Area Wide Optimization Program

Individual Program
Background Information
2019
Name of Agency: *Arkansas Department of Health*

**Official Recognition of AWOP**
Please provide the AWOP start date and describe any official recognition of AWOP in agency newsletters, web pages, awards programs, annual meetings, etc.

*Started optimization activities in 1997 and joined R6/7 AWOP in 1999*

**Official Adoption of AWOP Goals**
Please describe when and how AWOP goals were adopted by your agency and communicated to the water systems.

*Microbial (Turbidity) Goals were adopted in 1999 and DBP Goals were added in 2002. Goals have been communicated to water systems by direct mail, newsletter articles, and during technical assistance visits.*

**National Optimization Goals adopted by your PWSS Program** – Check all that apply: *(refer to Attachment I for descriptions of the NOLT optimization goals.)*

*Water Treatment Plants*
- Microbial (Turbidity): Raw Water _X_ Individual Settled _X_ CFE _Modified_  
  IFE _Modified_  
  Post BW w/FTW _Modified_  
  Post BW wo/FTW _Modified_  
  Disinfection (CT) _Modified_

- DBPs (TTHM/HAA5): Plant Effluent _X_ Enhanced Coagulation _X_ Disinfection _X_

- Chloramine Application: Ammonia Control _X_ Dosing (Chlorine & Ammonia) _Modified_

*Distribution Systems*
- Individual Site DBPs _Modified_  
  Long Term System DBPs _Modified_  
  Tank Operations _Modified_  
  Secondary Disinfection, Free Chlorine _Modified_

- Secondary Disinfection, Chloramines (monochloramine, Ammonia & Nitrite) _Modified_

**Modifications to the national goals or other optimization goals utilized by your Agency:**
Please describe any modified AWOP goals and/or any additional optimization goals adopted by your agency and communicated to the water systems.

*CFE and IFE goals are based on 15 minute readings, not 1 minute.*

*Post BW with FTW, do not exceed 0.5 NTU and filter to waste until < 0.10 NTU.*

*Meet CT requirements with factor of safety of at least 2.*

*LRAA’s of less than 55 / 75 ug/l HAA5/TTHM.*

*Tank goals of turnover time of 3 days or less and MPR > 1.*

*Distribution system minimum residual at any location, 0.10 PPM free chlorine or 1.0 PPM monochloramine.*
Description of Current AWOP Team Members and Responsibilities

Please provide the name, position/title, description of AWOP duties and approximate FTE that each team member spends on AWOP. Also indicate who serves as the AWOP team lead/point of contact.

Example: Nevel O. Meter, District Engineer, PBT trainer, ~ 0.3 FTE

(Note that if you submitted this information in 2017, that information is being provided and if there are no changes, simply indicate “no change” in this section.)

1. AWOP Team Leader: Craig Corder, Engineer Supervisor, Program Supervisor, 0.7 FTE
2. William Stacy, AWOP Engineer, all AWOP functions, 0.5 FTE
3. Chris Roberts, SWTR Engineer, assists with all AWOP functions, 0.2 FTE
4. Aaron Hilborn, Engineer Supervisor, assists with AWOP on DBP Control, 0.1 FTE
5. Callie Acuff, DBP Engineer, assists with AWOP on DBP control, 0.1 FTE
6. Vickie Welytok, SWTR Engineer, assists with CPE’s and CT evaluations, 0.05 FTE
7. Lance Jones, Chief Engineer, AWOP direction, <0.05 FTE
8. Jeff Stone, Section Director, AWOP direction <0.05 FTE
9. Steven Youngblood, Engineer Supervisor, assists with CPE’s, 0.05 FTE
10. Adam Parker, District Engineer, assists with CPE’s, 0.05 FTE
11. Robert Reaves, District Engineer, 0.1 FTE
12.
13. Hannah Dietz (Start Date July 1, 2019), all AWOP functions, 0.5 FTE
14.

Description of Former AWOP Team Members:

Please provide the name of former AWOP team members, and their reason for leaving the team. This information is for historical purposes and also to support networking as AWOP continues to expand.

(Note that if you submitted this information in 2017, that information is being provided and if there are no changes, simply indicate “no change” in this section.)

