Microbial and Disinfection Byproducts
Rule Revisions Working Group

Meeting 8: April 19, 2023, 11:00am-6:00pm ET

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WELCOME

Rob Greenwood, Ross Strategic
Elizabeth Corr, DFO, U.S.EPA OGWDW
Eric Burneson, U.S. EPA OGWDW

OPENING REMARKS

Lisa Daniels & Andy Kricun, WG Co-Chairs

Segment 1: Agenda Review & Meeting Procedures

Rob Greenwood, Ross Strategic

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Today's Virtual Meeting: Zoom Controls

This meeting is **not** being recorded

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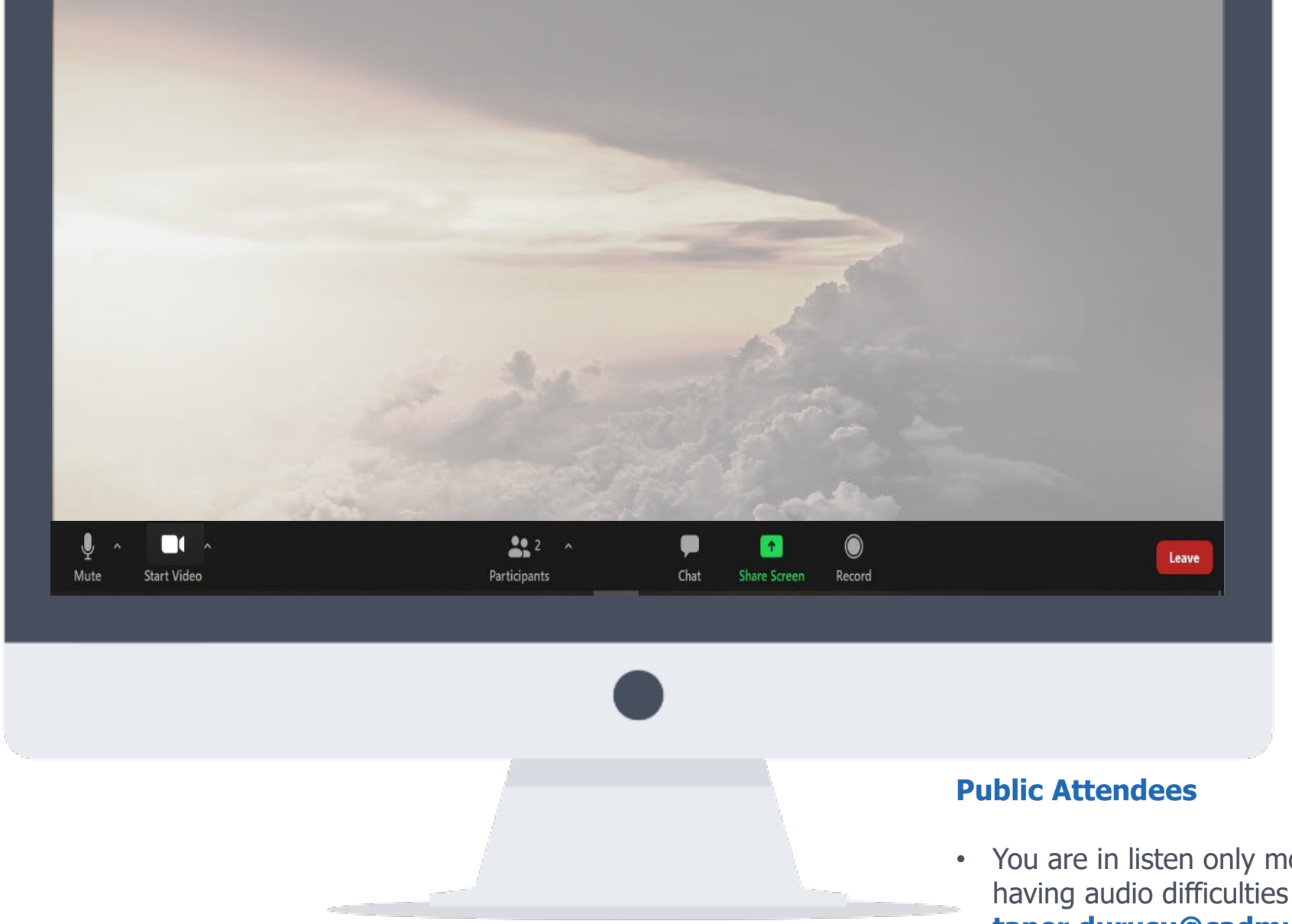

