

NDWAC MDBP Rule Revisions Working Group

April 19, 2023 Meeting 8 Summary

Meeting Summary

Background on the MDBP Working Group

The United States Environmental Protection Agency (EPA) has sought public input and information to inform potential regulatory revisions of eight National Primary Drinking Water Regulations (NPDWRs) included in five Microbial and Disinfection Byproducts (MDBP) rules following the third Six-Year Review. EPA hosted an initial virtual public meeting in October 2020 to solicit input on further improving public health protection from MDBPs in drinking water. Throughout 2021, EPA sought input relevant to potential rule revisions through additional public meetings focusing on topics identified through public comments and information.

EPA has charged the National Drinking Water Advisory Council (NDWAC or Council), a Federal Advisory Committee (FAC) established under the Safe Drinking Water Act (SDWA) of 1974 to provide the agency with advice and recommendations on potential revisions to the MDBP Rules. In addition, to support the work of the Council, EPA asked the NDWAC to form a working group to explore specific issues and identify potential MDBP rule revision options for the Council to consider in making recommendations to EPA. More information on the NDWAC MDBP Rule Revisions Working Group meeting schedules and other information are available at: <https://www.epa.gov/ndwac/national-drinking-water-advisory-council-ndwac-microbial-and-disinfection-byproducts-mdbp>. EPA is providing the public with an opportunity to send written input to EPA via the public docket at www.regulations.gov, Docket ID: EPA-HQ-OW-2020-0486.

Meeting summaries and background documents on each meeting topic are available in the MDBP Rule Revisions public docket at www.regulations.gov, Docket ID: EPA-HQ-OW-2020-0486. More information on the potential rule revisions is available at: <https://www.epa.gov/dwsixyearreview/potential-revisions-microbial-and-disinfection-byproducts-rules>.

Meeting Purpose

The eighth Working Group (WG) meeting was held to create and characterize an initial list of intervention ideas and related implementation mechanisms; to set up the ability to formulate intervention/implementation mechanism options for Working Group consideration at the June in-person meeting; and to understand where future information will be helpful to support discussions at the June in-person meeting.

This document provides a summary of presentations and discussions from the meeting on April 19, 2023.

Reference articles, the Draft Meeting 7 Summary, Draft Table 3, and the Initial Interventions Ideas were shared with the WG members ahead of the meeting. In addition to WG members, approximately 125 observers attended the meeting.

Segment 1

Agenda Review and Meeting Procedures

Elizabeth Corr, MDBP Rule Revisions Working Group Designated Federal Officer, Office of Ground Water and Drinking Water (OGWDW), Office of Water, EPA

Ms. Corr thanked all for joining the eighth meeting of the National Drinking Water Advisory Council's, Microbial and Disinfection Byproducts Rule Revisions Working Group. She noted that the Working Group (WG) is assisting the Council and responding to EPA's November 2021 charge on potential revisions to MDBP rules. She then introduced Eric Burneson, Director of the Standards and Risk Management Division with EPA's Office of Groundwater and Drinking Water.

Eric Burneson, Director, Standards and Risk Management Division, OGWDW, Office of Water, EPA

Mr. Burneson thanked all members for their participation and input through the past seven meetings and for their continued discussions on reaching a common understanding of problems associated with opportunistic pathogens and disinfection byproducts. He noted that today's agenda calls for the WG to help create and characterize initial intervention ideas, related to implementation mechanisms for a potential rule structure. This will allow the formulation of intervention and implementation mechanism options for the WG to consider and discuss at June's in-person meeting in Washington, DC. Mr. Burneson acknowledged how WG members have asked about other related EPA recent regulatory actions. He noted that all of the actions described are proposed regulations and don't currently require any actions by water systems. The WG is not being asked to expand its scope of work, but instead this information is being shared for relevance to public water supply systems and the actions they may take in the future depending on the outcome of the rule actions.

Mr. Burneson first discussed the EPA's March 14th announcement of a proposed National Primary Drinking Water Regulation (NPDWR) to establish legally enforceable maximum contaminant levels for six PFAS. The proposal includes proposed Maximum Contaminant Levels (MCLs) and Maximum Level Contaminant Goals (MCLGs) for PFOA and PFOS. EPA is also proposing a Hazard Index with MCLs that incorporate values for PFHxS, PFNA, Gen-X chemicals, and PFBS as a mixture. EPA is proposing these MCLs be set as close as feasible to health based MCLGs. If finalized, the rule would require public water supply systems to monitor for these contaminants and to notify the public of the levels found. If a contaminant exceeds the proposed MCLs, the public water system would be required to work to reduce levels of PFAS in drinking water. Mr. Burneson emphasized this is a proposed regulation. Water systems exceeding final MCLs would move to install best available technologies, including granular activated carbon (GAC). This treatment intersects with MDBP considerations because this technology would also remove DBP precursors, resulting in lower DBP concentrations in finished drinking waters.

Mr. Burneson next described additional actions by EPA to strengthen wastewater discharges that apply to coal fired power plants, known as the Steam-Electric Rule. On March 19th proposed guidelines were published to reduce discharges of toxic metals and other pollutants from power plants into water bodies. Mr. Burneson noted that wastewater from coal-fired power plants generally contain high levels of bromide, which is an inorganic precursor of brominated disinfection byproducts, and this rule is expected to reduce levels of bromide downstream of power plants, and at intakes for water systems. Finally, Mr. Burneson noted the March 28 announcement of a proposed rule to strengthen SDWA Consumer Confidence Reports, which would make drinking water quality reports with important public health information more accessible to residents and businesses across the country. The proposal supports public education by detailing measures to communicate information more clearly in water quality reports and improving access to reports.

Mr. Burneson expressed his appreciation for all efforts and for the WG member's continued engagement in meaningful and helpful discussions, as well as asking important questions. He extended thanks to the technical analysts who have helped to bring relevant information and interpretation of the data on opportunistic pathogen disinfection and disinfection byproducts – including their interdependencies. Mr. Burneson expressed enthusiasm for the June in-person meeting and noted virtual meeting flexibility will be provided.

Lisa Daniels, NDWAC MDBP Rules Revision Working Group Co-Chair

Ms. Daniels welcomed all to the eighth meeting and expressed continued thanks and appreciation for all of the work to date from the WG members, EPA, and technical analysts. Ms. Daniels noted the importance of these topics and expressed thanks for everyone's time.

Andy Kricun, NDWAC MDBP Rules Revision Working Group Co-Chair

Mr. Kricun echoed Lisa's sentiments and shared thanks to all the volunteers putting in their expertise. He noted how these efforts will make a difference down at the ground level in protecting public health. He further noted the idea that everyone, irrespective of who they are or where they live, will benefit from the findings and recommendations of this WG. Mr. Kricun extended thanks to the EPA, the technical staff for their guidance, and to Ross Strategic and their team for helping to frame discussions.

Robert Greenwood, Principal, Ross Strategic

Mr. Greenwood outlined the meeting's agenda and provided notes on the logistics of breakout discussions that the WG would be using later in the meeting. He guided the WG towards instructions for entering virtual breakout discussion rooms and thanked staff for working diligently to make this effort possible. Mr. Greenwood then referenced the WG meeting procedures noting that WG members are considered representatives of a particular point of view but not for their respective affiliated organizations, departments, or agencies. He provided an overview of the Zoom controls, and an overview of the day's agenda. Mr. Greenwood noted how technical and regulatory discussions in individual breakout sessions will be supported by EPA staff and technical analysts. He emphasized the notion of important and impactful ideas so that a high-quality list of potential interventions can be produced from the WG discussions for future consideration as interventions.

