



TAB 1

- 2024 Meeting Agenda
- Antitrust Statement
- Meeting Process
- Membership
- 2023 Draft Meeting Summary



Drinking Water Treatment Units Joint Committee 2024 Annual Meeting Agenda

Wednesday, May 15 – 9 am to 4:45 pm ET

NSF, 789 N. Dixboro Road, Ann Arbor, MI 48105

<u>Computer or Mobile App</u> Microsoft Teams meeting Join the meeting	<u>Phone (Audio Only)</u> 1) Dial: +1 248-434-3387 2) Enter Conference ID: 411 979 883# Find a local number
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TIME	TOPIC		SPEAKER	PURPOSE
9:00	Tab 1	Welcome	Bob Powitz	Admin
		Antitrust Statement	Monica Milla	
		Meeting Process		
		Attendance: Voting Members Roll Call		
		Membership Update		
		Review and Approval of Agenda	Bob Powitz	Action
	Review and Approval of May 2023 Meeting Summary			
Standards Administration				
9:30	Tab 2	Standards 101 Standards Update: Recent and Current Ballots	Monica Milla	Info
PFAS				
9:45	Tab 3	PFAS Task Group and Subtask Group Update and What’s Next	Arvind Patil Becky Tallon	Info
		DWTU-2024-11: PFAS Cation Water Chemistry	Larry Gottlieb	Action
		PFAS Values in NSF/ANSI/CAN 600 & Impact on DWTU	Kelly Magurany	Info
NSF/ANSI 42				
10:45	Tab 4	DWTU-2023-17: Taste and Odor	Ehud Levy	Action
		DWTU-2024-9: Direct Additives	Scott Randall	Action
Multiple DWTU Standards				
11:15	Tab 5	DWTU-2023-18: O&M Informational Annex, Rev. 03_24	Frank Brigano	Action
		DWTU-2024-2: Nanoplastics	Zac Gleason	
		DWTU-2024-3: Asbestos	Mandy Huntoon	
		DWTU-2024-8: Remote Monitoring	Ed Osann	
12:15 – 1:15 Lunch				

Drinking Water Treatment Units Joint Committee 2024 Annual Meeting Agenda

TIME	TOPIC		SPEAKER	PURPOSE
Multiple DWTU Standards				
1:15	Tab 5	DWTU-2024-4: Uranium	Caitlin Glover Joan Oppenheimer	
		DWTU-2024-5: Nitrate		
		DWTU-2024-6: Hexavalent Chromium		
		DWTU-2024-7: Treatment Trains	Eugene Leung	
NSF/ANSI 401				
2:15	Tab 6	DWTU-2024-10: New Claims	Mike Blumenstein	Action
Current Open Issues				
2:30	Tab 7	42i132r1 - Chloramine Test Water	Kyle Postmus	Action
Task Group Updates				
2:45	Tab 8	Metals Testing Variability	Rob Astle	Info
		MCLG	Gary Hatch	Info/Action
		600	Kristin Kerstens	Info
		RO Efficiency	Tom Palkon	Info
		Lead Validation	Arvind Patil	Info
		330 Definitions	Bob Powitz	Info
		End of Device Life	Regu Regunathan	Info
		TOC Concentration	Steve Woltornist	Info
Informational Updates				
4:05	Tab 9	Update on WaterSense RO Systems Specification	Emma Hughes	Info
		Michigan Filter First Legislation Update	Ariel Zoldan Kyle Postmus	
Committee Administrative Issues				
4:35		New Business	Bob Powitz	Admin
		Meeting Summary and Next Meeting Date		
4:45 Adjourn				

NSF Antitrust Statement

Because this meeting may involve representatives of competing businesses or otherwise implicate antitrust laws, it is important that I get everyone's agreement before we begin that the meeting will be conducted in full compliance with the antitrust laws. We must avoid any comment or action that encourages joint action by participating organizations or persons to restrict their competition or to violate the antitrust law. If you have any questions, I refer you to the NSF Antitrust policy. All committee work will be conducted in full compliance with the NSF Code of Conduct for standards development.

Is there anyone participating who is not in full agreement with the NSF Antitrust statement?

NSF Meeting Process Guideline

1. Presentation of an issue
2. Discussion (questions & answers) on the issue
 - In person attendees: Please raise your hand to make a comment
 - Phone and online attendees: Please use the raise hand and/or chat features
3. Motion on the issue (only voting members may make a motion)
4. Second to the motion (only voting members may second a motion)
5. Discussion on the motion
 - In person attendees: Please raise your hand to make a comment
 - Phone and online attendees: Please use the raise hand and/or chat features
6. Vote on the motion (voting members only)

To ensure voting members clearly understand the motion, the motion shall be restated by the secretariate immediately prior to the vote.

- Yes, Aye, Affirmative
- No, Nay, Negative
- Abstain, Abstention

If a voice vote seems to be close, a show of hands or a roll call vote is used to confirm the vote on the motion. A “friendly amendment” to the motion may be offered by voting members if the person making the original motion and the person seconding the motion agree.

A motion may be withdrawn by the person making the motion at any time.
A second to the motion may be withdrawn by the person seconding the motion at any time.

During the discussion of an issue or motion, the chair will recognize each person in turn so that everyone has an opportunity to comment in an orderly manner.

The above guideline is roughly based on Robert's Rules of Order and may be modified as necessary at any time.

DWTU JC Voting Members

Rick Andrew	Rick Andrew Consulting Services	Andrew Lombardo	KT Corporation
Rob Astle	KX Technologies	Art Lundquist	U.S. Army
Margaret Bicking	Ecowater Systems	Darren Lytle	U.S. Environmental Protection Agency
Chris Caldwell	Trojan Technologies	Philip McCrory	Consultant - User
Robert Dumancic	Ontario Ministry of the Environment	Shannon Murphy	Aquamor
Nathan Edman	AWWA	Artemis Nikolaou	IN Dept. of Environmental Management
Irina Garbar	UL Solutions	Thomas Palkon	IAPMO
Zac Gleason	Water Quality Association	Hemang Patel	Cuno, a 3M Company
Brook Hatton	CSA Group	Arvind Patil	Protect Plus / Ricura Technologies
Mandy Huntoon	NSF	Greg Reyneke	Red Fox Advisors, Inc.
Jeffrey Kempic	U.S. EPA	Tedd Schneidewend	Culligan International Company
Jun Kim	Florida Polytechnic University	Michael Schock	Consultant - Public Health/Regulatory
Janick Lalonde	National Defence & Canadian Forces	Mikhail Starostin	Green Mountain Coffee Roasters (Keurig)
Mark LeChevallier	Dr. Water Consulting, LLC	Becky Tallon	A. O. Smith Corporation
Sun Yong Lee	PUREMEM Co., Ltd.	Ashley Voskuhl	Association of State Drinking Water Administrators
France Lemieux	Health Canada	Joe Wolff	Elkay Manufacturing
Eugene Leung	CA Waterboards Div. of Drinking Water	Ariel Zoldan	MI Dept. of Environment, Great Lakes, and Energy

DWTU JC Membership Updates

New Voting Members

Andrew Lombardo	KT Corporation (August 2023)
Michael Schock	Consultant - Public Health/Regulatory (January 2024)
Rick Andrew	Rick Andrew Consulting Services (January 2024)

Resigned Voting Members

Mikiko Nakayama	Mitsubishi Chemical Cleansui Corporation (changed to Observer, June 2023)
Mark Rodhe	SUMit MHR1 Solutions (November 2023)

Current Balance (34 Voting Members)

- 11 Industry
- 9 Public Health/Regulatory
- 8 User
- 6 Lab/Certifier

Joint Committee on Drinking Water Treatment Units (DWTU)

Annual Meeting Summary

May 10, 2023

NOTE: Bold, underlined blue text is a link. Files may open on screen or download to your Downloads folder.

TAB 1

Opening Remarks

- Joint Committee (JC) Chair **B. Powitz** welcomed everyone and called the meeting to order.
- M. Milla covered some meeting housekeeping items, took attendance of voting/emeritus members, and read the antitrust statement. She stated a quorum had been reached.
- M. Milla provided a membership update since the last DWTU meeting, saying:
 - **Anita Anderson** (Minnesota Department of Health) and **Chin Chew** (Nebraska Department of Environment & Energy) resigned. She thanked them for their respective 11 and 4 years of service and wished them well in their future endeavors. **A. Anderson** remains involved in an observer role.
 - **Dr. Jun Kim** (Florida Polytechnic University–user category) and **Artemis Nikolaou** (Indiana Department of Environmental Management –public health/regulatory category) have joined and were welcomed.
 - Membership is balanced with 11 industry members, 9 public health/regulatory members, 7 users, and 6 certifier/labs.
 - We welcome applications any time and are especially seeking public health/regulatory and user members.
- M. Milla provided a [“Standards 101” overview](#) of Joint Committee/task group membership and participation, as well as the voting process (including negative comment adjudication).

Review of May 2023 Agenda

Motion: The agenda is acceptable as written. **A. Patil** motioned; **F. Lemieux** seconded.

Vote: All in favor.

Motion passed.

Review of May 2022 Meeting Summary

Motion: **R. Powitz** asked if there were any deletions, additions, or corrections to the May 2022 DWTU Joint Committee meeting summary. **F. Lemieux** moved to accept the meeting summary as written; **G. Reyneke** seconded.

Vote: All in favor.

Motion passed.

R. Powitz encouraged adding generic operating and maintenance instructions as an informational annex. This would benefit regulatory and user communities, as many devices sold in bulk don't come with instructions.

TAB 2

Standards Administration

A. [Standards Update](#)

M. Milla reviewed recent and upcoming issues. Fifty-one issues were published in 10 standards from November 2022 to May 2023. Notably, a few *et al* issues passed for a majority of standards, but missed the publication deadline of a few others. This includes online literature requirements (for 244, 53, and 58) and operational cycles (for 53 and 58), which will be balloted this summer.

TAB 3

Harmonization of DWTU and DWA Standards

A. Active Agents (DWTU-2023-12) and NSF/ANSI/CAN 600 Update

K. Licko [shared slides](#) to discuss both the active agents issue paper and alignment between DWTU standards and the drinking water additive (DWA) standard NSF/ANSI/CAN 600 for evaluation criteria.

Motion: Revive the DWTU Task Group on NSF/ANSI/CAN 600 to 1) check and revise active agent language, considering health and aesthetic effects and 2) have an annual meeting to evaluate how changes to 600 impact evaluation criteria in the DWTU standards. **F. Lemieux** made the motion; **G. Reyneke** seconded. **K. Licko** will continue to act as Chair.

Discussion:

K. Licko presented the issue paper, stating the language is confusing in NSF/ANSI 42 and 53 to determine which concentration of active agents to apply:

- The section mentions both concentrations of toxicological significance (health effects / EPA Primary Drinking Water Regulations and Health Canada Maximum Acceptable Concentrations) and for aesthetic effects (EPA Secondary Drinking Water Regulations), and if there's no maximum concentration, to establish a TAC according to 600.
- For example, copper has different levels depending on the regulation, and zinc's only value is not a maximum (but static) value.
- Additionally, due to multiple uses of the word "or," is it meant to go in order (health effects, then aesthetic effects, then establish according to 600), to pick the one that's lowest, or to meet all?
- Several different judgment calls could be made in selecting evaluation criteria across labs/certifiers.

K. Licko sought JC input and presented two options for addressing the active agent language:

- **Option 1:** Prepare a ballot to clarify the language and in 53, to redirect to NSF/ANSI/CAN 600 which contains health effects criteria (and in 42, possibly recommend aesthetic levels).
- **Option 2:** Form a task group for further discussion/clarification before going to ballot.

K. Licko stated there's a need for ongoing maintenance between the DWA and DWTU standards. She had chaired a task group on 600 pass/fail criteria review for specific requirements. This group could be revived to meet once a year, potentially after 600 is published, to see which level changes would impact any evaluation criteria in the DWTU standards. Those conversations need to occur because in some cases we care about health effects and in others, aesthetic effects. She recommended continuing to chair the standard 600 task group and, similar to a standing task group under 600, meet annually to discuss the changes, with everyone welcome to join.

R. Regunathan said the language needs to be updated. From a DWTU point of view the secondary limitations are just as important. Any chemical that's being leached out. If secondary is lower, it should be called as the requirement. The standard needs to be tweaked to put a ballot through to make sure that we do mean the lowest level. It's also a good idea to have an annual review and report back after publication of 600.

R. Regunathan motioned to ballot issue paper language to update the terminology and in addition revive the task group to meet at least once a year to review 600 changes.

F. Lemieux said she would be concerned about something that conflicts with 600 and it's important to have a task group to look at that, rather than go straight to ballot. The task group would ensure there's no conflicts and also address the issue at hand, which is in some cases you want the aesthetic value as opposed to the health-based value. She then motioned as stated above under "Motion:"

G. Reyneke said that's important as some corrosion inhibitors might be out of compliance with secondaries and we need to make sure we're not having unintended consequences.

T. Schneidewend said he likes referencing 600 to have a single source, but it needs review in cases where 600 would have higher recommendations than EPA.

S. Murphy said it's important for DWTU standards to keep up with 61 and 600, so the task group meeting annually after 600 is published is important.

T. Palkon asked the task group to consider having a 600A (or different document) for secondary contaminants instead of an annex in 600 to avoid confusion. There's significant difference between health and secondary concerns.

R. Powitz said in his years as chair, a new standard confuses things so let's first see if the task group can fit something into existing documents.

R. Regunathan said 600 is not concerned about aesthetics, but DWTU is. Pointing to the 600 toxicological value may not always be practical. For example, the health effects value for manganese can be high, but not for a device also claiming aesthetic effects. Aesthetic values must be given.

R. Herman said the analytical and sample collection methods are important. For active agents, a sample is typically pulled from the first volume from the unit after it's been sitting stagnant (to obtain the maximum value with no dilution downstream through mixing). For health effects, this value has to be safe if a person took the first drink out of first unit. For aesthetics, the device design is important. For faucet-mount, it would taste nasty. Then the issue is if the JC will disallow something being certified or whether consumers will complain the unit makes water taste bad. It's not just how much comes out, but the fact that we sample in a way that maximizes the potential leach rate for these compounds, is why we need to look at the difference between aesthetic and health effects.

K. Licko said she is working with the Health Advisory Board (HAB) to bring aesthetic levels into 600 and to add experts to HAB.

Vote: All in favor.

Motion passed.

B. [Analytical Alignment Between DWTU and NSF/ANSI/CAN 61 \(DWTU-2023-1\)](#)

Motion: Establish a task group to align analytical methods in DWTU and NSF/ANSI/CAN 61 and identify any conflicts; **Z. Gleason** made the motion; **R. Herman** seconded. **Z. Gleason** to chair.

Discussion: **Z. Gleason** presented his issue paper, stating there's some misalignment in analytical methods between NSF/ANSI/CAN 61 and NSF/ANSI 53 and 58. It's difficult to keep up with new technology and methods, so he suggested using language from 61 to allow using any validated standard method to do the analysis. Or, if we don't feel comfortable with that, creating a task group to go through and update the methods across the standards so that they're harmonized.

F. Lemieux agreed with alignment. She said she was uncomfortable citing U.S. legislation in a standard meant to be international and that U.S. legislation isn't complete as EPA often approves methods through a policy and they won't be listed under CFR Part 141. She said she supports changing the language to be similar, but maybe stay away from citing legislation.

R. Herman we said we need to add a caveat that specific methods may not be allowed according to the method. For example, there's a method allowed for lead influence that's not allowed for effluence.

Vote: All in favor.

Motion passed.

TAB 4

Harmonization of Multiple DWTU Standards

A. Fluoride Effluent Values (DWTU-2023-2)

Motion: Ballot lowering the maximum effluent value for the fluoride reduction test to 1.0 mg/L in NSF/ANSI 53, 58 and 62 to match the value in NSF/ANSI/CAN 600. **J. Wolff** made the motion;

F. Lemieux seconded.

Discussion: **M. Blumenstein** presented his issue paper, saying the maximum contaminant level (MCL) for fluoride was lowered in 600 at some point to 1.0 mg/L, but the maximum effluent value for the fluoride reduction test in NSF/ANSI 53, 58 and 62 is still 1.5 mg/L. He recommended balloting to lower the fluoride maximum effluent concentration in 53, 58, and 62 in two spots in the tables to harmonize those requirements.

G. Hatch wanted to verify the value was 1.0, not 1 (it was).

Vote: All in favor.

Motion passed.

B. Water Temperature (DWTU-2023-4)

Motion: Verify proposed temperature changes with several labs and then ballot the language.

T. Palkon made the motion; **R. Tallon** seconded.

Discussion: **T. Palkon** presented his issue paper, saying there are a few small temperature discrepancies in the standards. Some are based on rounding when converting F to C and others are unknown. He recommended balloting to harmonize the temperatures, by sticking with extraction testing of 20 ± 3 °C, having one specific conversion from C to F, using 20 ± 3 °C for hydrostatic pressure testing, and using 20 ± 3 °C for chemical reduction testing including for POEs. (Currently POE has its own temperature of exactly 20 °C, which is difficult to run.)

F. Lemieux said there may be specific reasons for the differences, like why there is a range of 13–24 °C for hydrostatic water temperatures. She was uncomfortable standardizing to ± 3 °C because 1° C can be quite significant. It might be worthwhile for a task group to look into the values and tolerances.

T. Palkon said he was okay with looking into it, but prefers the ballot process. NSF/ANSI 53 was using .25 °C as the variance instead of .3 °C. Mathematically, that's in the middle and is likely based on rounding discrepancies between the standards. Most changes are very similar to the current language. Hydrostatic was 13–24 °C with everything else using $\pm$. Tightening the range for all tests will provide more consistent results.

R. Herman said the conversion is a courtesy, not a spec but conversion. [Secretariat note: From an ANSI perspective, the value in parentheses is editorial, not normative.] Setting a single variation (i.e., 20 ± 3 °C) isn't a big deal. For hydrostatic, some labs may have to add heaters in winter as large tanks filled with tap water can get cold. A specific temperature is hardest to adjust for POEs due to high volumes. He suggested a small group meet once to go through it and come up with a ballot.

R. Regunathan said groundwater supplies coming into the lab run about 56 °F, so the 13–24 °C range was selected to accommodate that when the standard was first written. Standardization makes sense now, especially as many labs use recirculating water.

E. Leung asked if the exposure water temperature is higher because of the concern of more leaching from the equipment at higher temperatures.

T. Palkon said he didn't know the history and had adjusted it only slightly to honor the history.

R. Regunathan said the original group had in mind that higher temperature might lead to higher lead leaching, but didn't have any data to support it.

T. Schneidewend wondered if it's because that's closer to room temperature and it a non-moving test, where you don't have to cool.

F. Lemieux said the explanations are helpful, but before going to ballot we need to ensure the hydrostatic range is not too tight.

T. Palkon proposed calling a few labs that do this testing to make sure we're not tightening a range too much before this language goes to ballot.

M. Unger said the cold water exposure temperature in NSF/ANSI/CAN 61 is 23 ± 2 °C and we probably want to remain consistent. **T. Palkon** agreed.

Vote: All in favor.

Motion passed.

C. Use of the Term "Protocol" (DWTU-2023-7)

Decision: It was agreed that this is not an issue and is not confusing to the audience of the standards (no motion needed). No action moving forward. The issue paper is considered resolved.

Discussion: **M. Milla** presented her issue paper saying the Standards team noticed we refer to test procedures as test protocols, and that could cause confusion because there are official NSF/ANSI standards and non-ANSI standards documents, including those called protocols. To eliminate confusion between a type of standard document and a test procedure, we could either add a definition of protocol (as a test procedure) to NSF/ANSI 330, the DWTU glossary, or ballot changing "protocol" in the standards to "test method," "test procedure," or something else.

K. Licko suggested "testing parameter" to replace the term "protocol."

R. Herman said the common meaning of protocol is a set of rules or procedures you follow within a certain framework, and that's what's meant here. It's not meant as the type of document published. He also said the issue with "test method" is that it's not just the method, but also pass/fail or other criteria. He said protocol was the appropriate term to cover this.

T. Palkon said he likes the term protocol. We could use requirement, but maybe people won't like it. From the lab perspective, there's no confusion about "protocol."

R. Tallon said adding protocol to 330 as this definition creates confusion with the non-ANSI protocols because they don't fall under that definition. She sees protocol as the traditional definition that doesn't need to go in the glossary.

J. Kendzel said we may not need the term protocol as we're saying it shall conform to NSF/ANSI 61 or to this section.

R. Herman says it's not causing confusion because it states the protocol or standard is referenced. It's not causing confusion with labs. Do the certifiers and manufacturers have an issue?

J. Wolff said there's not a lot of confusion. It's lowercase protocol so we're talking about a common noun. It's not a capital P, which would refer to a specific document. If you were citing a specific protocol, you would use its full name or a reference. That distinction would be clear.

D. [Microparticles \(DWTU-2023-8\)](#)

Decision: Continue task group work; no motion needed.

Discussion: S. Coffin gave a [presentation on microplastics](#), saying:

- California (CA) has a legislative mandate to monitor for microplastics in drinking water.
- CA defines microplastics as “Solid polymeric materials to which chemical additives or other substances may have been added, which are particles which have at least three dimensions that are greater than 1 nanometer and less than 5,000 micrometers. Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded.” This differs from ASTM and ISO definitions as it includes synthetic rubber and fibers.
- In mammals, microplastic particles <10 µm when ingested can accumulate in organs.
- CA developed standard analytical methods through an interlaboratory validation study using two different types of spectroscopies, FTIR and Raman, in 26 laboratories.
- The test matrix included four different polymers, four different size fractions, four different shapes, and some false positives.
- There was relatively low recovery (30% of particles) across all labs for all particles, which was driven by the small particles. In the 1–20 µm range, most labs had a very difficult time counting and those that could reported wide variability.
- This range is important toxicologically, most abundant in drinking water sources, and most likely to break through most treatment processes.
- The standard analytical methods are available on the **state water website** and are being promulgated.
- CA is working with instrument manufacturers to narrow the gap between the analytical methods and the nominal definition of microplastics trying to get down into the nanoparticle range.
- In terms of testing this method and any other protocol that would use particles to see if treatment removes microplastics, we want to make sure that these particles are environmentally realistic.
- There are a lot of factors to consider for microplastics:
 - Raw virgin polymers aren’t in environment; they’re changed by biofouling and typically become positively charged.
 - The size and shape and the polymers are the most relevant.
 - The particles must work in your matrix, ensure homogeneity, and have proper shelf life.
- Few materials exist for testing microplastics in the lab and in a controlled way. Some novel protocols could be used to generate reference materials. A **recent study on cryo milling and SIV separation** demonstrated fairly good homogeneity of reference particles that can be made in the lab.
- CA is working with NIST to develop a proficiency testing sample for our accreditation program, and they’re really focusing on a minimum viable product of having lower size range starting up 1 micrometer and going up to 1000 micrometers with diversity of polymers, shapes and some false positives. But ideally we would have something that really represents drinking water particles and gets all the way down to our nominal definition of one nanometer.
- For large-scale drinking water treatment plants, removal depends on the type of mechanism used. Because microplastics have so many different parameters that can influence their removal (e.g., particle size, charge, and buoyancy), you can get incidental removal with techniques such as electrooxidation or flotation sand filtration.
 - Membrane filtration is most effective for removing particles based on the size exclusion principle.
 - Membrane pore size largely determines the removal efficacy for these particles.
- Some treatment devices for home use remove based on the buoyancy, charge, connectivity, hydrophobicity and size of the particles.

S. Coffin offered thoughts and recommendations to the JC and Microplastics Task Group:

- ISO 12103-1 Arizona test dust is a fairly representative particle mixture based on size characteristics (including ultrafines), but there are differences in density and texture.
 - o The particles are outside the maximum density range of all plastics in commerce, which could make it non-representative for treatment devices that leverage the buoyancy of the microplastics.
 - o It's made entirely of minerals that are more resilient than plastic particles when subjected to UV light or physical stress (like in mixing); plastics rapidly degrade into smaller and smaller particles (nanoparticles). This could be a very significant consideration when choosing a challenge mixture for treatment units.
- If working with UV AOP, be aware of the interaction with microplastics in terms of creating trihalomethanes. The plastics can act as a form of organic carbon.
- The vast majority of microplastics in drinking water sources are microfibers which behave a bit differently than fragments, which is mostly what ISO test dust is. A fiber can pass through a membrane lengthwise. You want to think about the width of the particle instead of the length.
- The particles can impact the membrane filter differently from inorganic particles. Biofouling on the plastic particles increases the rate of membrane caking and pore blocking, which could impact how long filters can effectively remove those particles.
- He recommended replacing the word microplastics with microparticles to be more accurate until there's a reliable and commercially available challenge mixture.
- Most consumers won't know the difference, but we want to be on the safe side and not claim something that in a year's time may not be a valid claim.

J. Wolff agreed consumers may not know the difference between a microplastic and a microparticle. He suggested postponing any microplastics evaluation until we get a representative test matrix.

T. Palkon agreed microplastics for lab use would not be commercially available soon. If industry is looking for a microparticle claim, we can still add it to NSF/ANSI and take the recommendation to separate microplastics from microparticles until we can figure out a suitable challenge.

H. Patel agreed on the need to distinguish microplastics versus the Arizona test dust challenge used in NSF standards, but wondered how different microparticles are from our existing 0.5 μm Class I particulate claim in NSF/ANSI 42. We can table those changes until we have more definition of what changes are needed to do a thorough evaluation of a microplastics removal claim.

R. Herman cautioned against making too many decisions in either direction at the moment, saying:

- Some of the studies were conducted in a municipal plant, whereas our standards cover residential RO systems. There are different flux rates and pressure differentials across those membranes.
- Plastics that get into a system can get smaller and smaller until they pass through. The question is what sizes? At the mentioned 99% for a membrane, if you have cross flow, those plastics may be discarded in the rejection water.
- Arizona test dust isn't a bad surrogate. It doesn't have all the same characteristics as microplastics, but size range is important and some characteristics of inorganics will typically cause a product to shed and release more of them than a microplastic -- like with biofouling, which doesn't typically happen with inorganic particulates, but can with plastics.
- The absorption rate can be different. Systems using electrostatic adsorption could have a difference because a lot of those are inorganic particles and have great charges. We'd have to look at some of those things carefully, as well as the literature and this kind of a new area.
- Currently, creating a stable synthetic or artificial microplastic challenge may not be doable.

