Area Wide Optimization Program

Individual Program Background Information 2019

Name of Agency: PA – Department of Environmental Protection (DEP)

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.

- 2003 was the start date for the PA AWOP Program.
- Pennsylvania DEP has dedicated internal and external websites for our AWOP Program activities.
- Pennsylvania DEP has executed an annual AWOP Awards Program for the last 12 years.
- Pennsylvania DEP has two meetings annually with our statewide Filter Plant Performance Evaluation (FPPE) staff where AWOP Program activities are discussed.

Official Adoption of AWOP Goals

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

- Pennsylvania filter plant optimization goals have been communicated with public water systems since the inception of the FPPE Program in 1988.
- AWOP filter plant goals were shared with water suppliers in 2003 when PA joined the AWOP Program.
- Optimization goals have always been included in PA's FPPE Protocol since the early 90's.
- In 2011, the FPPE Protocol was updated to change the filter goal from 0.1 NTU to 0.10 NTU. The FPPE Protocol updates are published in the PA Bulletin.
- Distribution system AWOP goals included on DEP website since 2012
- AWOP goals are shared with system staff during each filter plant and distribution system evaluation.
- During filter plant and distribution system follow-up meetings, AWOP goals are shared with the plant management as well as authority members or borough administrators.

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__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_ X_ Enhanced Coagulation____ Disinfection__X__

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

<u>Distribution Systems</u>

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.

For IFE and CFE turbidity goals, PA continues to based optimization goals on individual and combined filter effluent turbidity readings at intervals of 15-minute or less for continuous monitoring.

Adopted 25% of respective MCLs for TTHM and HAA5 at EP.

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.)

AWOP Team Leader: Kevin Anderson

STAFF NAME:		RESPONSIBLE FOR:
Justin Blashaw		Full Time Distribution Optimization – Central Office (CO)
Kurt Smith		Full Time Filter Plant Optimization Statewide Support - CO
Stephanie Stoner		Filter Plant Optimization/Distribution Optimization - CO
Mark Billus		Full Time Capability Enhancement Facilitation (CEF) - SC/SE
Paul Handke		Full Time Capability Enhancement Facilitation (CEF) -SW/NW
Woody Cole		Full Time Capability Enhancement Facilitation (CEF) - NC/NE
Dennis Harney		Full Time Operator Outreach Statewide - CO
Lisa Baughman		Full Time FPPEs - NWRO
Laura Blood		Full Time FPPEs - SWRO
Pamela Russell		Full Time FPPEs - SWRO
Bethany Shrodo		2/3 Time FPPEs & 1/3 Central Office AWOP Program - NCRO
Pete Mengak	P	Full Time FPPEs - NERO
Noah Fitzgerald		Full Time FPPEs - SERO
Zachary Duchow		Full Time FPPEs - SCRO
Adam Millhiem		Full Time FPPEs - SCRO
Vacant		Part Time FPPEs - SCRO
Patrick Sosik		Part Time FPPEs - SCRO
Ed Chescattie		Part Time AWOP Program - CO

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. Sheryl Martin - Formally part time SCRO - Promoted to another SDW Position
2. Andrew Strubilla - Formally part time SERO - Promoted to another SDW Position
3. Debbie Wilkes - Formally part time NERO - Moved to another SDW Position
4. John Paone - Formally full time SWRO – Retired
5. Jill Anderson - Formally part time SCRO - Promoted to another SDW Position

Inventory of State-Wide Treatment Facilities[1]	Number
Rapid rate filtration treatment plants[2,3]	~255
Utilizing static settling without tubes or plates	~66
Utilizing static settling with tubes or plates	~42
Utilizing sludge blanket clarification (upflow, pulsator)	~44
Utilizing contact adsorption clarification	~52
Utilizing sludge recirculation (including ballasted clarification)	2
Utilizing DAF, or other alternative clarification process	4
Utilizing direct/in-line filtration	12
Utilizing packaged filtration (package plants)	~62
Slow sand filter plants	22
Diatomaceous earth filter plants	9
Membrane treatment plants	44
Bag or cartridge filtration plants	~10
Primary disinfectant	
Free chlorine	339
Chloramines	1
Ozone	1
UV	2
Secondary disinfectant	
Free chlorine	2
Chloramines	22

[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

- Maintain existing AWOP efforts
- Incorporate UV and Ozone evaluation guidance into the FPPE Protocol.
- Improve documentation, communication, compliance, and follow-up after FPPEs.
- Continue to meet the demand for increases water system technical assistance due to additional regulatory monitoring and more stringent requirements in PA's Disinfection Requirements Rule and the 2019 General Update.

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):

- Pennsylvania DEP has an annually updated status component based on turbidity goals and their current FPPE rating. This information is shared with SDW staff and is used to help prioritize those water plants struggling with performance.
- A Distribution status component is currently under development, but data integrity remains a key obstacle.

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):

- Filter Plant Performance Evaluations (FPPE) at all filter plants – 3-year cycle goal
- Filter Plant CPE's – Conducted if EPA trigger is met
- Distribution System Optimization (1.5 dedicated staff)
- Distribution CPE's – 1 or 2 annually
- Distribution System Evaluations
- Operator Outreach Program (1 dedicated staff - ~20 part-time non-DEP operators)
- Capability Enhancement Program (3 dedicated state)
- Microbial PBT – 2007
- Partnership for Safe Water Grant with PA Section – AWWA
- Professional Engineering Services Program
- FPPE field staff conducted water system and DEP staff training
- Source Water Protection Activities

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___X__ 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 program added 5 new AWOP FTEs:
1 in each of these areas – CO, SE, NE, SW, NW

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.).

- Maintain an AWOP Awards Program and partner with local Rural Water Association or local AWWA Section to present awards at their conferences.
- Periodically present optimization related presentations at state conferences.

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.

- Partner with local section AWWA to promote Partnership for Safe Water. Pennsylvania funds a Partnership for Safe Water grant with PA Section AWWA to promote the Partnership for Safe Water.
- Implement an AWOP Awards Program and partner with local Rural Water Association or local AWWA Section to present awards at their conference.
- Partner with local Rural Water Association or local AWWA Section to present optimization related presentations at state conferences.
- It's important to have dedicated state staff for implementing AWOP efforts. It is a worthwhile investment. In the long run, improved public health protection and reduced burden on compliance and enforcement.
- A three-year return rate for conducting optimization assessments seems to be a good frequency. It gives systems enough time to make suggested improvements and demonstrate long term capability yet frequent enough to help reduce back sliding.
- Work with state continuing education folks to use CEH credits to make optimization efforts more attractive. In Pennsylvania, water systems can earn CEHs for completing phase III and phase IV of the Partnership for Safe Water.
- A mix of 10% and 15% DWSRF Set-aside funds are used to fund optimization efforts. The 10% is used more for statewide program development and the 15% is used for one-on-one local technical assistance.
- Participating with other states during national AWOP and Cap Dev/Op Cert events has been helpful with generating new ideas and incorporating them into our own state program. This helps us to continue moving forward with our program improvement efforts.

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).