See Appendix 1 for a roster of Working Group members and an indication of those in attendance.

Segment 2

Response to Working Group Questions

Ken Rotert, EPA OGWDW presented on the responses from technical analysts to WG member questions on Interventions to address opportunistic pathogens, residuals, and DBP formation. The responses were derived from input provided by the technical analysts, which included Mark LeChevallier (Dr. Water Consulting LLC; formerly with American Water), Andrew Jacque (Water Quality Investigations), Zaid Chowdhury (Garver), Scott Summers (University of Colorado, Boulder), Chris Owen (Hazen and Sawyer), and Susan Teefy (East Bay MUD).

The first question reviewed was “What are good storage to demand ratios?” Mr. Rotert stated that the response from technical analysts is that, overall, this is a difficult question to answer. A one-size-fits-all answer is not possible because ratios are determined by many factors and, some states have specific requirements. Some of these factors include fire code requirements, maximum hourly demand systems, hydraulics, and pumping facilities, as well as the number of treatment plants, wells, interconnections, and other vulnerabilities. There are some ‘rules of thumb’ and standards. However, some of those include having four hours of peak hourly demand for large systems and maximum daily demand for smaller systems. In addition, some other ‘rules of thumb’ are approximately 10% of the demand based on the population; and for large systems to consider the 10-day sustained maximum demand plus fire flow; and for smaller systems, storage is a critical part of supply if the supply unit is out of service for maintenance. Technical analysts also provided input that pressure zone needs may vary, so it’s best to evaluate these demand ratios through emergency planning to minimize water age. Also, systems often exercise their storage facilities, which influences the storage demand ratios that are used.

The next question was “How have systems met higher residual requirements?” Mr. Rotert explained options including uses of booster chlorination or booster chloramination. These are options for large distribution systems with long residence times. However, it was noted that this must be done carefully, especially in the context of adding chloramine because it can lead to some unintended consequences. Mechanical mixing in selected tanks when thermal stratification occurs is one way of meeting higher residual requirements. Deep cycling, where possible, is an option, as is pumping water to the top of a cascade of pressure zones and regulating it down to lower pressure zones. A note for this method is that it would require more power than pumping for individual zones, but it forces the water to turnover and decreases the overall water age. Some states have state nitrification action plans and that may dictate minimizing water age and increasing residuals by frequently exercising storage facilities and looping pipes. Lower operating bands for storage tanks were mentioned as another way to maintain higher residuals. An example includes operating a tank at 50% to 75% of capacity rather than 100%. However, this has to be balanced with emergency water needs. Selected tanks can also be used during the winter, with an increase of tanks used during summer months. One technical analyst mentioned using online analyzers with individual tanks, which would provide a better understanding of the residual being maintained, and that this option is more readily available with reagent-free solar powered analyzers. Florida has had state requirements for minimum disinfectant residuals for all PWS for more than 30 years. Minimum levels are segregated by free and combined chlorine. Florida also requires a minimum free chlorine CT for chloramine systems.

The third question was, “What multiple benefits may result from addressing opportunistic pathogens in distribution systems?” Mr. Rotert shared how controlling bacterial growth in the distribution system can provide multiple benefits for lower water age, attaining biofilm control, total coliform rule compliance, reduction of some taste and odors, lowered microbially influenced corrosion, and reduced growth of opportunistic organisms. Controlling biofilms in the system through nutrient reduction, treatment, and unidirectional flushing will result in fewer places for opportunistic pathogens to hide, yield less chlorine demand, as well as less plumbing corrosion, and better water

at the tap. It was suggested that these outcomes are easier to achieve for smaller systems, and, these benefits may not carry over into premise plumbing.

The fourth question was, “What are the most important aspects of reliably providing safe drinking water?” The response was to ensure that people who drink water from the tap do not fall sick due to waterborne illnesses. The next priority is to ensure that long term consumption of tap water doesn't result in chronic disease such as cancer. It is important that water is affordable for customers as well. Safely delivering water through the distribution system while considering infrastructure costs for pipes, tanks, pumping, etc. are important. Furthermore, a technical analyst stated that a well-trained and conscientious workforce that has community support is important. Overcoming complacency, resource limitations, and institutional barriers, were additional points made by the technical analysts.

The fifth question was “How can systems reduce spikes in DBP concentrations?” One part of the response was consistently shorter water age, and an example was storage tanks that are not managed properly, leading to extended water age. This could cause spikes in DBPs when that water is released. A more consistent application and provision of disinfectant residuals was also mentioned. The technical analysts also noted better biofilm controls and biostability controls at entry points can reduce spikes in DBP concentrations. This could include modified treatment based on changes in source conditions. Promoting better biofilm stability can reduce chances for biofilm sloughing events and release of DBP precursors. Different water sources should be blended prior to entry to the distribution system to minimize disruption to this biostability. Additional important measures are better distribution system management, better monitoring for source waters, and investigating the nature of DBP spikes. If TOCs are preferentially removed, there can be some shift towards different species, although the overall concentrations will be lower. Some technologies can preferentially remove bromide, but in some cases, this may not be very feasible. Generally, distribution systems with higher pH experience lower HAAs while systems with lower pH experience lower THMs. Carbonaceous DBPs (e.g., THM4, HAA9) can be controlled by decreasing the TOC precursors, water age, and chlorine dose.

Segment 3

Initial Interventions

Mr. Greenwood introduced Segment 3 and explained its primary objective: breakout discussion which would produce a diverse menu of initial intervention and related implementation mechanism ideas. The focus of the Breakout Discussions is to add to and clarify ideas captured in the “Initial Ideas” document sent to Working Group members in advance of this meeting. The “Initial Ideas” document captured the ideas received from Working Group members during check-in calls, all of which were reviewed by EPA staff for technical accuracy and clarity. By design, this list has not been vetted, that process will take place between Meetings 8 and 9. Mr. Greenwood explained that the Initial Ideas list has been set up in six sections: Overall Strategy Ideas, Source Water Ideas, Treatment Ideas, Distribution System Ideas, Premise Plumbing Ideas, and Enabling Environment Ideas. The Overall Strategy ideas are based on the concept of providing a flexible framework that incentivizes a view from source water to premise, and rewards identification of vulnerabilities.

Mr. Greenwood continued to review an outline of the Initial Ideas in the categories previously described:

- Source Water Ideas
 - Improve source water protection and management.
 - Expand leverage of non-SDWA authorities – bromide, iodide, WWTP discharges (nutrients and organic matter).