R. Regunathan said we shouldn't dismiss test dust as a surrogate. Microplastics is poorly defined all over the world and ranges in size greatly. It may be a long time before we can get a better surrogate,

and we've selected a decent one. As a task group, we have an obligation to discuss this and come to a reliable conclusion based on the input.

T. Schneidewend said he agrees with being more inclusive of particles and we have a pretty decent early surrogate. We can upgrade and improve in the future, but have a good starting point. From a marketing and product standpoint, consumers/users gravitate around the term microplastics (versus what the scientific community may use), so he wouldn't want to move away from microplastics unless we can shift the advertising. It seems like the fear is generated by the term microplastics.

T. Palkon agreed with **R. Regunathan** to take it back to the group. He agreed with **R. Herman** that there is a significant difference between the municipal water treatment of RO and what the standards cover (lower pressures, single pass vs. multiple passes, etc.). Data is likely not available on natural water, microplastics, and POU RO systems. He stated he would schedule another task group call to discuss the new information in terms of the surrogate, balloting, tweaking definitions, etc.

E. [Max Operating Pressure \(DWTU-2023-9\)](#)

Motion: Accept language with modifications as discussed below and send to ballot; **R. Herman** made the motion, **T. Palkon** seconded.

Discussion: **R. Prince** presented his issue paper, saying both rated service flow testing and reduction testing are intended to be run at the same pressures which causes an issue with systems that have inherent variation. Because of the tight pressure range for both tests, the service flow system has to flow slower than the reduction testing system. To resolve that, he recommended allowing higher pressures during reduction testing. The NSF/ANSI 42 chloramine reduction section already allows up to 90 psi inlet pressure and the rated service flow should maintain 60 psi. That's where we should control the actual flow rates and ensure the system meets/does not exceed the rated service flow and minimum service flow. The reduction sections of the standards should eliminate the conflict with the rated service flow by allowing the expanded upper pressure limit.

R. Herman said the standards don't contain a rated service flow test *per se*; they allow using the lowest rate achieved during full performance testing at 60 psi, but it may not be the target flow rate and that's where the problem is. For example, at the end of a suite of contaminant reduction tests, you could have one that started at the clean system flow rate of .49 gpm and that's as high as you can claim.

- The proposed solution would allow targeting, in the same example, system flow at least at .5 gpm. If the clean system flow rate is less than .5 gpm, you can increase that pressure to get the targeted minimum flow rate. It's still conservative; if the unit flows higher, that's fine, and you're always running at a higher flow rate so you don't get .49 if you targeted .5.
- The solution also puts an upper limit on how much to increase pressure until it's clogged. You want to be careful in the chloramine test where if you cannot maintain a 90 psi flow rate, that's the end of the test. That's different from the other tests, which allow a decrease in flow rate over time; it's the initial clean service flow rate that determines rated service flow. So you may not want to put that in, instead keeping the clogging spec (drop <75%). You may only want this adjustment to pressure at the beginning of the test and then to maintain that pressure during the test.

G. Reyneke said with plumbing code setting maximum influent pressure at 80 psi, do we have any concerns that we're out of the realm of reality?

A. Patil asked if 90 psi pressure is attainable in the field. Many people will not be able to get >60 psi, or sometimes even less than 60.

R. Prince said 90 psi is already in the standard and he felt it's more of a lab decision. If they didn't feel comfortable going up to 90 psi, they could deny that request or we could change the wording. There could be other factors for wanting to test at a higher pressure (bracketing or a particular sample needs to flow faster). The minimum service flow portion of the standard requires ensuring a system is flowing and meeting the reality of the situation and then you can evaluate the system reduction performance separately under higher pressures for reasons that **R. Herman** laid out. It eliminates variance and

ending up with a slower flow rate than intended. It's not saying the system itself requires 90 psi to operate correctly; it allows the unit to be run at a specified flow rate. We can adjust the 90 psi if we think it's too high, but any amount of additional or higher pressure would be helpful.

R. Tallon agreed with **R. Herman's** suggestion to set the pressure on the initial clean water flow and leave it there. That will allow maintaining the plugging factor that's part of the standards already.

Z. Gleason said the rated service flow/minimum service flow would be used to set what the product can claim as its operating flow rate. That would be set at 60 psi so we're not moving away from reality in terms of what a product is claiming from a flow rate perspective, but trying to address issues that come up during testing like variation from product to product or an expectation of some other artifact causing a miss on the flow rate. We are setting the flow rate at the start of a performance test and allowing the pressure to go >60 psi when setting that flow rate. Then we're allowing natural fouling to occur to decide if the product clogs. If anything, it would create a more conservative situation because you have a higher flow rate/lower contact.

G. Reyneke said he was comfortable with that.

T. Palkon said most products have a working max pressure of 100 (or 120) in the literature so he's not opposed to the 90. He agrees we should set it at the beginning and let it go. This generates test data and there are other tests for real-world flows to ensure the correct minimum flow rate. With the tweaks discussed, he felt this is ready to ballot.

R. Herman motioned modifying the language that if required, the pressure should be adjusted at the beginning of the test during the clean system flow rate and then maintained throughout the test.

Z. Gleason said the one small difference between that and what **R. Prince** is getting at is if a product is starting to slow down and the manufacturer wants to hit their capacity, can they apply more pressure to keep the product moving? If it's set at 70 psi to achieve 0.5 gpm, but then at 120% the flow rate dropped undesirably, can they increase the pressure to maintain and hit that longer capacity? Will that be an allowable option?

R. Prince said he was thinking of systems that couldn't meet it out of the gate, but it's something to consider but it would add complexity.

R. Herman said that is the intent of that section in 42 for chloramine, but it was not the intent of his motion due to the extra complexity it adds. We're trying to solve the problem of having a contaminant reduction test that won't be supported for a rated service flow and this would eliminate that problem.

H. Patel asked why rated service flow testing is needed. The standard doesn't ask for it, but a lot of labs do it and that creates a problem. Regarding flow reduction during a test, the VOC test is notorious for clogging up filters; if the test stands are not maintained, the bioburden goes up and quickly reduces product flow. He likes the idea of a high pressure and being able to adjust it as the test goes on to at least maintain the flow. 53 has other requirements for flow controls: For a chemical reduction test, if performance will be affected by flow rate, a flow control device must be included with the product. How asked how flow rates will change if the product already has a flow control and how that would be evaluated. We need to solve this problem and not rush to ballot, but have a task group look at all aspects and come up with a robust solution.

R. Regunathan said he is also concerned about the flow control requirement in 53 and that including it in 42 and 53 is a potential problem. The standards have distinctly different requirements for controlling the flow to maintain the ability to remove contaminants, usually by the use of flow controls which is common for products tested under in 53, not 42. The chloramine requirement was added to address a soft drink industry concern about how chloramines can affect drink quality. We found that filters clogged very quickly and allowed the higher pressure as a means to keep the test keep going. The chloramine requirement is not germane to other contaminant reductions in 53 or 42. Applying it across the entire set of standards would be a misapplication. It needs to be properly thought through.

R. Herman said that's why he wanted to modify this so that we don't actually apply increasing pressure over time to try to maintain 90; it's just at the beginning that you can adjust pressure.

- Clogging under an organics reduction test is usually either biofilm growth or polymerization in the media. This is different from a chloramine test where the pressure works because there's almost always static particulate that slowly adds to it and many of the tests are extremely high volume. The pressure is effective. It's not an issue with biofilm, which would still clog quickly even at 300 psi.
- This proposal is not designed to solve the problem with an improperly designed flow control; it solves the problem of being a few points below target and getting a little variation around the target. Flow controllers often peak at 70–80 psi; any higher, they restrict and start dropping the flow more.
- This applies to 53; 42 is a rated service where you set the flow rate. This doesn't apply to 42 except the chloramine test, but everything else you go at 60 psi and adjust the flow rate on the rig. For 53, you put it at 60 psi and the thing just flows at whatever it flows at.

C. Li said for chloramine testing, clogging can be addressed by using prefilters to remove particulates or maintain flow rate and capacity, but that might not be a factor at high volume, high flow.

T. Donda wanted to ensure the updated balloted language would not include “maintain the specified flow rate” because the standard allows the flow rate to drop during testing.

R. Prince said we can probably remove the last three sentences and add wording about being at the initial clean flow rate and then maintained.

T. Palkon said if we keep it as simple as “the initial clean flow rate can go up to 90 psi” there's no need for a task group. If we want to do more than that, then we'll need a task group.

H. Patel said he was opposed to going directly to ballot. With no task group, there's no opportunity to discuss nuances involved in robust testing and the two-thirds voting system doesn't highlight those key aspects for the rest of the members to value thoroughly. **R. Powitz** said members can vote no and comment on the ballot.

R. Regunathan said he was also opposed.

Vote: 31 in favor, one opposed (**H. Patel**).

Motion passed.

TAB 5

Current Open Issues/Action Items

A. [PFAS Task Group Update & What's Next \(DWTU-2023-5\)](#)

Decision: Continue task group work; no motion needed.

Discussion: **A. Patil** [shared slides](#) of the PFAS Task Group progress to date, plus plans for what's next. Full details are in the linked documents above. Highlights include:

- The JC approved a ballot in June 2022 for six new PFAS compounds (PFOA, PFOS, PFHpA, PFHxS, PFNA, and PFBA) in NSF/ANSI 53 and 58. This incorporated information developed in EPA's UCMR-3 and in some instances also utilized individual state health advisories and state MCLs.
- The standards allow reduction testing of PFAS compounds either individually or as a part of mixture.
- This is the first and only national health-based standard for PFAS that takes into account the latest MCLs and health advisories issued by individual states.
- EPA's UCMR-5 will develop occurrence data from U.S. public water systems for 23 new PFAS compounds plus the six in UCMR-3. This started this year and will complete by 2025.

- Incorporating the 23 new PFAS compounds in a health-based standard will be a Herculean task, so we proactively considered proving the concept by developing a surrogate compound(s) to represent all or most of these compounds. (Surrogacy has been successfully used by the DWTU JC for VOCs.)
- The Water Quality Research Foundation (WQRF) has funded a phased research project to investigate surrogacy for PFAS compounds for activated carbon, anion exchange, and reverse osmosis treatment technologies. The project is expected to be completed in 3 years when the occurrence data for UCMR-5 compounds will be available.
- WQRF established an Independent Task Group and Expert Observer Group (chaired by **A. Patil**) to prove the concept of PFAS surrogacy for activated carbon technology. The Task Group includes members of the NSF PFAS Task Group plus experts on activated carbon. The Expert Observer Group includes experts from the WQRF VOC Surrogate Project plus EPA research experts on PFAS.
- The WQRF Task Group and Expert Observer Group developed an RFP on PFAS surrogacy, and submissions are currently being evaluated. The project is expected to start by year end.
- Hazard Index = Sum of Hazard Quotient for PFAS
Hazard Quotient = PFAS Concentration / Health Based Water Concentration
Hazard Index = PFHxS in ppt / 9.0 ppt + PFNA in ppt / 10.0 ppt
+ GenX in ppt / 10.0 ppt + PFBS in ppt / 2,000 ppt
- Finalization of the Proposed Drinking Water Standard for PFAS is expected by December 2023 and would take effect in 2026.
- The DWTU PFAS Task Group could modify 53 and 58 to conform to EPA's new MCLs, using the same occurrence levels (UCMR-3) and the new health-based water concentrations (HBWCs). Analytical validation for accuracy, reproducibility, and conformance between labs will take some effort.
- New occurrence data from UCMR-5 is expected by 2025, which will need to be considered.
- The WQRF-funded surrogacy project is expected to yield results in 2024-2025.

To review all these issues and agree on further action, and to keep up with dynamic developments, A. Patil recommended that the JC authorize re-convening the DWTU PFAS Task Group. [Secretariat note: The task group was never deactivated, so no vote was required to continue task group work.]

E. Yeggy said WQRF has not yet voted on funding and would like to give the DWTU JC the opportunity to submit comments on the selected proposal. The WQRF group will decide whether this surrogate gets put into the standards, so DWTU JC comments and feedback are important. [Secretariat note: We will follow up with a formal request to the DWTU JC.]

F. Lemieux said the 29 PFAS compounds are based on analytical methods; there's no health effects data. They're there because that's what they have standards for, that's what they've done in round robin testing, and they're in UCMR-5. She spoke with **K. Magurany** (NSF) and **E. Burneson** (EPA Office of Groundwater and Drinking Water) about how to incorporate EPA MCL changes into NSF/ANSI/CAN 600 as Health Canada has a different approach of potentially using the MCLs when they're finalized at year end. She suggested not moving forward with any action until those values are finalized. She said **E. Burneson** mentioned some UCMR-5 data is expected to be released in July. The deadline for completion is the end of 2025, but they will release data as it's received.

A. Patil said it's a dynamic field. We'll get information over time and can figure out how to react.

F. Lemieux said **K. Magurany** and **E. Burneson** said other risk assessments are underway and the Health Advisory Board can review those numbers for standards use. Health Canada PFOA/PFOS numbers are quite high as we developed them before the new science came out. It will be about four years to come out with new guidelines. We have an interim exposure protection measure in place, which is completely treatment based, while we complete the risk assessments. It's not health based because it was too difficult and there's no consensus on some health effects. We're set at 30 ng/L for any PFAS under EPA Method 537.1 or 30 ng/L for all 29 compounds under EPA Method 533.

R. Powitz suggested timing the task group meetings around the release of new data.

R. Tallon requested convening the task group soon to start discussing how to handle the hazard index.

A. Patil said we will convene soon and discuss other topics as well.

R. Regunathan agreed this is not an easy task and to go beyond this point, we have no other legal basis to rely upon until EPA comes up with the numbers. We can anticipate and work on it, but cannot use those numbers as a basis for any concluding action.

K. Licko said she wanted to make sure the DWTU JC knew there is also a DWA PFAS Monitoring Task Group addressing the extraction-related issues, co-chaired by **K. Magurany**.

TAB 6

NSF/ANSI 42

A. Chloramine Run Time (DWTU-2023-10)

Motion: Establish task group to review language based on discussion below; **R. Prince** made the motion; **R. Herman** seconded. **R. Prince** to chair task group.

Discussion: **R. Prince** presented his issue paper, saying a change to the standard stipulated a 4-hour minimum runtime for the chloramine test on the 20%, 40%, 60%, 80% and 100% points. However, testing to this requirement significantly impacts performance. We need to reconsider how realistic this is and whether there's a better way to make reduction performance testing more consistent, but not so difficult that products have to be over-engineered to be able to pass the standard.

R. Prince shared data sets from testing POU filters at a .5 gpm flow rate under the 5/95 cycle:

- It started at a high reduction percentage and day by day the percentage dropped, eventually dropping to just under 80%, which is the new minimum reduction performance level.
- After a four-day stagnation over a holiday, it jumped back up to 96.3% reduction and even after the 4-hour runtime, it was still at 89%.
- At additional points, it started to drop a bit quicker, but when we went to four days in a row of running, if we took a point after an hour of runtime on the fourth day following stagnation, it was still at 83.5% reduction. It wasn't until 4 full hours that it dropped below 69.5%.
- The 4-hour vs. 1-hour runtime has a significant impact, whether or not you pass the test.
- The second data set records the approximate start and sampling times, and showed similar results. A five-day stagnation saw good recovery that went down significantly after the 4-hour runtime.
- Even at a 5/95 cycle at .5 gpm, it runs 24 gallons of water run through the filter per day, which is much higher than the average user of a POU filter.

R. Prince suggested, for POU filters, changing to a 1-hour minimum run time, consistent with the recently approved [operational cycles ballot](#). At a 1-hour run time and 5/95 cycle at .5 gpm, 1.5 gallons of water is filtered, which is in line with expected heavy use. It's not gaming the standard to get higher reduction percentages than what a consumer would expect. He also recommended that if the point would be taken past the 1-hour minimum run time, manufacturers can request doing it the next day. This also requires reducing the total points to 10 UV, 25%, 50%, 75%, and 100% for ease of analysis.

R. Regunathan asked if a filter used in post-mix operations at a higher flow rate would be POU or POE.

R. Prince said you could argue it has many POE characteristics and the certifier can potentially classify it as such. There's already a flow rate exception where 5/95 can only be <2 gpm. We could potentially follow a similar exception of <2 gpm for POU units, one exception should not prevent correcting this for the vast majority of POU filters.

H. Patel asked about water bottle filters with at a high flow rate.

R. Prince said it's the same response. If we have data the bottle filler is >2 gpm, we can add the same exception. If there's concern about 2 gpm, we can look at that as well.

R. Herman said he appreciates the data, and suggested either forming a task group or taking no action:

- The 5/95 is an option in the standards specifically for the devices in question (small POU systems with low flow rates) so they could operate much closer to the on/off cycling in real-world use.
- NSF conducted a study on residential POU use patterns, and on average 5/95 was what people use POU devices at. It was over three periods of the day, and the most use was in the evening.
- The tests have always been conservative because we accelerate them (for cost and to have high confidence that units with manufactured variances will perform in real world). Four-hour run time was added because it took that long for unit performance to stabilize. You can run up to 16 hours per day; to sample in the first hour and then run it for another 15 hours with it not reducing the chloramine inlet concentration by 80%, is like sampling only when the unit performs well and letting the rest of the test water run through and not absorb as much chloramine. Then running it the next morning for an hour and collecting the sample would be definitely improve performance, but it would not take care of weekend or stagnation issues, as the data showed the four-hour run time was much better at that.
- If you're going to have to take a sample that's longer than one hour from when the test started, letting manufacturers push to the next day is manipulating the test to get the best possible performance numbers.
- The minimum 4-hour run time ensures the units perform over the entire lifetime, not just after four hours. The sample points were added because this is a difficult test, and if manufacturers failed before the last sample point, they had enough data to make a claim. This is a difficult contaminant to remove, and it does require significant design engineering to get it to perform.

R. Prince said he's been able to request additional points and labs/certifiers have accommodated that. Or you can test to a lower capacity and get extra points to ensure you can at least meet some capacity before trying for your target. He asked if the use pattern study could be shared. He questioned 5/95 which implies 24 gallons per day of POU filter use.

R. Herman said the 5/95 wasn't based on a total volume per day, but how often it gets used and how much delay time there is between when it's sitting versus getting used.

R. Regunathan said issue usually that 5/95 comes up during the peak periods, maybe between 5-7 pm.

R. Prince said:

- That's exactly why 1 hour is fairly representative as the peak period is an hour, maybe two, and that will be after a long rest. He appreciates being conservative, but we're over-conservative compared to usage. Previous data showed the most usage was around 1 gpd. At 1 hour of runtime, .5 gpm at 5/95, that's 1.5 gallons, not even considering that you're still running that test the rest of the day.
- In actual usage, if someone's running it at peak for an hour, resting for 6 hours, and running it for another hour, you'd expect to see that recovery versus in the actual test it's running that entire time.
- He suggested additional points being taken at the end of the day are more for reference and don't necessarily have a pass/fail criteria. You don't want it to go down to 20% and then recover. But from the data shown, when it's going down to 79.2% and you're failing because of that, even though that's unrealistic for the actual usage, that's a problem in the standard.
- There's a middle ground somewhere to get closer to actual usage and still make sure we're not gaming testing and artificially passing.

Vote: All in favor.

Motion passed.

TAB 7

NSF/ANSI 53

A. Carb Dose Reference Update (DWTU-2023-6)

Motion: Model several systems to see if they could pass and then ballot removing the Carb Dose reference with the supporting data. **R. Herman** made the motion; **T. Palkon** seconded. **R. Herman** to conduct the verification.

Discussion: **M. Milla** presented her issue paper, saying in a publication review, we discovered normative language in 53 that requires using Carb Dose software from EPA to calculate total activity of lead, polonium, and bismuth after one year of use. However, that software is no longer available online and no longer supported by EPA. After discovering **R. Herman** had a copy of the software files, and checking with NSF's legal team, we uploaded the files to the NSF Online Workspace (NOW) and linked to them in 53. This is an interim solution—if these files are still needed, is there a different calculation we can provide, and if not, can we remove the reference?

R. Regunathan and **G. Hatch** asked if anyone was certified for these.

K. Postmus said NSF has a few companies listed.

E. Yeggy said WQA has a couple listings as well.

R. Herman provided some background and a suggestion on the calculation:

- It determines how much radioactive exposure could occur from a carbon system that has been absorbing radon over a year. As radon is absorbed, it decays through a decay chain and ends up with an inert lead at the end of the chain. Down that chain different radioactive elements emit different types of radiation over time.
- This calculation looked at the performance the unit achieved during testing and the amount of carbon used in the device itself, and determines what its level of radioactivity would be over a year, which had to be <2,000 pCi/g. We never got even got close (more around 150 pCi/g).
- It's not a simple calculation to recreate and we don't have the source code, but it may not be needed. It would have to be an extremely tiny carbon block to get the concentration high enough to violate this requirement. We have a fixed inlet amount and the ones we calculated had 95–98% reduction. Even with full reduction over a year, the carbon block would have to be extremely small (it also depends on flow rate). It's unlikely any product could violate this.
- Since the software can still be run, we could model several different size systems based on their flow rate, assuming 100% reduction, and determine some levels and whether any could possibly fail this limit. If none can fail the limit, we remove it from the standard.

G. Hatch said if there's nothing that violates it, we can remove it, but we need some kind of limits.

H. Herman agreed we could add limits on flow rates.

F. Lemieux asked if we knew why EPA stopped maintaining the software.

H. Herman said the person who coded it left EPA and the radiological group split off. They mostly deal with mining now and no longer needed the software. We were the only ones using it.

Vote: All in favor.

Motion passed.

TAB 8

A. [Lead-Free Changes \(DWTU-2023-11\)](#)

Motion: Ballot the second option proposed in issue paper (see below). **A. Zoldan** made the motion; **F. Lemieux** seconded.

Discussion: **R. Prince** presented his issue paper, saying 177 says all materials must meet the definition of lead-free in the Safe Drinking Water Act (SDWA) as amended in 1986. This brings up some issues:

- The language in 1986 is not the same as the today, so do we really mean to refer to the latest one?
- This also seems a bit unnecessary as it conflicts with 372: 177 states that all materials must meet the SDWA requirement whereas 372 allows using a weighted average for the entire system. You could potentially have a more stringent requirement in 177 than in 372 for very small material with a high percentage of lead.
- SDWA has accepted exemptions for fixtures for non-potable services which include shower valves. In the standards, we could assume shower filters are under that same exception (whether they technically are or not, which is an EPA and legal decision).

R. Prince provided two options:

- Remove that all references to the SDWA in 177 and leave the lead-free requirements through 372 as an optional certification for shower filters, **or**
- Harmonize the requirements of 177 with those of 372 and eliminate the reference to the 1986 version of the SDWA. This resolves the issues of the weighted average value of materials, so a shower filter would not be held to a more stringent standard than 372.

T. Palkon said the language exists as 177 was originally published before the modification of the SDWA in 372 existed. Tub spouts and shower valves do not have to comply with 372, but it's unclear for shower heads. **R. Prince** said they're not specifically listed as an exception.

T. Palkon said shower heads are covered in ASME A112.18.1. It doesn't specify shower filters, but states that fittings intended to convey or dispense water for human consumption must comply with 372. It doesn't include shower heads as having a primary intent to deliver water for human consumption. If shower heads are certifying to 372, it's not being mandated by the current standard.

D. Farley said ASME does not require it for non-potable items such as shower heads, and it's definitely not required for NSF/ANSI 61. It should be looked into, though.

E. Gill said for the federal level you only need to comply the flow rate pull force; she didn't recall ever seeing a lead-free ruling for showerheads. She questioned why 372 would be rolled into this since it's not being consumed.

F. Lemieux said she imagines EPA deemed it wasn't significant enough, but sports teams fill carboys with water from the showerhead. From a public health standpoint, that's a potential exposure. Even if it's excluded, we can at a minimum have it as an optional claim.

M. LeChevallier said EPA defines potable water as intended for human consumption (drinking, bathing, showering, hand washing, teeth brushing, food preparation, and dishwashing). It's not just ingestion. Non-potable water is not even intended even for domestic use. Potable water would be considered water used for all domestic uses including showering. Shower heads don't get a bye just because you don't necessarily drink out of a shower head.

J. Kempic said some exemptions are written into legislation. The Reduction of Lead in Drinking Water Act of 2011 specifically identified shower valves and tub fillers as exemptions that Congress ordered into the act. There are certain things that are literally listed in the act and that we've codified in our regulation. But "shower valves" is somewhat vague as to whether that means shower head.

D. Farley said we should consider harmonizing with other standards, e.g., ASME and 61 (which defines potable water and, from a PMI standpoint, that excludes shower heads).

F. Lemieux asked **J. Kempic** if there's a requirement to label anything that's not intended for drinking water consumption if they're not meeting 372/lead-free legislation.

J. Kempic said there are two types of exemptions: 1) those listed specifically by product name like toilets, bidets, tub fillers, and shower valves, and 2) those more defined as "used exclusively for non-potable services," which gets into interpretations, is a higher bar than "intended for," and in some situations requires labeling that the product should not be used for any potable application.

D. Farley said 177 has a requirement for labeling that it's non-potable.

T. Palkon said Option 2 requires NSF 372 testing for 177 shower filters.

Vote: 30 in favor, two abstentions (**H. Patel** and **T. Palkon**)

Motion passed.

