Area Wide Optimization Program

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.

- *Year Program Started: 2004*
- *Waterworks performance awards based on the AWOP goals are issued in the spring of each year, based on the previous calendar year performance data.*
- *A public information document describing the program is posted on the VDH ODW web site.*

Official Adoption of AWOP Goals

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

Virginia adopted performance goals for clarification and filtration processes in surface water treatment plants with gravity flow, granular media filters effective January 1, 2005. Water systems were notified of the new goals and the requirement to submit data used to evaluate the goals on monthly operating reports.

National Optimization Goals <u>adopted</u> by your PWSS Program – Check all that apply:

(refer to Attachment I for descriptions of the NOLT optimization goals.)

<u>Water Treatment Plants</u>

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) ____

<u>Distribution Systems</u>

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.

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: Dixon Tucker, PE, VOPC Member - Southeast Virginia Field Office*
2. *Robert Edelman, PE* — *VOPC Member – Central Offic*
3. *Susan Minor* — *VOPC Member – Central Office*
4. *Nyibe Smith* — *VOPC Member - East Central Field Office*
5. *Bernard Proctor, PE* — *VOPC Member - Danville Field Office*
6. *Aaron Moses, PE* — *VOPC Member - Central Office*
7. *Thomas Thompson, PE* — *VOPC Member - Lexington Field Office*
8. *Jim Keating, PE* — *VOPC Member - Culpeper Field Office*
9. *David Dawson, PE* — *VOPC Member - Abingdon Field Office*

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 Marque* — *new job outside Office of Drinking Water*
2. *Matthew Haun* — *replaced due to change of committee focus*
3. *Roy Soto, PE* — *new position within Office of Drinking Water*
4. *Randall Morrissette, PE* — *replaced due to time commitments*
5. *James Reynolds, PE* — *new job outside Office of Drinking Water*
6. *Michelle Caruthers, P.E.* — *new job outside Office of Drinking Water*
7. *James Moore, P.E.* — *promotion*
8. *Doug Meyer, P.E.* — *new job responsibilities*
9. *Charles Rest, P.E.* — *new job responsibilities*
10. *Bennett Ragnauth, P.E.* — *new job responsibilities*
11. *Mike Painter, P.E* — *retired*
12. *Susan Douglas, P.E.* — *new job responsibilities*

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

[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

Virginia envisions the following:

1. *Continuing with the existing turbidity optimization goals and awards program for granular media filtration water plants.*
2. *Implementing PBT DBP and/or Distribution System Optimization.*
3. *Considering adopting optimization goals for DBPs (TTHM and HAA5).*
4. *Considering adopting optimization goals for chlorine residuals distribution system with free chlorine and chloramine secondary disinfectants.*

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):

Prioritizing additional implantation efforts toward those systems with health base violations (primarily DBPs).

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):

PBT for DBPs, Sanitary Surveys, Targeted Technical Assistance.
Distribution system optimization (1 to 4 systems) in the 2019/2020 period. If indicated by system grouping (primary/consecutive), a Performance Based Training at a primary facility. We also desire to bring our newer staff up to speed with special studies so that they can encourage them during the 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_____
Technical Assistance__X__ DWSRF Prioritization_____ Enforcement_____ 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.).

Virginia implements an annual conventional water plant awards program and utilizes sanitary surveys to increase water system awareness of the program and their performance.

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.

AWOP is implemented one plant at a time, over time. It takes a personal relationship between the state staff member and the water plant representative. It takes a mixture of peer pressure, personal hand-holding, encouragement, teaching, cajoling, etc. Plants that have adopted and are meeting optimization goals have more margin for error and are rarely have compliance problems. Plants meeting optimization goals often have staff that understand in a detailed way how and why their plant works. They often know how to complete a special study, draw the graph, interpret their own data, and can learn from their experiences and mistakes.

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 <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 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 <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).