- Update source water assessments – periodic review.
 - Support broader uptake of best practices.
 - Improve state and EPA responsiveness to source water conditions.
 - Improve use of currently available data.
- Update GWUDI determination
- Treatment Ideas
 - Reevaluate CT Tables for *Legionella* inactivation potential.
 - Require all groundwater systems to provide distribution system disinfection.
 - Improve chloramination practice and outcomes.
 - Prepare improved guidance.
 - Establish requirements to prevent negative outcomes from improper use (e.g., pH control, corrosion control, nitrate monitoring, sampling during chlorine burnout).
 - Mandatory education and review of challenges.
 - Incentives to select alternatives if technical capacity lacking.
 - Elevate precursor removal practice and outcomes.
 - Identify set of BMPs and prepare guidance.
 - Expand/incentivize organics removal: explore adjustments to 3X3 matrix approach; consider fixed TOC number for finished water; apply to non-conventional treatment plants.
 - Broaden precursor removal/control to industrial discharges (e.g., bromide, iodide, manganese).
 - Improve filtration for turbidity control and require continuous monitoring at all filters.
 - Revisit Operational Evaluation Level (OEL) requirement.
- Distribution System Ideas
 - Improve disinfectant residual consistency in distribution systems:
 - Set numeric minimum disinfectant residual level.
 - Revise monitoring and sampling requirements (more frequent, stagnation zones, different locations)
 - Revise current compliance approach (five percent of samples with undetectable residual for any two consecutive months).
 - Eliminate Heterotrophic Plate Count compliance option.
 - Increase regulatory focus on brominated HAAs.
 - Develop individual DBP MCLs based on toxicity.
 - Alter DBP monitoring requirements for systems that demonstrate through source water screening low/no organics in source water.
 - Establish “find and fix” framework for distribution system water quality (benefits for DBPs and microbial control)
 - Establish a distribution system rule.
 - Prepare best practices guidance.
 - Improve storage tank operations and maintenance:
 - Prepare updated guidance.
 - Promote mixing in storage tanks.
 - Develop storage tank rule(s) – consider “find and fix” approach.
 - Improve consecutive system water quality conditions:
 - Identify minimum wholesale system requirements.
 - Require sampling at master meter.
 - Identify and document success factors.
 - Understand regionalization dynamics and address implementation challenges with resources.
- Premise Plumbing Ideas

- Recognize full measure of public health benefit will not emerge without actions to elevate premise water quality.
 - Develop and enforce uniform standards and individual codes that are adequately protective of public health.
 - Require buildings meeting CDC water management program criteria to implement the guidance.
 - Recognize distinctions among building types and occupants: vulnerable populations (hospitals), number of residents (apartment complexes), commercial versus residential.
 - Apply DS requirements to the premise context.
 - Develop an EPA proposal and concrete commitments for how partnerships and other actions will be undertaken to elevate premise water quality.
 - Stand up a national program for premise plumbing management – a national level campaign to elevate premise plumbing water quality.
- SDWA Enabling Environment Ideas
 - Fix financial capacity for historically disadvantaged communities.
 - Provide additional funding to state oversight programs.
 - Improve technical assistance availability: Thriving Communities Technical Assistance Centers as model.
 - Conduct national regionalization study - profile shared service opportunities.
 - Establish national commitment and program to create a low-income household safety net (LIHEP model) (Note: LIHWAP currently exists but set to expire end of 2023 unless Congress reauthorizes).
 - Evaluate and improve operator certification and training to expand number and availability of certified operators (e.g., portable credentials).
 - Evaluate and recraft MDBP enforcement mechanisms to make follow through assured and efficient.
 - Improve access to implementation tools (e.g., provide software for automated calculations).
 - Evaluate and recraft MDBP public notification to better assure timely awareness of system deficiencies (recognize key considerations such as sensitive populations and laboratory lead times).
 - Establish a federal requirement for all classifications of water supplies to have certified operators even for non-community systems.

Mr. Greenwood gave the WG members breakout discussion guidelines including to keep the discussions informal, flexible, and free flowing and to learn from each other. He emphasized that no decisions will be made at this meeting, and no ideas come off the table at this meeting. This will be a brainstorming discussion. He continued to explain that we are seeking a diverse menu of ideas to work from for preparing options for WG member consideration at Meeting 9; and that WG members should expect that some ideas will put them possibly well outside of their comfort zone. He asked that WG members raise what they see as key considerations for ideas on the list, and to ask questions of the Technical Analysts who will be participating as resources in the breakout groups.

Mr. Greenwood asked the WG Members to consider the following questions in their Breakout Discussions:

- Are there additional ideas you have for inclusion? Why do you think they are important and impactful?
- Are there refinements or additional details that you believe will be helpful to add to the identified ideas?
- Can we say more about why you believe an idea is important and impactful (what root causes addressed, connection to our problem characterization understandings, etc.)?
- What Environmental Justice implications do you believe these ideas have (opportunities to advance EJ, potential unintended EJ consequences)?

- What implementation challenge implications do you believe these ideas have (opportunities to reduce burden while maintaining or enhancing public health protection, potential burden increases)?

Mr. Greenwood then explained the logistical directions for WG members and the public to leave the plenary meeting and join the Breakout Discussions. The WG members then dispersed into their pre-assigned Breakout Discussion Rooms, with each room assigned no more than 6 WG members.

Breakout Discussion: Source Water and Treatment

The Source Water and Treatment breakout discussion was facilitated by Rob Greenwood. Working Group member participants were Scott Borman, Lynn Thorp, Gary Williams, Jolyn Leslie, Kay Coffey, and Mike Hotaling. Technical Analysts serving as a resource to the discussion were Zaid Chowdhury and Scott Summers, along with EPA staff Jimmy Chen, Menaka Atree, and Adam Cadwallader.

The breakout group facilitator asked participants to 1) identify any additional ideas for inclusion and explain why they are important and impactful, and 2) identify ideas on the current list that would benefit from further refinement and discussion. The discussion was structured to first address Source Water intervention ideas, then move onto Treatment intervention ideas. For both of these areas, breakout group participants focused substantially on providing observations related to ideas on the draft list provided to WG members in advance of the meeting. Participant observations related to existing ideas are directly referenced to the outline numbering associated with them.

Source Water Discussion

Source Water Item 1.b (leveraging non-SDWA authorities): a WG member expressed interest in how the authority of the MDBP WG could create further emphasis on the use of the CWA and other authorities for improved source control. They cited the example of Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category (where a current draft proposal will address some bromide discharges) while there remain a large number of bromide sources that are not well understood. Further emphasis on determining and regulating these sources could help solve a part of the brominated HAA challenge some drinking water systems face.

Source Water 1.c (update source water assessments): This discussion focused initially on how source water assessments previously required under the 1996 Amendments to the Safe Drinking Water Act could be updated and modified to address current source water assessment needs. Specific observations from WG members related to this line of discussion included the following:

- The previous source water assessment requirement focused on *Cryptosporidium* and *Giardia* – updated source water assessment efforts likely need to focus on other, or additional, parameters such as TOC and bromide, and it is also important to consider DOC and SUVA as both are associated with DBP formation.
- Source water assessments should be done on a regular basis, and they should include multiple parameters. New source water assessment requirements need to be sufficiently flexible to allow individual water systems to tailor their efforts to prevailing local water quality conditions.
- Land use and other conditions that affect source water quality have likely changed for systems since the previous source water assessments were required 20 years ago. This suggests a need to promote another round of source water assessments, although it is probably not the case that the same process as used

previously should be adopted. There also will be an important communication aspect related to any new source water assessment including when it is appropriate to implement and by whom.

- Ground water systems also can have DBP issues – as a result, it will be important to include such systems in any discussion related to new source water assessment efforts. For example, a WG member indicated that, in Washington State, most DBP MCL violations occur with ground water sources. The state requires such systems to perform assessments for DOC/TOC to gauge whether treatment may be needed to prevent DBP MCL exceedances. In Response, a Technical Analyst observed that the Ground Water Rule only provides for source water assessments relative to fecal contamination. The analyst suggested that perhaps the Ground Water Rule could be revised to include TOC/DOC. In response to a question from EPA staff regarding how ground water could be included in source water assessment, a WG member indicated that Washington State has set some minimum TOC/DOC levels based on the data it has. The State has seen low levels of DOC (e.g., 1.2 mg/L) causing DBP problems such as THM exceedances.