TAB 9

Task Group Updates

The detailed reports are linked; only supplemental information is noted here:

- [244 Subtask Group on Test Procedures](#) (**G. Hatch**)
- [MCLG](#) (**G. Hatch**) – The group will meet one final time to resolve the issue.
- [Microplastics](#) (**T. Palkon**) – The group will meet to discuss microparticle input on from **S. Coffin**.
- [RO Efficiency](#) (**T. Palkon**)
- [Turbidity](#) (**H. Patel**)
- [Higher Lead Influent Subtask Group](#) (**A. Patil**)
- [Activated Carbon Testing](#) (**D. Purkiss**)
- [End of Device Life](#) (**R. Regunathan**)
- [TOC Concentration](#) (**S. Woltornist**)
- [WQA ORD1901 – Manganese](#) (**E. Yeggy**)

TAB 10

Informational Updates

A. [Health Advisory Board Updates](#)

K. Magurany provided an overview of the NSF Health Advisory Board (HAB) including charge and membership, the compound review process, and the list of high-priority compounds. Recently reviewed compounds (*bold = HAB acceptance*): **isobutyl acetate**, **dimethylamine**, **2- & 3-heptanone**, butylated hydroxytoluene, **butyl ether**, and **bisphenol A propoxylate**. Compounds in review: benzoic acid, cesium, 3,4-dimethylphenol (3, 4-xyleneol), triallyl cyanurate, and trimethylamine.

B. [WaterSense Reverse Osmosis Systems Draft Specification Update](#)

E. Hughes provided an overview of the EPA WaterSense program, WaterSense involvement in standards committees (NSF/ANSI 58 and ASSE 1086 are referenced), and a summary of the draft specification. She said next steps were forming a working group with industry members to figure out the best labeling requirements, but as there's already a DWTU task group addressing efficiency and recovery rating, it might make more sense to address these issues that way. She will follow up with the DWTU secretariat to confirm and facilitate.

C. [Drinking Water Legislation Updates](#)

D. Farquhar provided an update on bills regarding drinking water, saying there is no federal environmental health law; most legislation regarding environmental health occurs at the state and local levels. Four state bills have passed so far this year: WV-PFAS protection, VA-onsite sewage regulation, MT-subdivision sanitation laws, and IN-child care facility drinking water, which references NSF/ANSI 42 and 53. He also provided a reference document, [Drinking Water Legislation 2023](#), which contains detailed information on the laws covered in his presentation.

Committee Administrative Issues & New Business

R. Powitz asked the group if there was any additional new business.

E. Leung said a big issue facing local and county public health is replacing lead service lines, which will coincide with the rollout of a lot of POU devices. There's general confusion in how to identify the correct filter. He suggested if there's a way to improve the labeling requirements under NSF/ANSI 53 and 42 by developing a simple voluntary unified logo for packaging for lead filters. It would allow 1) end users to quickly identify a filter that works for them, and 2) regulators, local and county health staff, and sanitarians can point to it. There are currently so many certifier marks and product labels. It would be similar to the [EPA Consumer Tool for Identifying POU Drinking Water Filters Certified to Reduce Lead](#), but easier to navigate with one label for use across all certifiers.

A. Patil said isn't that duplication with a certified product? Isn't certification a guarantee of the product being well performing?

E. Leung said it's not duplicating the certification, but adding perhaps a literature requirement. Kind of like WaterSense, it would be a label that we agree on in addition to certification to improve labeling to educate the public, healthcare providers, everybody.

F. Lemieux said we're trying to simplify languages across the board; government has gone to simplified language for any instructions for the average person. For lead it would be ideal if there were a logo in addition to the certification mark that clearly identifies the product removes lead. If you don't understand how the standards work, it's not obvious what you're looking for.

R. Powitz cited a case where a family bought a lead filter certified to 42 because it was cheaper. The child was sensitive so they're exploring suing the store. The information is there, but not in a way useful to the consumer. This is concerning to public health professionals.

K. Postmus expressed concern about misuse of a logo, asking who has the authority to monitor use, how do they enforce it being applied appropriately, and who responds to any misuse? That's the value of a certification mark and the whole validation process.

M. Milla expressed concern that this seems like a certification policy issue, not a standards issue. The two activities are firewalled. And on the front end, who would develop the logo? Certification marks are developed by companies with graphic designers, which is outside the standards purview.

T. Palkon said this issue was brought up when 372 and 61 Annex G originated. Who would own the mark? How do we enforce it? What if someone not certified decides to use the mark -- no one can enforce random artwork available to the public.

K. Licko said there's precedence with the LED Q mark. There is possibly a path forward that we could incorporate something into our certification mark that makes it easy.

R. Herman mentioned antitrust concerns. We have very complex technologies and close to 100 different types of contaminants that different products can remove or treat. It's very hard to communicate something complex simply. Whatever we come up with, we still need to educate. Lead is only one contaminant. How do we deal with all the PFAS? If education doesn't reach the regulatory community, it doesn't reach the public.

R. Regunathan said it needs to be brought up in a different avenue, not through an SDO.

K. Magurany said the food industry applied smart label to products so consumers can directly access product-specific information.

T. Palkon said WQA started work 10 years ago on something similar to a food label on candy bars. This is an industry association-led effort, supported by certifiers, labs, and regulators.

T. Schneidewend said a smart label or QR code linking to the specific certification may be useful, especially if it's a landing page teaching how to read the label.

J. Kendzel said the biggest confusion is we have all sorts of certification marks already. He would recommend the public health folks suggesting how to make the labeling requirements in the standards easier for the consumer to see what this filter is certified to do. A logo is probably more in the realm of an industry association.

H. Patel said the issue is that every filter carries a mark even if only certified for material safety or structure, instead of contaminant reduction claims. The standards allow that.

T. Donda said there's no requirement on the packaging in our standards so how do consumers know which product to choose? Packaging requirements may be a way to address this issue.

T. Palkon said our performance data sheets require labeling lead reduction at both pH 6.5 and 8.5. He supports simplifying what the consumer needs in a less technical way as well as considering optional packaging requirements. He isn't a fan of a new mark specifically for lead.

F. Lemieux said from a public health standpoint, we're telling people to get the filters, but they don't have a way of figuring out the correct product to protect themselves. Labeling requirements are definitely an option we should consider and it's relatively urgent and critical.

J. Talley said if we're trying to educate new consumers, labeling maybe not be the place to start; typically if you're looking at the label you already own the product. Guidance on what should be on retail packaging, especially related to contaminants of concern, may be a good start. We may also have to educate consumers on where to find information on what products are certified for lead reduction and what types of products would be best to use in their home.

R. Herman said most products certified for lead do put that on the box. Telling manufacturers how to communicate their lead reduction claim may help, but only if we do the education piece too. We still have to communicate what lead reduction means and may be something the standard could do.

G. Reyneke said it may be informal education to vendors that they need to talk about their certification. This should be a commercially-driven solution instead of a prescription from a standards authority.

R. Powitz said regulators like performance data sheets on pretty much everything.

L. Cang said service people at big boxes aren't familiar with lead certification.

J. Wolff brought up new business. There's a higher lead influent task group, but there is some market demand for products that produce water with lead at <1 ppb (lower than the current standard). Is there any appetite for discussion around the 53 claim for that? The MCLG for lead is 0.

T. Donda asked **J. Wolff** what would prevent a manufacturer from making that claim if they reached <1 ppb. They could put the average percent reduction on the product data sheet.

R. Herman said it would be certified for lead reduction and you can also state the actual effluent maximum effluent value.

J. Wolff said it's fine print and that's hard for education.

R. Powitz reviewed the action items. The next annual meeting date was tentatively set for **Wednesday, May 8, 2024**. If this conflicts with industry meetings, let us know.

R. Regunathan motioned to adjourn the meeting; **R. Herman** seconded. All were in favor.

2023 Annual Meeting Participants

JOINT COMMITTEE MEMBERS

Chair, Robert Powitz (R.W. Powitz & Assoc., P.C.)

Public Health/Regulatory

- Robert Dumancic (Ontario Ministry of the Environment)
- Jeffrey Kempic (U.S. EPA)
- Mark LeChevallier (Dr. Water Consulting, LLC)
- France Lemieux (Health Canada)
- Eugene Leung (CA Waterboards)
- Darren Lytle (USEPA)
- Artemis Nikolaou (IDEM)
- Ashley Voskuhl (ASDWA)
- Ariel Zoldan (Michigan EGLE)

Industry

- Rob Astle (KX Technologies)
- Margaret Bicking (Ecowater Systems)
- Chris Caldwell (Trojan Technologies)
- Sun Yong Lee (PUREMEM Co. Ltd.)
- Shannon Murphy (Aquamor)
- Mikiko Nakayama (Mitsubishi Chemical Cleansui Corp.)
- Hemang Patel (Cuno, a 3M Company)
- Arvind Patil (Protect Plus/Ricura Technologies)
- Tedd Schneidewend (Culligan International)
- Becky Tallon (A.O. Smith)
- Joe Wolff (Elkay Manufacturing)

User

- Jun Kim (Florida Polytechnic University)
- Janick Lalonde (National Defense & Canadian Forces)
- Art Lundquist (US Army Public Health Command)
- McCrory, Philip (Consultant – User)
- Greg Reyneke (Red Fox Advisors, Inc.)
- Mikhail Starostin (Green Mountain Coffee Roasters/Keurig)

Certifier/Testing Lab

- Nathan Edman (AWWA)
- Irina Garbar (UL LLC)
- Zac Gleason (Water Quality Association)
- Brook Hatton (CSA Group)
- Mandy Huntoon (NSF)
- Tom Palkon (IAPMO)

Non-Voting Emeritus Members

- Frank Brigano (Consultant - Industry)
- Gary Hatch (Hatch Global Consulting Services)
- Rob Herman (Herman & Associates)
- Regu Regunathan (Regunathan & Associates)

Proxy

- Steven Woltornist (KX Technologies) for Rob Astle
(afternoon only)

Joint Committee Member Not in Attendance

- Mark Rohde (Sumit MHRI Solutions)

2023 Annual Meeting Participants

OBSERVERS

- Tim Beall (Topper Manufacturing/WOW Water Systems)
- Cyndi Benson (Harmsco Filtration Products)
- Emily Berquist (Minnesota Department of Health)
- Debra Bickers (Whirlpool)
- Mark Brotman (Kinetico, Inc.)
- Sung Choe (IAPMO)
- Tina Donda (IAPMO)
- Doré, Evelyne (Health Canada)
- Jaclyn Fant (Water Quality Association)
- David Farley (Sprite Industries)
- Kristen Fischer-Ptak (Hollingsworth & Vose)
- Katie Friedman (Clorox)
- John Galt (Minnesota Department of Health)
- Evie Gill (Culligan International)
- Emma Hughes (ERG/EPA WaterSense)
- Jim Kendzel (American Supply Association)
- Lisa Kohlmann (Calgon Carbon Corporation)
- Kevin Kons (Water Quality Association)
- Shayna Kriss (The LeverEdge)
- Cang Li (Kinetico, Inc.)
- Kristin Licko (Water Quality Association)
- Kristin Lodygowski (Water Quality Association)
- Andrew Lombardo (Aqua Guidance)
- Marissa Malinski (IAPMO)
- Meera Manickam (3M)
- Andrew Marschner (Pentair)
- Richard Martin (RAM Consulting Services)
- Kgalaletso Mothooagae (Safe Bite Consulting)
- Kathryn Muench (A.O. Smith)
- Stacie Ott (Water Quality Association)
- Robert Pickering (ERG/EPA WaterSense)
- Ryan Prince (Paragon Water Systems, Inc.)
- Farzad Rezaei (Hollingsworth & Vose)
- Ed Robakowski (Kinetico, Inc.)
- Michelle Rogalny (Pentair)
- Brandon Rudolph (3M)
- Denise Russell (Ahlstrom Filtration)
- Harkirat Sahni (Paragon Water Systems, Inc.)
- William Siegmund (Pure Water Works, Inc.)
- Ann Schleinz (Water Quality Association)
- Daisy Smitananda (Harmsco Filtration Products)
- John Smith (Kinetico, Inc.)
- Ralph Stanley (Conestoga College)
- Jennifer Talley (Paragon Water Systems, Inc.)
- Mark Unger (The LeverEdge)
- Walter Vance (Kinetico, Inc.)
- Deonna Warren (Paragon Water Systems, Inc.)
- Kyle Whalen (Water Quality Association)
- Steven Woltornist (KX Technologies)
- Samuel Yates (Calgon Carbon Corporation)
- Eric Yeggy (Water Quality Association)

Guest Presenters

- Scott Coffin (CA Waterboards)
- Doug Farquhar (NEHA)

NSF International Staff

- Robin Bechanko
- Nikki Beetsch
- Mike Blumenstein
- Jeremy Brown
- Matthew Brown
- Sandra Games
- Kari Grounds
- Megan Harvell
- Benjamin Kaczmarek
- Lexi Kalisek
- Thomas Kogelschatz
- Robert Lisenko
- Anna LeVoy
- Mark Mapili
- Monica Milla (secretariat)
- Gabe Nacula
- Jiyeon Park
- Kyle Postmus
- Dave Purkiss
- Jennifer Sharp
- Michael Sheffield
- Shelby Smith
- Rebecca Sweeney
- Amanda Zeoli



TAB 2:

Standards Admin

- Standards 101
- Standards Update

Will be populated soon



TAB 3:

PFAS

- PFAS Task Group Update
- PFAS Hazard Index Subtask Group Update
- DWTU-2024-11: PFAS Cation Water Chemistry Issue Paper
- PFAS Values in 600 & Impact on DWTU

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

PFAS Task Group

Chair: Dr. Arvind Patil, Protect Plus/Ricura Technologies

Task Group Charge

Expand scope of task group to consider removal of other PFAS contaminants under NSF/ANSI 53 & 58

Task Group Roster

Voting Members

Albert, John	Water Research Foundation, The
Barse, Kirtipal	Watts Water Technologies
Boodoo, Francis	Purolite
Brigano, Frank	Consultant - Industry
Chase, Harold	NSF
Gottlieb, Larry	ResinTech Inc.
Hatch, Gary	Hatch Global Consulting Services
Huntoon, Mandy	NSF
Kempic, Jeffrey	U.S. Environmental Protection Agency
Lalonde, Janick	National Defence & Canadian Forces
Lemieux, France	Health Canada
Leung, Eugene	California Waterboards Division of Drinking Water
Olsen, Phil	Water Think Tank, LLC
Regunathan, Regu	ReguNathan & Associates, Inc.
Speth, Thomas	U.S. EPA
Tallon, Becky	A. O. Smith Corporation
Unger, Mark	The LeverEdge
Ver Strat, Steve	SVS Consulting Services LLC

Non-Voting Members

Anderson, Anita	Minnesota Dept. of Health
Andrew, Rick	Rick Andrew Consulting Services
Aridi, Sal	IAPMO
Cyndi Benson	Harmsco Filtration Products
Blumenstein, Mike	NSF
Brotman, Mark	Kinetico
Burkhardt, Jonathan	U.S. EPA
Cadwallader, Adam	U.S. EPA
Cartwright, Peter	Cartwright Consulting Co.
Cassou, Frank	Cyclopure, Inc.
Choe, Sung	IAPMO
Choi, Yuna	Coway
Ciapiak, Casey	Town of Natick, MA
DeLand, Derek	NSF
Donda, Tina	IAPMO
Du, Guoqiong (June)	NSF
Dunn, Jeffrey	United States Army
Follweiler, Amy	KX Technologies
Forrester, Eric	Calgon Carbon Corporation
Friedman, Katie	The Clorox Company
Gleason, Zac	Water Quality Association
Gorzelnik, Stanley	U.S. EPA

Task Group Chair Report

Hahn, Adam	Cyclopure
Herman, Rob	Herman & Associates LLC
Kerstens, Kristin	Water Quality Association
Kim, Jun	Florida Polytechnic University
Kohlmann, Lisa	Calgon Carbon Corporation
Koutrakos, Andrew	KX Technologies
Lee, Rahyun	Coway
Lee, Sun Yong	PUREMEM Co., Ltd.
Lombardo, Andrew	KT Corporation
Lu, Guoxin	Water Quality Association
Lundquist, Art	U.S. Army
Luo, Qi	Pace Analytical Services, Inc.
MacMillan, Hunter	FAS
Magurany, Kelly	NSF
Malinski, Marissa	IAPMO
Marschner, Andrew	Pentair
Martin, Richard	RAM Consulting Services
Matthis, John	Calgon Carbon Corporation
McClure, Andy	Jacobi Carbons
Megonnell, Neal	AqueoUS Vets
Menyhert, Miles	Jacobi Carbons
Metzger, Marianne	ResinTech Inc.
Myers, Dorota	KX Technologies
Nakayama, Mikiko	Mitsubishi Chemical Cleansui Corporation
Oppenheimer, Joan	Stantec
Palkon, Thomas	IAPMO
Poczatek, Bryanna	Water Quality Association
Postmus, Kyle	NSF
Pressman, Jonathan	U.S. EPA
Purkiss, Dave	NSF
Ratzersdorfer, Benjamin	KX Technologies
Rogalny, Michelle	Pentair
Rorabeck, Brian	Pentair
Sahni, Harkirat	Paragon Water Systems
Schneidewend, Tedd	Culligan International Company
Sheffield, Michael	NSF
Simone, Marco	Pentair
Singer, Jeffrey	Jacobi Carbons
Smitananda, Daisy	Harmsco Filtration Products
Thomas, Jarrett	Suburban Laboratories
Waterbury, Matthew	U.S. Army
Woltornist, Steven	KX Technologies
Yates, Samuel	Calgon Carbon Corporation
Yeggy, Eric	Water Quality Association
Young, Jaime	IAPMO

Meetings Held Since Last JC Meeting

7/17/23, 8/7/23

Summary of Task Group Work

At the 2020 DWTU Joint Committee meeting the Task Force successfully balloted protocols for the mixture of 8 PFAS compounds with the total influent challenge of 3000 Parts per Trillion (ppt), using the activated carbon, anion exchange and reverse osmosis technologies. The approval was contingent on successful validation of analytical technique. The original total PFAS influent and effluent challenges included the six compounds from EPA's UCMR 3 (PFOA + PFOS, PFNA, PFHxS, GEN X and PFHpA)

Task Group Chair Report

plus PFBS and PFDA. These were determined from available toxicity and occurrence levels. The original PFAS challenge was a mixture made up of PFOA (500 ppt), PFOS (1000 ppt), PFHxS (200 ppt), PFNA (40ppt), PFHpA (40 ppt), Gen X (900 ppt), PFBS (260 ppt), and PFDA (10 ppt).

Brief statement of information provided:

The Task Group spent the year 2021 working on validation of the protocol, which is now completed. Recently Revision 2 removed Gen X from the mixture since the occurrence data on it was incomplete and EPA was in the process of determining its MCL. Revision 3 is currently being balloted, where clarification on reduction claim was given either as a general PFAS claim, which includes a mixture of 7 contaminants with a total influent challenge of 2160 ppt, or individual claims for any of the seven contaminants.

Approval of Revision 2 and 3 will result in first comprehensive and most up to date NSF/ANSI Standard that takes all the information developed in UCMR 3 and also utilized the individual State advisories and MCLs in some instances. The resultant standard will also allow testing of PFAS compounds either individually or as a part of a mixture.

In December 21, 2021, EPA has announced UCMR 5, that will develop occurrence data from US Public Water Systems for a total of 29 PFAS compounds, that includes 6 PFAS compounds from UCMR 3 and are the subject of this NSF Standard. There are additional 23 new PFAS compounds in this list.

Generation of occurrence data for these 29 PFAS compounds from US Public Water Systems, will commence in 2023 and is required to be completed by 2025.

Since consideration of all these new 23 PFAS compounds in a health-based standard will be a Herculean task, we are proactively considering the possibility of proving a concept of developing a Surrogate compound to represent all or at least a large group of these compounds. Surrogacy approach was successfully used in case of Volatile Organic Compounds (VOC) in the past.

Water Quality Research Foundation (WQRF) has recently approved a phased research project that will investigate the concept of Surrogacy for PFAS compounds for the treatment technologies of Activated Carbon, Anion Exchange and Reverse Osmosis. The research project is expected to be completed in next 3 years, in time, when the occurrence data of UCMR 5 compounds will be available.

Progress Done on WQRF's PFAS Surrogacy Project:

During 2022, WQRF has established an Independent Task Force and Expert Observer Group, under the Chairmanship of Arvind Patil to prove the concept of PFAS Surrogacy for the Activated Carbon Technology. The Task Force includes, besides some of the members of the current NSF PFAS Task Force, new experts on activated carbon, representing major U.S. Activated Carbon Suppliers. The Observer Group includes experts from last WQRF VOC Surrogate Project, as well as number of EPA Research experts on PFAS.

Starting from January 2023, the Task Group along with Observer Group, developed a document on Request for Proposal (RFP) on the PFAS Surrogacy Project and this was circulated among the academic as well as private and certifying Laboratories. A total of 3 Laboratories have responded to the RFP and submitted Research Proposals. The WQRF Task Force and Observer Experts are currently evaluating these proposals in consultation with the Submitters. The final selected Proposal is expected to start the Project by the end of the year.

Task Group Chair Report

Latest EPA PFAS National Primary Drinking Water Proposal:

The Joint Committee approved in 2022, the Revision 2 and 3 to the NSF/ANSI 53i125r3 and 58190r3 have created first health based PFAS Standard taking into account information developed in EPA UCMR 3 and utilized latest Individual State advisories and MCLs in some instances. The resultant Standard allowed removal of 8 PFAS compounds, either individually or as a mixture. Since then, EPA has proposed a new national Primary Drinking Water Proposal for 6 PFAS compounds from UCMR 3, that have health-based limits that are much lower than the above-mentioned NSF Standards 53 and 58.

Summary of 2023-2024 Activities:

In August of 2023, EPA came up with a Proposal for First National Primary Drinking Water Regulation (NPDWR) for the six PFAS compounds and established MCLGs and MCLs

Compound	Critical Health Effect	MCLG	MCL
Perfluorooctanoic acid (PFOA)	Cancer	0 ppt	4.0 ppt
Perfluorooctanesulfonic acid (PFOS)	Cancer	0 ppt	4.0 ppt
Perfluorohexanesulfonic acid (PFHxS)	Thyroid	Hazard Index >1.0	Hazard Index >1.0
Perfluorobutanesulfonic acid (PFBS)	Thyroid	Hazard Index >1.0	Hazard Index >1.0
Perfluorononanoic acid (PFNA)	Developmental	Hazard Index >1.0	Hazard Index >1.0
Hexafluoropropylene oxide dimer acid (HFPO-DA or GenX)	Liver	Hazard Index >1.0	Hazard Index >1.0

- The PFAS NPDWR introduces the concept of hazard index:
 Hazard Index = Sum of Hazard Quotient for PFAS
 Hazard Quotient = PFAS Concentration/Health Based Water Concentration (HBWC)
 Hazard Index = PFHxS in ppt /9.0 ppt + PFNA in ppt /10.0 ppt
 + GenX in ppt /10.0 ppt + PFBS in ppt /2000 ppt

Compound	Critical Health Effect	HBWC
PFHxS	Thyroid	9.0 ppt
PFBS	Thyroid	2,000 ppt
PFNA	Developmental	10.0 ppt
HFPO-DA or GenX	Liver	10.0 ppt

These Regulations were to be finalized in 2024. In the meantime, the Joint Committee decided to create a Sub Task Group on concept of Hazard Index and how it could be used to extend the current NSF PFAS Standard. A separate Report on the activities of this Hazard Index Task Group will be issued.

On April 16, 2024, EPA finalized the above Regulations on MCL for the six PFAS compounds. It also set a limit on PFAS Mixtures containing two or more of PFHxS, PFNA., HFPO-DA and PFBS using a Hazard Index MCL to account for combined levels of these compounds in drinking water. Non-enforceable Maximum Contaminant Level Goals have also been set for these compounds.

Task Group Chair Report

The new MCLs for the 6 PFAS compounds become effective in 2029. Till then NSF PFAS Standard 533i125r3 and 5819Or3 are effective.

Progress Report on WQRF's PFAS Surrogacy Project:

Three Universities responded to the January 2023 Request for Proposal (RFP) on PFAS Surrogacy Project. The Task Force and Expert Observer Group spent considerable time studying each proposal, interviewing the Investigators and finally choosing the winner proposal. The winning proposal was from the University of British Columbia and Primary Investigator was Dr Madjid Mohseni with Dr. Ehsan Banayan Esfahani Banayan, a Post-doctoral Fellow assisting.

The overall objective of this research is to determine PFAS surrogate(s) that can be used as standards to evaluate the effectiveness of activated carbon adsorption systems/technologies in removing a wide range of PFAS from drinking water. This objective will be achieved through a series of specific sub-objectives, including determining adsorption capacity of three coal-, wood-, and coconut-based granulated activated carbon (GAC) and two ion-exchange (IX) resins for a series of legacy and emerging PFAS with different chain lengths and functional groups, and determining breakthrough curves of individual and total PFAS for each adsorbent, and finally, evaluating the impacts of challenge waters on PFAS removal.

Stage 1 of the project consisted of Literature Review and designing of Experimental and Analytical Methodology and was completed in the fourth quarter of 2023.

The goal of Stage 2 was to validate the study design developed in Stage 1 – to comprehensively evaluate the adsorption performance of various adsorbents for PFAS removal by addressing specific questions: determining the approximate recovery rates of each PFAS with different adsorbents, analyzing breakthrough curves for each PFAS with each adsorbent, quantifying PFAS concentrations in influent and effluent samples, and comparing the uptake of PFAS among different adsorbent materials.

Efficacy of three types of coal-, coconut shell-, and wood-based GACs and two types of IX resins for capturing a range of 16 PFAS with distinct characteristics – chain length and functional groups was examined. The studied PFAS include PFCAs, PFSA, PFECAs, FTSA, and FASAs with chain lengths in the range of C3-C9. The comprehensive experimental approaches employed herein follow three main domains of 1) isotherm study – to investigate adsorption capacities, 2) kinetic study – to investigate PFAS removal rates, and 3) rapid small scale column test (RSSCT) – to study breakthrough curves of PFAS.

1)) The results of isotherm study revealed significant differences in adsorption capacities of IX resins and GACs for various PFAS. Notably, IX resins demonstrate greater Freundlich constants compared to GACs across all individual, cumulative, and total PFAS. For instance, the Freundlich constants for IXR #1 and #2 ranged from 26.3 to 81.6 and 14.5 to 115.6, respectively, whereas those for GACs #1, #2, and #3 were markedly lower, ranging from 5.4 to 27.7, 4.3 to 29.2, and 0.0 to 22.9, respectively. A comparison between IXR #1 and #2 shows the superior adsorption capacity of IXR #1 for shorter chain PFAS and PFCAs, while IXR #2 showed slightly greater promise for longer chain PFAS and PFSA.