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Public Attendees

- You are in listen only mode and will not be able to unmute. If you are having audio difficulties send an email to **taner.durusu@cadmusgroup.com**
- Any comments you may have can be sent to **MDBPRevisions@epa.gov** or to Public Docket: www.regulations.gov / Docket ID Number: EPA-HQ-OW-2020-0486

EPA AND FACILITATION TEAM

Eric Burneson
EPA OGWDW, Standards and Risk Management Division Director

Crystal Rodgers-Jenkins
EPA OGWDW, Associate Director, Standards and Risk Management Division

Ryan Albert
EPA OGWDW, Chief Standards and Risk Management Division

Ken Rotert
EPA OGWDW

Rich Weisman
EPA OGWDW

Rob Greenwood
Ross Strategic

Sarah Faust
Ross Strategic

Dana Stefan
Ross Strategic

Leeland Gotlieb
Cadmus

Erin Mateo
Cadmus

Taner Durusu
Cadmus

Christine DeRiuex
Cadmus

Today's Agenda

11:00-12:15	• Segment 1: Agenda Review and Meeting Procedures • Segment 2: Response to Working Group Questions and Building Plumbing Management Guidelines • Segment 3: Initial Interventions
	15 Minute Break (12:15-12:30 pm ET)
12:30-1:30	• Segment 3, cont.: Interventions Ideas (Breakout Discussion)
	60 Minute Lunch Break (1:30-2:30 pm ET)
2:30-3:30	• Segment 3, cont.: Interventions Ideas (Breakout Discussion)
	15 Minute Break (3:30-3:55 pm ET)
3:55-6:00	• Segment 4: Interventions Ideas Plenary Discussion • Segment 5: Next Steps

Segment 2: Response to Working Group Questions

Ken Rotert, EPA OGWDW

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Interventions to address OP, Residuals, and DBPs: Follow up Information

- Technical analysts who provided input to the responses on the following slides
  - Mark LeChevallier - Dr. Water Consulting LLC. Formerly with American Water.
  - Chris Owen - Hazen and Sawyer.
  - Andy Jacque - Water Quality Investigations.
  - Zaid Chowdhury - Garver.
  - Scott Summers - University of Colorado – Boulder.
  - Susan Teefy - East Bay Municipal Utility District.

Interventions to address OP, Residuals, and DBPs: Follow up Information

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- What are good storage to demand ratios?
  - This is difficult to generalize and will vary by community. One size doesn't fit all.
  - Ratios are determined by many factors, with many states having specific requirements. Factors include:
    - Fire code requirements
    - Maximum hourly demand
    - System hydraulics and pumping capacity
    - Number of treatment plants, wells, interconnections, and other vulnerabilities (e.g., seismic, critical customers).
  - Some rules of thumb or standards include:
    - 4 hours at Peak Hourly Demand for large systems and Max Day Demand for smaller systems (1.5 x average daily usage).
    - Approximately 10 percent of the demand based on population.
    - In large systems, we must consider the 10-day sustained maximum demand plus fire.
    - In smaller systems, storage becomes a critical part of supply if a supply unit is out of service for maintenance.
  - Pressure zone needs may vary. It's best to be evaluated through emergency planning.
  - To minimize water age, systems often exercise (fill and draw at regular intervals) their storage facilities.

Interventions to address OP, Residuals, and DBPs: Follow up Information

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- How have systems met higher residual requirements?
  - Booster chlorination and booster chloramination are options for large distribution systems with long residence times (adding chlorine and/or ammonia to the water in the distribution system). Must be done carefully.
  - Mechanical mixing in selected tanks when thermal stratification occurs
  - Deep cycling where possible
  - Pumping water in one lift to the top of a cascade of PZs, and regulating it down to the lower PZs. This requires more power than pumping to each individual PZ, but it forces the water to turn over and decreases overall water age.
  - State nitrification action plans (NAP) may dictate minimizing water age and increasing residuals by frequent exercising of storage facilities and looping pipes to avoid dead ends.
  - Lower operating bands where possible (e.g. operate tank between 50% and 75% of capacity rather than 100%).
  - Seasonal outages of selected tanks during winter, increase number of tanks in service in summer.
  - Online chlorine analyzers at individual tanks. This is more feasible now that reagentless solar-powered analyzers are readily available
  - 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. FL also requires a minimum free chlorine CT for chloramine systems.

