintaining quality – using multiple barrier approach



AWOP

- The program began in 1989 with microbial (turbidity) optimization at surface water treatment plants and has expanded to other areas – including distribution system for free chlorine and chloramine systems



WATER TREATMENT & DISTRIBUTION OPTIMIZATION REVIEW

- WHY OPTIMIZE?
- CHALLENGES
- **TRAINING APPROACH:**
 - ADEM/PUBLIC WATER SYSTEMS
 - ADEM/PUBLIC WATER SYSTEMS AND TRAINING PROVIDER (**ARWA**)



WHY OPTIMIZE THE DISTRIBUTION SYSTEM?

- Public Health Protection

- *On Avg, 1971-2002, distribution related outbreaks caused 152 illnesses, with the largest causing 5,000+ illnesses (Craun, et al 2006)

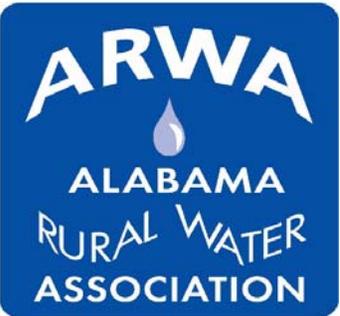
- *Public Health Risks Include:

- Microbial Contaminants (ex. Salmonella, E. Coli, Leionella)

- Chemical Contaminants (ex. Organic, inorganic, DBPs)

- *Secondary Benefit:

- Proactive Approach to Meeting Compliance



WHAT IS ARWA'S ROLE?

- EXPERIENCED TRAINING PROVIDER

Since 1977 – 39 years Local Training

- **2015 – ARWA HELD 27 LOCAL TRAINING CLASSES**
***2,954 ATTENDEES** *** 202.75 CEHs**



WHY IS TRAINING NEEDED?

- EDUCATE THE UTILITY MANAGERS OF AWOP STRATEGIES DESIGNED TO IMPROVE WATER QUALITY
- SEEK BUY-IN FROM UTILITY REPRESENTATIVES TO TRY NEW RECOMMENDATIONS FOR IMPROVED WATER QUALITY
- MONITOR PROGRESS OF SYSTEMS IN SAMPLING RESULTS TO DETERMINE IF IMPROVEMENTS ARE MET

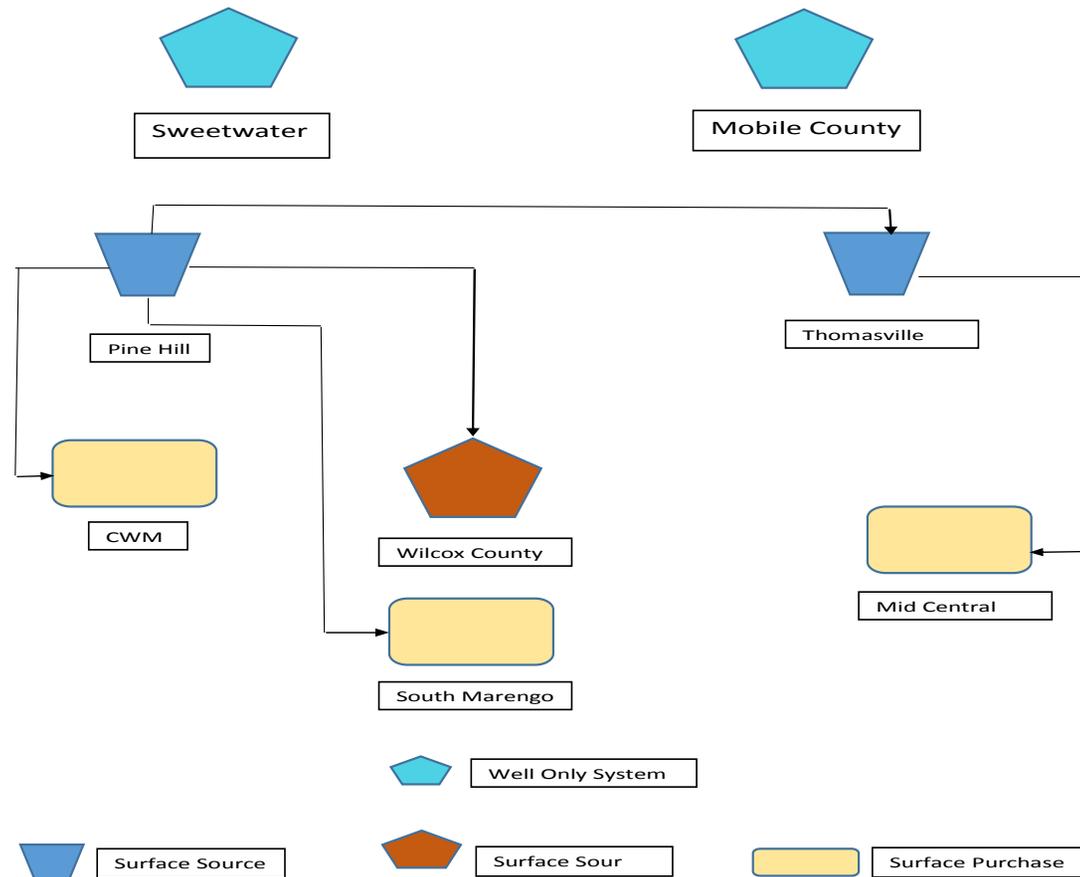


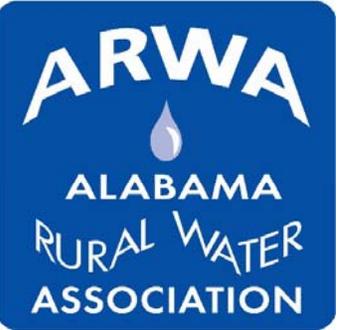
MOST RECENT ARWA AWOP TRAINING CLASS

Modular

Distribution System Optimization

Wilcox-Clarke Counties Area





WATER QUALITY

Optimization Tools & Approaches to
Evaluate and Improve Water Quality



Treatment & Distribution System Considerations

- Optimization tools can identify the source of the water quality issues: water treatment, distribution system operations, or both!
- Once IDENTIFIED, efforts can be directed to improve water quality:
 - In-plant optimization approaches focus on TOC removal and optimizing disinfection – to minimize in-plant DBP formation and/or maximize disinfectant stability
 - Distribution system optimization approaches focus on minimizing water quality degradation in the distribution system



