Area Wide Optimization Program

Individual Program Background Information 2019

Name of Agency: Oklahoma Department of Environmental Quality (DEQ)

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.

Year Program started: 1999

The Oklahoma Rural Water Association highlighted the AWOP Awards Program in their May 2019 Magazine Issue.

Beginning July 1, 2019, the Oklahoma DEQ AWOP and AWOP Awards Program will be highlighted on the new website.

Official Adoption of AWOP Goals

Please describe when and how AWOP goals were adopted by your agency and communicated to the water systems.

AWOP goals were adopted simultaneously with NOLT. These goals are communicated to water systems during CPEs, PBTs, AWOP Awards visits, and other optimization training provided by Oklahoma DEQ.

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_X___ IFE_X___
Post BW w/FTW___X_ Post BW wo/FTW__X__ Disinfection (CT) _X___

DBPs (TTHM/HAA5): Plant Effluent_____ Enhanced Coagulation_X___ Disinfection__X__

Chloramine Application: Ammonia Control__X__ Dosing (Chlorine & Ammonia) _X___

Distribution Systems

Individual Site DBPs __X__ Long Term System DBPs__X__ Tank Operations__X__
Secondary Disinfection, Free Chlorine _X___
Secondary Disinfection, Chloramines (monochloramine, Ammonia & Nitrite) _X___

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.

Due to limited time and resources dedicated to AWOP, Oklahoma has only adopted goals set by NOLT with one exception. Oklahoma has an optimization goal for total chlorine to be greater or equal to 1.0 part per million.

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: Rachel Brookins, District Representative, Public Water Supply Engineering Section (PWSES) (part-time)
2. AWOP Co-Team Leader: Candy Thompson, Project Engineer, Drinking Water State Revolving Fund (DWSRF) (part-time)
3. Kay Coffey, Engineering Manager, Team Member (part-time)
4. Steven Hoffman, Project Engineer, DWSRF, Team Member (part-time)
5. Dawn Hoggard, District Engineer, PWSES, Team Member (part-time)
6. David Mercer, District Engineer, PWSES, Team Member (part-time)
7. Shane Hacker, District Engineer, PWSES, Team Member (part-time)
8. Brandon Bowman, Capacity Development Section Manager, Team Member (part-time)
9. Leslie Smith, Project Engineer, DWSRF, Team Member (part-time)
10. Eddie Rhandour, Engineering Manager, DWSRF, Team Member (part-time)
11. Mark Stasyszen, District Engineer, PWSES, Team Member (part-time)
12. Ginger Sharkness, District Engineer, PWSES, Team Member (part-time)
13. Audrey Plunkett, District Representative, PWSES, Team Member (part-time)
14. Rose Marinaro, District Representative, PWSES, Team Member (part-time)
15. Trey Peterson, District Representative, PWSES, Team Member (part-time)
16. Travis Archer, PWSES Manager, Team Member (part-time)
17. Alex Dolan, District Representative, PWSES, Team Member (part-time)
18. Brandon Brooks, District Representative, PWSES, Team Member (part-time)
19. Steven Thibodeau, Compliance Coordinator, Public Water Supply Compliance Section

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.

1. Shaun Wiegmann, former PWSES District Representative – Took a new position with Indian Health Services
2. Jophine Abraham, former PWSES District Representative – Moved to Texas for personal reasons
3. Isaac Cornelson, former PWSES District Representative – Transferred to the Construction Permitting Section in Water Quality at Oklahoma DEQ
4. Harry Fairbanks, former PWSES District Representative – Left DEQ

Inventory of State-Wide Treatment Facilities[1]	Number
Rapid rate filtration treatment plants[2,3]	164
Utilizing static settling without tubes or plates	69
Utilizing static settling with tubes or plates	17
Utilizing sludge blanket clarification (upflow, pulsator)	65
Utilizing contact adsorption clarification	30
Utilizing sludge recirculation (including ballasted clarification)	8
Utilizing DAF, or other alternative clarification process	1
Utilizing direct/in-line filtration	0
Utilizing packaged filtration (package plants)	30
Slow sand filter plants	10
Diatomaceous earth filter plants	0
Membrane treatment plants	7
Bag or cartridge filtration plants	0
Primary disinfectant	
Free chlorine	179
Chloramines	0
Ozone	2
UV	0
Secondary disinfectant	
Free chlorine	165
Chloramines	16

[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

Short Term Goals:

- *Educate staff about AWOP and its public health benefits to hopefully instill enthusiasm about the program. Oklahoma does not have dedicated AWOP staff. Staff volunteer to participate in AWOP, which increases workloads. It is challenging to convince staff to take on extra duties.*
- *Incorporate the new Capacity Development Section staff into AWOP. Recently, a new Capacity Development Section was created. We hope their participation in AWOP will be a regular part of their job duties as capacity development plays an integral role in Oklahoma's optimization program.*
- *Continue training for new and existing staff. Turnover is frequent, and new staff needs to be trained on CPEs, PBTs, AWOP Workshops, etc. Existing staff need to keep their skills sharp when performing these tasks as well.*
- *Continue to expand and improve the AWOP Awards Program. In the previous background document (2017), we hoped to create and implement an AWOP Awards Program in Oklahoma. We have been successful with that vision. We implemented the program in January 2019. We are learning a lot as we go, but it appears to be gaining traction.*

- *Revamp the Status Component as a result of the Sanitary Survey changes. This modification would include having two status components, one for turbidity and one for DBPs.*

Long Term Goals

- *Continue to improve and implement maintenance component goals*
- *Integrate additional AWOP goals and concepts into Sanitary Surveys, especially data integrity*
- *Reinitiate DBP PBT efforts in the state*
- *Perform more frequent CPEs*
- *Create a full-time AWOP position*
- *Partner with Oklahoma Rural Water Association to expand the state's technical optimization abilities when providing technical assistance*

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 are currently in the process of revising our Turbidity Status Component. Deficiencies noted in sanitary surveys correlate to points within our Status Component. However, sanitary survey duties and frequencies have shifted to a new Division. We need to modify our Status Component to adjust for this change.