Discussion moved from considering new, updated source water assessments to the potential for alternative thinking about how to respond to DBP precursors in source water. One WG member indicated they have seen success with forming DBPs early in the treatment process and then treating for them after they are formed rather than focusing on precursors. This approach focused on volatile DBPs that are first created and then aerated for removal (e.g., up to 70 percent of DBPs can be chloroform and, if created during treatment, can be stripped off using mixers in storage tanks). Another WG member noted in response to this observation that this approach works only for those DBPs that can be volatilized. Another WG member provided an example where DBPs are primarily formed in distribution after leaving the treatment plant and then are passively aerated in distribution system storage tanks. This was in contrast to the initial example provided and point, in this member's view, to the need for flexibility in rules that allow different modes of treatment and operation.

Discussion then shifted to focus on the potential contribution of wastewater discharges to drinking water system source water challenges. Perspectives shared related to this line of discussion included the following:

- A Technical Analyst observed that wastewater treatment plant discharges contribute to the formation of nitrogenous DBPs, and there is current uncertainty regarding the best way to have one or two chemical indicators of organic precursor contribution to DBP formation. There is the possibility of sucralose as an indicator compound to provide an understanding of wastewater discharge impact. Sucralose is not a DBP precursor, but it can potentially help understand the degree of potential wastewater discharge impact. This Technical Analyst further observed that it will be helpful to better understand the contribution of runoff containing nitrogenous fertilizers and suggested that EPA should provide guidance indicating that, if a water treatment plant has a particular type of effluent impacting its source water, then there are certain types of treatment the systems can consider as appropriate.
- A WG member asked how, in practice, this line of thinking would translate into regulatory or non-regulatory action – if, for example, a drinking water system wanted to address wastewater discharge impacts coming from upstream, how could that be done in practical terms? In response, the technical analyst indicated that, in a perfect world, a balance would emerge between application of the Clean Water Act and the Safe Drinking Water Act and provided as an example, efforts undertaken by the State of Colorado to address nutrient discharges. In this context, more frequent source water assessments can improve the understanding of agricultural runoff and wastewater treatment contributions to source waters and provide information needed to take further action.
- A WG member, following this line of discussion, observed that there are a number of studies, including those done by the USGS and private consultancies, which provide substantial data on what percent of drinking water sources are impacted by wastewater treatment effluent. Another member observed that, as there is more wastewater treatment effluent impacting source water, there is also more cyanobacteria

formation which can have a direct impact on DBP precursors as well. In response, a WG member observed that, in their experience, non-point source pollution sources are a substantially larger contributor to drinking water source water impacts and that those sources are more difficult to identify and address. As an example, this member indicated that, in a review of nitrate contribution to source waters, agricultural sources contributed 48 percent, animal operations 50 percent, while human sources including wastewater treatment and septic tanks contributed 2 percent.

Source Water Item 1.d (improve state and EPA responsiveness to source water conditions): a WG member observed that source water protection takes place at a local land use level. More responsiveness at the state or EPA level will have limited impact in the absence of local ordinances or other tools to directly protect and management source water contexts.

Source Water Item 2 (GWUDI determination): This discussion was initiated by a WG member question about what issues there are with the definition and implementing methodology associated with Ground Water Under the Direct Influence of Surface Water (GWUDI) determination. In response, another WG member indicated the current microscopic particulate analysis (MPA) method may not accurately determine the risk of presence of *Cryptosporidium* or *Giardia* in ground water. This member further observed that there are also ground water disinfection issues. Even though groundwater tends to be low in TOC, there is enough there to support biofilm growth in unchlorinated systems.

Source Water Item 3 (research need relative to speciated organics and DBP formation): a WG member indicated it will be helpful to have the analysis distinguish between volatile and non-volatile species to help systems better connect types of DBPs to treatment choices. A separate member indicated support for the additional THM and HAA analysis, and further indicated an interest in research that could support basing MCLs on the toxicity of each individual DBP species (especially chloroform) rather than as a group, as long as backsliding is avoided.

Treatment Discussion

Treatment Item 4 (elevate precursor removal): a WG member explained their interest in this idea area is based on the understanding that some DBP precursors interfere with disinfection and contribute to DBP formation. That appears to set up an opportunity to improve conditions related to DBP formation and microbial control. This member acknowledged that they understand this sounds good in theory but can be complicated in practice. Another member observed that precursor removal is a delicate balance, and there are a variety of ways to accomplish it driving the need to allow for flexibility for systems. An additional member supported the idea of looking for further precursor removal opportunities but cautioned that a system can reach a limit for how much TOC can be removed before seeing significantly rising costs associated with advanced treatment such as GAC, and even steeper costs if moving to membrane filtration. Essentially, cost can become a barrier when moving beyond coagulation. Continuing this discussion, a WG member observed that the proposed PFAS rule under the SDWA has the potential to drive advanced treatment that will also reduce certain DBP precursors. Another WG member observed that treatment for PFAS may raise simultaneous compliance challenges and, in instances where activated carbon is used for PFAS treatment, this WG member suggested that precursor removal for organics may consume the absorption material and limit PFAS treatment. Furthering this discussion, a WG member relayed an experience with a system that is using GAC for PFAS removal. This system recently changed out the carbon but, due to high levels of arsenic contamination, it had to go to a regulated landfill rather than receive regeneration. A Technical Analysis further observed that they have seen problems getting carbon regenerated.

Treatment Item 6 (continuous monitoring at filters): a WG member emphasized their support for adding a requirement that all filters should be individually monitored with an on-line continuously recording turbidimeter, even when a water treatment plant has only two or fewer filters. Another WG member agreed with this suggestion and

further suggested that filter media assessments should be done on a routine basis as part of minimum requirements to ensure proper, on-going functioning. Discussion then shifted to focus on the role of biologically active filtration treatment. A Technical Analyst indicated that biologically active filtration has been included in the Ten State Standards. Previously, states have been restricted from promoting utilization of such filtration for lack of guidance. Inclusion in the Ten State Standards helps to remedy this restriction. A WG member added that biological filtration is one tool to remove TOC. A separate Technical Analyst indicated that, instead of promoting biologically active filtration, the objective should be to promote biologically stable water entering the distribution system and indicated that source water may not need to receive such treatment to accomplish this. A final WG member observation related to this discussion thread indicated that EPA's current guidance related to DBP control is focused on conventional treatment plants – it will be helpful to broaden guidance to include slow sand filtration plants and ground water systems.

Treatment Item 7 (revising OEL requirement): a WG member provided further background that what is happening in practice does not satisfy the intent of the requirement (i.e., to proactively identify and correct for the possibility of a DBP MCL exceedance). This member suggested the substituting a trigger value may be helpful and suggested the possibility of a comprehensive performance evaluation for DBPs, using more of an Area Wide Optimization Program model than the current OEL requirement. Another member observed that, for some systems, elevated DBPs can be a summertime issue due to temperature and suggested that this could be considered in the context of a trigger approach, especially for consecutive systems in the Southern US. A different member expressed agreement that the OEL is not working as intended and explained that the State of Washington reaches out to systems when they have their first high result to work with them.

Rounding out the treatment discussion, a WG member observed that the Surface Water Treatment Rule (SWTR) requires surface water treatment plants that do not filter to meet a minimum log-removal of *Giardia* and viruses through disinfection (CT) and to submit records related to CT. However, the SWTR does not apply these same requirements to surface water treatment plants that do filter. This member suggested that surface water treatment plants that do filter should be required to meet these same requirements, in accordance with the multiple barrier concept. This member also identified the need to develop more efficient and less expensive ways to remove NOM (TOC as the indicator) at the treatment plant to reduce the concentration of DBPs in distribution.