This distinction highlights the potential application and specific advantages of each resin type. Comparing different types of GACs also determines the superior capacities of coal- and coconut shell-based GACs compared to wood-based one, particularly for short-chain PFAS. Additionally, the study underscored the crucial role of PFAS characteristics, such as chain length and functional group, in determining their adsorption properties, with longer chain PFAS and those with sulfonic or sulfonamide functional groups exhibiting higher Freundlich constants across both IX resins and GACs.

2) Observations obtained through kinetic study reveals that IX resins exhibit significantly faster kinetics compared to GACs, with average pseudo-first order rate constants of 1.97×10^{-3} and $1.82 \times 10^{-3} \text{ min}^{-1}$ for IXR #1 and #2, respectively, surpassing those of GACs by more than two-fold. Both IX resins show

Task Group Chair Report

similar kinetics, indicating their effectiveness in PFAS removal. IX resins capture both short- and long-chain PFAS with comparable kinetic rate constants given the contribution of both hydrophobic and electrostatic (ion-exchange) mechanisms. GAC #1 and #2 demonstrate comparable rate constants, while GAC #3 exhibits slower kinetics, particularly for short-chain PFAS. Chain length influences PFAS kinetics when adsorbed by GACs, with longer-chain PFAS exhibiting greater rate constants across all GACs. Moreover, PFAS with sulfonic and sulfonamide functional groups show higher removal kinetics compared to those with carboxylic groups, consistent with adsorption capacities. These results emphasize the importance of considering both resin and GAC types and PFAS characteristics when designing effective PFAS removal strategies.

3) The RSSCT study, spanning up to ~64,000 BVs for IX resins #1 and #2 and ~10,000 BVs for GACs #1, #2, and #3, yielded valuable insights. These results determined the BVs at which 10%, 50%, and 100% breakthrough (BV10, BV50, and BV100) occurred for each PFAS category, suggesting potential surrogates for each resin and GAC type. While both resins exhibited comparable efficiencies, IXR #2 initially outperformed, with IXR #1 showing better performance over time. In contrast, GACs demonstrated significantly earlier breakthroughs, with coal-based GAC performing better than coconut shell and wood-based GACs, the latter reaching saturation earlier. Moreover, longer chain PFAS correlated with higher breakthrough BVs across all categories and adsorbent. Shorter chain PFAS, particularly with **PFBA** consistently exhibiting smaller BV50 across all resins and GACs, emerge as potential PFAS surrogates.

From the work conducted in this stage 2, the experimental methodologies and analytical procedures have been validated. Furthermore, the performance of various adsorbents in removing different PFAS at higher concentrations has been assessed.

These findings serve as a crucial foundation for the next phase, wherein the efficacy of different adsorbents under conditions reflecting PFAS concentrations found in drinking water supply, will be investigated in Stage 3.

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

Subtask Group on PFAS Hazard Index

Chair: Becky Tallon, A.O. Smith

Task Group Charge

Determine how the EPA PFAS Hazard Index values can be incorporated into the DWTU standards

Task Group Roster

Voting Members

Andrew, Rick	Rick Andrew Consulting Services
Gleason, Zac	Water Quality Association
Gorzelnik, Stanley	U.S. Environmental Protection Agency
Gottlieb, Larry	ResinTech Inc.
Kerstens, Kristin	Water Quality Association
Lu, Guoxin	Water Quality Association
Magurany, Kelly	NSF
Menyhert, Miles	Jacobi Carbons
Regunathan, Regu	ReguNathan & Associates, Inc.
Rogalny, Michelle	Pentair
Rorabeck, Brian	Pentair

Non-Voting Members

Martin, Richard	RAM Consulting Services
Myers, Dorota	KX Technologies

Meetings Held Since Last JC Meeting

8/28/23

Summary of Task Group Work

Will appear in final packet.

ISSUE PAPER

NSF standard(s) impacted: _____

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

Recommendation:

Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.

Item #: DWTU-2024-11

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ISSUE PAPER

Supplementary materials (photographs, diagrams, reports, etc.):

If not provided electronically, the submitter will be responsible to have sufficient copies to distribute to committee members.

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Name:* _____

Company: _____

Telephone: _____ Email: _____

Submission date: _____

Please submit to: Joint Committee Secretariat or to standards@nsf.org

**Type written name will suffice as signature*

Item #: DWTU-2024-11
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[Note – the recommended changes to the standard which include the current text of the relevant section(s) indicate deletions by use of ~~strikeout~~ and additions by **grey highlighting**. Rationale Statements are in *italics* and only used to add clarity; these statements will NOT be in the finished publication.]

NSF/ANSI Standard
for Drinking Water Additives –

Health Effects Evaluation and Criteria for Chemicals in Drinking Water

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Table 4.1
Drinking water criteria
(previously NSF/ANSI 60 Annex C, NSF/ANSI 61 Annex D)

Substance	CAS#	MCL/MAC or TAC (mg/L)	SPAC (mg/L)	STEL (mg/L)	Source of supporting documentation 1, 2, 3, 4, 5, 6, 7	Additional information
.						
.						
.						
perfluorohexanoic acid (PFHxA)	307-24-4	0.002	0.0002	—	Derived from the oral RfD on the U.S. EPA IRIS database with a default 20% RSC for drinking water. Verification date: 2023-04-10	Detections shall be evaluated to individual criteria, or according to the hazard index approach ¹¹ when observed with: CAS#s: 45187-15-3, 72007-68- 2, 108427-53-8 and/or 122499-17-6
.						
.						
.						
perfluorooctanoic acid (PFOA)	335-67-1	0.0000040 0.00007 (total)	0.00000040 ¹⁰ 0.000007 (total) ¹⁰	—	40 C.F.R. § 141.60, 40 C.F.R. § 141.61 U.S. EPA Lifetime Drinking Water Health Advisory. Issue date: 2016	Detections shall be summed with the following chemical: CAS# 1763-23-1.
.						
.						
.						
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0000040 0.00007 (total)	0.00000040 ¹⁰ 0.000007 (total) ¹⁰	—	40 C.F.R. § 141.60, 40 C.F.R. § 141.61 U.S. EPA Lifetime Drinking Water Health Advisory. Issue date: 2016	Detections shall be summed with the following chemical: CAS# 335-67-1.
.						

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Table 4.1
Drinking water criteria
(previously NSF/ANSI 60 Annex C, NSF/ANSI 61 Annex D)

Substance	CAS#	MCL/MAC or TAC (mg/L)	SPAC (mg/L)	STEL (mg/L)	Source of supporting documentation 1, 2, 3, 4, 5, 6, 7	Additional information
perfluorobutane sulfonic acid (PFBS)	45187-15-3	0.002	0.0002	—	40 C.F.R. § 141.60, 40 C.F.R. § 141.61 (Health-Based Water Concentration)	Detections shall be evaluated to individual criteria, or according to the hazard index approach ¹¹ when observed with: CAS#s: 307-24-4, 72007-68-2, 108427-53-8 and/or 122499-17-6
.						
.						
.						
perfluorononanoic acid (PFNA)	72007-68-2	0.00001	0.000001 ¹⁰	—	40 C.F.R. § 141.60, 40 C.F.R. § 141.61 (Health-Based Water Concentration)	Detections shall be evaluated to individual criteria, or according to the hazard index approach ¹¹ when observed with: CAS#s: 307-24-4, 45187-15-3, 108427-53-8 and/or 122499-17-6
.						
.						
.						

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Table 4.1
Drinking water criteria
(previously NSF/ANSI 60 Annex C, NSF/ANSI 61 Annex D)

Substance	CAS#	MCL/MAC or TAC (mg/L)	SPAC (mg/L)	STEL (mg/L)	Source of supporting documentation 1, 2, 3, 4, 5, 6, 7	Additional information
perfluorohexane sulfonic acid (PFHxS)	108427-53- 8	0.00001	0.000001 ¹⁰	—	40 C.F.R. § 141.60, 40 C.F.R. § 141.61	Detections shall be evaluated to individual criteria, or according to the hazard index approach ¹¹ when observed with: CAS#s: 307-24-4, 45187-15-3, 72007-68-2, and/or 122499-17-6
.						
.						
.						
hexafluoropropylene oxide dimer acid (HFPO-DA; Gen X)	122499-17- 6	0.00001	0.000001 ¹⁰	—	40 C.F.R. § 141.60, 40 C.F.R. § 141.61	Detections shall be evaluated to individual criteria, or according to the hazard index approach ¹¹ when observed with: CAS#s: 307-24-4, 45187-15-3, 72007-68-2, and/or 108427-53-8
.						
.						
.						

¹ The references for criteria based on US primary drinking water regulations are from the US Code of Federal Regulations, Title 40 (Protection of Environment), revised as of July 1, 2011. This document is available on-line at <www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR>. Issue dates are given for criteria based on Health Canada guidelines. Additional information on the guidelines for these chemicals is available at <hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php#tech_doc>.

² NSF action levels have been derived according to the requirements of Section 3.

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Table 4.1
Drinking water criteria
(previously NSF/ANSI 60 Annex C, NSF/ANSI 61 Annex D)

[illegible]

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Table 4.1
Drinking water criteria
(previously NSF/ANSI 60 Annex C, NSF/ANSI 61 Annex D)

Substance	CAS#	MCL/MAC or TAC (mg/L)	SPAC (mg/L)	STEL (mg/L)	Source of supporting documentation 1, 2, 3, 4, 5, 6, 7	Additional information
the requirements of Section 9.5.1, or Section 9.5.1.1.1, respectively.						
¹⁰ Limitations in analytical methods may preclude detection at levels sufficient to report these compounds at or below the SPAC. To the maximum extent possible, testing laboratories shall seek the lowest detection limits via both sample exposure and analysis.						
¹¹ The hazard index (HI) approach is applied to account for dose-additive health effects that may occur when a person is exposed to multiple compounds having a similar mode of action in the body but varying in potency. A hazard index of 1 is used to protect against health concerns associated with exposure to chemical mixtures and is calculated as follows referencing the observed concentration in water for each extracting chemical divided by its individual TAC. Where a compound is not observed to occur in water, its associated fraction may be removed from the equation:						
$HI \text{ TAC: } \left(\frac{HFPO-DA \text{ ppt}}{10 \text{ ppt}} \right) + \left(\frac{PFBS \text{ ppt}}{2000 \text{ ppt}} \right) + \left(\frac{PFHxA \text{ ppt}}{2000 \text{ ppt}} \right) + \left(\frac{PFHxS \text{ ppt}}{10 \text{ ppt}} \right) + \left(\frac{PFNA \text{ ppt}}{10 \text{ ppt}} \right) \leq 1$						



TAB 4:

NSF/ANSI 42 Issue Papers

- DWTU-2023-17: Taste and Odor
- DWTU-2024-9: Direct Additives



JOINT COMMITTEE ISSUE PAPER

NSF standard(s) impacted: NSF/ANSI 42

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

Issue 1. NSF/ANSI Standard 42 must either incorporate a human taste and odor assessment component or delete all references to “taste/odor” from the Standard 42 and expressly qualify chemical reduction claims to the named chemicals used in testing.

1.a. Statement of the Problem – Taste and Odor

NSF/ANSI Standard 42 is a misleading assessment of drinking water “taste/odor” since a 50% reduction of free available chlorine (FAC) from challenge water can still exceed the taste and odor threshold for human populations. Testing to meet 50 percent reduction does not mean that the filter will remove the objectionable taste and odor of FAC because the average person can taste/smell FAC (Cl_2 , HOCl , OCl^-) at 0.5 to 1 mg/l, and some at levels as low as 0.3 mg/l.¹ Reduction of 2.2 mg/l FAC to 1.1 mg/l meets the Standard, but does not justify claims of reducing taste and odor.

1.b. Discussion

Because taste and odor are subjective human perceptions and NSF/ANSI 42 reflects only a quantitative measurement of chlorine reduction that is in no way related to recognized thresholds of taste and odor, any unqualified references to “taste/odor” in NSF/ANSI 42 are misleading. Taste and odor of drinking water are properly assessed by human receptors and to be a valid assessment of taste and odor, human judgment is required. Most public utilities rely on “taste and odor panels” to detect, through human sensory perception, and establish a “threshold odor number” (TON) or categorize the description of the contaminant in accordance with Standard Methods for the Examination of Water and Waste Water – 2170 Flavor Profile Analysis.

Drinking water filter manufacturers who make broad and unqualified taste and odor reduction claims based exclusively on NSF/ANSI 42 certification are exposed to Lanham Act liability for false and misleading advertising because the Standard does not consider the wide variety of causes for malodorous, foul-tasting water, including but not limited to contaminants identified by the U.S.

¹ Guidelines for drinking-water quality: Fourth edition incorporating the first and second addenda [Internet]. Geneva: World Health Organization; 2022. 10, Acceptability aspects: Taste, odour and appearance. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK579463/>.

Environmental Protection Agency's (EPA) Secondary Maximum Contaminant Levels (e.g., aluminum, copper, fluoride, manganese, sulfate, and silver). Moreover, NSF itself may be exposed to contributing to the false advertising of others who claim generalized non-specific "taste/odor" claims based on NSF/ANSI 42 certification.

1.c. Recommendation with respect to "taste/odor" reduction claims

For the reasons discussed above, the Joint Committee should review the truthfulness of the information that NSF/ANSI 42 is delivering to the consumer and make the following modification:

Absent incorporating a human assessment component in the testing protocol, NSF should disallow any generalized, non-specific "taste/odor" reduction claims based on the NSF/ANSI 42 Standard, and limit claims to chemical-specific (chlorine) reduction claims that accurately describe what the filter actually does, e.g., "Reduces chlorine concentration by half."

Issue 2. The NSF certification requirement NSF/ANSI 42 should expressly stipulate that carbon media in drinking water treatment units shall not add detectable levels of metals to treated drinking water.

2.a. Statement of the Problem – Metals Extractible from Carbon Media

Surveillance of carbon-based drinking water treatment units (DWTUs) sold commercially reveals detectable metals (aluminum and antimony) leaching from carbon media. Regardless of whether or not metals extracted from carbon filter media exceed EPA MCLs, consumers purchase and use DWTUs with the reasonable expectation that they will *remove* harmful metals from drinking water, not *add* metals to it. Manufacturers of filters that add metals to drinking water are potentially exposed to liability under deceptive trade practices theories, as is also NSF, whose certification mark they bear.

2.b. Discussion

Sources of carbon used to manufacture drinking water filter media are geographically and materially variable, ranging from plant-based (wood, coconut shells, oil palm kernel shells) to bituminous coal. All carbon sources are naturally occurring and subject to influences of geographic, geologic and activating conditions on composition, particularly metals content. Higher quality carbons are given special treatment (acid washed) to remove extractible metals, whereas lower quality carbons may receive only cursory treatment, or none at all. Like most things, carbon quality varies in direct proportion to price, and some filter manufacturers tend to use cheaper carbon for run-of-mill filter production, or blend different priced carbons with the objectives of obtaining "adequate" performance at lower cost. This practice can result in detectable levels of metals leaching from carbon media in commercially sold filters.

As shown in the table below and attached R.J. Lee laboratory report, aqueous extracts of carbon from two commercially sold DWTUs showed detectable levels of aluminum (660 ug/l, 826 ug/l) and antimony (2.7 ug/l, 2.64 ug/l). Test results are presented below in comparison with regulatory limits. It is noteworthy that extractible antimony exceeds California's 1 ug/l Public Health Goal for drinking water and extractible aluminum exceeds EPA's Secondary Maximum Contaminant Level (MCL) of 50-200 ug/l for that metal, a number based on unacceptable aesthetic (taste and odor) effects.

Filter Extraction Test Results

Extractible Metal	R.J. Lee Extraction, ug/l	EPA MCL, ug/l	EPA MCLG, ug/l	EPA Secondary MCL, ug/l	CA OEHHA Public Health Goal ug/l
Antimony	2.64 2.7	6	6	--	1
Aluminum	660 826	--	--	50-200	600

Of particular concern with respect to aluminum is why the 2900 ppb criterion for this metal under NSF/ANSI 42 is different, and over an order of magnitude higher than the 250 ppb limit set by NSF/ANSI 61 and that for bottled water? It would be expected that acceptance criteria for organoleptic metals be harmonized in NSF's drinking water standards.

2.c. Recommendations with respect to metals from carbon media

Metals leaching from carbon filter media are a contaminant introduced by a product consumers purchase to remove objectionable toxic substances from drinking water. As a matter of policy, NSF should adopt a *zero tolerance* for detectable levels of extractible metals from carbon media. EPA Method 6020 or methods of equivalent sensitivity are recommended. Further, acceptance criteria for metals, and aluminum in particular, should be uniform across all standards pertaining to drinking water.

Issue 3. NSF water filter qualification testing should obtain representative test products from market sources in preference to filters submitted by the manufacturer. Extractible metals are an expeditious and creditable method to verify the quality characteristics of carbon media in commercial products against products submitted for certification testing.

3.a. Statement of the Problem – Uncertain continuity of carbon qualification

A corollary to the problem of variable carbon quality described in Issue 2 is the uncertainty that carbon used for certification testing of candidate filters has the same quality characteristics as carbon used in production run products sold in the marketplace.

3.b. Discussion

It is axiomatic that filters obtained for qualification testing – i.e., confirmatory testing that products conform to the Standards for which they were certified – must be representative of products sold commercially, but this is difficult to verify. Obtaining water filtration products from commercial sources for qualification testing provides the highest degree of confidence that the products tested are representative examples of the product certified by NSF.

A cost-effective and expeditious means to confirm whether carbon quality characteristics of filters obtained for qualification testing corresponds to certification testing is extractible metals analysis.

3.c. Recommendations

Water filtration products obtained for qualification testing should preferably be obtained from commercial sources rather than submitted by the manufacturer.

Extractible metals provide a quick and cost effective means of verification that carbon quality in qualification test samples corresponds to products tested for certification.

Supplementary materials (photographs, diagrams, reports, etc.):

If not provided electronically, the submitter will be responsible to have sufficient copies to distribute to committee members.

Attached are laboratory reports from R. J. Lee showing test results for extractible metals obtained from two commercial samples of drinking water treatment units certified to meet NSF/ANSI 42. *(Being Fedexed to NSF.)*

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Name:* _____ Ehud Levy

Company: _____ Nano Smart Technology LLC

Telephone: _____ 404 667 9115 Email: _____ ehud@ehudlevy.com

Submission date: _____ October 16, 2023

Please submit to: Joint Committee Secretariat or to standards@nsf.org

**Type written name will suffice as signature*

LABORATORY REPORT

Nano Smart Technology LLC

Report Date: February 14, 2023
Client Project: N/A
Purchase Order No.: N/A
Prep/Analysis: Beaker Leach / EPA 6020 (WL) PA

Client Sample ID	RJ Lee Group ID	Sampling Date	Analyte	Matrix	Sample Concentration Total µg/L (PPB)	Minimum Reporting Limit µg/L (PPB)	Analysis Date	Q
[REDACTED]	PA090220230011-001	NP	Aluminum	Solid	826	100	02/14/2023	
[REDACTED]	PA090220230011-001	NP	Antimony	Solid	264	1.00	02/14/2023	
[REDACTED]	PA090220230011-001	NP	Arsenic	Solid	< 1.00	1.00	02/14/2023	

Comments:

Report Qualifiers (Q):

E = Value above highest calibration standard
J = Value below lowest calibration standard but above MDL (Method Detection Limit)
L = LCS (Laboratory Control Standard/SRM (Standard Reference Material) or LTB (Laboratory Fortified Blank) recovery outside accepted recovery limits
H = Holding times for preparation or analysis exceeded
NP = Not Provided
D = RL (reporting limit verification) outside accepted limits
B = Analyte detected in the associated Method Blank
S = Spike Recovery outside accepted limits
R = RPD (relative percent difference) outside accepted limits

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples. This laboratory operates in accord with ISO 17025:2017 guidelines, and holds a limited scope of accreditations under different accrediting agencies; refer to <http://www.rjlg.com/about-us/guaccertifications/> for more information and current status. This report may not be used to claim product endorsement by any laboratory accrediting agency. The results contained in this report relate only to the items tested or to the sample(s) as received by the laboratory. Any reproduction of this document must be in full for the report to be valid. Unless otherwise noted (either in the comments section of the report and/or with the appropriate qualifiers (Q) column) the following apply: (a) Samples were received in good condition, (b) All QC samples are within acceptable established limits and (c) Results have not been blank corrected. Quality Control data is available upon request.

ISSUE PAPER

NSF standard(s) impacted: 42

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

The scope of NSF/ANSI 42 applies to drinking water treatment systems and components used for reduction of specific substances present in drinking water. Some of these systems contain substances that are intended to control corrosion or add minerals through direct chemical addition to the treated water. Because these substances dissolve over time, many are intended to be reapplied at periodic intervals to maintain the intended beneficial effects. Many of these minerals are independently tested from the system because they are sold separately to support periodic replenishment. Example substances include phosphate compounds and calcium carbonate-based minerals.

However, these direct additives and the testing scheme for NSF/ANSI 42 are ill fitting. Standard 42 does not control the dosing under test conditions. Fast dissolving substances may be completely removed from the test vessel after the Day 1 dwell and the first flush. The Day 1 test water collection will also be a much higher concentration than in the system application. Even slow dissolving substances will likely be over saturated in the test vessel compared to a system that moderates water flow to the substance. Solid minerals may also have mixed compositions with slow and fast dissolving chemicals, where the dissolved metals profile changes over time. A 3-day test with 100% of mineral mass may not capture the contaminants concentrations that are relevant on day 100 when only 25% of the mineral mass remains. Alternatively, the full contaminant profile would be captured if the substance were crushed and dissolved prior to the analytical test.

The resultant problem is that testing these substances using NSF/ANSI 42 is overly aggressive on dosing for all substances intended to dissolve into the water, while also under reporting contaminants for a subset of those substances.

Direct additives to drinking water are within the scope of NSF/ANSI/CAN 60 – Drinking Water Treatment Chemicals – Health Effects. The scope includes all direct additives regardless of drinking water chemistry or the point of treatment. That Joint Committee reaffirmed in 2022 that source water treatment, POE treatment, POU treatment, and even emergency water treatment for field applications fall under the scope of NSF/ANSI/CAN 60.

This issue paper proposes two changes to address these gaps. Evaluation of the direct additive to the requirements of NSF/ANSI/CAN 60 for contaminants. And validation of direct additive dosing by the drinking water treatment system.

Dosing rates of the direct additives directly control dosing of contaminants. Double the dose translates to double the contaminants. Thus, dosing control is critical to health effects compliance for direct additives. Validation of the dosing rates based on system design is necessary to ensure intentional additives and contaminants are dosed appropriately. Overdosing can cause aesthetic issues, short term health impacts, and increase chronic exposure to regulated contaminants.

Recommendation:

*Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by **highlighting** or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.*

Item #: DWTU-2024-9
(For NSF internal use)

ISSUE PAPER

4 Materials

4.1 Materials in contact with drinking water

4.1.1 POE drinking water treatment units shall conform to the protocol in NSF/ANSI/CAN 61.

4.1.2 POU drinking water treatment units shall conform to the protocol in this section and be evaluated for weighted average lead content in accordance with NSF/ANSI/CAN 372. The weighted average lead content of the contact materials and coated substrates shall be $\leq 0.25\%$.

4.1.3 Treatment chemicals used in drinking water treatment units shall conform to the requirements of NSF/ANSI/CAN 60. Treatment chemicals are direct additives to the water through the dosing or dissolution of a substance.

...

6.9 Active agents and additives

Where an active agent is used in the drinking water treatment process, the product water shall not contain that substance, ~~(or its degradation products)~~, or its contaminants at a concentration of toxicological significance as given by the U.S. EPA Primary Drinking Water Regulations,⁵ by the Health Canada Maximum Acceptable Concentrations,⁸ by any U.S. Federal regulatory agency, or at a concentration that exceeds constituent limits of the U.S. EPA Secondary Drinking Water Regulations⁵ for all sample points. If the substance does not have a maximum drinking water concentration established by U.S. EPA or Health Canada, a TAC shall be established according to the requirements of NSF/ANSI/CAN 600, Section 3.

Collection of product water samples for the analysis of active agents or their degradation products, employed in the aesthetic improvement of drinking water, shall be in accordance with the sampling schedule(s) for the verification of specific reduction claims or as otherwise specified in this standard. At least one sample shall be collected immediately after a rest period of at least 8-h duration.

Sampling for an active agent shall be performed using the performance test procedure that is likely to result in the highest potential extraction of the active agent. Determination of the appropriate test procedure shall consider the following parameters:

- the chemical composition of the challenge water used in the performance test; and
- the duration of rest periods prior to the specified sampling points in the performance test.

NOTE — The performance test used to evaluate extraction of an active agent or additive may be a test other than that performed to verify other performance claim(s) made by the manufacturer. Some examples are provided in the following table:

Type of active agent	Recommended test protocol for active agent evaluation
copper / zinc media	chlorine reduction
silver	bacteriostasis
phosphates and silicates (corrosion control)	extraction
calcium carbonate	extraction

Item #: DWTU-2024-9
(For NSF internal use)

ISSUE PAPER

Supplementary materials (photographs, diagrams, reports, etc.):

If not provided electronically, the submitter will be responsible to have sufficient copies to distribute to committee members.

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Name:* Scott Randall

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Submission date: April 16, 2024

Please submit to: Joint Committee Secretariat or to standards@nsf.org

**Type written name will suffice as signature*

Item #: DWTU-2024-9
(For NSF internal use)

TAB 5:

Multiple Standards Issue Papers

- DWTU-2023-18: O&M Informational Annex
- DWTU-2024-2: Nanoplastics
- DWTU-2024-3: Asbestos
- DWTU-2024-8: Remote Monitoring
- DWTU-2024-4: Uranium
- DWTU-2024-5: Nitrate
- DWTU-2024-6: Hexavalent Chromium
- DWTU-2024-7: Treatment Trains



JOINT COMMITTEE ISSUE PAPER

NSF standard(s) impacted: NSF/ANSI DWTU Standards 42, 44, 53, 55, 58

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

Purpose: Develop Operation and Maintenance (O&M) Annexes for POU/POE equipment for all DWTU Standards.