Before the Stage 2 DBPR went into effect, we did have a DBP Status Component using Stage 1 DBPR data. However, we have had issues compiling Stage 2 DBP data. We are working to resolve these issues.

Ideally, we would like to have two Status Components – Turbidity and DBPs. In the interim, we have been focusing on WTPs in elevated LT2 bins. We also consider turbidity and DBP violations. Our current target is to have our new Status Components in place by the end of calendar year 2019.

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):

Oklahoma is implementing CPEs, PBTs, technical assistance, and sanitary surveys.

AWOP Maintenance Component Implementation:

Integrate

Please check the following areas where AWOP has been integrated into the PWSS Program:
Plan Reviews_____ Permitting_____ Capacity Development__X___ Operator Training__X___ Technical Assistance_X_____ DWSRF Prioritization_____ 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

Please see Oklahoma's AWOP enhancements below:

- Ongoing efforts to modify Status Component, including creating two Status Components (turbidity and DBPs)
- Including additional AWOP concepts in sanitary surveys

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.).

Please see Oklahoma's AWOP sustaining activities below:

- New AWOP Awards Program
- New Oklahoma DEQ website with dedicated AWOP portion
- Monthly AWOP meetings with staff
- Performing workshops from quarterly meetings to educate staff
- Partnering with Oklahoma Rural Water to implement optimization concepts
-Continue conducting CPEs to ensure staff is adequately trained

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 there is no dedicated AWOP staff, other duties constantly take precedence over AWOP activities, making it difficult to perform AWOP training, schedule CPEs, implement workshops, etc. It is crucial to have an AWOP Champion dedicated to sustaining AWOP activities and communicating with staff and management to keep them interested and involved.

Upper management views AWOP as a voluntary program since it is not required by EPA. However, management is most supportive of AWOP when measurable improvements are presented to them. No matter the number of staff, enthusiasm for AWOP may be limited. Therefore, it is critical to maintain a core team supporting and participating in AWOP.

It can be difficult to maintain balance between enforcement and optimization, especially with the AWOP Awards Program. We have observed that for a successful program, AWOP Awards must be totally separate from enforcement. We have modified some things in our program to maintain this separation.

Attachment I: Optimization Goals Adopted by the NOLT

Category	Goal	Applies to	Description
Microbial	Minimum Data Monitoring Goal Raw Water Turbidity	Rapid Rate Filtration Plants	— Record maximum daily raw water turbidity.

Microbial	Individual Sedimentation Basin Performance and Monitoring Goals	Rapid Rate Filtration Plants	— Settled water turbidity ≤ 2 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. — 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.
Microbial	Individual and Combined Filter Performance and Monitoring Goals	Rapid Rate Filtration Plants	— 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 <u>without</u> 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 <u>with</u> 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.
Microbial	Disinfection Performance and Monitoring Goals	Rapid Rate Filtration Plants	—Meet CT requirements to achieve inactivation of *Giardia* and viruses plus a system-specific factor of safety. — Record disinfectant residual, temperature, and pH at maximum daily flow for CT calculations.
Disinfection By-Product	Plant Effluent Disinfection Byproducts (DBPs) Performance and Monitoring Goals	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	—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 HAA5). —Collect quarterly TTHM and HAA5 samples at the plant effluent and distribution system compliance sites.
Disinfection By-Product	Enhanced Coagulation Performance and Monitoring Goals	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	—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).
Disinfection By-Product	Disinfection Performance and Monitoring Goal	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	—Meet CT requirements to achieve inactivation of *Giardia* 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).
Distribution System	Disinfection Byproducts Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize any Secondary Disinfectant	—Individual Site Goal: Quarterly Maximum Locational Running Annual Average TTHM/HAA5 values not to exceed 70/50 ppb. —Long-Term System Goal: Average of Maximum Locational Running Annual Average TTHM/HAA5 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 HAA5 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 base on investigative sampling (minimum of one critical site in each quadrant of the system, four sites total).
Plants that Utilize Chloramine	Disinfection: Ammonia Control Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	—Maintain a detectable free ammonia residual in the plant effluent ≤ 0.10 mg/L as NH_3-N. —Monitor free ammonia at <u>least</u> once per day in the plant effluent. • The monitoring frequency may be adjusted based on the variability observed over an extended period of time. • Free ammonia may be monitored in the source water periodically (e.g., once per week) to assess variability.
Plants that Utilize Chloramine	Operational Guideline Chlorine and Ammonia Dosing	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	—Maintain a chlorine-to-nitrogen mass ratio between 4.5:1 and 5.0:1 (or chlorine-to-ammonia mass ratio between 3.7:1 and 4.1:1), which should result in a detectable free ammonia in the plant effluent that is ≤ 0.10 mg/L as NH_3-N.
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 <u>all sample locations</u>. • 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 base 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).