1. Adam Osmon, left ADH took job in China with Instrumentation Company
2. Kristina Frogoso, left ADH took job with Black & Vetch in Kansas City
3. George Marshall, left ADH took job in northwest Arkansas
4. Marshall Hatfield, retired from ADH
5. Steve Burghart, still at ADH, not active in AWOP recently.
6.
7.
8.
9.
10.
11.
12.
### Inventory of State-Wide Treatment Facilities

<table>
<thead>
<tr>
<th>Facilities Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid rate filtration treatment plants</td>
<td>80</td>
</tr>
<tr>
<td>Utilizing static settling without tubes or plates</td>
<td>33</td>
</tr>
<tr>
<td>Utilizing static settling with tubes or plates</td>
<td>14</td>
</tr>
<tr>
<td>Utilizing sludge blanket clarification (upflow, pulsator)</td>
<td>38</td>
</tr>
<tr>
<td>Utilizing contact adsorption clarification</td>
<td>12</td>
</tr>
<tr>
<td>Utilizing sludge recirculation (including ballasted clarification)</td>
<td>10</td>
</tr>
<tr>
<td>Utilizing DAF, or other alternative clarification process</td>
<td>0</td>
</tr>
<tr>
<td>Utilizing direct/in-line filtration</td>
<td>0</td>
</tr>
<tr>
<td>Utilizing packaged filtration (package plants)</td>
<td>22</td>
</tr>
<tr>
<td>Slow sand filter plants</td>
<td>0</td>
</tr>
<tr>
<td>Diatomaceous earth filter plants</td>
<td>0</td>
</tr>
<tr>
<td>Membrane treatment plants</td>
<td>1</td>
</tr>
<tr>
<td>Bag or cartridge filtration plants</td>
<td>2</td>
</tr>
<tr>
<td>Primary disinfectant</td>
<td>82</td>
</tr>
<tr>
<td>Free chlorine</td>
<td>1</td>
</tr>
<tr>
<td>Chloramines</td>
<td>seasonal</td>
</tr>
<tr>
<td>Ozone</td>
<td>2</td>
</tr>
<tr>
<td>UV</td>
<td>0</td>
</tr>
<tr>
<td>Secondary disinfectant</td>
<td>70</td>
</tr>
<tr>
<td>Free chlorine</td>
<td>12</td>
</tr>
<tr>
<td>Chloramines</td>
<td></td>
</tr>
</tbody>
</table>

1. Limited to surface water treatment plants (includes surface, GUDI, blended sources).
2. All surface water treatment plants, except cartridge, membrane and slow sand.
3. When a plant utilizes multiple treatment processes or configurations identified below, please include them all in this inventory, e.g., a package plant that utilizes a CAC will be included as a rapid rate plant using CAC and packaged filtration.

### AWOP Vision:
Please describe the vision for your AWOP

____ We would like to move from primarily compliance / enforcement technical assistance to working on optimization of water systems that are already compliant with regulations and are close to and trying to achieve optimization.____
**Status Component Implementation:**
Please describe status component activities that are implemented in your agency, e.g., (are water systems ranked according to public health risk and how is this information used; how is water system data integrity ensured):

___ 
We use a ranking system based on water quality, violations, and other factors to rank surface water treatment plants. We try to work with the plants with the worst rankings to improve their performance. Over the last two years technical assistance has been focused on systems with a history of multiple compliance issues, primarily surface systems, but some ground water and purchase as well.

___ 
We are conducting some data audits at surface water treatment plants. We are conducting water quality monitoring equipment checks (pH meters, chlorine analyzers, turbidimeters) with a goal of at least one check at each surface water treatment plant per year. We are doing few investigations on RTCR sampling and monitoring and on DBP sample sites.

**Targeted Performance Improvement (TPI) Implementation:**
Please list all activities that are implemented as TPI activities in your state, e.g., CPEs, PBT, Enhanced Sanitary Surveys, technical assistance, other):

___ CPE’s, Targeted technical assistance, data audits, tank studies

**AWOP Maintenance Component Implementation:**

*Integrate*
Please check the following areas where AWOP has been integrated into the PWSS Program:

Plan Reviews__X__ Permitting_____ Capacity Development__X__ Operator Training__X__
Technical Assistance__X__ DWSRF Prioritization__X__ Enforcement__X__ Sanitary Surveys__X__
Other(identify)__________________________________________

*Enhance*
Please describe any AWOP enhancements that have been implemented in your program. One example could include modifying status component criteria

___________________________________________________________

___________________________________________________________

**Sustain**
Please describe any activities that you implement to sustain your agency’s AWOP. Some examples could include efforts to promote and incentivize AWOP (e.g., publish regular newsletter, awards program, AWOP participation = higher ranking for grant/loan funding, etc.).

