Area Wide Optimization Program

Individual Program Background Information 2019

Name of Agency: Iowa DNR

Official Recognition of AWOP

Iowa's AWOP program started in 2006. Information is available at:

http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Supply-Engineering/Optimization-Program-AWOP

Official Adoption of AWOP Goals

Iowa has formally adopted AWOP goals in Section 567 of the Iowa Administrative Code Chapter 43.12(455b). These goals are communicated to systems and offered as recommendations during Sanitary Surveys.

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) ____

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) ____

<u>Iowa has a Regulatory requirement of 0.3 mg/L free chlorine or 1.5 mg/L total chlorine at all locations in the distribution system with the exceptions of dead ends.</u>

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. No Change

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. No Change

Inventory of State-Wide Treatment Facilities[1]	Number
Rapid rate filtration treatment plants[2,3]	32
Utilizing static settling without tubes or plates	7
Utilizing static settling with tubes or plates	2
Utilizing sludge blanket clarification (upflow, pulsator)	23
Utilizing contact adsorption clarification	
Utilizing sludge recirculation (including ballasted clarification)	
Utilizing DAF, or other alternative clarification process	
Utilizing direct/in-line filtration	1
Utilizing packaged filtration (package plants)	1
Slow sand filter plants	
Diatomaceous earth filter plants	
Membrane treatment plants	6
Bag or cartridge filtration plants	
Primary disinfectant	
Free chlorine	38
Chloramines	
Ozone	
UV	1
Secondary disinfectant	
Free chlorine	
Chloramines	18

[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 we have been focused on building/rebuilding the AWOP team. Therefore, our efforts over the last 2-3 years have been heavily geared towards developing additional staff capability and providing training for CPEs. We partnered with the state of Kansas in 2017/2018 on 4 training CPEs which proved to be extremely valuable for our program. We have also been focusing on updating and maintaining the Status Component and developing a sustainable, long term approach to keeping the status component updated in order to "draw the graph" and sell the program. We have found value in data integrity training for operators in the past and are planning to put on another series of training events in 2020 as time allows. We are also currently working with a contractor on developing a 6 module training course specifically for surface water operations. Optimization concepts will be integrated into this training program with the goal to integrate into Iowa's Operator Certification program.

Looking out even longer term, we would be interested in exploring other opportunities like DS optimization as it relates to nitrification due to many of our systems using chloramines, either unintentionally or by design, develop additional Performance Based Training opportunities, perhaps with regard to DBPs, and expanding data integrity concepts to membrane plants and maybe even UV if it fits. These will be difficult to pursue at this time due to limited staff time and other job responsibilities.

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):

In May, 2019 we revised our status component to simplify the process in an effort to allow for a more efficient and sustainable long term approach. The goal is to update the status component annually based on OAS data and to rank surface water systems in the State. Systems are ranked primarily against AWOP turbidity goals. This information will be used primarily to “draw the graph” and sell the program. Iowa has an ongoing awareness of data integrity, we’ve provided training to field staff, so we look and address issues as we see them or review them. We also are planning additional data training workshops due to operator turnover.

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): CPEs, PBT, Enhanced Sanitary Surveys, Data Integrity Workshops, OAS graph review____

AWOP Maintenance Component Implementation:

Integrate

Please check the following areas where AWOP has been integrated into the PWSS Program:
Plan Reviews__X___ Permitting__X___ 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

Iowa participated in 2 CPE trainings in Kansas in 2017 in turn Kansas participated in two CPE trainings in Iowa in 2018.

The status component criteria was modified in May, 2019 to simplify the process in an effort to allow for a more efficient and sustainable long term approach.

Iowa also incorporated Data Integrity concepts in a recently developed guidance document distributed to operators in regards to developing turbidity monitoring protocols.

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.).

Integrate AWOP concepts across DW programs. Get more field office staff involved in AWOP and TPI events.

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.

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 without 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 with 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). —For systems in compliance with the TTHM and HAA5 MCLs, collect quarterly plant effluent DBP samples; for systems not in compliance, collect monthly plant effluent samples.
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.
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).