Background: Currently, the DWTU Standards do not address operation and maintenance requirements for POU and POE equipment. Federal, State and Local Regulators rely on the NSF/ANSI Standards for implementation of POU/POE products for potential compliance purposes and to address consumer needs. At past NSF DWTU Joint Committees, the need for O&M Annexes has been raised by Regulators and others. Though the DWTU Standards require manufacturers to provide O&M instructions, Regulators often do not necessarily have ready access to specific products' operating manuals with their maintenance requirements. An O&M Annex would aid Regulators by providing general guidance on the proper O&M of all POU/POE equipment.

Recommendation:

*Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by **highlighting** or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.*

Recommendation: Establish a Task Group to Develop O&M Annexes for the DWTU Standards covering the spectrum of POU/POE product offerings.

These O&M Annexes would address generic installation, operation and maintenance requirements, e.g., filter changes, regeneration requirements, UV lamp replacement cycles, Ozone and Chlorine dosages, etc.

The Task Force should include Regulators to facilitate elucidation of O&M needs and Manufacturers to guide in the O&M requirements.

Supplementary materials (photographs, diagrams, reports, etc.):

If not provided electronically, the submitter will be responsible to have sufficient copies to distribute to committee members.

Item #: DWTU-2023-18, REV 3_24
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Name:* Frank A. Brigano

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Submission date: November 1, 2023

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**Type written name will suffice as signature*

Item #: DWTU-2023-18, REV 3_24
(For NSF internal use)



JOINT COMMITTEE ISSUE PAPER

NSF Standard(s) Impacted: NSF/ANSI 401 / 58

Purpose and Background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

Research findings on the impact of microplastics on human health are continuously being reported, and microplastics are progressively decreasing in size over time. Furthermore, smaller fragmented plastics may have a greater impact on the human body. While there have been issues with testing methods for microplastics in previous task groups, considering concerns about their harmfulness and the decreasing size of plastics, I believe there is a need to address the removal efficiency of nanoplastics.

Recommendation:

Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.

Due to significant public interest in nano-plastics and the substantial demand for verifying their removal capabilities, many companies are promoting the efficacy of their nano-particle removal methods through non-standardized and validated approaches to confirm their effectiveness in removing nano-plastics. Therefore, I propose the inclusion of standards for assessing the removal efficiency of nano-plastics within RO (Reverse Osmosis) systems.

Supplementary materials (photographs, diagrams, reports, etc.):

If not provided electronically, the submitter will be responsible to have sufficient copies to distribute to committee members.

It has been demonstrated that RO systems utilizing SiO₂ nano-particles achieved a removal efficiency of 99.9% in tests assessing their removal performance. (Please refer to the attached)

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Signature*: Kangjin, Lee, Ph.D.

Company: Coway Co.,Ltd.

Telephone: 82-2-870-5132 Email: lkj7178@coway.com

Is this a revision of a previous Issue Paper (if yes put original issue number): Yes (DWTU-2022-8)

Submission date: 4/4/2024

Please submit to: Joint Committee's Secretariat or to standards@nsf.org

**Type written name will suffice as signature*

Item #: DWTU-2024-2
(For NSF International internal use)

Test Result for Nanoplastics Reduction in DWTU

(Using SiO₂ nanoparticles, 30nm)

Coway Co., Ltd. & WQA
2024.04.02

Test Summary of nanoplastic reduction using SiO₂ nanoparticle

Silicon Dioxide (SiO₂) Nanopowder Solution (Nanoparticles Dispersion in Water)

Appearance	Type	pH value	Original particle size	Assay SiO ₂	Solvent	SiO ₂ Purity	Manufacturing company
Transparent	amorphous	8-11	30nm	≥25.2%	75%Water	99.99%	US Research Nanomaterials, Inc.

➤ Influent

500 ± 50 mg/L



RO system

➤ Effluent Sampling
(During 7 days)

Analysis of influent & effluent samples by ICP/OES

Sampling Schedule

Date	Operation	Sampling
Day 1 (Tue.)	Conditioning with general water	
	Test water loading	
	4h	Sampling and empty tank
	8h	Sampling and empty tank
Day 2~4 (Wed.~ Fri.)	24h, 48h, 72h	Sampling and empty tank
	5 % of DPR	
	36h, 60h, 84h	Sampling and empty tank
Day 5~6 (Sat. ~ Sun.)	Stagnation with pressure	
Day 7 (Mon.)	144h	Sampling and empty tank
	148h	Sampling

All of test and sampling procedures were followed by NSF/ANSI 58

Test Result

Date	Operation	Concentration(mg/L)			Percent Reduction(%)	
		Test water	Sample #1 Purified water	Sample #2 Purified water	Sample #1	Sample #2
Day 1	1st sampling	537.2	0.44	0.45	99.92	99.92
	2nd sampling	496.1	0.45	0.48	99.91	99.90
Day 2	1st sampling	510.8	0.62	0.60	99.88	99.88
	2nd sampling	535.7	0.82	0.85	99.85	99.84
Day 3	1st sampling	539.1	0.78	0.78	99.86	99.86
	2nd sampling	536.8	0.91	0.91	99.83	99.83
Day 4	1st sampling	535.4	0.86	0.86	99.84	99.84
	2nd sampling	507.6	0.84	0.84	99.83	99.83
Day 5~6	Stagnation					
Day 7	1st sampling	527.7	0.91	0.96	99.83	99.82
	2nd sampling	509.1	0.97	0.95	99.81	99.81

Note)

Detection limit: 0.003 mg/L

ND: Not detected, means analysis result less than detection limit

If the result is below the limit of quantification, the removal rate is calculated using the limit of quantification and described as higher than that value.

Refer to Appendix III

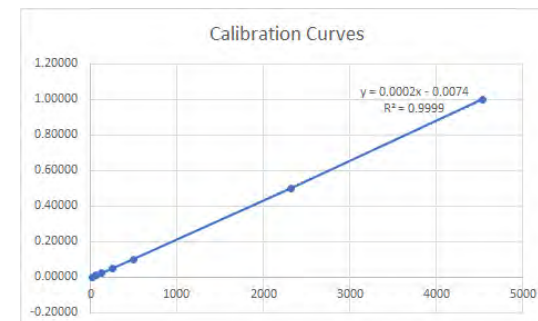
Measurement uncertainty: 0.096 ± 0.002 mg/L

Analysis Summary

Sample

ICP/AES

- Element : Si
- Wavelength(nm) : 251.611



$$\text{Intensity} = 4550.36042091 * \text{Concentration} + 36.32219804$$

standards	Intensity	Method Concentration	Calculated Concentration	% Error
Blank	20.924209	0.00000	-0.0003384	N/A
Standard 1	64.340741	0.01000	0.006157	38.425663
Standard 2	122.233538	0.02000	0.01888	5.599412
Standard 3	261.605096	0.05000	0.049509	0.982394
Standard 4	496.258197	0.10000	0.101077	1.076828
Standard 5	2323.621401	0.50000	0.502663	0.532661
Standard 6	4532.933121	1.00000	0.988183	1.181214



ICP/OES 5110 (Agilent Technologies)

Conditions

- Read time(s) : 5
- RF power(kW) : 1.20
- Stabilization time(s) : 15
- Viewing mode : Axial
- Viewig height(mm) : 8
- Nebulizer flow(L/min) : 0.70
- Plasma flow (L/min) : 12.0
- Aux flow (L/min) : 1.00
- Replicates : 3
- Rinse time(s) : 30

ISSUE PAPER

NSF standard(s) impacted: NSF/ANSI 53 and 58

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

Propose a change to section 7.3.1.4.3 Influent challenge - Asbestos in NSF/ANSI 53 and section 7.2.1.4 Influent challenge in NSF/ANSI 58 to be solely chrysotile fibers. It has become increasingly more difficult for the lab to purchase anthophyllite asbestos.

Chrysotile is the most commonly used form of asbestos. It belongs to the serpentine family of minerals. Chrysotile was widely used in roofs, ceilings, walls, and floors of homes and businesses. It was also found in automobile brake linings, gaskets, and insulation for pipes and appliances. Anthophyllite is an asbestos mineral belonging to the amphibole family. Anthophyllite was used in limited quantities for insulation products and construction materials.

Recommendation:

Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.

Propose a change to section 7.3.1.4.3 Influent challenge - Asbestos in NSF/ANSI 53 and section 7.2.1.4 Influent challenge in NSF/ANSI 58

A 50/50 blend of Chrysotile and anthophyllite asbestos shall be added to the general test water specified in Section X.X.X.X to produce a chrysotile and anthophyllite asbestos fiber concentration in the range of 107 to 108 fibers per liter. Only fibers greater than 10 µm shall be counted to confirm challenge.

Item #:DWTU-2024-3

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Supplementary materials (photographs, diagrams, reports, etc.):

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Submission date: 04/12/2024

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Item #: DWTU-2024-3

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NSF standard(s) impacted: 53

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

The purpose of our recommendation is to encourage and facilitate the remote monitoring of filtration devices that are designed to remove lead from drinking water. A new informative annex to the standard would establish minimum requirements for those features that allow the availability and status of lead filtration devices to be monitored remotely. When offered, this capability would allow authorized parties to remotely detect when a filtration device is in need of maintenance or is no longer functioning properly, without having to physically inspect the device.

The harmful effects of lead exposure are well-documented, and lead is frequently found in drinking water. Lead levels in water can fluctuate widely, and so filter life can vary. Filtration devices are installed and used in several instances; many places require or at least allow for the use of filters in schools and child care centers. Small water systems may also use water filters for compliance with the Safe Drinking Water Act. If a small system uses filtration devices to comply with the proposed Lead and Copper Rule Improvements (LCRI), the system must own, control, and maintain the filter system. Between filtration programs in schools and the proposed LCRI, there are potentially tens of thousands of filters, if not more, that must be maintained properly in order to reduce lead exposure. Remote monitoring of these devices would be both an enormous efficiency gain for owners of multiple devices and provide reassurance that those consuming the filtered water, including young children and infants, are in fact being protected from additional lead exposure.

We are extremely grateful for the time and input of WQA's Water Science Think Tank. Their insights strengthened the recommendation.

Recommendation:

Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.

See attached proposed language.

Item #: DWTU-2024-8

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Supplementary materials (photographs, diagrams, reports, etc.):

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Item #: DWTU-2024-8

(For NSF internal use)

Lead Filtration Devices Remote Monitoring

Add a new Informative Annex to NSF 53 as follows:

Informative Annex 8

Key elements for remote monitoring of point-of-entry and point-of-use drinking water treatment systems designed for lead removal

The information contained in this annex is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. Therefore, this annex may contain material that has not been subjected to public review or a consensus process.

In addition, it does not contain requirements necessary for conformance to this standard.

I-8.1 Background

This annex is intended to set out a standardized framework for the remote monitoring of POE and POU drinking water treatment systems designed for lead removal. Lead (Pb) remains a concern in drinking water, and sources of lead remain widespread. In light of the health effects of lead exposure, the concentration of vulnerable populations in locations such as schools and child care facilities, and the widespread presence of plumbing containing lead in these places, lead filtration devices perform an important and growing role in protecting public health.

Additionally, some public water suppliers may rely upon POE or POU devices for compliance purposes, with the PWS operator then responsible for continued effective operation of the devices. In some instances, the geographic dispersal of sites with installed lead filtration devices may pose a challenge for proper maintenance and monitoring. Remote monitoring can allow the status of the treatment system to be verified by an authorized party more frequently and consistently than if checks were limited to on-site physical inspection.

Information collected remotely can provide instantaneous indications of the status of the treatment unit. Additionally, information with predictive value, such as the cumulative volume of water through the treatment system, can allow for timely intervention when maintenance is needed. However, maintaining awareness of the current operational status of the system is the highest priority. For all of these reasons, the installation of remote monitoring capability in all new POE and POU drinking water treatment systems designed for lead removal is strongly encouraged.

I-8.2 Information to be accessible through remote monitoring

A drinking water treatment system designed for lead removal should incorporate a communications system that can acquire and store information for transmission at least once daily to one or more authorized recipients of such information regarding the current status of the treatment system for purposes of verifying its safety and availability for use.

If a remote monitoring system is incorporated, it shall be capable of conveying at least the following information, as summarized in Table 1:

- a) the manufacturer, product model, and unique identifier (e.g. serial number) of the individual drinking water treatment system;
- b) an indication that the treatment system is fully installed, activated, and available for use;
- c) alarms or signals indicating failure of mechanical or electronic components. For example, this could include:

i) a signal indicating that the flow rate exceeds the rated service flow of the product, which could be a sign of improper installation, a seal failure, a cracked block, or some other problem;

ii) an alarm to indicate higher than expected differential pressure which may indicate that the device is plugged or fouled;

iii) leak detection; and/or

iv) other features that would be applicable and appropriate based on the technology and product design;

d) alarms or signals indicating that an essential maintenance task (e.g. filter replacement) has not been performed. When a maintenance alarm will be triggered to replace a consumable component based on duration of its use or volume of water treated, the system should also transmit regular information on the consumable component's status relative to its overall life cycle (e.g., 90% of the rated service capacity has been used);

e) where a filter indicator light or other indicator of performance is present, the color status indicated and any other performance indication designed to be audible or visible to the user;

f) date of installation of the currently-installed filter cartridge.

g) Most recent date and time of treated water production.

h) if an automated auxiliary device to enhance the performance of the POE or POU unit, such as an automated flushing device, is present:

i) the manufacturer, product model, and unique identifier (e.g. serial number) of the auxiliary device;

ii) an indication that the auxiliary device is fully installed, activated, and available for use;

- iii. alarms or signals indicating failure of mechanical or electronic components;
 - iv) alarms or signals indicating that an essential maintenance task (e.g. valve operation) has not been performed; and
 - v) the most recent date and time that the auxiliary device operated.
- i) if a manufacturer-supplied reservoir for treated water is present, the temperature of the water leaving the reservoir.

These elements are described further in Table 1 below.

Table 1
Drinking Water Treatment System Remote Monitoring:
Data Elements to be Transmitted at least Daily

Data Element	Reported Values	How Data Will Be Used
No Signal [I-8.2.b]	No Signal	The remote sensing transmitter is not activated or is not working. Connectivity issue requires resolution.
Treatment system identifying information [I-8.2.a]	Manufacturer, product model, and unique identifier (serial number)	Identify the individual unit for tracking performance over time.
Treatment system activation [I-8.2.b]	System is fully installed, activated, and ready for use. Y/N	Confirms the treatment unit is ready for use.
Treatment system error alarms (there can be zero alarms or multiple alarm codes at the same time) [I-8.2.c] [I-8.2.d]	Failure of mechanical or electronic component. More detailed values could include: 0. No error 1. Failure of a mechanical component 2. Failure of an electrical component 3. Flow rate exceeds the rated service flow of the product 4. High differential pressure 5. Leak Detected 6. Essential maintenance not performed, e.g., expired/spent filter cartridge not changed 7. Device did not operate when initiated; reason unknown.	Identifies the error code(s) to facilitate servicing with appropriate equipment and urgency.
Option for lifecycle status of consumable component(s) [I-8.2.d]	% of rated service capacity consumed	Data check to confirm whether the color status is correct based on tracked flow or timed use, and to schedule the servicing of the unit accordingly.
Color status indicator of filter cartridge and status of any other	Green, yellow, or red, and any other performance indicator	Indicates the unit's reported filter cartridge status and any other indicator of performance.

performance indicator [I-8.2.e]		
Date of installation of the currently installed filter cartridge [I-8.2.f]	Date	Date check to confirm whether the color status is correct based on service life expiration date, and to schedule the servicing of the unit accordingly.
Most recent date and time of treated water production [I-8.2.g]	Date and time	Confirm operation of the treatment system, and enable calculation of period of stagnation.
Auxiliary device identifying information [I-8.2.h]	Manufacturer, product model, and unique identifier	Identify the individual unit for tracking purposes and track reliability.
Auxiliary device activation [I-8.2.h]	Device is fully installed, activated, and ready for use. Y/N	Determine whether or not the device is capable of being automated per programmed requirements.
Auxiliary device error alarms (there can be zero alarms or as many as three different alarm codes at the same time) [I-8.2.h]	0. No error 1. Failure of mechanical components 2. Failure of electronic components 3. Essential maintenance not performed	Identifies the error code(s) to facilitate servicing with appropriate equipment and urgency.
Most recent date and time the auxiliary device operated [I-8.2.h]	Date and time	Determine whether the device is properly activating based on programmed requirements.
Reservoir water temperature [I-8.2.i]	Water temperature at reservoir outlet	Confirms the operation of refrigeration equipment for treated water reservoir.

I-8.3 Data security, privacy, and interoperability

Information acquired and stored for transmission shall be stored in non-volatile memory to protect against a loss of electric power. Following an unscheduled loss of connectivity, a remote

monitoring system should, upon restoration of connectivity, retrieve and send all stored information.

If a remote monitoring system is incorporated, its operation shall be described in the user manual, including its modes of communication, the operating parameters to be monitored, and the procedures for activating the monitoring system, including restart after planned shutdown or loss of power.

The remote monitoring system shall have an activation mechanism and shall be activated only by the owner or user or with the express consent of the owner and/or user. The encryption features of the remote monitoring system shall enable the owner or user to change the encryption key and the IP address of the location receiving the data from the treatment system. To ensure interoperability, the system should be capable of providing output that is convertible to a CSV file.



NSF standard(s) impacted: NSF/ANSI 53

Purpose and background:

Drinking water treatment units for POU/POE applications for public water systems (PWS) in California must be independently certified via NSF/ANSI standard to be utilized, in lieu of centralized treatment, for the purpose of complying with maximum contaminant levels (MCLs) or action levels requirements (Title 22, § 64418, California Code of Regulations). The California State Water Resource Control Board (State Water Board) developed several reports (Linked in Supplementary Materials) that showed that POU/POE devices can provide the most economically feasible treatment option to provide drinking water that meets the State's requirements, when other centralized solutions are not viable. The adoption of POU/POE devices depends on having certification standards that meet the water quality objectives, i.e., the MCLs.

One of the contaminants identified by the State Board as needing certified POU/POE devices in California is uranium (Link: [here](#)). Uranium is one of the naturally occurring radioactive elements and has three major isotopes (U-234, U-235, and U-238). In water (pH 6.5 – 8.5), it is primarily present as two anionic complexes ($\text{UO}_2(\text{CO}_3)_2^{2-}$ and $\text{UO}_2(\text{CO}_3)_2^{4-}$). Potential health impacts from uranium stem from its radioactivity and chemical toxicity, with the health effects being kidney toxicity and increased risk of cancer (Link: [here](#)). In 2001, California adopted a MCL for uranium of 20 pCi/L, which is 0.025 mg/L based on the 0.79 pCi/μg from the kidney toxicity for adults (Link: [here](#)).

NSF/ANSI 58 currently includes challenge testing standards for Uranium at $0.100 \pm 10\%$ and $0.400 \pm 10\%$ mg/L with a maximum effluent concentration of 0.020 mg/L. However, there is a limited number of certified devices on the market. We would ask that both $0.100 \pm 10\%$ mg/L and $0.400 \pm 10\%$ mg/L challenge test standards be adopted under NSF/ANSI 53. The inclusion of non-reverse osmosis treatment options would allow vendors to certify devices already in use in California for the removal of uranium, i.e., strong base anion exchange resins (Link: [here](#)). Methods to evaluate these levels are based on US Environmental Protection Agency (EPA) Methods 200.7 and 200.8 alongside other trace metals.

Strong-base anion exchange resins are a well-established approach for the removal of uranium from groundwater (Link: [here](#)). However, there is potential for interference from other co-occurring constituents, e.g., sulfate, nitrate, and arsenic. The affinity of anionic species with these resins follows uranium > sulfate > arsenate > nitrate (Link: [here](#)). Over long-term, recent studies have shown that uranium can still effectively be removed in the presence of nitrate by several strong base anion exchange resins (Link: [here](#) and [here](#)). To meet the MCLs for uranium using POU/POE devices, it is critical to require the appropriate changeout frequencies to be both protective of human health and ensure that disposal does not require additional management for its potential radioactivity.

The $0.100 \pm 10\%$ mg/L and $0.400 \pm 10\%$ mg/L influent challenge concentration for uranium would be protective of the populations most likely to adopt POU/POE devices to meet the MCL, including PWS with fewer than 200 connections and domestic wells as shown in the table below (Supplementary Materials; Table 1). To determine the uranium levels in these populations, four different data sources were used. These four data sources included domestic wells monitored by the United States Geological Survey (USGS), private wells monitored by private and governmental organizations, and public water systems (PWS) with fewer than 200 connections monitored by the State Water Board. Across these data sources, the 95th and 99th percentile for uranium were in the range of 0.020 – 0.050 mg/L and 0.023 – 0.23 mg/L, respectively. The number of domestic wells excluded at $0.100 \pm 10\%$ mg/L uranium challenge test is 20 of the 853 sites or 97.6% included. For PWS with fewer than 200 connections, the

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0.100 ± 10% mg/L uranium challenge test excludes 405 of the 32,875 of the service connections monitored (total approximate population of 765 excluded) or 98.8% of service connections included. One caveat to the monitoring data is it does not include the California's State Small Water Systems. This designation refers to systems with five to fourteen service connections and there are approximately 1,329 of these systems (Link: [here](#)).

Recommendation:

We would ask that two challenge levels be adopted under the NSF/ANSI 53 standard for uranium (0.100 ± 10% mg/L and 0.400 ± 10% mg/L) with a maximum effluent concentration of 0.020 mg/L in Tables 7.13 and 8.1 or to launch a Task Group to review the additions outlined below to NSF/ANSI 53.

Table 7.13. General Metals Reduction Requirements

Substance	Table 7.13 General metals reduction requirements				
	Individual influent sample point limits (mg/L)	Average influent challenge (mg/L)	Maximum effluent concentration (mg/L)	U.S. EPA Method(s)	Compound
None Uranium	None 0.100 OR 0.400	None 0.100 ± 10% OR 0.400 ± 10%	None 0.02	None 200.7 and 200.8	None UO ₂ (NO ₃) ₂

Table 8.1 Performance Data Sheet Requirements

Substance	Table 8.1 Performance data sheet requirements	
	Influent challenge concentration (mg/L)	Maximum permissible product water concentration (mg/L)
None Uranium	None 0.100 ± 10% OR 0.400 ± 10%	None 0.02

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Supplementary materials (photographs, diagrams, reports, etc.):

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Table 1. Summary of occurrence data for uranium in California.

Contaminant	Level	Data source			
		Groundwater Ambient Monitoring and Assessment (GAMA)		PWS	
		USGS	Local Groundwater Wells	2023 Risk Assessment	State Water Board
Uranium	95 th percentile (mg/L)	0.050	0.020	0.042	0.043
	99 th percentile (mg/L)	0.23	0.023	0.100	0.061
	Max (mg/L)	1.2	0.024	0.41	0.18
Type of Data		Discrete monitoring data, 2004 - 2022	Discrete monitoring data, 2015-2016	9 year running annual average, 2014-2022	Discrete monitoring data from previous 10 years ² , 2014-2024
Number of Systems & Population		Statewide domestic ¹ wells	Private domestic ¹ wells from various private and governmental organizations	PWS with < 200 connections	PWS with < 200 connections
Estimated Service connections (or wells) represented by data		821 wells	32 wells	32,637	2,838
Estimated population represented by data		Not available	Not available	296,277	5,261,497
Link or Reference		GAMA Groundwater (ca.gov) ; GAMA USGS statewide	GAMA Groundwater (ca.gov) ; GAMA localgw	Risk Assessment Data & Results	State Water Board

¹Domestic is defined by GAMA as the following: "privately-owned water supply wells... used to supply water for the domestic needs of an individual residence or systems of four or less service connections".

²Dataset includes wholesalers.

Details of the anticipated need for POU/POE in California can be found in this report: <https://www.waterboards.ca.gov/safer/docs/2023/2023-POU-POE-report.pdf>.

Information regarding the detection of uranium in California public water systems and information on removal during water treatment: https://www.waterboards.ca.gov/gama/docs/coc_radionuclides.pdf and <https://oehha.ca.gov/chemicals/uranium>.

Background on use of ion exchange for uranium removal: [Guidelines for Canadian Drinking Water Quality Guideline Technical Document - Uranium - Canada.ca](#)

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Research on removal of uranium by ion exchange in presence of other co-contaminants by US EPA and US Department of Energy: <https://doi.org/10.1016/j.watres.2019.115455> and https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20135.pdf

Location of SSWS: <https://www.communitywatercenter.org/drinkingwatertool/ca-water>

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NSF standard(s) impacted: NSF/ANSI 53 and 58

Purpose and background:

Drinking water treatment units for POU/POE applications for public water systems (PWS) in California must be independently certified via NSF/ANSI standard to be utilized, in lieu of centralized treatment, for the purpose of complying with maximum contaminant levels (MCLs) or action levels requirements (Title 22, § 64418, California Code of Regulations). The California State Water Resource Control Board (State Water Board) developed several reports (Linked in Supplementary Materials) that showed that POU/POE devices can provide the most economically feasible treatment option to provide drinking water that meets the State's requirements, when other centralized solutions are not viable. The adoption of POU/POE devices depends on having certification standards that meet the water quality objectives, i.e., the MCLs.

Nitrate is a primary contaminant that is a risk to public health, especially for pregnant and nursing women and infants. High nitrate levels may affect the oxygen-carrying ability of the blood of pregnant women. Additionally, nitrite can cause methemoglobinemia. Infants are at greater risk as their stomachs easily convert nitrate to nitrite, causing blue baby syndrome (Link: [here](#)). There is also evidence of colorectal cancer, thyroid disease, and neural tube defects as outcomes of drinking water with high levels of nitrate (Link: [here](#)).