___________________________________________________________

___________________________________________________________

___________________________________________________________
Lessons Learned:
Please list “lessons learned” that you feel would be helpful to other programs, e.g., how to build and maintain internal support, how to integrate AWOP into your PWSS program, etc). If you are new to AWOP, please list a question or concern you’d like to know more about.

*When developing priority lists or ranking systems, keep them simple and easy to update.*
*Involve as many staff as possible in AWOP to help minimize the impact of staff turnover.*
*Keep your management informed on findings and accomplishments.*

____________________________________________
## Attachment I: Optimization Goals Adopted by the NOLT

<table>
<thead>
<tr>
<th>Category</th>
<th>Goal</th>
<th>Applies to</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microbial</strong></td>
<td>Minimum Data Monitoring Goal Raw Water Turbidity</td>
<td>Rapid Rate Filtration Plants</td>
<td>— Record maximum daily raw water turbidity.</td>
</tr>
<tr>
<td><strong>Microbial</strong></td>
<td>Individual Sedimentation Basin Performance and Monitoring Goals</td>
<td>Rapid Rate Filtration Plants</td>
<td>— Settled water turbidity ≤ 2 NTU in 95% of readings when the annual average raw turbidity is &gt; 10 NTU. Optimization is based on the daily maximum values recorded from all readings. — Settled water turbidity ≤ 1 NTU in 95% of readings when the annual average raw turbidity is ≤ 10 NTU. Optimization is based on the daily maximum values recorded from all readings. — Record individual sedimentation basin effluent turbidity readings at intervals of 4-hours or less if taking grab samples, or 15 minutes or less for continuous monitoring.</td>
</tr>
<tr>
<td><strong>Microbial</strong></td>
<td>Individual and Combined Filter Performance and Monitoring Goals</td>
<td>Rapid Rate Filtration Plants</td>
<td>— Combined filter effluent turbidity ≤ 0.10 NTU in 95% of readings. Optimization is based on the daily maximum values recorded from all readings. — Individual filter effluent turbidity ≤ 0.10 NTU in 95% of readings (excluding 15-minute period following filter backwash). Optimization is based on the daily maximum values recorded from all readings. — Post backwash individual filter effluent turbidity for filters without filter-to-waste capability: Maximum individual filter effluent turbidity following backwash ≤ 0.30 NTU and achieve ≤ 0.10 NTU within 15 minutes. — Post backwash individual filter effluent turbidity for filters with filter-to-waste capability: Minimize individual filter effluent turbidity during filter-to-waste period and record maximum value. Return the filter to service at ≤ 0.10 NTU. — Record individual and combined filter effluent turbidity readings at intervals of 1-minute or less for continuous monitoring.</td>
</tr>
<tr>
<td><strong>Microbial</strong></td>
<td>Disinfection Performance and Monitoring Goals</td>
<td>Rapid Rate Filtration Plants</td>
<td>— Meet CT requirements to achieve inactivation of <em>Giardia</em> and viruses plus a system-specific factor of safety. — Record disinfectant residual, temperature, and pH at maximum daily flow for CT calculations.</td>
</tr>
<tr>
<td><strong>Disinfection By-Product</strong></td>
<td>Plant Effluent Disinfection Byproducts (DBPs) Performance and Monitoring Goals</td>
<td>Surface Water and Groundwater Under the Direct Influence of Surface Water Plants</td>
<td>— System Specific Targets: Could be a discrete value or range that is based on a running annual average. Recommended goal value/range should be 30% to 50% of long term LRAA goals (e.g., 20-30 ppb for TTHM, 15-20 ppb for HAAS). — Collect quarterly TTHM and HAAS samples at the plant effluent and distribution system compliance sites.</td>
</tr>
<tr>
<td><strong>Disinfection By-Product</strong></td>
<td>Enhanced Coagulation Performance and Monitoring Goals</td>
<td>Surface Water and Groundwater Under the Direct Influence of Surface Water Plants</td>
<td>— Meet Stage 1 D/DBP Rule TOC removal requirements for enhanced coagulation, which are based on source water alkalinity and TOC levels, or an alternative compliance criterion, as a running annual average (RAA) of the performance ratio (actual TOC removal/required TOC removal) plus a factor of safety of 10% (or performance ratio ≥ 1.1). — Collect monthly total organic carbon samples for raw and treated water (only applies to parent systems).</td>
</tr>
<tr>