Interventions to address OP, Residuals, and DBPs: Follow up Information

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- What multiple benefits may result from addressing opportunistic pathogens in distribution systems?
  - Since addressing OPs means focusing and controlling bacterial growth in the distribution system, multiple benefits are realized for lower water age, biofilm control, total coliform rule compliance, reduction of some taste & odors, lower microbial influenced corrosion, reduce growth of higher organisms (nematodes, larvae, crustaceans, etc.).
  - Controlling OPs will most likely prompt systems to maintain higher residual throughout the systems which will minimize biofilm growth and in turn will decrease decay of residuals. These actions will increase protection against cross contamination through leaks; however, presence of residuals for longer within DS will increase DBP levels and compliance with DBP rule will become more challenging.
  - Controlling biofilm in the system through nutrient reduction at treatment and UDF in the system will result in less places for OPs to hide, less chlorine demand, less plumbing corrosion and better water at the tap. This is easier to achieve in smaller systems.
  - Lower water age (time) and control of biofilms (chlorine demand) will likely result in lower DBPs.
  - These benefits may not carry over into premise plumbing.

Interventions to address OP, Residuals, and DBPs: Follow up Information

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- What are the most important aspects of reliably providing safe drinking water?
  - Making sure that people who drink water from their tap do not fall sick due to a waterborne illness (e.g., giardiasis, Legionnaires' disease). The next priority is to make sure that long-term consumption of tap water do not result in chronic disease such as cancer. For this later aspect, it is important to focus of contaminants that are more toxic than the others. Regulating by groups or surrogates has their limitations.
  - It is important that customers can afford to pay for the water. Reliability includes not only consistently producing high quality water but also delivering it throughout the distribution system. Infrastructure costs (pipes, tanks, pumping plants, treatment plants, etc.) are significant.
  - A well-trained and conscientious work force that has community support.
  - Overcoming complacency, resource limitations and institutional barriers.

Interventions to address OP, Residuals, and DBPs: Follow up Information

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- How can systems reduce spikes in DBP concentrations?
  - More consistent water age. For example, storage tanks that do not get exercised properly could be holding some water with a very high water-age (possibly high DBPs) which can cause a spike in DBPs when that water is released. More consistent disinfectant residuals.
  - Better biofilm and biostability control at the entry point and in the system. At the entry point, this may mean modified treatment based on changing source conditions associated with weather (implementing a contingency plan). In the system, promoting better biostability means a reduced chance for a biofilm sloughing event and the release of DBP precursors. Differing sources should be blended prior to entry to minimized disruption to biostability.
  - Better distribution system management, better monitoring for flashy source waters (TOC and chlorine demand)
  - Has the nature of DBP spikes been investigated?

Interventions to address OP, Residuals, and DBPs: Follow up Information

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- What interventions help with which DBPs?
  - Increasing precursor removal probably helps with all chlorinated and brominated DBPs. If TOC is preferentially removed, some shift towards brominated species may happen, although the overall concentrations will be lower. If technologies can be applied to preferentially remove bromide (probably not very feasible), it is likely to lower the brominated DBPs.
  - Generally, distribution systems with higher pH experience lower HAAs while systems with lower pH experience lower THMs.
  - Dimethylamine (DMA), organic nitrogen precursors, and iodide in source waters (generally in wastewater influenced sources) could promote the formation of nitrogenous and iodinated DBPs (e.g., NDMA, IAAs). These DBPs are often found in larger quantities in chloraminated systems. Free chlorine contact time before chloramination helps lower these DBPs.