High levels of nitrate have been detected in California water sources due to its widespread use as a fertilizer. Nitrate levels can be as high as one to two orders of magnitude above the MCL (10 mg/L as N) in water supplies heavily impacted by farming and ranching. The Supplementary Materials (Table 1) shows the upper 95th percentile, 99th percentile, and maximum concentration of available occurrence data in California, from domestic wells and PWS with fewer than 200 connections. Domestic well data from 2002 to 2024 was collected from four different programs which monitor wells that serve 4 or fewer connections. The PWS data from the State Water Board spans nine or ten year periods and includes systems with 15 to 200 connections (Supplementary Materials). Notably, there are no data for water systems with five to fourteen service connections. These systems, designated as State Small Water Systems (SSWS) in California, are not included in these databases because the data is tracked at the county level. There are an estimated 1,329 SSWS (Link: [here](#)).

Other states, such as New Mexico, Texas, Oklahoma, Colorado, Kansas, Wyoming, South Dakota, Nebraska, and Illinois have also reported levels higher than the MCL (Link: [here](#)). For example, 2,631 groundwater samples collected in 2022 by the Texas Water Development Board exceeded the nitrate-N MCL of 10 mg/L, representing ~8% of the most recent nitrate analyses from wells throughout the state. The highest median nitrate-N concentrations were observed in the Seymour Aquifer (10.8 mg/L) with the 95th percentile of 33.9 mg/L (Link: [here](#)). An analysis of wells in the High Plains aquifer revealed that 10% of the 32,355 groundwater wells tested were above the MCL (Link: [here](#)). This aquifer include wells in New Mexico, Texas, Oklahoma, Colorado, Kansas, Wyoming, South Dakota, and Nebraska (Link: [here](#)). Similarly, there are multiple regions in Illinois where the MCL for nitrate was exceeded and values as high as 80 mg/L as N have been reported (Link: [here](#)).

To be approved to treat high levels of nitrate in California and other states, POU/POE devices need to be certified through the NSF/ANSI standard. The current NSF/ANSI 53 standard specifies influent concentration for nitrate (as N) up to 27 mg/L and nitrite (as N) up to 3 mg/L. Similarly, the current NSF/ANSI 58 standard treats source nitrate (as N) at levels up to 65 mg/L and 5 mg/L nitrite (as N). In California, levels of nitrate often exceed the influent

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challenge levels specified in NSF/ANSI 53 and at times the levels specified in NSF/ANSI 58 (see Supplementary Section).

There are recent advances in resin technologies to develop nitrate selective ion exchange resins that can increase nitrate removal capacity in POU/POE devices. For example, two type of strong base resins, Triethylamine and Tributylamine have functional groups placed into the anion resin to reduce sulfate selectivity (Link: [here](#)). The larger size of the amine groups in these two resins make it more difficult for divalent ions, like sulfate, to attach themselves simultaneously to multiple sites on the resin, thereby increasing nitrate selectivity. In addition, other device manufacturers are pursuing treatment design approach that combine different treatment units in series to achieve high removal rates for nitrate. These new devices coming into the market need to be certified as a unit through NSF/ANSI 53 or 58 to be implemented in California.

POU/POE devices are now largely accepted as final barrier for drinking water systems, and in some cases the most cost-effective means to achieve safe drinking water. Based on the high levels of nitrate found in several source-water, the current NSF/ANSI certification standards would not be able to demonstrate adequate treatment for some of the impacted communities in California. Additional and optional tiers of "Average Influent Challenge" concentrations are required to address the need of communities experiencing levels of nitrate beyond what is covered in the current NSF/ANSI Standards.

Recommendation:

Adopt the recommendations specified below or launch a Task Group to review the additional optional tests to NSF/ANSI 53 and NSF/ANSI 58. It is recommended that two additional tiers of "Average Influent Challenge" be added to existing NSF/ANSI 53, 70 mg/L and 110 mg/L of nitrate plus nitrite as N. Additionally, it is recommended that an 'Average Influent Challenge' of 110 mg/L nitrate as N be added as a third-tier testing option to the existing standards in NSF/ANSI 58. We recommend the revisions below to be incorporated into Table 7.2 and Table 8.1 in NSF/ANSI 53 and Table 7.3 and 8.1 in NSF/ANSI 58.

Edits to NSF/ANSI 53 are underlined below:

Substance	NSF/ANSI 53 Table 7.2			
	Individual influent sample point limits (mg/L)	Average influent challenge (mg/L)	Maximum effluent concentration (mg/L)	U.S. EPA Method(s)
Nitrate plus nitrite (as N)	30 ± 20% OR <u>70 ± 10%</u> OR <u>110 ± 10%</u>	30 ± 10% added as 27 mg/L NO ₃ [as N] and 3 mg/L NO ₂ [as N] <u>OR</u> <u>70 ± 10%</u> <u>65mg/L NO₃ [as N]</u> <u>5 mg/L NO₂ [as N]</u> <u>OR</u> <u>110 ± 10%</u> <u>110 mg/L NO₃ [as N]</u>	10*	300

*Of the 10 mg/L nitrate as N, not more than 1 mg/L shall be NO₂ as N.

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Substance	NSF/ANSI 53 Table 8.1	
	Individual challenge concentration (mg/L)	Maximum permissible product water concentration (mg/L)
Nitrate plus nitrite (as N) nitrate nitrite	30 ± 10%	10 10 1
	27 ± 10%	
	3 ± 10%	
	OR	
	70 ± 10%	
	65 ± 10%	
	5 ± 10%	
	OR	
	110 ± 10%	
	110 ± 10%	

Edits to NSF/ANSI 58 are underlined below:

Substance	NSF/ANSI 58 Table 7.3				
	Individual influent sample point limits (mg/L)	Average influent challenge (mg/L)	Maximum effluent concentration (mg/L)	U.S. EPA Method(s)	Compounds
Nitrate plus nitrite (as N)	30.0 ± 20%	30.0 ± 10% (added as 27 mg/L as N of nitrate and 3 mg/L as N of nitrite) OR 70 ± 10% (added as 65mg/L as N of nitrate and 5 mg/L as N of nitrite) OR 110 ± 10% 110 mg/L NO3 [as N]	10.0*	300	NaNO3 NaNO2

*Of the 10 mg/L nitrate as N, not more than 1 mg/L shall be NO2 as N.

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Substance	NSF/ANSI 58 Table 8.1	
	Influent challenge concentration (mg/L)	Maximum permissible product water concentration (mg/L)
Nitrate plus nitrite (both as N) Nitrate Nitrite	30 ± 10% 27 mg/L NO ₃ [as N] 3 mg/L NO ₂ [as N] OR 70 ± 10% 65mg/L NO ₃ [as N] 5 mg/L NO ₂ [as N] OR <u>110 ± 10%</u> <u>110 mg/L NO₃ [as N]</u>	 10 mg/L 10 mg/L 1 mg/L

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Supplementary materials (photographs, diagrams, reports, etc.):

Table 1. Summary of occurrence data of nitrate and nitrate + nitrate (as mg/L of N) in California:

Contaminant	Parameter	Summary of Occurrence Data					
		GAMA: Domestic Wells				PWS	
		USGS Statewide Data	Domestic Statewide Data	Local Groundwater Wells	Irrigated Lands Regulatory Program Wells ^{4,5}	2023 Needs Assessment Report ²	State Board Monitoring Data ³
Compiled data for Nitrate And Nitrate + Nitrite	95 th percentile (mg/L as N)	21	17	49	38	8.6	12.6
	99 th percentile (mg/L as N)	51	37	64	69	17.4	53
	Max (mg/L as N)	85	104	92	251	58	110
Type of Data		Statewide Domestic ¹ Wells	Private domestic ¹ wells in 6 CA counties (Yuba, El Dorado, Tehama, Tulare, San Diego, and Monterey)	Discrete monitoring data private domestic ¹ wells from various private and governmental organizations	Domestic ¹ wells on agricultural land.	9-year running annual average.	Discrete monitoring data from previous 10 years. Includes wholesalers. Measured in mg/L of Nitrate as N.
Representative Population		Domestic Wells for individual residence or systems of four or fewer service connections				Public Water Systems <200 connections	Public Water Systems <200 connections
Estimated Service connections (or wells) represented by data		710 Wells	781 wells	479 wells	15,033 wells	29,975	6,715
Estimated population represented by data		Not available	Not available	Not available	Not available	295,734	10,398,083
Link or Reference to data		GAMA Groundwater (ca.gov) GAMA_USGS	GAMA Groundwater (ca.gov) GAMA_DOM	GAMA Groundwater (ca.gov) GAMA_LOCALGW	GAMA Groundwater (ca.gov) WB_ILRP	Risk Assessment Data & Results	Data obtained from California State Water Board

¹Domestic is defined by GAMA as the following: “privately-owned water supply wells... used to supply water for the domestic needs of an individual residence or systems of four or less service connections”.

²Excludes data for one PWS (CA CA2000293, MD 46 Ahwahnee Resorts serving 300 people), where data of 1,600 and 220 mg/L as N value were reported.

³Excludes one datapoint for LPA69 San Joaquin Count (PWS# CA3901248, Well #3 treatment blended effluent), where nitrate levels of 3,400 mg/L as N were reported on 07/1/6/2015 because subsequent data for same facility shows significantly lower levels.

⁴Excludes following datapoints: 627 mg/L (AGL020004947-RANCH 9 DOM), 557 mg/L (AGL020002567-WHALE ROCK #1), 273 mg/L (AGL020002561-MARKHOUS_D), of nitrate + nitrite data as nitrogen, because for these

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wells, only one high data point was reported followed by several lower (<53 mg/L as N) datapoints for the same well.

⁵The maximum value is 251 mg/L as N; however, the highest challenge tier recommended in this Issue Paper is 110 mg/L as N for the influent challenge concentrations in the updated standard, considering potential limitation in removal technologies. This value will cover the 99.7th percentile of the data set.

The Point-of-Use Point-of-Entry Report (2023) by California Water Boards outlines the state's need for POU/POE systems that treat high levels of nitrate. Linked here: <https://www.waterboards.ca.gov/safer/docs/2023/2023-POU-POE-report.pdf>

California Department of Public Health, Nitrate Fact Sheet: [fact sheet nitrate may2014 update.pdf \(ca.gov\)](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/NitrateFactSheet.aspx)

Report on effects of Nitrate: <https://mdpi.com/1660-4601/15/7/1557>

Nitrate Fact Sheet: [coc nitrate.pdf \(ca.gov\)](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/NitrateFactSheet.aspx)

Background on number of SSWS: <https://www.communitywatercenter.org/drinkingwatertool/ca-water>

Background on nitrate levels in groundwater in states apart from California:

[EWG Investigation - June 2020](#)

[Nolan et al., 2015 - EST- Natural Uranium Contamination in Major US Aquifers](#)

[Malito et al, 2022 - Assessment of Nitrate in GW and PWS in Texas](#)

[Abascal et al., 2022 - Global Diagnosis of Nitrate Pollution in GW](#)

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NSF standard(s) impacted: NSF/ANSI 53 and NSF/ANSI 58

Purpose and background:

Drinking water treatment units for POU/POE applications for public water systems (PWS) in California must be independently certified via NSF/ANSI standard to be utilized, in lieu of centralized treatment, for the purpose of complying with maximum contaminant levels (MCLs) or action levels requirements (Title 22, § 64418, California Code of Regulations). The California State Water Resource Control Board (State Water Board) developed several reports (Linked in Supplementary Materials) that showed that POU/POE devices can provide the most economically feasible treatment option to provide drinking water that meets the State's requirements, when other centralized solutions are not viable. The adoption of POU/POE devices depends on having certification standards that meet the water quality objectives, i.e., the MCLs.

Chromium is present in water due to natural and anthropogenic sources. The most common form of chromium in water is the trivalent form, which is an essential element for humans. In the hexavalent form, chromium has been shown to be carcinogenic and toxic to the liver. Hexavalent chromium is among the chemicals known to the state to cause cancer [Title 27, California Code of Regulations, Section 27001], pursuant to California's Safe Drinking Water and Toxic Enforcement Act of 1986 ("Proposition 65").

The State Water Board started the formal rulemaking process to re-establish an MCL of 0.010 mg/L for hexavalent chromium, with the publication of Notice of Proposed Rulemaking released in June 2023 (Link: [here](#)). The public health goal (PHG) for hexavalent chromium is 0.00002 mg/L, as established by California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA). PWS will be required to comply with a hexavalent chromium MCL of 0.010 mg/L according to the proposed size-based compliance schedule described in the Notice of Proposed Rulemaking. Across the United States, California tends to lead in setting drinking water MCLs with other states using these standards as guidance when considering updates to MCLs. Outside the US, several global agencies also recommend guidelines lower than the US Environmental Protection Agency (EPA) MCL. For example, the Australian National Water Quality Management Strategy guideline specifies that both the hexavalent and total chromium levels must be below 0.05 mg/L (Link: [here](#)) and the World Health Organization has a guideline of 0.05 mg/L for total chromium (Link: [here](#)).

The Supplementary Materials (Table 1) shows the upper 95th percentile, 99th percentile, and maximum concentration of available occurrence data, from PWS and domestic wells in California. Additional occurrence data analysis by the Division of Drinking Water at State Water Board showed 10-year (2012-2022) average concentrations exceeding 0.010 mg/L in more than 4% of the public water systems monitored (Link: [here](#)), consistent with a prior publication that characterized occurrence data of hexavalent chromium in California (Izbicki et al., 2015). Notably, there is limited data for water systems with five to fourteen service connections, which are systems designated as State Small Water Systems (SSWS) in California, and these systems are not represented in the occurrence data presented in the Supplementary Materials (Table 1). The number of SSWS in California is estimated to be 1,329 water systems (Link: [here](#)).

The current NSF/ANSI certification standards have a maximum effluent concentration for hexavalent chromium that is an order of magnitude above the proposed MCL of 0.010 mg/L, which makes it infeasible for the State to move forward with a statewide program that uses POU/POE devices as a compliance tool for the proposed hexavalent chromium MCL. POU/POE devices are now largely accepted as final barrier for drinking water systems, and in

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some cases the most cost-effective means to meet the State's MCL in the interim or long-term. Addition of this lower maximum effluent concentration to the NSF/ANSI 53 and NSF/ANSI 58 will make it possible to implement POU/POE devices as a solution to provide drinking water that meets the State's water quality objectives. This change will also be useful for manufacturers looking to sell devices outside the US, e.g., Australia, where the standards are lower than the current 0.1 mg/L maximum allowable product water level.

Recommendation:

Adopt the recommendations underlined below or launch a Task Group to review the addition of a 0.010 mg/L, as an option for 'maximum effluent concentration' to the existing hexavalent chromium standards under NSF/ANSI 53 and NSF/ANSI 58.

We recommend the revisions underlined below to be incorporated into Table 7.13 and 8.1 in NSF/ANSI 53 and Table 7.2 and 8.1 in NSF/ANSI 58.

NSF/ANSI 53 – Table 7.13 General metals reduction requirements					
Contaminant	Individual influent sample point limits (mg/L)	Average influent challenge level (mg/L)	Maximum allowable product water level (mg/L)	U.S. EPA Method(s)	Compounds
Hexavalent Chromium	0.3 +/- 25%	0.3 +/- 10% (added as hexavalent)	0.1 <u>OR</u> <u>0.01</u>	SM3500-CrD	Na ₂ Cr ₂ O ₇ 2 H ₂ O

NSF/ANSI 53 – Table 8.1 Performance data sheet requirements		
Substance	Influent challenge concentration (mg/L)	Maximum permissible product water concentration (mg/L)
chromium (hexavalent)	0.3 +/- 10%	0.1 <u>OR</u> <u>0.01</u>

NSF/ANSI 58 – Table 7.2 Contaminant reduction requirements					
Contaminant	Individual influent sample point limits (mg/L)	Average influent challenge level (mg/L)	Maximum allowable product water level (mg/L)	U.S. EPA Method(s)	Compounds
Hexavalent Chromium	0.3 +/- 20%, 0.3 +/- 25% ^g	0.3 +/- 10% (added as hexavalent)	0.1 <u>OR</u> <u>0.01</u>	200.7, 200.8, 200.9	Na ₂ Cr ₂ O ₇ 2 H ₂ O

NSF/ANSI 58 – Table 8.1 Performance data sheet requirements		
Substance	Influent challenge concentration (mg/L)	Maximum permissible product water concentration (mg/L)
chromium (hexavalent)	0.3 +/- 20%	0.1 <u>OR</u> <u>0.01</u>

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Supplementary materials (photographs, diagrams, reports, etc.):

Table 1. Summary of occurrence data of hexavalent chromium in California:

Contaminant	Parameter	Summary of Occurrence Data			
		Domestic Wells	PWS		
		GAMA ¹ Local GW	2023 Needs Assessment Report	State Water Board Monitoring Data	State Water Board Website
Hexavalent chromium concentration	95% percentile (mg/L)	0.015	0.026	0.0084	0.0093
	99% percentile (mg/L)	0.024	0.039	0.017	0.019
	Max (mg/L)	0.035	0.052	0.019	0.17
Type of Data		Discrete monitoring data private domestic ² wells from various private and governmental organizations	Running annual average	Discrete monitoring data ³ from previous 10 years.	Average data for 10 years 2012-2022
Representative Population		Domestic Wells for individual residence or systems of four or fewer service connections	Public water systems <200 connections	Public Water Systems <200 connections	Public Water Systems
Estimated Service connections (or wells) represented by data		220 Wells	16,775 Service connections	1,047 Service connections	8,158,959 Service connections
Estimated population represented by data		Not available	207,270	5,140,681	33,910,403
Link or Reference to data		GAMA Groundwater (ca.gov)	Risk Assessment Data & Results	Data obtained from SWB	SWB- Hex Chrom Data

¹Groundwater Ambient Monitoring and Assessment Data

²Domestic is defined by GAMA as the following: “privately-owned water supply wells. A water well used to supply water for the domestic needs of an individual residence or systems of four or less service connections”.

³Dataset includes wholesalers.

State Water Board Fact sheet on Hexavalent Chromium - [Fact Sheet on Hex Chrom](#)

Reference Document for State Water Board reports: [SWB- Hex Chrom Data](#)

State Water Board - Needs Assessment Report, 2023 - [Needs Assessment Report-2023](#)

State Water Board - POU/POE Pilot Studies, 2023 - [POU/POE 2023 Report](#)

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Hexavalent chromium rulemaking: Third revised Public Notice – Notice of Proposed Rulemaking, Title 22, Chapter 15 – [Notice of Proposed Rulemaking](#)

Publication on Hexavalent chromium occurrence in California (Izbicki et al, 2015) [Cr\(VI\) Occurrence, Izbicki et al](#)

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NSF standard(s) impacted: NSF/ANSI 53 and NSF/ANSI 58

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

With increasingly stringent water quality standards and/or worsening nitrate concentration, the use of a POU reverse osmosis treatment followed by specialized media (ion exchange media for PFAS or nitrate selective ion exchange media) is likely needed and desirable. The existing "treatment train" certification method outlined in Normative Annex 2 of NSF/ANSI 58 provides the structure for testing of sequential treatment technologies. Manufacturers have expressed long certification (test bench) time needed and resultant extra cost for certification of treatment trains are major deterrants for these treatment devices from being certified and come to market. With the increased interest from consumers and regulators for POU devices that can deliver extremely high quality treated water from POU treatment devices, it may be helpful for the JC to discuss and create a task group to explore, come to consensus and provide additional guidance and examples on how RO + IX treatment trains can be streamlined and tested more efficiently.

Recommendation:

Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.

Based on feedback from the JC, the potential to form a task group to review and update Normative Annex 2 to allow more efficient certification of treatment devices based on the treatment train concept.

Specifically, streamlining of reverse osmosis + specialized ion exchange media treatment trains certification.

Technically speaking, the pre-treatment by reverse osmosis removes major concerns for chromatographic peaking of ion exchange media for nitrate and other anions and the ion exchange media can be very effective to further polish treated RO water for short chain PFAS compounds and allow higher influent nitrate water be treated.

Some potential solutions to consider may include: 1) Using multiple parallel units to generate RO (stage 1) treated water more quickly to speed up certification. 2) Create a recipe for using commercial NF or RO to generate a generic RO permeate (stage 1) that represents the "worst case" RO permeate that can be used to certify Stage 2 IX media. This option can allow many NSF/ANSI 61 PFAS and nitrate treatment media be tested and evaluated quickly.

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ISSUE PAPER



Supplementary materials (photographs, diagrams, reports, etc.):

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Item #: DWTU-2024-7

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TAB 6:

NSF/ANSI 401 Issue Paper

- DWTU-2024-10: New Claims

NSF standard(s) impacted: 401

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

NSF is proposing 11 new substances to add to NSF/ANSI 401. All are substances of concern in source waters around the globe.

Recommendation:

Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.

Send proposal to ballot

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ISSUE PAPER



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Item #: DWTU-2024-10

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1

Estriol

- Estrogen hormone produced during pregnancy. Used in a variety of hormone replacement medications.
- Occurrence Data:
 - On EPA Contaminant Candidate Lists (CCL) 3-5
 - Kolpin, et al., 2002 – Sampled 70 public water supplies (PWS), detected in 21%.
 - Median 19 ng/L (ppt), max. 51 ppt
 - Montagner, et al., 2019 – Sampled various water sources in Brazil
 - 31% detection (n = 187)
 - Mean 38 ppt, max. 1,398 ppt
- EPA Health Reference Level – 350 ppt
- Lab reporting limit – 100 ng/L
- Proposal:
 - Influent – 1,000 ng/L
 - Max. effluent – 100 ng/L

2

Equilin

- Estrogen hormone produced by pregnant horses. Used in a variety of hormone replacement medications including Premarin.
- Occurrence Data:
 - On EPA Contaminant Candidate List (CCL3-CCL5)
 - Kolpin, et al., 2002 – Sampled 70 public water supplies (PWS), detected in one sample at 147 ppt
 - Ishibashi et al., 2018 – Measured equilin in river water ranging from 0.22 to 2.7 ppt
- EPA Health Reference Level – 350 ppt
- Lab reporting limit – 25 ng/L
- Proposal:
 - Influent – 150 ng/L
 - Max. effluent – 25 ng/L

3

Equilenin

- Estrogen hormone produced by pregnant horses. Used in a variety of hormone replacement medications, including Premarin
- Occurrence Data:
 - On EPA Contaminant Candidate List (CCL3-CCL5)
 - Kolpin, et al., 2002 – U.S. nationwide surface water survey., detected in two of 70 samples with a max. of 278 ppt and a median of 0.14
 - Ishibashi et al., 2018 – “levels similar to those of equilin”
- EPA Health Reference Level – 350 ppt
- Lab reporting limit – 25 ng/L
- Proposal:
 - Influent – 300 ng/L
 - Max. effluent – 45 ng/L

4

Sulfamerazine

- Antibacterial agent – widely used for livestock
- Occurrence Data:
 - Not on EPA CCL lists
 - Bartelt-Hunt, et al., 2011 – max. of 54 ppt in ground water
 - Wang, et al., 2015 – 3 ppt in urban river water in China
- EPA Health Reference Level - none
- Lab reporting limit – 75 ng/L
- Proposal:
 - Influent – 500 ng/L
 - Max. effluent – 75 ng/L

5

Sulfamethazine

- Antibacterial agent – widely used for both humans and livestock
- Occurrence Data:
 - Not on EPA CCL lists
 - Kolpin, et al., 2002 – Found in six samples with a max. of 220 ppt
 - Minnesota Pollution Control Agency, 2013 – Found in two lakes, max. of 134 ppt
- EPA Health Reference Level - none
- Lab reporting limit – 25 ng/L
- Proposal:
 - Influent – 150 ng/L
 - Max. effluent – 25 ng/L

6

Sulfamethoxazole

- Antibacterial agent – widely used for both humans and livestock
- Occurrence Data:
 - Not on EPA CCL lists, but on CCL 5 candidate list
 - Kolpin, et al., 2002 – Found in 13 of 104 surface water samples with a max. of 1,900 ppt and a median of 150 ppt
 - Minnesota Pollution Control Agency, 2013 – Found in one lake at 57 ppt
 - Wang, et al., 2015 – Found in 100% of river water samples, with a mean of 28 ppt, and max. of 79 ppt.
- EPA Health Reference Level - none
- Lab reporting limit – 100 ng/L
- Proposal:
 - Influent – 2,000 ng/L
 - Max. effluent – 300 ng/L

7

Benzoylcegonine

- Main metabolite of cocaine
- Occurrence Data:
 - Not on EPA CCL lists
 - Huerta-Fontela, et al., 2008 – median 45 ppt, max. 130 ppt in 22 surface water samples
 - Zuccato, et al., 2005 – mean of 25 ppt in river water
 - Montagner, et al., 2019 –
 - Found in 43 of 51 samples
 - Mean 133 ppt, max. 1,019 ppt
- EPA Health Reference Level - none
- Lab reporting limit – 300 ng/L
- Proposal:
 - Influent – 5,000 ng/L
 - Max. effluent – 750 ng/L

8

Norethisterone (norethindrone)

- Synthetic hormone for birth control and other uses
- Occurrence Data:
 - On CCL 4 list but not CCL 5
 - Kolpin, et al., 2002 – Found in 9 of 70 samples with a max. of 872 ppt and a median of 48 ppt.
 - Tan, et al., 2015 – Max. of 230 ppt
- EPA Health Reference Level – 40 ppt
- Lab reporting limit – 100 ng/L
- Proposal:
 - Influent – 1,000 ng/L
 - Max. effluent – 100 ng/L

9

Permethrin

- Insecticide
- Occurrence Data:
 - On CCL 5 list
 - WHO report for development of WHO Guidelines for Drinking-water Quality – Up to 0.8 mg/L in surface water. Considered readily removed by conventional treatment methods, no detection in finished drinking water.
 - National Pesticide Information Center – Not likely to contaminate groundwater due to low water solubility and strong adsorption to soil
- EPA Health Reference Level – 1,750 ppb
- WHO Health Reference Level – 300 ppb
- Lab reporting limit – 10 ng/L
- Proposal:
 - Influent – 300 ng/L
 - Max. effluent – 10 ng/L

10

Chloral Hydrate (trichloroacetaldehyde)

- Sedative drug
- Also a disinfection byproduct
- Occurrence Data:
 - Not on EPA CCL lists
 - WHO Guidelines for Drinking-water Quality – “generally below 10 ppb”
- EPA Health Reference Level – none
- WHO Health Reference Level – 100 ppb
- Lab reporting limit – 100 ng/L
- Proposal:
 - Influent – 25,000 ng/L
 - Max. effluent – 3,750 ng/L

11

Dichloroacetic Acid

- Disinfection byproduct
- Occurrence Data:
 - Not on EPA CCL lists
 - WHO Guidelines for Drinking-water Quality Fact Sheet:
 - Chlorinated drinking water in Japan – 4.5 ppb and 7.5 ppb
 - Max. of 200 ppb in Australia
 - U.S. – 7 ppb and 17 ppb. Max of 99 ppb in treated surface water
- EPA Health Reference Level – none
- WHO Health Reference Level – 50 ppb
- Lab reporting limit – 1,000 ng/L
- Proposal:
 - Influent – 400,000 ng/L
 - Max. effluent – 60,000 ng/L

12

Substance	CAS Number	Individual influent sample point limits (ng/L)	Average influent challenge (ng/L)	Maximum effluent concentration (ng/L)	Recommended methods of analysis
estriol	50-27-1	1,000 ± 40%	1,000 ± 20%	100	
equilin	474-86-2	150 ± 40%	150 ± 20%	25	
equilenin	517-09-9	300 ± 40%	300 ± 20%	45	
sulfamerazine	127-79-7	500 ± 40%	500 ± 20%	75	
sulfamethazine	57-68-1	150 ± 40%	150 ± 20%	25	
sulfamethoxazole	723-46-6	2,000 ± 40%	2,000 ± 20%	300	
benzoylcegonine	519-09-5	5,000 ± 40%	5,000 ± 20%	750	
norethisterone (norethindrone)	68-22-4	1,000 ± 40%	1,000 ± 20%	100	
permethrin	52645-53-1	300 ± 40%	300 ± 20%	10	
chloral hydrate (trichloroacetaldehyde)	302-17-0	25,000 ± 40%	25,000 ± 20%	3,750	
dichloroacetic acid	79-43-6	400,000 ± 40%	400,000 ± 20%	60,000	



TAB 7:

Open Issues

- 42i132r1 – Chloramine Test Water

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[Note: The recommended changes to the standard which include the current text of the relevant section(s) indicate deletions by use of ~~strikeout~~ and additions by **gray highlighting**. Rationale statements are in *italics* and only used to add clarity; these statements will NOT be in the finished publication.]