Environmental Justice Implications

After completing the review and additions to the Source Water and Treatment ideas list, WG members were asked to reflect on the potential Environmental Justice implications of the Source Water and Treatment intervention ideas under consideration. WG member observations were as follows:

- Some workgroup members noted that they perceive increasing the costs of drinking water as an EJ issue. They stated that increased costs may have implications for those systems that are struggling to afford meeting current requirements.
- The DBP and opportunistic pathogen problems can disproportionately impact underserved communities – it is important that these consumers receive the same quality of water as systems that have strong financial and technical capacity.
- If an EPA regulation leads to something like the use of granular activated carbon (GAC) in a water treatment facility, the cost of construction, maintenance, and operations increases and may become more expensive than a smaller or disadvantaged community can afford. Some type of regionalization or consolidation may be necessary to provide water quality that meets applicable standards.
- Regulatory development under the SDWA requires a cost-benefit analysis to ascertain the appropriateness of solutions proposed for regulating drinking water, including for small and disadvantaged communities. Given this requirement, the rules should produce an equal amount of protection for all customers.

- The ideas proposed are linked improving utility operations and related water quality and this in turn can help with the disproportionate burden disadvantaged communities can experience and generate a more equitable outcome overall.
- Treatment technologies should be used that are appropriate to the resources available to small or disadvantaged systems. For small and disadvantaged systems, treatment technologies should be avoided that may appear to be lower in cost, but may prove to be less reliable or sustainable, e.g., point of use (POU) treatment devices.
- There are holes in the current rules that allow inequities to occur. PWS seek to produce the same, high-quality water for everyone. However, the rules allow for variability (e.g., chlorine residuals, storage conditions, water age) that can result in variable water quality to different consumers, with much of this variability appearing on the transmission/distribution side.

Breakout Discussion: Distribution System

The Distribution System Breakout Discussion included WG members Lisa Daniels, Rosemary Menard, Nancy Quirk, John Choate, Erik Olson, and Elin Betanzo. The group was supported by Technical Analysts Chad Seidel, Mark LeChevallier, Chris Owen, and Vanessa Speight, and EPA staff Rich Weisman, Alison Dugan, Angela Davis, and Stanley Gorzelnik.

The WG members began by responding to the request for additional ideas for inclusion with a discussion on electronic reporting. A WG member noted that electronic reporting for sanitary surveys could be very helpful and simplify a lot of compliance determinations. It was suggested that simplifying and streamlining reporting in a non-paper age could provide many benefits to the complex nature of reporting, compliance, and data analysis for research purposes. Another WG member added that electronic reporting would provide for smart data systems and with the appropriate software, create a system that develops custom-tailored rules based on a water system's boundary conditions. Each utility could have a custom set of requirements that apply to it and would not need to spend time and money on monitoring issues that do not relate to their particular water system profile. This level of customization is typically daunting and impossible to implement in a paper reporting system. The discussion continued to identify that if specific issues were flagged in a sanitary survey, then follow up and the compliance time frame would be automatically set through the electronic reporting. The state implementing authority would be able to readily track if follow-up recommendations are being followed through on.

Another WG member agreed that there is a lot of potential merit in expanding electronic reporting but noted that there are pitfalls to electronic reporting that must be identified and accounted for. This WG member gave the example that in California there is an automatic reporting system where labs can automatically upload sample results to the state regulator, but this can create confusion when samples not intended for compliance purposes, possibly done for research and development by the utility, are sent from the lab straight to the state and are mistakenly reported as compliance samples. In this instance, the ease of automatic reporting by the lab creates confusion that takes time and effort to sort out. An additional issue raised by a different WG member was that the utilities need some method and opportunity to review and approve automatically reported sampling and compliance information prior to public notification, as any errors in the data or sampling could result in mis-notification to the public and confusion.

A Technical Analyst serving as a resource to the group stated that a lot of states have electronic reporting requirements, but they don't apply to sanitary surveys. He stated that electronic reporting of sanitary survey results would be very beneficial in terms of data collection, and this process is an excellent opportunity to consider this concept. Another Technical Analyst in the discussion stated that the WG should consider defining the degree and

levels of information that should be reported. Some states have electronic reporting in place, but they vary in their reporting approach and do not provide comparable data. He suggested that it is important to identify different parameters for electronic reporting that would provide comprehensive data sets supporting analysis that can respond to such questions as “how are we meeting water quality objectives?” Another issue of importance is sampling locations within a distribution system and GIS location of those points. Often sampling reports only include an address and not data with the location that could be uploaded to create a profile within the distribution system to uncover parameters affecting the water quality at the sampling site. Connecting sampling locations with monitoring data in an electronic format could be helpful in terms of creating useful data sets. One Technical Analyst agreed that the industry would benefit by having consistency across the states with a template approach to sanitary surveys and training for surveyors, as well as better data consistency and reporting. This Technical Analyst gave the example that often pH values are not reported with DBPs or tagged with disinfectant residual information, although this kind of data would be helpful when looking at overall issues with DBPs.

A WG member then described from a state regulator perspective that it would be helpful to differentiate reporting of monitoring results versus larger results for sanitary surveys that cover many system aspects and multiple water quality topics. This WG member urged the members to consider the specifics about distribution system data that the WG would want to capture in electronic reporting.

Another WG member stated concern with the concept of “customized” rules in that such an approach could leave opportunity for discrimination and could result in environmental justice issues. This WG member gave the example of lower income areas with systems that have a harder time meeting all rules. There is a need to be careful that customized rules do not create a context where such systems meet lower standards. The member further noted that having different rules for different utilities would be very hard to implement.

A WG member further noted that, as a request to the technical analysts, it would be helpful to develop an understanding of the current state of electronic reporting across states, what opportunities there may be within the current system not just for sanitary surveys but for all electronic reporting, and whether the SDWA could be updated to expand electronic reporting.

The Breakout Discussion then continued to the topic of *Legionella* and minimum disinfection residuals. One WG member first asked whether *Legionella* is accounted for under the current CT approach. A Technical Analyst responded that *Legionella* is not an issue at treatment plants, and that the monitoring data shows that *Legionella* regrows within the distribution system. This Technical Analyst explained that the CT Tables were created for *Cryptosporidium* and *Giardia*, and that there are no CT tables for *Legionella*. *Legionella* is like *E. coli* in that it is very easily inactivated with disinfection, and very easy to kill in clean, free-flowing water, and therefore there is no benefit to adjusting CT for *Legionella* at the treatment plant. A WG member suggested that as more buildings consider installing secondary disinfection, the CT for *Legionella* may become more relevant in that context.

The discussion then moved to *Legionella* in the distribution system, and how the WG can suggest improvements in the distribution system that would affect *Legionella* while avoiding unintended consequences or massive changes in distribution system water quality dynamics. The WG member referenced a need to understand more about biofilms and what kinds of actions can be taken without causing red water and other undesirable outcomes that can come from making changes in distribution systems.

A WG member posed to the group that an important issue is to ask what the purpose of using a numeric disinfectant residual is and what number would provide additional protection from *Legionella* in the distribution system. As previously stated, free-floating *Legionella* are easy to control with disinfection, but embedded *Legionella* pose a challenge.

A Technical Analyst agreed that determining the objectives is the first step to what numbers might be appropriate and stated that currently the residual data does not allow for national comparisons among states with numeric residuals. This Technical Analyst suggested that the group put forth a framework on what objectives could be accomplished and then determine the means to accomplish those objectives in the regulatory updates. He further stated that we have research from states that have instituted numeric disinfection residuals, and we can look at what happened in those states with occurrence, residuals, and DBPs, but, because of data gaps and distinctive reporting mechanisms, we can't currently look across the country nationally at systems' residual data.

