

Area Wide Optimization Program



Individual Program Background Information 2019

Name of Agency: Michigan Department of Environment, Great Lakes, and Energy (EGLE)

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.

Initial notice to water systems that MI started an AWOP was provided on 12-1-2017. Subsequent notifications have been provided via articles in the MI-AWWA newsletter, announcements MI-AWWA regional and annual section meetings, at operator training courses, and during routine water plant surveillance visits. No awards program has been established yet.

Official Adoption of AWOP Goals

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

The goals were formally adopted and communicated to water systems in our 12-1-2017 memo to water systems. The NOLT goals were provided as an attachment.

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)___

All goals have been adopted. However, because we are new to AWOP implementation of the goals will be phased in based on priority and our progress. The microbial goals will be our initial focus. While improvements can be made, disinfection byproducts are not a widespread problem in the state.

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.

None

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.)

Name	Title	AWOP Duties	FTE on AWOP*
Mike Bolf	Engineering Unit Supervisor	Team Leader/Primary Contact	<0.1
Bob London	SW Treatment Eng Specialist	AWOP implementation	<0.1
Ernie Sarkipato	SW Treatment Eng Specialist	AWOP implementation	<0.1
Steph Johnson	SW Treatment Eng Specialist	AWOP implementation	<0.1
Shannon Henderson	SW Treatment Engineer	AWOP implementation	<0.1
Amy Vail	DW Analyst	Data support	<0.1
Brian Thurston	Field Operations Section Manager	Managerial support	<0.1

**MI remains committed to AWOP and is making slow, but steady progress. Due to competing priorities, staff vacancies, and many inexperienced staff, very little time is available to devote to AWOP.*

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.

No Change

Inventory of State-Wide Treatment Facilities¹	Number
Rapid rate filtration treatment plants ^{2,3}	70
Utilizing static settling without tubes or plates	
Utilizing static settling with tubes or plates	10
Utilizing sludge blanket clarification (upflow, pulsator)	16
Utilizing contact adsorption clarification	3
Utilizing sludge recirculation (including ballasted clarification)	0
Utilizing DAF, or other alternative clarification process	0
Utilizing direct/in-line filtration	7
Utilizing packaged filtration (package plants)	3
Slow sand filter plants	0
Diatomaceous earth filter plants	1
Membrane treatment plants	15
Bag or cartridge filtration plants	0
Primary disinfectant	
Free chlorine	73
Chloramines	0
Ozone (<i>several others ozonate, but only 2 get CT credit</i>)	2
UV	2
Secondary disinfectant	
Free chlorine	73
Chloramines	2
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

To have experienced and well-trained state staff capable of providing technical assistance and troubleshooting services to enhance public health protection. To have water plant operators motivated to consistently meet AWOP goals and who possess the tools and ability to determine optimal performance.

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):

The status component of our AWOP is still in development. We have identified what data we will track, but are still working on a system of ranking the data to establish a prioritized list.

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):

We do not have any formal TPI implementation yet.

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 MI program is still in its infancy.

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.).

We included AWOP activities right into the position descriptions for new SW engineering staff. Several AWOP concepts have been inserted into new sanitary survey checklists. We also plan to have an awards 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.

Educating management on the benefits of AWOP resulted in strong support from our agency decision makers at the onset. This will likely need to be an ongoing process as managers come and go. Also the staff responsible for direct implementation have to buy into the concept because they are in a position to sell it to WTP staff.

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	<p>— 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.</p> <p>— 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.</p> <p>— 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.</p>
Microbial	Individual and Combined Filter Performance and Monitoring Goals	Rapid Rate Filtration Plants	<p>— Combined filter effluent turbidity ≤ 0.10 NTU in 95% of readings. Optimization is based on the daily maximum values recorded from all readings.</p> <p>— 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.</p> <p>— 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.</p> <p>— 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.</p> <p>— Record individual and combined filter effluent turbidity readings at intervals of 1-minute or less for continuous monitoring.</p>
Microbial	Disinfection Performance and Monitoring Goals	Rapid Rate Filtration Plants	<p>— Meet CT requirements to achieve inactivation of <i>Giardia</i> and viruses plus a system-specific factor of safety.</p> <p>— Record disinfectant residual, temperature, and pH at maximum daily flow for CT calculations.</p>
Disinfection By-Product	Plant Effluent Disinfection Byproducts (DBPs) Performance and Monitoring Goals	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	<p>— 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).</p> <p>— Collect quarterly TTHM and HAA5 samples at the plant effluent and distribution system compliance sites.</p>
Disinfection By-Product	Enhanced Coagulation Performance and Monitoring Goals	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	<p>— 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).</p> <p>— Collect monthly total organic carbon samples for raw and treated water (only applies to parent systems).</p>
Disinfection By-Product	Disinfection Performance and Monitoring Goal	Surface Water and Groundwater Under the Direct Influence of Surface Water Plants	<p>— Meet CT requirements to achieve inactivation of <i>Giardia</i> and viruses plus a system-specific factor of safety.</p> <p>— Record disinfection residual, temperature, and pH at maximum daily flow for CT calculations (only applies to parent systems).</p>

<i>Distribution System</i>	Disinfection Byproducts Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize any Secondary Disinfectant	<p>—Individual Site Goal: Quarterly Maximum Locational Running Annual Average TTHM/HAA5 values not to exceed 70/50 ppb.</p> <p>—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).</p> <p>—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.</p>
<i>Free Chlorine Distribution System</i>	Disinfection Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize Free Chlorine as a Secondary Disinfectant	<p>—Maintain ≥ 0.20 mg/L free chlorine residual at all monitoring sites in the distribution system, at all times.</p> <p>—Monitoring should be performed at least monthly, but more frequently at critical times (i.e., summer months).</p> <p>—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).</p>
<i>Plants that Utilize Chloramine</i>	Disinfection: Ammonia Control Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	<p>—Maintain a detectable free ammonia residual in the plant effluent ≤ 0.10 mg/L as $\text{NH}_3\text{-N}$.</p> <p>—Monitor free ammonia at <u>least</u> once per day in the plant effluent.</p> <ul style="list-style-type: none"> • 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.
<i>Plants that Utilize Chloramine</i>	Operational Guideline Chlorine and Ammonia Dosing	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	<p>—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 $\text{NH}_3\text{-N}$.</p>
<i>Chloramine Distribution System</i>	Disinfection: Monochloramine and Nitrification-Related Parameters Performance and Monitoring Goals	Parent and Consecutive Water Systems that Utilize Chloramine as a Secondary Disinfectant	<p>—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.</p> <p>—Monitor monochloramine, free ammonia, and nitrite in the distribution system and at the entry points (to establish a baseline).</p> <ul style="list-style-type: none"> • 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).
<i>Distribution System</i>	Operational Guidelines Tank Operations	Parent and Consecutive Water Systems that Contain Storage Tanks (any secondary disinfectant)	<p>—Maintain an average turnover time < 5 days; or establish and maintain a water turnover rate at each storage facility.</p> <p>—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).</p>