<td><strong>Disinfection By-Product</strong></td>
<td>Disinfection Performance and Monitoring Goal</td>
<td>Surface Water and Groundwater Under the Direct Influence of Surface Water Plants</td>
<td>— Meet CT requirements to achieve inactivation of <em>Giardia</em> and viruses plus a system-specific factor of safety. — Record disinfection residual, temperature, and pH at maximum daily flow for CT calculations (only applies to parent systems).</td>
</tr>
</tbody>
</table>
— Long-Term System Goal: Average of Maximum Locational Running Annual Average TTHM/HAAS values not to exceed 60/40 ppb (the average of the last 8 quarters cannot exceed 60/40 ppb).  
— For systems in compliance with the TTHM and HAAS MCLs, collect quarterly DBP samples at all compliance locations; for systems not in compliance, collect monthly samples. |
| Free Chlorine Distribution System | Disinfection Performance and Monitoring Goals | Parent and Consecutive Water Systems that Utilize Free Chlorine as a Secondary Disinfectant | — Maintain ≥ 0.20 mg/L free chlorine residual at all monitoring sites in the distribution system, at all times.  
— Monitoring should be performed at least monthly, but more frequently at critical times (i.e., summer months).  
— Sample locations should include bacteriological and DBP compliance sites, all distribution system entry points (e.g., plant effluent, consecutive system connections), all tanks (preferably while draining), and identified critical sites based on investigative sampling (minimum of one critical site in each quadrant of the system, four sites total). |
| Plants that Utilize Choloramine | Disinfection: Ammonia Control Performance and Monitoring Goals | Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant | — Maintain ≥ 1.50 mg/L monochloramine residual at all monitoring sites in the distribution system, at all times, to provide a disinfection barrier against both microbial contamination and nitrification prevention.  
— Monitor monochloramine, free ammonia, and nitrite in the distribution system and at the entry points (to establish a baseline).  
• Monochloramine and free ammonia should be monitored at all sample locations.  
• Nitrite should be monitored at sample locations where monochloramine is ≤ 1.50 mg/L; nitrate may also be monitored, to further assess nitrification.  
• Sample locations should include bacteriological and DBP compliance sites, all distribution system entry points (e.g., plant effluent, consecutive system connections), all tanks (preferably while draining), and identified critical sites based on investigative sampling (minimum of one critical site in each quadrant of the system, four sites total).  
• Monitoring should be done at least monthly, but more frequently at critical times (e.g., summer months). |
| Chloramine Distribution System | Disinfection: Monochloramine and Nitrification-Related Parameters Performance and Monitoring Goals | Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant | — Maintain ≥ 1.50 mg/L monochloramine residual at all monitoring sites in the distribution system, at all times, to provide a disinfection barrier against both microbial contamination and nitrification prevention.  
— Monitor monochloramine, free ammonia, and nitrite in the distribution system and at the entry points (to establish a baseline).  
• Monochloramine and free ammonia should be monitored at all sample locations.  
• Nitrite should be monitored at sample locations where monochloramine is ≤ 1.50 mg/L; nitrate may also be monitored, to further assess nitrification.  
• Sample locations should include bacteriological and DBP compliance sites, all distribution system entry points (e.g., plant effluent, consecutive system connections), all tanks (preferably while draining), and identified critical sites based on investigative sampling (minimum of one critical site in each quadrant of the system, four sites total).  
• Monitoring should be done at least monthly, but more frequently at critical times (e.g., summer months). |
| Distribution System | Operational Guidelines Tank Operations | Parent and Consecutive Water Systems that Contain Storage Tanks (any secondary disinfectant) | — Maintain an average turnover time < 5 days; or establish and maintain a water turnover rate at each storage facility.  
— Maintain good mixing (i.e., Performance Ratio ≥ 1) at all times; for tanks where the PR cannot be calculated, adequate mixing (i.e., uniform water quality) should be confirmed by alternate means (e.g., tank profiling/water quality sampling). |