Another Technical Analyst agreed that the question is how a routine residual manages *Legionella*, and coming back to how that will achieve water quality objectives. Based on his research and experience, the follow-up actions when the sampling shows the required minimum disinfectant level has not been achieved is as important as the level at which the minimum disinfectant residual is set. Under current requirements, no follow up is required as long as 95% of measurements are detecting disinfectant residual. This is problematic because those areas that are not detecting residual can be areas where *Legionella* is flourishing. This is an example of why having a numeric residual detected consistently throughout the system, and following up if it is not detected, will improve water quality. In terms of what the numeric minimum should be, above 0.1 mg/L is probably necessary, anything below is problematic, and 0.25 mg/L or 0.3 mg/L may be appropriate. However, the consequences of not immediately addressing issues in the parts of the system that are not meeting the minimum level is the most critical component of any regulatory update. A Technical Analyst agreed that an important issue for the WG to consider, possibly more important than the number at which the residual level is set, is the statistical context for defining compliance, and as mentioned previously only 95% of samples must meet the standard of minimum detectible residual.

A WG member commented that, in some distribution systems, disinfectant residuals are difficult to maintain in areas where there are dead ends. This member asked what the consequences would be for water systems that could not meet a minimum disinfectant residual in those areas where either lower customer demand or dead ends with no loop system exist.

A WG member asked if the Technical Analysts had opinions as to why *Legionella* outbreaks are seen more in the northeast, and if there were conclusions to draw about *Legionella* occurrence from those incidents. A Technical Analyst stated that it is an interesting research question, and he has not seen definitive conclusions from researchers. Because *Legionella* occurrence is related to water temperature it is surprising these outbreaks are more prominent in the northeast and not the south. It may be that the systems in the south are using chloramine, and managing *Legionella* with that disinfectant, while systems in the northeast are using free chlorine but getting water temperatures warm enough to grow *Legionella*. In his opinion, there is no good answer to the question at this time and it is a major question.

Another WG member asked how water systems could evaluate their *Legionella* occurrence if they are not currently using chlorine as a disinfectant. A Technical Analyst noted that the ecology of *Legionella* and coliform bacteria are entirely different, and that *E. coli* samples would not give any correlation to *Legionella* occurrence. He stated that there are no current monitoring requirements for *Legionella* occurrence, and the EPA may want to revisit its previous determination that it is impracticable or infeasible to monitor for *Legionella* and other Opportunistic Pathogen occurrence. There is a Legiolert test that is available for detecting *Legionella*. The Technical Analyst furthered shared that, of the other Opportunistic Pathogens under discussion by the WG, the opportunity to improve public health is greatest for *Legionella*, as it is the leading cause of outbreaks and fatalities, we know it is present in water systems, and we have tools that can be applied to manage its impact.

The WG members also discussed monitoring distribution systems for *Legionella* and if there was any ability to extend that monitoring into premise plumbing systems. One suggested approach is to use disinfectant monitoring and follow up with *Legionella* monitoring to determine if there is a problem in a water system or building. The

concept is, if you find disinfectant residual below the target level, then you monitor for *Legionella* occurrence to determine if there is a consequence of low disinfectant residual in your water system or building. This is one example of how there are different ways of using monitoring. It was discussed that encouraging monitoring in premise plumbing is a significant challenge due to lack of EPA authority, even as available options should be reviewed.

Another Technical Analyst noted that maintaining disinfectant residual starts with well-treated water coming from a good water source, and flow in distribution systems is a fundamental part of maintaining the disinfectant residual. This analyst was emphasizing that disinfectant residual cannot be addressed solely at the treatment plant, and that water quality management plans for distribution systems are an important consideration that can provide a holistic view of water quality.

Regarding Storage Tanks, the WG members discussed that, in addition to mixing of waters, which is described in the Initial Ideas document, turnover is an important concept that should be added. A Technical Analyst noted that stratification control, turnover, mixing, inspection, cleaning, and temperature control are all components of storage tank operations that will control *Legionella* and should be considered for interventions. Another member mentioned that, in their experience, not all utilities are focused on turnover time, and raising awareness of this issue could help water systems. On the issue of water volume in tanks and managing levels to minimize water age, a WG member provided their experience that some systems cannot lower their levels because of pressurization issues and noted that a one size fits all approach and dictating specific levels will not work for all water systems. The WG member stated that, in these circumstances, mixing and other approaches would work best. Another WG Member noted that local zoning and other conditions can dictate heights of towers as an example of flexibility that water system need in planning their water storage management.

A WG member raised the topic of consecutive systems and the idea that ensuring water received by purchasing systems meets MDBP requirements. This member viewed this as important in the context of efforts to promote system consolidation for communities that struggle to pay for their own water supply and treatment facilities. This WG member expressed interest in creating boundaries and protections for such receiving systems. Another WG member described consecutive systems that are multiple connections away from the original water treatment location, and the costs involved in increasing sampling and monitoring requirements, especially for very small systems that do not have an alternative to purchased water. This WG member noted that, in rural areas, the cost per customer of implementing enhanced monitoring is much higher than the cost per customer in more densely populated regions. This member reminded the WG of the importance of always considering the cost to additional requirements.

WG members then discussed the Environmental Justice lens of the Initial Ideas. One WG member revisited sanitary surveys in the context of electronic reporting and also from an approach of improving sanitary surveys with an eye towards identifying unique issues that may affect EJ communities and creating targeted approaches for addressing those issues.

Another WG member stated that water age issues and location monitoring are very important from an EJ perspective in the context of shrinking cities, where there is low population and high-water age in areas where multiple factors have led to less water use. Another WG member stated that, while this is important, recognition should also be made that shrinking cities may not be everywhere, and regulations should not apply to systems that are not experiencing this type of shift in their water system.

Regarding DBPs, WG members noted that the timing of the breakout discussion did not allow for a discussion, but that they are very interested in moving all of the DBP items on the Initial Ideas document forward, noting in particular that there may be EJ issues around altering DBP requirements for systems that demonstrate through

source water screening that they have low or no organics in source water. A WG member also stated a need for information on which DBP surrogates would produce the best, overall outcomes and the reasons supporting use of different surrogates. Another WG member raised the concept of a hazard index for DBPs, as was recently proposed by EPA for PFAS compounds.

The WG members discussed the Technical, Managerial, and Financial (TMF) issues facing many water utilities and that these factors underpin the implementation challenges that water systems are facing. It was stated that, unless the TMF is tackled more effectively than it has been historically, there will still be major implementation issues for some water systems. Another WG member noted that the types of implementation challenges utilities are facing are evolving given the emphasis on regionalization and consecutive systems. Alison Dugan (EPA) was asked by a WG member what simultaneous compliance challenges they see, and what are the most effective solutions. Ms. Dugan offered that states that provide strong technical support and expertise to water systems see the best outcomes. Also providing time and training for implementing new requirements is key, and support for management and staff level training and education are initiatives that can create improved water quality outcomes. Ms. Dugan emphasized the relationship of the state regulatory and support systems with the water systems as a key component to successfully helping systems through simultaneous compliance challenges.

A WG member with experience in Pennsylvania offered that they have had success with distribution system optimization and working to improve water age and water quality, along with a numeric disinfectant residual that is paired with checking on DBP levels to ensure no unintended consequences.

The Breakout discussion then concluded, and the members returned to the plenary session.

Breakout Discussion: Premise Plumbing and SDWA Enabling Environment

Dana Stefan, with Ross Strategic welcomed the WG members to the small group discussion on Premise Plumbing and Enabling Environment ideas.