Interventions to address OP, Residuals, and DBPs: Follow up Information

- What interventions help with which DBPs?
  - A risk driven approach should be taken.
    - Carbonaceous DBPs (e.g., THM4, HAA9) can be controlled by: decreasing the TOC precursors, water age, chlorine dose.
    - Nitrogenous and iodinated DBPs (e.g., NDMA, HANs, IAAs) control is less well defined. More extensive treatment of source waters impacted by wastewater discharge, optimization of pre-oxidation (Cl2, O3) prior to the use of chloramines

Segment 3: Initial Interventions

Presentation, Breakout Discussions, Facilitated Discussion

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Initial Intervention Ideas – Setting Up for Breakout Discussions

- Primary Objective for Breakout Discussions: diverse menu of initial intervention and related implementation mechanism ideas.
- Focus is to add to and clarify ideas captured in the Word document sent to WG members on April 14th.
- The document captures ideas received from WG members during check in calls, and EPA staff provided review for technical accuracy and clarity.
- By design, no vetting of the ideas has taken place – that process will begin between Meeting 8 and 9 and be a focus of Meeting 9.

Initial Intervention Ideas – Setting Up for Breakout Discussions

- Six Sections:
  - Overall Strategy Ideas
  - Source Water Ideas
  - Treatment Ideas
  - Distribution System Ideas
  - Premise Plumbing Ideas
  - Enabling Environment Ideas
- Overall Strategy Ideas
  - Flexible framework that incentivizes a source water to premise system view.
  - Reward identification of vulnerabilities.

Breakout discussions

Source water and treatment	Distribution System	Premise Plumbing
Kay Coffey	Lisa Daniels	Andy Kricun
Mike Hotaling	Rosemary Menard	Lisa Ragain
Scott Borman	John Choate	Bill Moody
Gary Williams	Nancy Quirk	Alex Rodriguez
Jolyn Leslie	Erik Olson	Jeff Griffiths
Lynn Thorp	Elin Betanzo	Ben Pauli
Rob Greenwood	*Sarah Faust*	*Dana Stefan*

Initial Intervention Ideas – Setting Up for Breakout Discussions

- 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

Initial Intervention Ideas – Setting Up for Breakout Discussions

- 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.
    - Identity 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.

Initial Intervention Ideas – Setting Up for Breakout Discussions

- 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.

Initial Intervention Ideas – Setting Up for Breakout Discussions

- Distribution System Ideas Continued
  - 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.

Initial Intervention Ideas – Setting Up for Breakout Discussions

- 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 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.

Initial Intervention Ideas – Setting Up for Breakout Discussions

- 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).

Initial Intervention Ideas – Setting Up for Breakout Discussions

- SDWA Enabling Environment Ideas Continued
  - 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.

Initial Intervention Ideas – Setting Up for Breakout Discussions

- Breakout Discussion Guidelines
  - We want to keep discussions informal, flexible, and free flowing – **learn from each other.**
  - No decisions will be made at this meeting!
  - No ideas come off the table at this meeting – we will be in brainstorm discussion mode.
  - We are seeking a diverse menu of ideas to work from for preparing options for WG member consideration at Meeting 9.
  - Expect that some ideas will put some WG members outside of (possibly well outside of) their comfort zone – Technical Analyst review work between Meeting 8 and 9, and WG discussions at Meeting 9 are intended to fully vet ideas/options.
  - Raise what you see as key considerations for ideas on the list – this will help members develop a well-rounded understanding of the ideas.
  - Ask questions of the Technical Analysts – we will have them participating as a resource in the breakout groups.

Initial Intervention Ideas – Setting Up for Breakout Discussions

- Breakout Discussion Questions:
  - 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)?

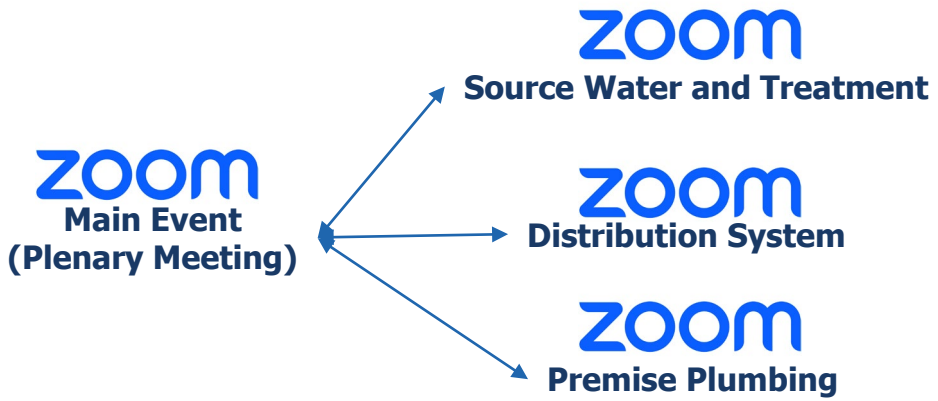
Today's Virtual Meeting: Breakout Discussions