Treatment & Distribution System Considerations

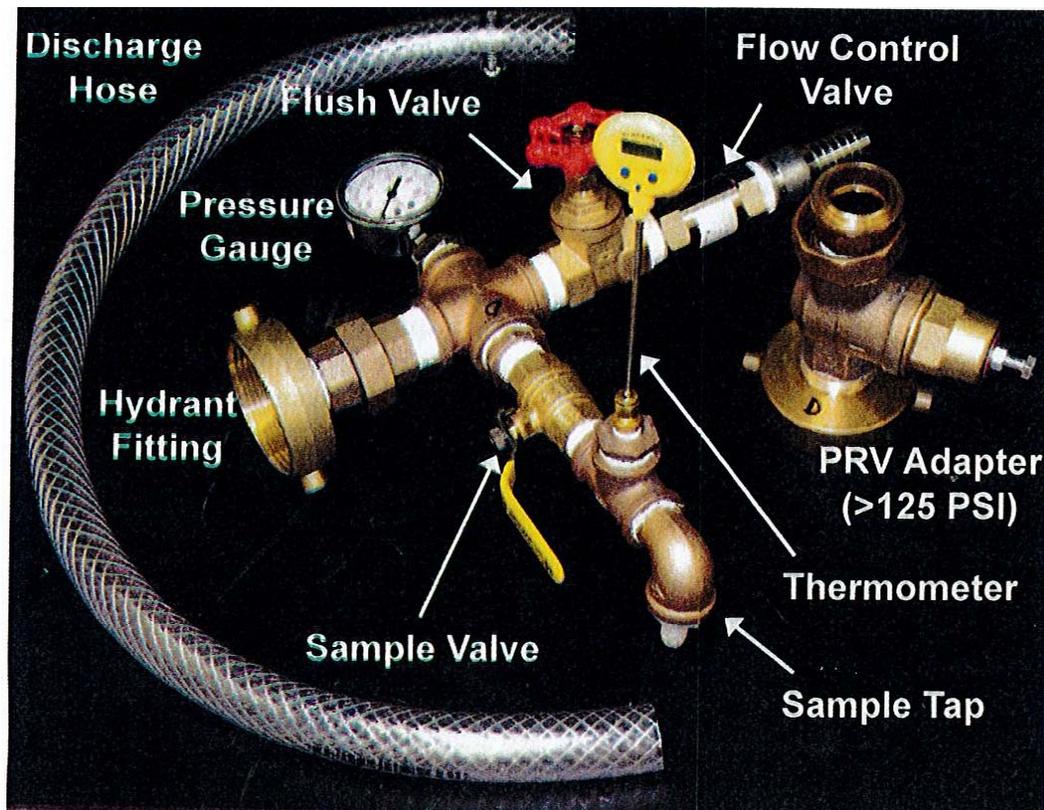
Evaluation Tools Included:

- Distribution System Influent Hold Study: assess stability of water quality entering the system (i.e., from the plant effluent or master meter)
- Chlorine/Ammonia dosing Evaluation
- Optimization monitoring in the distribution system
- Corrective strategies to minimize water age and improve water quality include:
 - Tank Operations
 - **Strategic Flushing**
 - Rerouting water
- Parameters differ for free chlorine and chloramine systems, but overall approach is very similar!

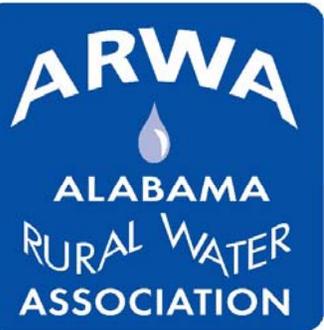


Flushing: Overview

ARWA Circuit Rider built 4 of these flushing devices. Loaned to systems participating in the AWOP Program.



Homes or sampling sites may not always be readily available or convenient for sampling. By using this device, the operators are able to flush and pull samples from hydrants without stirring up sediment from the water main. The device has a flow control valve set at 20 gallons per minute.



Benefits of an Automatic Flushing Program

- Immediate water quality improvement due to reduced water age
 - Increase chlorine residual
 - Decreases disinfection by-products
 - Reduces complaints with taste, odor and color
 - Nitrification prevention/control strategy
 - Removes accumulated sediment and biofilm (applies to higher velocity flushing ≥ 5 ft/sec)
- Time (man hours) savings with auto flushers
- 2 systems have auto-flushing programs with noted improvements in water quality



Summary

- The AWOP utilizes optimization based approaches to impact water quality at the consumers' tap
 - Water quality goals and guidelines have been established
 - Optimization tools are used to evaluate water quality
 - Optimization strategies have successfully improved/maintained distribution system water quality
- Optimization investment typically includes staff time for monitoring and implementing strategies
- Optimization may not be the solution for every system, but should be a starting point for all systems striving to improve distribution system water quality



Area-Wide Optimization Program's (AWOP) Approach to Maintaining Distribution System Water Quality

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