Area Wide Optimization Program

Kentucky
Individual Program
Background Information
2019

Name of Agency:

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.

The Kentucky AWOP began in 1997. Areas of recognition include AWOP certificate and award program during the annual Kentucky Water and Wastewater Operator Association (KWWOA) conference and annual press release. The Kentucky Energy and Environment Cabinet launched a new website in 2019 that includes an AWOP page (https://eec.ky.gov/Environmental-Protection/Water/Drinking/DWProfessionals/Pages/Technical-Assistance.aspx).

Official Adoption of AWOP Goals

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

Microbial AWOP goals were adopted during the establishment of the program in 1997, and were communicated to water systems over time through one-on-one site visits, sanitary surveys, and CPEs.

DBP AWOP goals were adopted in 2011 and updated in 2018. To disseminate the program information to the water systems AWOP flyers were mailed, presentations were delivered at the annual KWWOA conference, and one-on-one site visits were conducted.

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_√___ Individual Settled_√___ CFE_√___ IFE_√___
Post BW w/FTW_√___ Post BW wo/FTW_√___ Disinfection (CT) _√___

DBPs (TTHM/HAA5): Plant Effluent_√___ Enhanced Coagulation_√___ Disinfection_√___

Chloramine Application: Ammonia Control_√___ Dosing (Chlorine & Ammonia) _√___

Distribution Systems

Individual Site DBPs _√___ Long Term System DBPs_√___ Tank Operations____
Secondary Disinfection, Free Chlorine _√___
Secondary Disinfection, Chloramines (monochloramine, Ammonia & Nitrite) __√__

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.
Although all water systems are tracked and ranked, only water systems that formally commit to the program and adopt AWOP goals are eligible for AWOP certificates and awards.

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: Jackie Logsdon, Environmental Scientist V, DW Technical Assistance & AWOP—Madisonville & Paducah Regional Offices, AWOP Coordinator, ~0.7 FTE
2. CJ Bailey, Environmental Scientist IV, DW Technical Assistance & AWOP—Columbia & Bowling Green Regional Offices, ~0.5 FTE
3. Gabe Tanner, Environmental Scientist IV, DW Technical Assistance & AWOP—Louisville & Frankfort Regional Offices, ~0.5 FTE
4. David Messer, Environmental Scientist IV, DW Technical Assistance & AWOP—Hazard & London Regional Offices, ~0.5 FTE
5. Mark Martin, Environmental Scientist IV, DW Technical Assistance & AWOP—Florence & Morehead Regional Offices, ~0.5 FTE
6. Joe Uliasz, Environmental Control Supervisor, Drinking Water Compliance and Technical Assistance Section Supervisor

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. Roger Conn—Transfer within State Government
2. Tom Stern—Retirement
3. Jim Sproles—Retirement
4. Ed Fortner—Left State Government
5. Jim Hamon—Retirement
6. Noah Taylor—Transfer within Division
7. Linda Metts—Transfer within Section
8. Crystal Davis—Transfer within Branch
9. Julie Roney—Left State Government
10. Don DeKoster—Deceased
11. Russell Neal—Transfer within Division
12. Brian Chitti—Left KY State Government to work for OH State Government
13. Eric Sutton—Transfer within Section

Inventory of State-Wide Treatment Facilities[1]	Number
Rapid rate filtration treatment plants[2,3]	135
Utilizing static settling without tubes or plates	16
Utilizing static settling with tubes or plates	57
Utilizing sludge blanket clarification (upflow, pulsator)	37
Utilizing contact adsorption clarification	5
Utilizing sludge recirculation (including ballasted clarification)	17
Utilizing DAF, or other alternative clarification process	3
Utilizing direct/in-line filtration	0
Utilizing packaged filtration (package plants)	0
Slow sand filter plants	1
Diatomaceous earth filter plants	0
Membrane treatment plants	8
Bag or cartridge filtration plants	0
Primary disinfectant	
Free chlorine	135
Chloramines	0
Ozone	0
UV	0
Secondary disinfectant	
Free chlorine	121
Chloramines	14

[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

The short term vision for the KY AWOP is to ensure new personnel are adequately trained and CPE certified, provide Targeted Technical Assistance (TTA) to water plant personnel to optimize TOC removal, and continue to provide TTA to consecutive systems to optimize distribution systems. In the long term, the intent is to achieve and maintain a high level of compliance with the Stage II DBPR and return some focus back to the optimization (both microbial and DBP) and AWOP integration throughout other areas of the KY PWSS.

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):

Each surface water treatment plant is tracked for all adopted turbidity goals and ranked according to public health risk. This information is used to determine needed technical assistance (CPE, PBT, TTA, etc.). To ensure data integrity, AWOP personnel and DOW inspectors have received data

integrity training provided by TSC. During sanitary surveys, routine inspections, TTA, CPE, site visits, etc., data integrity may be evaluated.

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, PBT, TTA, DSO

AWOP Maintenance Component Implementation:

Integrate

Please check the following areas where AWOP has been integrated into the PWSS Program:
Plan Reviews_____ Permitting_____ Capacity Development_√____ Operator Training_√____ Technical Assistance_√____ DWSRF Prioritization_____ Enforcement_√____ Sanitary Surveys_√___ Other (identify)_____

Enhance

Please describe any AWOP enhancements that have been implemented in your program. One example could include modifying status component criteria
The Enforcement Targeting Tool (ETT) is incorporated into the status component ranking. This helps with integrating AWOP into compliance and enforcement activities.

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.).
Each year, systems that have committed to AWOP and met all the goals receive a certificate and two systems receive an award (award is based on three years of performance and compliance). The certificates and awards are handed out publicly during the KWWOA conference—the most attended conference in KY by operators. Soon after, an annual AWOP press release goes out recognizing each system that received a certificate/award and includes details of the program.

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.
We found that integrating AWOP into the compliance and enforcement processes strengthened internal support and improved compliance. Priority rankings include the ETT score. This puts the focus is on systems that are close to experiencing compliance issues, are already out of compliance, have been referred to enforcement, or are actively under an agreed order. AWOP tools, such as TTA, CPE, PBT, and Modular DSO Training, are utilized for compliance assistance, particularly with DBPs. We have found that since systems need the support and tools AWOP has to offer, the program becomes less "voluntary".

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 NH3-N. —Monitor free ammonia at least 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 NH3-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 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 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).