Participants for this session included Andy Kricun, Lisa Ragain, Bill Moody, Alex Rodriguez, Benjamin Pauli, and Jeffrey Griffiths. The Technical Analysts supporting the group were Shawn McElmurry and Andrew Jacque. From EPA's Office of Ground Water and Drinking Water, Kenneth Rotert and Neel Patel provided support, along with Darren Lytle (from EPA's Office of Research and Development).

The discussion was based on the questions mentioned above. The "Initial Ideas" previously described in the plenary session by Rob Greenwood, and provided to WG members in advance of the meeting was used as a basis for discussion.

Premise Plumbing Discussion

Ms. Stefan outlined the framework for this discussion and encouraged members to be specific about how their suggested intervention ideas apply to the varying types of buildings that were identified by the WG in previous meetings, including buildings that perform treatment and are public water systems under SDWA; institutional buildings that do not perform treatment and are typically not regulated under SDWA which can include hospitals, schools, hotels, and residential buildings.

As part of the initial list of ideas, some members emphasized the importance of requiring buildings that meet CDC water management program criteria to comply with the CDC guidance. These members added that this would entail the development of a new regulatory framework for premise plumbing and noted that there are some existing provisions that could be leveraged from SDWA about facilities that provide water treatment, and from some EPA guidelines on specific treatment types such as for lead and copper. They also highlighted that one critical element as part of any regulatory framework for premise plumbing is the need to create capacity and dedicated resources for compliance and enforcement, which represents one of the main concerns for states and local governments that will need adequate numbers of and training for staff to oversee these buildings.

Another implication shared by one member is that bringing the large, currently non-regulated buildings under SDWA may also create a disincentive for these facilities to voluntarily provide drinking water treatment if it results in needing to follow stricter or complex regulations. On the other hand, some members also noted that this type of building often have liability risks for drinking water quality and an example was given with a hotel in Las Vegas where people sued the building due to exposures of *Legionella*.

Members also highlighted that states conduct drinking water treatment implementation in different ways, and that required regulatory elements may be interpreted differently. The definition of treatment could be interpreted as any kind of change to the chemical nature or the microbiological or physical nature of the water. While management of private water systems may be a significant effort for states, it was noted that often states focus on providing attention to facilities with sensitive and vulnerable populations. Ohio was offered as an example of a state with a program that helps identify unintended consequences of specific treatment and assists utilities with interpretations of regulations and monitoring guidance.

The group discussed potential incentives for currently non-regulated large buildings that provide drinking water to improve the building water quality. A core theme that emerged was the potential to work with insurance companies to promote best practices in building water quality management as it may reduce the building's liability, and some large buildings may consider improved building water quality management efforts as it may reduce their insurance costs. One option could be for insurance companies to require water safety plans (with an opportunity to combine best available versions currently in use by insurers and building owners) for large buildings as part of their insurance and risk management. One consideration is that large commercial buildings running systems akin to small distribution systems would need certified operators familiar with any newly instituted rules, if the improved management involved the implementation of water treatment and regulation under SDWA.

Another incentive suggested by members was to develop a model code for premise plumbing for different building types (e.g., residential vs commercial) that is easy for adoption and replication not only by state and local governments, but also by green building certification groups (e.g., groups focused on health or sustainability). Some WG members suggested the Energy Star voluntary program as an example and also identified a certification of excellence for hospitals as a model to consider. Potential organizations that could help with the model code development include EPA, CDC, or ASHRAE. Members noted that the 'model' code should consider the varied building types, as well as unique codes across states and municipalities, and offices of licensures who handle unique facilities.

A WG Member indicated that there are existing codes in place at local, state, and federal level (e.g., Departments of Health, Departments of Education, Hospital Conglomerates) that could be leveraged, and suggested to review the following:

- Existing state and local government plumbing codes that could be used as templates for replication.
- The [ASHRAE Standard 514](#) (under development, expected to be finalized by end of 2023).
- The [Model Aquatic Health Code \(MAHC\)](#) used for swimming pools that many local governments have adopted.
- The Center for Medicare-Medicaid Services (CMS) requirements for medical facilities. CMS has regulatory authority.
- The [IAPMO and AWWA Recommended Practices for the Safe Closure and Reopening of Building Water Systems](#).

EPA added that CDC and ASHRAE may be invited as potential speakers in future MDBP Working Group meetings to discuss the CDC water management program, and the ASHRAE standards in place or under development applicable to chemical, microbial, and physical hazards within buildings.

The WG discussed the changes to water that require a building water system to become a regulated treatment facility (under SDWA regulatory authority), and the complex relationship between building water treatment and state regulation, as well as the additional burden to state regulators of more buildings with water systems being subject to SDWA regulation.

In regard to incentivizing more voluntary water quality management initiatives overall was the development of a recognition/incentive program for buildings providing good water quality (e.g., lower loan rate as incentives). The group indicated that hospitals may have some best practices and suggested to explore the work of the Society for Hospital Epidemiology promoting best practices on premise plumbing and identify other blue ribbon or Gold Star type of building programs that could be used as example to give recognition to buildings with good water quality management.

Another idea advanced by some members of the group is the importance of conducting community education with an emphasis on the shared responsibility for water quality. Potential efforts include:

- Disseminating existing information and resources (such as the [CDC guidelines](#));
- Developing a homeowners' guide with a list of easy, actionable, and regularly updated best practices that homeowners could easily access (e.g., links are regularly updated, points of local contact available, and materials available in formats including but not exclusive to web-based);
- Educate about premise level water management (operating water heaters, temperature, filtration).

Communication may be different given the different audiences, e.g., premise plumbing with focus on vulnerable populations. Members emphasized the need to have community leaders conduct the communication efforts as they have a better understanding of the community dynamics.

A WG member highlighted that community education also has an EJ component as it relates to procedural justice, i.e., ensuring that community members are involved in decisions that are impacting them and that they have a chance to inform utilities of any local issues, and ensuring local community members can work with utilities and property managers as part a building's water management program team.

Another WG member noted that more emphasis could be put on increasing engineer education, ensuring continuing education opportunities, and leveraging engineers' expertise and public system installers for plumbing water quality design as they are able to identify common issues and root causes (operation, design, maintenance issues). Drinking water experts and engineers are usually not the same, and education is important. A Technical Analyst also suggested educating building owners and operators.

A WG member indicated that there is a need for consistency across state and local codes and minimizing the conflicting codes. One option suggested was to work with green building certification leads to coordinate plumbing codes and avoid conflicting priorities (e.g., water conservation vs water age). Another WG member noted there can be unintended consequences and added an example of reducing chlorine residuals but finding an increase in biofilm occurrence, or finding an increase in corrosion due to added treatment which creates opportunities for pathogens to proliferate.

As part of an EJ perspective related to premise plumbing, A WG member highlighted the importance of providing affordable options for monitoring packages for building owners to engage them in testing their water quality (e.g., testing kits for lead, chlorine residual, *Legionella*, PFAS), noting that existing laboratory options seem costly. Members added that one option would be to focus testing on disadvantaged communities and, if recurrent issues are identified, a program could be developed to allocate funding to address issues. The group also suggested that monitoring could happen in tiers, i.e., it can start with a simple screening test and if issues are identified, additional tests can be conducted. This effort could be initiated by states that could put together a package of screenings.

Community leaders may need to be identified to help with engagement and sampling, though members indicated that it is difficult to find community leaders, and it is unknown how that could be funded.