This virtual meeting is composed on 4 different Zoom webinar links:

- **Main Event (plenary meeting)** *you are here now
- **Breakout Discussion: Source Water and Treatment**
- **Breakout Discussion: Distribution System**
- **Breakout Discussion: Premise Plumbing and SDWA Enabling Environment**

NOTE:

- Each breakout discussion has a separate link
- You will need to leave your current Zoom room before you can join another one (you will be prompted to leave your current meeting when attempting to join another)
- You will need to use the original Zoom link to return to the main event (plenary meeting) when leaving a breakout room.



Public Attendees

- You can join any of the breakout discussions using the links received from **Leeland.Gotlieb@cadmusgroup.com** or **Eventbrite**. Links to each breakout discussion will also be shared in the chat of the main event (plenary meeting).
- You are free to enter and leave any of the three breakout rooms, but you cannot join more than one at a time.

Panelists (Working Group Members)

- You have individualized links to breakout discussions, and you can email **twendel@rossstrategic.com** with any technical issues you experience attempting to get into breakout rooms.

Breakout Discussion: Source Water and Treatment

If you need technical support within the breakout room, please contact Abby Ulmer **Abigail.Ulmer@cadmusgroup.com**.

Panelists and **Public Attendees** will need to use their original invitation links to the main meeting to return to the plenary at the conclusion of this breakout room.

Public Attendees

- You are in listen only mode and will not be able to unmute, chat, or raise hands.

- Any comments you may have can be sent to **MDBPRevisions@epa.gov** or to Public Docket: www.regulations.gov / Docket ID Number: EPA-HQ-OW-2020-0486

Breakout Discussion: Distribution System

If you need technical support within the breakout room, please contact Christine DeRieux **Christine.DeRieux@cadmusgroup.com**.

Panelists and **Public Attendees** will need to use their original invitation links to the main meeting to return to the plenary at the conclusion of this breakout room.

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Breakout Discussion: Premise Plumbing and SDWA Enabling Environment

If you need technical support within the breakout room, please contact Taner Durusu **Taner.Durusu@cadmusgroup.com**.

Panelists and **Public Attendees** will need to use their original invitation links to the main meeting to return to the plenary at the conclusion of this breakout room.

Public Attendees

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Breakout Discussions in Progress

Please join the following active discussions:

- Breakout Room: Source Water and Treatment - https://www.zoomgov.com/j/1608521448?pwd=L1ZuRkZibG1iSmdtR0RtakhVdi9HZz09
- Breakout Room: Distribution System - https://www.zoomgov.com/j/1609741394?pwd=V3FTbVQ3WFJ6TWpYazd6QXA1NjJqZz09
- Breakout Room: Premise Plumbing and SDWA Enabling Environment - https://www.zoomgov.com/j/1605562247?pwd=QlljNFovZTdJYnhhbzdEbkNJTTFnQT09

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*Main Event (plenary meeting) you are here now - **https://www.zoomgov.com/j/1600420739?pwd=OW5UTlhENUUzejFhdU5OV2k5VTlNdz09**

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25 Minute Break

3:30-3:55 pm ET

Segment 4: Interventions Ideas Plenary Discussion

Facilitated Discussion

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Breakout Discussion Reports

- Breakout Discussion 1 Report: Source Water and Treatment
- Breakout Discussion 2 Report: Distribution System
- Breakout Discussion 3 Report: Premise Plumbing and SDWA Enabling Environment

Facilitated Discussion

- 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)?