NSF/ANSI 42:

Drinking Water Treatment Units – Aesthetic Effects

•

7.3 Chemical reduction testing

•

7.3.2 Chloramine reduction testing

•

7.3.2.6 Influent challenge

7.3.2.6.1 Chloramine reduction test water

A water supply (municipal, well, RO/DI, or any combination of these) with parameters adjusted to ~~with~~ the following ~~specific~~ characteristics shall be used:

pH	9.0 ± 0.25
temperature	20 ± 3 °C (68 ± 5 °F)
TDS	200 to 500 mg/L
hardness	< 170 mg/L as CaCO ₃
turbidity	< 1 NTU
TOC (total organic carbon)	> 1.0 mg/L ^a
organic nitrogen ^b	< 0.2 mg/L ^c
chloramine (analyzed as specified in Section 7.3.2.3)	2.7 to 3.3 mg/L monochloramine (measured as Cl ₂ /L) ^d
^a If naturally present in source water at adequate concentration. Adjustment of TOC is given in Section 7.3.2.6.4.	
^b Measured as the difference between Kjeldahl nitrogen and ammonia nitrogen.	
^c This requirement may be waived if the test water used during analytical validation (Section 7.3.2.3.2) contains organic nitrogen > 0.2 mg/L.	
^d Monochloramine NH ₂ Cl (CAS #10599-90-3)	

NOTE — mg/L monochloramine (as mg Cl₂/L) = mg/L NH₂Cl × 1.4.

The water characteristics shall be adjusted using the procedures in this section. In addition, the test water shall be prefiltered through a particulate reduction filter rated to the Class I requirements of NSF/ANSI 42.

•

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7.3.2.3 Analytical methods

⋮

7.3.2.3.2 Monochloramine analysis

Analyses for monochloramine reduction testing shall be performed in accordance with either the DPD Ferrous Titrimetric Method (4500-Cl F) or the DPD Colorimetric Method (4500-Cl G) in *Standard Methods*.⁴ The method used for monochloramine analysis shall be validated for the challenge water used (see Section 7.3.2.5). A challenge water sample shall be split for analysis by both the selected method and the HPLC Method defined in Annex N-1. A minimum of seven analyses shall be generated from the split sample using both the selected analytical method and the HPLC method. The monochloramine results from both methods shall be compared using a Student's *t* test, and no significant difference shall be observed at the 95% confidence level. Subsequent monochloramine analysis shall be according to the selected method after successful validation.

When significant changes to the challenge water chemistry occur (e.g., change from municipal to synthetic water), revalidation of the selected monochloramine method shall be performed.

NOTE — As an alternative, the HPLC method in Annex N-1 may be used for all monochloramine analyses.

Rationale: Provides clarifying language to explicitly permit the use of synthetic water that meets the chloramine reduction test water criteria in Section 7.3.2.6.1.

42i132r1 – Chloramine Test Water

Ballot comments and responses

Group	Joint Committee on Drinking Water Treatment Units	total committee ballots sent:	32
		% committee ballots returned:	75%
		affirmative votes:	14
		negative votes:	5
		abstentions:	5
Public comment end	1/14/23	% affirmative of total ballots sent:	44%
		% affirmative of total affirmative + negative ballots:	74%

Commenter name	Shannon Murphy	Voter or Nonvoter	Voter	Section, paragraph, figure, table, etc.	N/A
Commenter company	Aquamor	Affirmative, Negative, Abstain	Negative	Type of comment ¹	te
<u>Subject, comment</u>	<u>Water Makeup Validation</u> Where initially this appears to be a simple yes vote, I agree with Rob's comments pertaining to some quick validation testing to ensure these different sources provide a consistent and repeatable test. We have witnessed variances in results with testes in Standard 53 based upon source water and makeup. Where chloramine may be a simpler evaluation, it should be reviewed to ensure consistency and repeatability really across labs if possible.				
Proposed change	Conduct some quick validation testing on the makeup water options and ensure consistent results and water stability.				
Response to comment					

Commenter name	Brook Hatton	Voter or Nonvoter	Voter	Section, paragraph, figure, table, etc.	N/A
Commenter company	CSA Group	Affirmative, Negative, Abstain	Negative	Type of comment ¹	te
<u>Subject, comment</u>	<u>Synthetic test water needs to be better defined and validated</u> While I support the ability to prepare test water from deionised or RO/DI water, I'm concerned that the verbiage, as is, would permit test water with no hardness. I'm not sure that this would affect significantly impact chloramine reduction testing but I suspect that it may. While the lack of a comparison study to validate the change also concerns me, I suspect that the use of municipal water from different sources may also produce different results.				
Proposed change	Set a minimum hardness concentration as well as provide instructions on increasing hardness in test water prepared from deionised water. This may also help with pH stability. I'd also like to see a comparison test of synthetic and municipal water with similar characteristics.				
Response to comment					

¹ Type of comment: **ge** = general **te** = technical **ed** = editorial

42i132r1 – Chloramine Test Water

Ballot comments and responses

Group	Joint Committee on Drinking Water Treatment Units	total committee ballots sent:	32
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Public comment end	1/14/23	% affirmative of total ballots sent:	44%
		% affirmative of total affirmative + negative ballots:	74%

Commenter name	Mandy Huntoon	Voter or Nonvoter	Voter	Section, paragraph, figure, table, etc.	N/A
Commenter company	NSF	Affirmative, Negative, Abstain	Negative	Type of comment ¹	te
Subject, comment	<u>Test Water characteristics - specifically Hardness</u> The current range for Hardness is <170mg/L with guidance on how to decrease "by blending with deionized water." This statement implies that the test laboratory is starting with a water supply that has hardness present. If a synthetic water is used, the test laboratory could have a hardness level of zero and still meet Standard specifications, but not mimic natural waters. I recommend a synthetic water with proposed alkalinity and hardness levels be validated prior to implementation in the Standard.				
Proposed change					
Response to comment					

Commenter name	Art Lundquist	Voter or Nonvoter	Voter	Section, paragraph, figure, table, etc.	N/A
Commenter company	U.S. Army	Affirmative, Negative, Abstain	Negative	Type of comment ¹	ge
Subject, comment	<u>Validate Test Water</u> Concur with comments that test water should be validated prior to implementing change.				
Proposed change					
Response to comment					

¹ Type of comment: **ge** = general **te** = technical **ed** = editorial

42i132r1 – Chloramine Test Water

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Commenter name	Zac Gleason	Voter or Nonvoter	Voter	Section, paragraph, figure, table, etc.	N/A
Commenter company	Water Quality Association	Affirmative, Negative, Abstain	Negative	Type of comment ¹	te
Subject, comment	<u>Test Variation</u> I would echo concerns about variation in testing as water varies and also recommend that this change wait until the work being done TOC for organics testing under 53 is complete as it will likely inform on upper limits and base water adjustments				
Proposed change					
Response to comment					

Commenter name	Rob Herman	Voter or Nonvoter	Nonvoter	Section, paragraph, figure, table, etc.	N/A
Commenter company	Herman & Associates LLC	Affirmative, Negative, Abstain		Type of comment ¹	te
Subject, comment	<u>Significant deviation from original validation</u> The "water supply" referenced in the requirements was always intended to be an potable drinking water supply that represents municipal or well waters. The use of a purified (RO/DI) water source was only considered when parameters needed to be adjusted by dilution (i.e. hardness). This test was validated over several years using several potable water sources, at NSF International, two water sources were used at the time, Sacramento, California (deep well) and Ann Arbor, Michigan (well and surface). Manufacturers and other laboratories also performed the initial testing to ensure validation of the test using potable (municipal or well) water supplies in the years leading up to adoption in the Standard. I am not aware of any validation of the test that a purely synthetic water supply was used to evaluate chloramine reduction on carbon based DWTUs. My concern is not only that this has not been validated, but there is a strong potential that the test water recipe is not adequate to ensure a synthetic (RO/DI water source) test water will be stable during use as there are no pH buffering compounds in the test recipe and the recipe was specifically developed with the assumption that this would be a municipal or well water source that was already stable and contained minerals and organic matter in equilibrium. I am not opposed to the concept of using RO/DI water to create a synthetic test water for chloramine reduction, however, considering the variance in performance seen with the contaminant, we should be endeavoring to minimize variance across laboratories instead of creating an unknown wild card.				
Proposed change	Evaluate the test water recipe with the intent to allow an RO/DI water supply (add and/or adjust specifications) and then validate the synthetic water supply against existing municipal and well water supplies at multiple laboratories to establish the variance between laboratories when using the two water sources. This would shed light on the existing level of variation in the standard using municipal/well water supplies, and establish the variation inherent within the RO/DI synthetic water and if there are substantial performance differences in chloramine reduction between the two types of water sources.				

¹ Type of comment: **ge** = general **te** = technical **ed** = editorial

42i132r1 – Chloramine Test Water

Ballot comments and responses

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Public comment end	1/14/23	% affirmative of total ballots sent:	44%
		% affirmative of total affirmative + negative ballots:	74%
	This type of study would allow an analysis of variation and perhaps even show that variation could be greatly reduced by using RO/DI as the source water. Unfortunately, without performing a study, we are creating a situation that may result in even worse variation than what we are currently experiencing within the industry.		
Response to comment			



TAB 8:

Task Group Updates

- Metals Testing Variability
- MCLG
- 600
- RO Efficiency
- Lead Validation
- 330 Definitions
- End of Device Life
- TOC Concentration

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

Metals Testing Variability Task Group

Chair: Rob Astle, KX Technologies - Vice Chair: Shannon Murphy, Aquamor

Task Group Charge

Consider changes in NSF/ANSI 53 to increase reproducibility of test protocols for lead and mercury reduction

Task Group Roster

Voting Members

Phil Dietz	IAPMO
Tina Donda	IAPMO
Zac Gleason	Water Quality Association
Brook Hatton	CSA Group
Mandy Huntoon	NSF
Kangjin Lee	Coway
Andrew Lombardo	KT Corporation
George Lukasik	BCS Laboratories
Darren Lytle	U.S. Environmental Protection Agency
Kgalaletso Mothooagae	Safe Bite Consulting
Tom Palkon	IAPMO
Arvind Patil	Protect Plus / Ricura Technologies
Kyle Postmus	NSF
Ryan Prince	Paragon Water Systems
Ed Robakowski	Kinetico, Inc.
John Smith	Kinetico, Inc.
Shelby Smith	NSF
Mikhail Starostin	Green Mountain Coffee Roasters (Keurig)
Jennifer Tully	U.S. Environmental Protection Agency

Non-Voting Members

Katie Friedman	The Clorox Company
Rob Herman	Herman & Associates LLC
Miles Menyhert	Jacobi Carbons

Meetings Held

10/5/23, 11/13/23, 12/11/23, 2/12/24, 3/11/24, 4/8/24

Summary of Task Group Work

In July of 2023, an issue paper was submitted identifying an observed variability in “lab to lab” and “test to test” variability in heavy metals testing. In order to best understand the issue and potential root causes, the TG agreed to following the DMAIC model for project management and problem solving: Define, Measure, Analyze, Improve and Control. Since the creation of the task group, the following has been accomplished:

Task Group Chair Report

Define:

- After reviewing initial data, the team agreed to the hypothesis that one source of variability in testing could be a result of the standard allowing the use of either City or RODI water to create the challenge. Trace levels of other heavy metals in city water could impact the results of the test, as they may artificially (and inconsistently) 'over-challenge' the filter.
- The team also agreed that while this may not be the only factor in observed variability, it would be the priority focus at this time.
- Scope for this task group is heavy metals testing, except Pb8.5 (for which there is already an active task group), and Arsenic testing (which already requires RODI water).

Measure:

- Team agreed to simplify the testing for the first round – limiting to Hg 6.5
- TG agreed to a formal (first round) test protocol involving the ANSI labs
 - o 4 identical filters sent to each participating lab
 - o After initial flush, Run Hg 6.5 at 0.65 gpm, continuous flow
 - One test with RODI-based challenge
 - One test with City water-based challenge
 - Each test in duplicate
 - o Run 200 gallons per day, collecting samples every 25 gallons (will analyze samples at 50 gal intervals and retain remaining samples)
 - o Expect breakthrough on day 2, with possible breakthrough on day 3
- KX Technologies will produce 100 (encapsulated carbon block) filters from a single lot of materials for this test program. The first set of filters will be shipped to the participating labs in April, with testing planned for May
 - o Extra samples were produced in the event any tests need repeating, or to have additional samples produced from the same production lot for subsequent testing, as appropriate.
- In addition to the testing, each lab will conduct a comprehensive analysis of inorganic and organic materials present, even in trace levels, in their city and RODI water for future comparison.

Analyze

- Results to round 1 testing are expected late May / early July.
- TG will analyze and assess next steps

Improve

- TBD

Control

- TBD

Summary:

The TG is excited to generate our first data in the next month or so. This data will essentially guide the TG into the next steps. I am happy to answer questions from the JC or Observers.

Thank you:

I would like to take this opportunity to thank this Task Group. They are all highly engaged in this topic, and (as expected) highly knowledgeable in the subject matter. I have found our meetings enjoyable and educational. And, I would like to give special thanks and recognition to Monica Milla – for all her work in scheduling meetings, publishing notes, keeping the TG on track, following up with various topics, and more. Her efforts are greatly appreciated!

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

MCLG Study Task Group

Chair: Dr. Gary Hatch, Hatch Global Consulting Services

Task Group Charge

Investigate options for achieving the goal of minimizing the health risks from contaminants in drinking water that exceed the MCLG but do not exceed the MCL.

Task Group Roster

Voting Members

Douglas Anderson	Culligan
Margaret Bicking	Ecowater Systems
Frank Brigano	Consultant - Industry
Chris Caldwell	Trojan Technologies
France Lemieux	Health Canada
Eugene Leung	California Waterboards Division of Drinking Water
Darren Lytle	U.S. Environmental Protection Agency
Shannon Murphy	Aquamor
Thomas Palkon	IAPMO
Arvind Patil	Protect Plus / Ricura Technologies
Regu Raghunathan	ReguNathan & Associates
Becky Tallon	A. O. Smith Corporation
Mark Unger	The LeverEdge
Steve Ver Strat	SVS Consulting Services
Eric Yeggy	Water Quality Association
Ariel Zoldan	Michigan Department of Environment, Great Lakes, and Energy (EGLE)

Non-Voting Members

Tina Donda	IAPMO
Mandy Huntoon	NSF
Marissa Malinski	IAPMO
Kyle Postmus	NSF
Michael Schock	U.S. Environmental Protection Agency
Joe Wolff	Elkay Manufacturing

Meetings Held Since Last JC Meeting

2/14/24

Summary of Task Group Work

Background -

The MCLG Task Group was officially formed at the October 26, 2020 DWTU Joint Committee with the charge of investigating the right approach for minimizing health risks from drinking water that might have contaminants that exceed the MCLG but do not exceed the MCL. The driving force behind this effort was that though a contaminant in drinking water may meet the MCL, it still carries a finite health risk by exceeding the MCLG. Therefore, reducing that contaminant to or below its MCLG would minimize that contaminant's health risk to the public. For more information on how the USEPA establishes MCLs and MCLGs for public drinking water, visit the internet at "How EPA regulates drinking water contaminants".

Task Group Chair Report

NSF/ANSI Standards for contaminant reduction health claims -

Health effects contaminant reduction claims can be made by meeting the reduction requirements in a number of different NSF/ANSI drinking water treatment unit (DWTU) standards. These are:

- 53, media filters - inorganics, organics and cyst reduction
- 58, reverse osmosis (RO) systems - inorganics, organics and cyst reduction
- 62, distillation units - inorganics and microbial reduction only
- 44, softeners - barium and radium

Many contaminants listed in the standards for reduction claims have established MCLGs. And some of these compounds are of little concern relative to frequency of detection throughout the USA. For information regarding many of these contaminants' occurrence, visit the internet at "WQRF Contaminant Occurrence Map" (available from the Water Quality Research Foundation (WQRF), a research affiliate of the Water Quality Association (WQA)).

Tables 1 - 4 attached to this report show the MCLGs and MCLs for contaminants and other chemicals that have been established by the USEPA as part of the National Primary Drinking Water Regulations (NPDWR). This information is available on the USEPA web site (<https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations#six>).

Of all the regulated contaminants or other chemicals regulated and having MCLGs and/or MCLs, 54 appear in NSF/ANSI Standard 53 as available for making reduction claims. Of these 54, 34 have their MCLG equal to the MCL (see Table 1), which is the "Maximum Effluent Concentration" required not to be exceeded during certification testing. Therefore, DWTUs just by meeting the reduction claims for up to 34 contaminants or certain other chemicals can claim meeting a so-called "MCLG reduction claim", which means: "The level of a contaminant in drinking water below which there is no known or expected risk to health over a lifetime of consumption". As can be seen, this leaves a potential 20 contaminants and chemicals available for making a so-called "MCLG reduction claim".

MCLG Task Group Issues of concern -

Many issues regarding how a claim could be made and described for meeting the performance requirements to achieve the MCLG of a contaminant (that is less than the MCL) have created road blocks to moving forward. Some of these issues are:

- How would the claim be titled? Some suggested a "non-detect claim", or "minimum risk claim? Concern was raised calling it an "MCLG claim" because "MCLG" is a regulatory term and we should avoid any reference to satisfying or meeting USEPA regulations.
- How would this new claim be perceived by consumers relative to all the other health claims for DWTU devices? Will they understand and appreciate the significance of "minimizing health risk to the MCLG" versus the protection offered by other currently certified products making the standard reduction claims for the same contaminant(s)?
- What contaminants should first be selected for such a claim (lead? arsenic?...others?), or how many contaminants should be selected....initially just one, or two, or more? If many are selected, the frequency of occurrence and the time period since the latest detection should be a factor for deciding.
- How to address "non-detect"? There are about 18 contaminants (see Table 3) that have an MCLG of zero. How can a claim be made to address meeting "zero"? Detection limits for a contaminant vary among testing agencies. Who decides? Should that be the "Reporting Limit", or ... what limit? A suggestion was made to have all certifying agencies conduct round-robin testing to determine "minimum detection limits for....what contaminants? How many contaminants? The round-robin testing would probably have to be repeated every 5 years or when new analytical technology dictates.

Task Group Chair Report

- Advances in analytical technology may render the established “detection limit” the device was certified to obsolete. Will the manufacturer be required to retest to the new detection limit prior to the 5-year retest....or when?... or within one year?
- To establish a device’s capacity to meet the so-called “zero MCLG claim”, how would the test protocol be run to determine the “zero” or “non-detect” point? At first break-through, or 90% prior to the break-through point, or 75%....?
- Per Eric Yeggy (WQA): “There is always variability during testing....the lower the detection limit, the higher the risk of variability.” Occasionally an outlier data point occurs far from the expected breakthrough point. Should this be thrown out? Allow only one outlier?
- Per Eric Yeggy (WQA): WQA “surveyed certain manufacturers and found some weren’t really in favor of this.”
- Numerous manufacturers have DWTU products that are certified for reducing many of the contaminants and chemicals that have established MCLGs. It is realistic to assume that they would have to retest and certify the same product(s) (with different model numbers) to achieve a so-called “MCLG claim”, and most likely would have to claim a lower capacity to meet the “non-detect” requirement. This could cause a serious issue of consumer confusion.
- Per Eric Yeggy (WQA): “WQA is not against this concept, and had worked with ASPE toward a draft standard for an optional claim: Manufacturers could choose to make a claim to a lower limit, which could help states with lower limits that want to see products certified to a different level. It was more the manufactures who didn’t see a need for it and there was never a consensus as to why.”
- Per Regu Regunathan (Regunathan & Associates): “(This effort) was still worthwhile to pursue, because we’re capable of reducing to non-detectable levels for many health-related contaminants. However, if manufactures aren’t supportive, there may be nothing to gain by continuing the (task) group.”

NOTE: This report was prepared for the purpose of providing information to “interested parties” who will be asked for their participation in a survey for providing guidance to the NSF MCLG Task Group in continuing their efforts to establish a so-called “MCLG claim” for DWTU products.