Enabling Environment Discussion

Discussion highlighted the importance of focusing, through funding and technical assistance, on historically disadvantaged communities or communities that regularly have difficulties meeting drinking water standards and suggested implementing a 'find-and-fix model' such as used with the Revised Total Coliform Rule where the direction would be less punitive when issues are identified and more about building capacity. Puerto Rico was cited as an example with significant infrastructure issues.

Overall, members noted that more education is needed, for both water system leaders and the public. The group recommended to explore developing a universal board management training for water system leaders, an effort adopted by some states already, since leaders running the water systems need to understand the water management implications. The universal board management training should include private non-profits, or systems with populations of 10,000 and less to provide greater coverage to those who might benefit most from this effort, namely the EJ communities. Providing more education to consumers and building maintenance staff would also be helpful, particularly on issues that they could address such as proper operation of water heaters and safe temperature settings, and the difference between point of use and point of entry filtration.

One idea suggested addressed through discussion is to enable community oversight and involvement in water management. Discussion noted that, for outreach and engagement with local communities, there is a need to hire people that are from the local community or are familiar with the local issues. Members noted that NEJAC is working on recommendations for technical assistance, and one requirement could be to identify a leader with local community expertise and understanding of how to interact with communities.

A WG Members also indicated that a national study on scalding is needed to better understand scalding issues, patients impacted, and water heaters. The WG discussed the need to leverage existing information and the International Classification of Diseases (ICD) codes.

On the idea of conducting a national regionalization study to profile opportunities for shared services, discussion indicated that regionalization may create opportunities for smaller systems, including workforce availability and overall capacity. One member shared that regionalization goes beyond economic impacts, and, in some areas, there will be public acceptance issues from small communities.

Discussion further indicated that there may be updates needed to the operator certification requirements to identify if there are any updates that need to be made to the operator certification programs to include areas that may need additional training and that could increase availability and accessibility of certification programs (e.g., portable credentials).

Segment 4

Interventions Ideas Plenary Discussion

After groups reconvened into the plenary meeting, Mr. Greenwood invited members to report out the key takeaways from their breakout discussions. The rest of the WG provided additional input on the three breakout discussion topics and high-level observations on potential EJ implications.

Report outs from breakout discussions and points of emphasis

For the Source Water and Treatment topic, the WG member reporting for the group described the areas of discussion as:

- Source water assessments could be done more frequently and possibly on a routine basis, with additional parameters that could impact DBP formation
- Applying source water assessment to groundwater systems
- Monitoring individual filter effluent continuously at all filters
- Routine filter media assessment
- Promoting biologically stable water entering the distribution system through improving TOC removal
- Expanding EPA Guidance for DBP mitigation beyond conventional treatment
- Consistency across treatment systems for minimum log removal requirements
- Considering per customer cost of new treatment and technology for systems with low numbers of customers and implementing technology and operational capacity support so all systems can provide same high quality water

For the Distribution System breakout, the WG member reporting described key areas of discussion as:

- The objective for a numeric minimum residual was discussed in the context of the improvements to water quality created not just from the specific residual level but also from the distribution system management efforts that will be undertaken to achieve a consistent residual
- Whether monitoring for residual is the key component or if monitoring for *Legionella* or other OPs, or if there are appropriate surrogates if any surrogates should be considered; and whether monitoring for *Legionella* in a location where you had a low chlorine residual sample is an effective strategy
- The importance of addressing EJ concerns and capturing the entire distribution system with sampling to ensure everyone throughout the system has the same water quality, while the current compliance system allows for certain parts of the system to not meet the residual detection but be in compliance
- Using the “find and fix” framework to assist systems in taking immediate actions to improve water quality
- The important issues around storage tanks
- The need to improve education about the safety of water
- How to implement improvements to distribution systems, especially around biofilms, without causing unintended consequences
- Exploring opportunities for electronic reporting to simplify compliance and availability of data
- The importance of public notice and how, when, and what types of information are helpful to the public

For the Premise Plumbing and SDWA Enabling Environment topic, the WG member reporting for the group noted as key points of discussion:

- While EPA does not have legal authority over premise plumbing, there is a need for an intentional review of opportunities for aligning premise plumbing water quality improvement goals with local codes, incentives, and guidance
- A review of the opportunities for a regulatory framework for premise plumbing, along with corresponding support for state and federal staffing to support this framework
- A need for widely disseminated best practices for premise plumbing with examples of high performing jurisdictions or building water managers
- Increased resources (including funding, workforce, and legal capacity) will be needed to support the additional ideas that will be part of the MDBP rules revision, with emphasis on the find and fix framework.

- Engaging and empowering the community in identifying problems and potential solutions to MDBP issues with their water systems

As an additional observation, one WG member suggested to explore ways to address improvements in the drinking water systems operated by third parties. They explained that, usually municipalities hire operators, though in some cases third parties are used that operate multiple systems.

High-level observations on potential EJ implications

WG members were asked to identify potential EJ implications of the discussions:

- One member indicated that procedural justice should be part of the EJ considerations, i.e., leveraging the local knowledge and ensuring that local communities are involved in the decisions that are impacting them.
- WG members emphasized that dedicated funding will be needed for disadvantaged communities (e.g., continuation of LIHWAP) to ensure that the implementation of the revised MDBP rules does not widen the gap between EJ communities and communities with stronger TMF fundamentals.
- One member noted that there are additional opportunities for addressing EJ concerns in source water quality and source water protection and suggested the need for a greater focus on source water protection in EJ communities. The same member indicated that it would be beneficial to coordinate with other federal rulemaking efforts such as the Clean Water Act to align efforts on water quality.
- Another member remarked that part of the WG's discussion focused on the need for more education and suggested that there may be a need to review the operator certification programs and understand usage of existing funding to provide appropriate training and technical assistance.
- Discussion emphasized that EJ communities are often disproportionately impacted from not just drinking water impacts but also often carry heavy pollution burdens; the impact to these communities is cumulative and opportunities to address a cumulative disproportionate public health burden should be considered. Another WG member also noted that in many EJ communities there is a distrust in tap water and more education is needed in communities where safe drinking water is a more affordable option than bottled water.
- The WG discussed that regionalization for small communities will help build economies of scale and reduce some of the current challenges (e., g., workforce shortage). In response, other members noted that regionalization will likely face public acceptance issues in some communities, in part related to concerns communities have about maintaining autonomy.

Segment 5

Next Steps

Mr. Greenwood shared that, as a next step, the facilitation team will continue to coordinate with the technical analysts on the list of ideas generated by the WG and package them into potential options to be shared with the WG ahead of the June 27-29 meeting. The potential options will be reviewed at the June meeting with the goal of understanding initial emerging recommendations based on identified common ground. The draft recommendations will be developed after the June meeting.

Ms. Corr also thanked WG members and appreciated thoughtful responses and appreciation of information shared, as well as the variety of perspectives brought to the table.

Ms. Daniels and Mr. Kricun noted the great interactive meeting and thanked everyone for their participation and time commitment.

Ms. Corr extended final thanks to all participants for their contributions. Ms. Corr then adjourned Meeting #8.

Appendix 1: MDBP Working Group Meeting Attendance –
 April 19, 2023

Name	Attendance
Andy Kricun, WG Co-Chair	X
Lisa Daniels, WG Co-Chair	X
Alex Rodriguez	X
Benjamin Pauli	X
Bill Moody	X
Elin Betanzo	X
Erik Olson	X
Gary Williams	X
Jeffrey Griffiths	X
John Choate	X
Jolyn Leslie	X
Kay Coffey	X
Lynn Thorp	X
Lisa Ragain	X
Michael Hotaling	X
Nancy Quirk	X
Rosemary Menard	X
Scott Borman	X