Segment 5: Next Steps

Co-Chairs Andy Kricun & Lisa Daniels
Rob Greenwood, Ross Strategic

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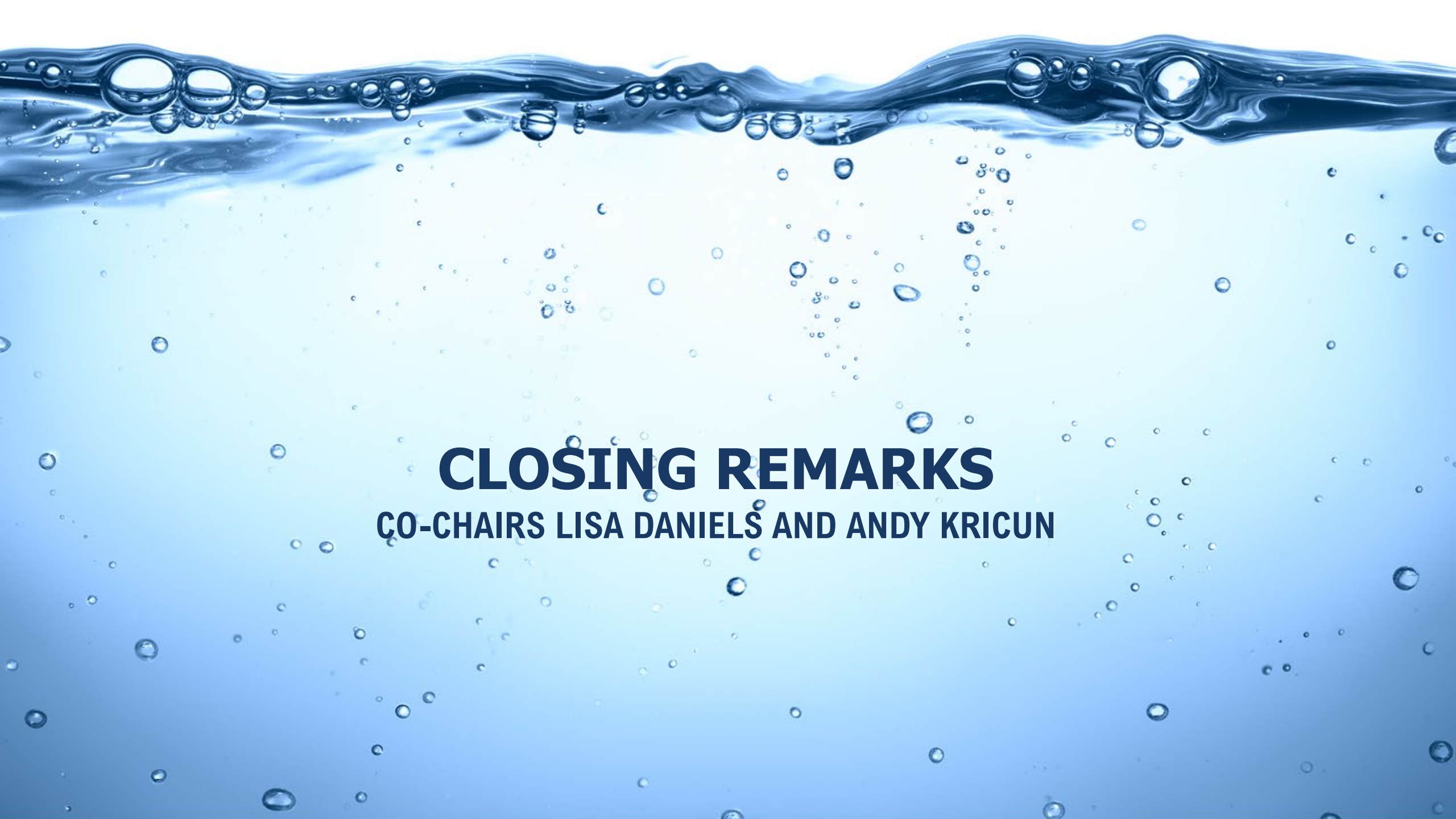
Next Steps

- Engage Technical Analysts and EPA to translate menu of ideas into options for WG consideration at Meeting 9.
- Prepare summary for meeting 8.
- Schedule interim check-ins.
- Schedule the Working Group meetings for the remainder of the year.



CLOSING REMARKS

CO-CHAIRS LISA DANIELS AND ANDY KRICUN

MEETING CLOSURE

ELIZABETH CORR, U.S.EPA, DFO