Table 1 - Contaminants with MCLG’s = MCL’s				
Category	Contaminant	MCLG (mg/L)	MCL or TT* (mg/L)	Included in NSF 53 claims, individually or in Surrogate test
Disinfectants	<u>Chloramines (as Cl₂)</u>	MRDLG=4	MRDL=4.0	Yes
Disinfectants	<u>Chlorine (as Cl₂)</u>	MRDLG=4	MRDL=4.0	Yes
Disinfectants	<u>Chlorine dioxide (as ClO₂)</u>	MRDLG=0.8	MRDL=0.8	NO
Inorganic Chemicals	<u>Antimony</u>	0.006	0.006	NO
Inorganic Chemicals	<u>Asbestos (fiber > 10 micrometers)</u>	7 million fibers per liter (MFL)	7 MFL	Yes
Inorganic Chemicals	<u>Barium</u>	2	2	Yes
Inorganic Chemicals	<u>Beryllium</u>	0.004	0.004	NO
Inorganic Chemicals	<u>Cadmium</u>	0.005	0.005	Yes
Inorganic Chemicals	<u>Chromium (total)</u>	0.1	0.1	Yes

Task Group Chair Report

Table 1 - Contaminants with MCLG's = MCL's				
Category	Contaminant	MCLG (mg/L)	MCL or TT* (mg/L)	Included in NSF 53 claims, individually or in Surrogate test
Inorganic Chemicals	<u>Copper</u>	1.3	TT; Action Level=1.3	Yes
Inorganic Chemicals	<u>Cyanide (as free cyanide)</u>	0.2	0.2	NO
Inorganic Chemicals	<u>Fluoride</u>	4	4	Yes
Inorganic Chemicals	<u>Mercury (inorganic)</u>	0.002	0.002	Yes
Inorganic Chemicals	<u>Nitrate (measured as Nitrogen)</u>	10	10	Yes
Inorganic Chemicals	<u>Nitrite (measured as Nitrogen)</u>	1	1	Yes
Inorganic Chemicals	<u>Selenium</u>	0.05	0.05	Yes
Organic Chemicals	<u>Atrazine</u>	0.003	0.003	Yes
Organic Chemicals	<u>Carbofuran</u>	0.04	0.04	Yes
Organic Chemicals	<u>Chlorobenzene</u>	0.1	0.1	Yes
Organic Chemicals	<u>2,4-D</u>	0.07	0.07	Yes
Organic Chemicals	<u>Dalapon</u>	0.2	0.2	NO
Organic Chemicals	<u>o-Dichlorobenzene</u>	0.6	0.6	Yes
Organic Chemicals	<u>p-Dichlorobenzene</u>	0.075	0.075	Yes
Organic Chemicals	<u>1,1-Dichloroethylene</u>	0.007	0.007	Yes
Organic Chemicals	<u>cis-1,2-Dichloroethylene</u>	0.07	0.07	Yes
Organic Chemicals	<u>trans-1,2-Dichloroethylene</u>	0.1	0.1	Yes
Organic Chemicals	<u>Di(2-ethylhexyl) adipate</u>	0.4	0.4	NO
Organic Chemicals	<u>Dinoseb</u>	0.007	0.007	Yes
Organic Chemicals	<u>Diquat</u>	0.02	0.02	NO
Organic Chemicals	<u>Endothall</u>	0.1	0.1	NO
Organic Chemicals	<u>Endrin</u>	0.002	0.002	Yes

Task Group Chair Report

Table 1 - Contaminants with MCLG's = MCL's				
Category	Contaminant	MCLG (mg/L)	MCL or TT* (mg/L)	Included in NSF 53 claims, individually or in Surrogate test
Organic Chemicals	<u>Ethylbenzene</u>	0.7	0.7	Yes
Organic Chemicals	<u>Glyphosate</u>	0.7	0.7	NO
Organic Chemicals	<u>Hexachlorocyclopentadiene</u>	0.05	0.05	Yes
Organic Chemicals	<u>Lindane</u>	0.0002	0.0002	Yes
Organic Chemicals	<u>Methoxychlor</u>	0.04	0.04	Yes
Organic Chemicals	<u>Oxamyl (Vydate)</u>	0.2	0.2	NO
Organic Chemicals	<u>Picloram</u>	0.5	0.5	NO
Organic Chemicals	<u>Simazine</u>	0.004	0.004	Yes
Organic Chemicals	<u>Styrene</u>	0.1	0.1	Yes
Organic Chemicals	<u>Toluene</u>	1	1	Yes
Organic Chemicals	<u>2,4,5-TP (Silvex)</u>	0.05	0.05	Yes
Organic Chemicals	<u>1,2,4-Trichlorobenzene</u>	0.07	0.07	Yes
Organic Chemicals	<u>1,1,1-Trichloroethane</u>	0.2	0.2	Yes
Organic Chemicals	<u>Xylenes (total)</u>	10	10	Yes
*TT - Treatment Technique (See USEPA NPDWR's)				

Task Group Chair Report

Table 2 - Contaminants with MCLG's < MCL but > zero (measurable)				
Category	Contaminant	MCLG (mg/L)	MCL (mg/L)	Included in NSF 53 claims
Inorganic Chemical	Thallium	0.0005	0.002	NO
Inorganic Chemical	Chlorite	0.8	1	NO
Organic Chemical	1,1,2-Trichloroethane	0.003	0.005	Yes
Disinfection Byproduct	Chloroform	0.07	0.08 (as a group in TTHMs)	Yes (used as a surrogate for TTHM and VOC testing)
Disinfection Byproduct	Dibromochloromethane	0.06	0.08 (as a group in TTHMs)	(No, but included with TTHM claim)
Disinfection Byproduct	Trichloroacetic acid	0.02	0.06 (as a group in HAA5)	NO

Table 3 - Organic Contaminants with MCLG's "zero"					
Category	Contaminant	MCLG (mg/L)	MCL or TT* (mg/L)	Included in NSF 53 as VOC claim	Sources of Contaminant in Drinking Water (from NPDWR's)
Organic Chemicals	Alachlor	zero	0.002	Yes	Runoff from herbicide used on row crops
Organic Chemicals	Benzene	zero	0.005	Yes	Discharge from factories; leaching from gas storage tanks and landfills
Organic Chemicals	Carbon_tetrachloride	zero	0.005	Yes	Discharge from chemical plants and other industrial activities
Organic Chemicals	1,2-Dibromo-3-chloropropane (DBCP)	zero	0.0002	Yes	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
Organic Chemicals	1,2-Dichloroethane	zero	0.005	Yes	Discharge from industrial chemical factories
Organic Chemicals	Ethylene dibromide	zero	0.00005	Yes	Discharge from petroleum refineries
Organic Chemicals	Heptachlor	zero	0.0004	Yes	Residue of banned termiticide-- banned 1988

Task Group Chair Report

Table 3 - Organic Contaminants with MCLG's "zero"					
Category	Contaminant	MCLG (mg/L)	MCL or TT* (mg/L)	Included in NSF 53 as VOC claim	Sources of Contaminant in Drinking Water (from NPDWR's)
Organic Chemicals	Heptachlor epoxide	zero	0.0002	Yes	Breakdown of heptachlor
Organic Chemicals	Pentachlorophenol	zero	0.001	Yes	Discharge from wood preserving factories
Organic Chemicals	Tetrachloroethylene	zero	0.005	Yes	Discharge from factories and dry cleaners
Organic Chemicals	Trichloroethylene	zero	0.005	Yes	Discharge from metal degreasing sites and other factories
Organic Chemicals	Acrylamide	zero	TT	NO	Added to water during sewage/wastewater treatment
Organic Chemicals	Benzo(a)pyrene (PAHs)	zero	0.0002	NO	Leaching from linings of water storage tanks and distribution lines
Organic Chemicals	Chlordane	zero	0.002	Yes	Residue of banned termiticide
Organic Chemicals	Dichloromethane	zero	0.005	NO	Discharge from drug and chemical factories
Organic Chemicals	1,2-Dichloropropane	zero	0.005	Yes	Discharge from industrial chemical factories
Organic Chemicals	Di(2-ethylhexyl) phthalate	zero	0.006	NO	Discharge from rubber and chemical factories
Organic Chemicals	Dioxin (2,3,7,8-TCDD)	zero	0.00000003	NO	Emissions from waste incineration and other combustion; discharge from chemical factories
Organic Chemicals	Epichlorohydrin	zero	TT	NO	Discharge from industrial chemical factories; an impurity of some water treatment chemicals

Task Group Chair Report

Table 3 - Organic Contaminants with MCLG's "zero"					
Category	Contaminant	MCLG (mg/L)	MCL or TT* (mg/L)	Included in NSF 53 as VOC claim	Sources of Contaminant in Drinking Water (from NPDWR's)
Organic Chemicals	Hexachlorobenzene	zero	0.001	NO	Discharge from metal refineries and agricultural chemical factories
Organic Chemicals	Polychlorinated biphenyls (PCBs)	zero	0.0005	Yes	Runoff from landfills; discharge of waste chemicals
Organic Chemicals	Toxaphene	zero	0.003	Yes	Runoff/leaching from insecticide used on cotton and cattle
Organic Chemicals	Vinyl chloride	zero	0.002	NO	Leaching from PVC pipes; discharge from plastic factories
Disinfection Byproducts	Bromodichloromethane	zero	0.08 (included with TTHM's testing)	Yes	Byproduct of drinking water disinfection
Disinfection Byproducts	Bromoform	zero	0.08 (included with surrogate TTHM's claim)	Yes	Byproduct of drinking water disinfection
Disinfection Byproducts	Tribromoacetic acid	no individual MCL or MCLG	0.06 (included with HAA5's and TTHM surrogate claim)	Yes	Byproduct of drinking water disinfection
Disinfection Byproducts	dichloroacetic acid	zero	0.06 (included with HAA5's)	NO	Byproduct of drinking water disinfection
*TT - Treatment Technique (see USEPA NPDWR's)					

Task Group Chair Report

Table 4 - MCLGs and MCLs for HAAs and THMs

Category	Contaminant	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water	Included in NSF 53 claims, individually or in Surrogate / VOC test
Disinfection Byproducts	Haloacetic acids (HAA5)(as a group) ^a	No MCLG	0.06 (for combined HAA5's)	Increased risk of cancer	Byproduct of drinking water disinfection	NO
Disinfection Byproducts	Haloacetic acids (HAA5): bromoacetic acid	No MCLG	0.06 (for combined HAA5's)	Increased risk of cancer	Byproduct of drinking water disinfection	NO
Disinfection Byproducts	Haloacetic acids (HAA5): dibromoacetic acid	No MCLG	0.06 (for combined HAA5's)	Increased risk of cancer	Byproduct of drinking water disinfection	NO
Disinfection Byproducts	Haloacetic acids (HAA5): tribromoacetic acid	No MCLG	0.06 (for combined HAA5's)	Increased risk of cancer	Byproduct of drinking water disinfection	YES, included with VOC surrogate claim
Disinfection Byproducts	Haloacetic acids (HAA5): monochloroacetic acid ^b	0.07	0.06 (for combined HAA5's)	Increased risk of cancer	Byproduct of drinking water disinfection	NO
Disinfection Byproducts	Haloacetic acids (HAA5): dichloroacetic acid	0	0.06 (for combined HAA5's)	Increased risk of cancer	Byproduct of drinking water disinfection	NO
Disinfection Byproducts	Haloacetic acids (HAA5): trichloroacetic acid	0.02	0.06 (for combined HAA5's)	Increased risk of cancer	Byproduct of drinking water disinfection	NO
Disinfection Byproducts	Total Trihalomethanes (TTHMs)(as a group)	No MCLG	0.08 (for combined TTHM's)	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	YES, included with TTHM and VOC surrogate claim
Disinfection Byproducts	Chloroform	0.07	0.08 (for combined TTHM's)	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	YES, included with TTHM and VOC surrogate claim

Task Group Chair Report

Table 4 - MCLGs and MCLs for HAAs and THMs

Category	Contaminant	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water	Included in NSF 53 claims, individually or in Surrogate / VOC test
Disinfection Byproducts	Bromodichloromethane	0	0.08 (for combined TTHM's)	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	YES, included with TTHM and VOC surrogate claim
Disinfection Byproducts	Dibromochloromethane	0.06	0.08 (for combined TTHM's)	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	YES, included with TTHM and VOC surrogate claim
Disinfection Byproducts	Bromoform	0	0.08 (for combined TTHM's)	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	YES, included with TTHM and VOC surrogate claim

^a - see USEPA NPDWR's: ^b - monochloroacetic acid has an MCLG of 0.07 mg/L which is greater than the MCL of the combined HAA5.



Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

NSF/ANSI/CAN 600 Task Group

Chair: Kristin Kerstens, WQA

Task Group Charge

1) Check and revise active agent language, considering health and aesthetic effects, and 2) have an annual meeting to evaluate how changes to 600 impact evaluation criteria in the DWTU standards

Task Group Roster

Donda, Tina	IAPMO
Lodygowski, Kristin	IAPMO
Prince, Ryan	Paragon Water Systems

Meetings Held Since Last JC Meeting

NA

Summary of Task Group Work

The task group has not met yet, as there are several pending evaluation criteria ballots being prepared for the JC to consider adding to NSF/ANSI/CAN 600.

The group is also seeking additional members.

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

Task Group on RO Efficiency

Chairs: Tim Beall, Topper Manufacturing, and Tom Palkon, IAPMO

Subtask Group on Test Procedures

Chair: Tom Palkon, IAPMO

Task Group Charge

Determine efficiency tests for tankless RO systems (including those with automatic flushing) and examine removing recovery ratings for auto shutoff tank type systems.

Task Group Roster

Voting Members

Bicking, Margaret	Ecowater Systems
Donda, Tina	IAPMO
Fisher, Kathryn	A. O. Smith Corporation
Gleason, Zac	Water Quality Association
Herman, Rob	Herman & Associates LLC
Huntoon, Mandy	NSF
Leung, Eugene	California Waterboards Division of Drinking Water
Levoy, Anna	NSF
Murphy, Shannon	Aquamor
Postmus, Kyle	NSF
Regunathan, Regu	ReguNathan & Associates, Inc.
Reyneke, Greg	Red Fox Advisors, Inc.
Rorabeck, Brian	Pentair
Schneidewend, Tedd	Culligan International Company
Smith, John	Kinetico, Inc.
Tallon, Becky	A. O. Smith Corporation
Unger, Mark	The LeverEdge
Yeggy, Eric	Water Quality Association

Non-Voting Members

Anderson, Anita	Minnesota Dept. of Health
Blumenstein, Mike	NSF
Cartwright, Peter	Cartwright Consulting Co.
Hughes, Emma	EPA
Malinski, Marissa	IAPMO
Pickering, Robert	Eastern Research Group
Wales, Josh	Masco Corp.

Subtask Group Roster

Beall, Tim	Topper Manufacturing
Schneidewend, Tedd	Culligan International Company
Tallon, Becky	A. O. Smith Corporation

Meetings Held Since Last JC Meeting

Task Group: 8/16/23, 2/29/24, 4/9/24 **Subtask Group:** 10/30/23, 2/26/24

Task Group Chair Report

Summary of Task Group Work

Will appear in final packet.

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

Subtask Group on Lead Validation

Chair: Dr. Arvind Patil, Protect Plus/Ricura Technologies

Task Group Charge

To develop a stable, reproducible lead test solution that will represent the Newark water conditions, in the presence of orthophosphates, that led to the leakages of lead in NSF 53 certified devices

Task Group Roster

Voting Members

Dietz, Phil	IAPMO
Gleason, Zac	Water Quality Association
Huntoon, Mandy	NSF
Lombardo, Andrew	Aqua Guidance
Lu, Guoxin	Water Quality Association
Palkon, Thomas	IAPMO

Non-Voting Members

Aridi, Sal	IAPMO
Astle, Rob	KX Technologies
Donda, Tina	IAPMO
Follweiler, Amy	KX Technologies
Friedman, Katie	The Clorox Company
Herman, Rob	Herman & Associates LLC
Lee, Sun Yong	PUREMEM Co., Ltd.
Lu, Guoxin	Water Quality Association
Lytle, Darren	U.S. EPA
McDonald, Jonathan	Consultant
Regunathan, Regu	ReguNathan & Associates
Rorabeck, Brian	Pentair
Sahni, Harkirat	Paragon Water Systems
Schock, Michael	Consultant - Public Health/Regulatory
Ver Strat. Steve	SVS Consulting Services LLC
Walls, Daniel	Philadelphia Water Department
Wolff, Joe	Elkay Water Solutions
Woltornist, Steven	KX Technologies
Young, Jaime	Quality Filter Testing Laboratory, LLC

Meetings Held Since Last JC Meeting

5/25/23, 7/19/23, 9/15/23, 11/27/23, 1/29/24, 4/9/24

Summary of Task Group Work

This Subtask Group has been undertaking Round Robin tests between the participating laboratories to create stable lead particle size distribution, for a challenge influent solution, that will mimic the conditions encountered in Newark, where NSF 53 certified treatment devices failed in removing lead to 10 ppb in the effluent.

Task Group Chair Report

Brief statement of information provided:

Creation of right lead particle size distribution is highly dependent on the composition of Test Water used. The ultimate aim here is to produce stable particle size distribution containing greater than 50 – 60% ultrafine lead particles between 0.1 μ to 0.45 μ range, that were similar to those found in Newark situation and which were considered responsible for causing lead leakages in NSF certified treatment devices. Initially low TDS pH 6.5 Test water that existed in NSF Standard 53 for lead, was used in the tests

However, various participating laboratories were unable to produce consistent and stable particles in the above-mentioned ultrafine range.

The new parameters for hardness, alkalinity, and phosphate concentration for Test Water were then developed from averages of about 300 readings from Newark water, spanning over 27 weeks, received from Mike Schock of EPA.

In the latest Round Robin Test # 5, three laboratories were able to achieve more than 50% stable fraction of lead particles in the ultrafine range between 0.1 μ and 0.45 μ . However, two laboratories could not achieve the stability of ultrafine lead particles.

During the latest subtask group meeting, based on analysis of trends of various lab results, it was decided to increase alkalinity to 45 ± 5 mg/L from existing 30 ± 2 mg/L. Hardness was reduced to 25 ± 5 mg/L using calcium only from existing 45 ± 2 mg/L,

The composition of this new Test water is being circulated to the participating laboratories for new Round Robin test # 6.

Results of Modified Round Robin Test # 6:

The specifications of the Round Robin Test # 6, were modified to increase the alkalinity to 45 ± 5 mg/L from existing 30 ± 2 mg/L; Hardness was reduced to 25 ± 5 mg/L using Calcium only. With this modification laboratories from NSF and WQA were able to get Lead particulate in the 0.1 to 0.45 μ range above 50% range as required. The range varied from 51% to 81% for NSF and 57% to 62% for WQA.

Total Lead Particulate Requirement:

The Total particulate requirement for NSF pH 8.5 Standard protocol is 30%. It was not clear what that number should be in Newark modified Test water.

In the current test results, the total lead particulate between 0.1 μ to 1.2 μ was 30 to 38% for NSF and 93% to 96% for WQA. WQA Lab also found that by using only soluble lead (and not both soluble and insoluble) stock solutions in the preparation of final solution, much more consistent and stable (over 24-hour period) high range (> 80%) Total particulate Lead was produced besides also producing high range ultrafine Lead particulate. Similar findings were obtained in the past by Clorox and Protect Plus. So, the question was what should the requirement for Total Particulate be?

Going back to the old work done in 2019, when the Lead leakages were first found in NSF certified devices in Newark water, it was found that Lead Particulate speciation produced with Newark water based on CCR data, had produced, not only high range (75% to 80%) ultrafine Lead particulate between 0.1 μ to 0.45 μ but also Total particulate between 0.1 to 1.2 μ of almost 100%. So, the aim of the Round Robin Test should be to reproduce these conditions that led to the leakages of Lead in the NSF certified devices in the first place.

Task Group Chair Report

It was inferred that most of the variable and unstable results between the various participating Laboratories may partly be caused by use of insoluble Lead.

Round Robin Test # 7:

It was then decided by the Sub Task Group for Lead Validation, that all the Participating Labs will repeat the tests using all the same Test water Specification but eliminating the use of Insoluble Lead stock solution in the final preparation. It was hoped that this will result in uniform stable and reproducible results between the certifying laboratories, that can be part of the new NSF Standard.

Results of Round Robin Test # 7

The use of only the soluble lead stock improved the results of some laboratories, but still all the laboratories were not able to obtain the ultrafine lead particles between 0.1 to 0.4 microns greater than 50% and still have total particulate of close to 100%. It was proposed that some of the differences between the labs may be due to variability in the purity of water used in the pre-blend. It was suggested to use either ultrapure water or filter the RO/DI water through 0.1 0.2 micron filter. Furthermore, addition phosphate in the pre-blend was also recommended.

Results of Round Robin Test # 8

At least one of the labs did get the desired results. But other labs were not getting both ultrafine and the Total particulate to agree, A new Target of ultrafine being greater than >40% and total particulate being 70%± 20% was set. Each laboratory was asked to use their experience within the limits established in RR#8 to achieve the above specification (RR#9).

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

330 Definitions Task Group

Chair: Dr. Bob Powitz, R.W. Powitz & Assoc., P.C.

Task Group Charge

Reevaluate existing terms and add new terms/definitions to standard

Task Group Roster

Voting Members

Andrew, Rick	Rick Andrew Consulting Services
Brigano, Frank	Consultant - Industry
Fisher, Kathryn	A. O. Smith Corp.
Herman, Rob	Herman & Associates LLC

Meetings Held Since Last JC Meeting

4/11/24, 4/30/24

Summary of Task Group Work

Group has reviewed the existing standard and is preparing to ballot several new terms and definitions, based on discussion in task groups over the last several years.

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

End of Device Life Task Group

Chair: Rob Herman, Herman and Associates, January 2024 – present
Regu Regunathan, ReguNathan & Associates, May 2022 – December 2023

Task Group Charge

Examine life indication and performance across all standards to ensure certified manufacturers have built-in controls for the units to perform as indicated and update test procedures for this determination.

Task Group Roster

Voting Members

Beck, Michael	Pentair
Bicking, Margaret	Ecowater Systems
Donda, Tina	IAPMO
Huntoon, Mandy	NSF
Leung, Eugene	California Waterboards Division of Drinking Water
Murphy, Shannon	Aquamor
Patel, Hemang	Cuno, a 3M Company
Regunathan, Regu	ReguNathan & Associates
Reyneke, Greg	Red Fox Advisors, Inc.
Schneidewend, Tedd	Culligan International Company
Tallon, Becky	A. O. Smith Corporation
Unger, Mark	The LeverEdge
Yeggy, Eric	Water Quality Association

Non-Voting Members

Blumenstein, Mike	NSF
Caughron, Sean	Elbi of America
Douglas, Kenneth	Masco Corporation
Farley, Sarah	Pentair
Frantz, Casey	SGS North America Inc
Gibeault, Mark	Kohler Company
Hatch, Gary	Hatch Global Consulting Services
Hill, Chloe	Pentair
Malinski, Marissa	IAPMO
McDonald, Chris	Fortune Brands Innovations
Patil, Arvind	Protect Plus / Ricura Technologies
Pedersen, Michael	AquaTru
Plewka, Scott	Pentair
Postmus, Kyle	NSF
Sahni, Harkirat	Paragon Water Systems
Shahkaramipour, Nima	Pentair
Sowa, Ryan	Great Lakes International, Inc.
Thusoo, Vikas	Envirogard Products Limited
Wales, Josh	Masco Corporation
Wild, Jonathan	Kinetico, Inc.

Meetings Held Since Last JC Meeting

6/22/23, 8/3/23, 10/4/23, 10/13/23, 12/14/23, 1/10/24, 2/15/24, 4/3/24, 4/24/24

Task Group Chair Report

Summary of Task Group Work

The task group has met 9 times since the last report and significant progress has been made. Draft language is in development for two different types of indicators:

- End of Life Indicator (ELI) is to prompt the replacement of components to improve the reliability of systems after installation. The ELI does not provide information on the specific performance of the system for any contaminant or parameter.
- Performance Indication Device (PID) is intended to provide confidence that the system is maintaining contaminant reduction performance over its lifetime. PID shall only be used on systems where the PID monitors all health related contaminant claims made for the system. PID is a supplemental indication that is optional and does not replace or supplant the ELI requirements.

The Task Group is focusing on NSF/ANSI Standard 58 at this time and has developed 5 different methods of ELI: time based, volume based, TDS monitored, specific contaminant monitoring, and manufacturer monitored systems. At this time there are two methods of PID: TDS Monitored and Specific Contaminant monitoring.

Test methods are also under development for the evaluation of a TDS monitored system with two options being considered, 1) the monitor probes are removed from the system and tested, and 2) the monitor probes are left in situ and some modifications are made to the system to enable testing. At this time it would appear that both testing options will be included. Validation of these test methods has not yet been performed.

The Task Group has also reviewed and included language from several other standards to minimize variation whenever possible. This includes sections of NSF/ANSI 244 and 53.

The Task Group has made excellent progress over the last year and are expecting to ballot this project prior to the next JC meeting in 2025.

Task Group Chair Report

Joint Committee on Drinking Water Treatment Units

TOC Concentration Task Group

Chair: Steven Woltornist, KX Technologies

Task Group Charge

Better specify the TOC concentration and chemistry in test waters used for organic contaminants in NSF/ANSI standards to 1) match real-world water conditions, 2) minimize test variability, and 3) minimize cost/complexity of testing

Task Group Roster

Voting Members

Donda, Tina	IAPMO
Gleason, Zac	Water Quality Association
Hatch, Gary	Hatch Global Consulting Services
Hatton, Brook	CSA Group
Herman, Rob	Herman & Associates LLC
Huntoon, Mandy	NSF
Lombardo, Andrew	Aqua Guidance
Lukasik, George	BCS Laboratories
Lundquist, Art	U.S. Army
Palkon, Thomas	IAPMO
Regunathan, Regu	ReguNathan & Associates, Inc.
Rorabeck, Brian	Pentair
Rudolph, Brandon	3M

Non-Voting Members

Anderson, Anita	Minnesota Dept. of Health (<i>moved to observer in Jan. 2023</i>)
Aridi, Sal	IAPMO
Hamilton, Brandon	Filtration Parts Inc.
Malinski, Marissa	IAPMO
Postmus, Kyle	NSF
Yeggy, Eric	Water Quality Association
Young, Jaime	Quality Filter Testing Laboratory, LLC

Meetings Held Since Last JC Meeting

7/31/23, 4/30/24

Summary of Task Group Work

Will appear in final packet.



TAB 9:

Informational Updates

- Update on WaterSense RO Systems Specification
- Michigan Filter First Legislation Update

INFORMATION PAPER

An information paper is a document to share information, research, or other news that would be of interest to the relevant Joint Committee. Anyone can submit an information paper, excluding the Joint Committee Chair or Secretariat. An information paper does not go to ballot but may be motioned to be resubmitted as an issue paper if appropriate. The Joint Committee Chair will determine which of the following options is most appropriate:

- *the information paper requires more work from the submitter before distribution;*
- *the information paper may be circulated to the Joint Committee for review; or*
- *the information paper will be added to the agenda of the next face-to-face meeting.*

Subject: Update on WaterSense Reverse Osmosis Systems Specification

Brief statement of information provided:

The U.S. Environmental Protection Agency's (EPA) WaterSense program would like to provide an update on its WaterSense Specification for Point-of-Use Reverse Osmosis (RO) Systems. WaterSense is a voluntary partnership program sponsored by EPA that labels water-efficient products to make them easier for consumers to identify at the point-of-purchase. The WaterSense specification, which is currently in development, is intended to help consumers identify and purchase more water-efficient RO systems. EPA released a draft specification in December 2022 and has since received several comments related to the requirements proposed in the draft specification. EPA plans to move forward with a final specification and would like to present a status update to DWTU attendees, several of whom are stakeholders and active participants in the industry engagement portion of the specification's development. Talking points will likely include a summary of comments received in response to the Specification Development Update document that EPA published in February, EPA's next steps and considerations for the final specification, and plans for future coordination with the joint committee to ensure the WaterSense requirements align with NSF/ANSI 58. EPA will give attendees an opportunity to ask questions and offer feedback. More information on the WaterSense specification development can be found at www.epa.gov/watersense/point-use-reverse-osmosis-systems.

Name:* Emma Hughes

Company: Eastern Research Group, Inc. (Contractor to EPA)

Telephone: 860-942-2578 Email: emma.hughes@erg.com

Submission date: 04/08/2024

Please submit to: Joint Committee Secretariat or to standards@nsf.org

**Type written name will suffice as signature*

INFORMATION PAPER

An information paper is a document to share information, research, or other news that would be of interest to the relevant Joint Committee. Anyone can submit an information paper, excluding the Joint Committee Chair or Secretariat. An information paper does not go to ballot but may be motioned to be resubmitted as an issue paper if appropriate. The Joint Committee Chair will determine which of the following options is most appropriate:

- *the information paper requires more work from the submitter before distribution;*
- *the information paper may be circulated to the Joint Committee for review; or*
- *the information paper will be added to the agenda of the next face-to-face meeting.*

Subject: Michigan Filter First Legislation Update

Brief statement of information provided:

Michigan recently enacted new legislation requiring all schools and daycare centers to install certified lead reduction filters on potable water taps. To help schools and daycare centers in Michigan find certified filters the Michigan Department of Environment, Great Lakes, and Energy (EGLE) has worked with NSF to create a new listing category. Through this process EGLE also met with IAPMO and WQA to try to coordinate updates across all certification agencies.

I (or another person from EGLE) will give an overview of the legislation along and someone from NSF will give an overview of the listing update collaborative project.

Name:* Ariel Zoldan

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

Telephone: 517-599-8684 Email: zoldana@michigan.gov

Submission date: 04/15/2024

Please submit to: Joint Committee Secretariat or to standards@nsf.org

**Type written name will suffice as signature*