National Drinking Water Advisory Council (NDWAC) Public Meeting on the Proposed National Primary Drinking Water Regulation for Perchlorate

January 10, 2025 | 11:30 AM – 4:30 PM EST

Chair's Welcome and Council's Introductions

Mr. Steve B. Elmore, Chair of the National Drinking Water Advisory Council (NDWAC), opened the meeting by welcoming participants. He introduced the upcoming Environmental Protection Agency (EPA) presentation by Dr. Anne Lausier on perchlorate and outlined the council's agenda. Mr. Elmore then conducted a roll call to introduce the council members and the Center for Disease Control (CDC) liaisons present for the meeting.

NDWAC MEMBERS

- **Yolanda Barney** - Environmental Department Manager, Surface and Ground Water Protection Department, Navajo Nation Environmental Protection Agency
- **Elin W. Betanzo** - Founder and Principal of Safe Water Engineering, LLC
- **Shellie R. Chard** – Director, Water Quality Division, Oklahoma Department of Environmental Quality
- **Anthony B. Soaring Eagle Jones Jr.** - Director of Water Operations, Pechanga Tribal Government
- **Kyle Jones** - Policy and Legal Director, Community Water Center
- **Eric Labelle** - Public Works Director / Town Engineer, Town of Kennebunkport ME
- **Jana Littlewood** - Board of Directors (Alaska Representative), National Rural Water Association
- **Ramon Lucero** - Regional Field Manager, Rural Community Assistance Corporation, Community and Environmental Services
- **Jeffery Phillips** - Chief Operating Officer, Greenville Water
- **William Pickering** - Chief Executive Officer, Pittsburgh Water and Sewer Authority
- **Alex Rodriguez** - President and Chief Executive Officer, DCG Public Affairs, Diversity Consulting Group, LLC
- **Jeffrey W. Szabo** - Chief Executive Officer, Suffolk County Water Authority
- **Julie Waechter** - Chief Program Officer, DigDeep Right to Water Project
- **Olivia B. Wein -** Senior Attorney, National Consumer Law Center

CENTERS FOR DISEASE CONTROL AND PREVENTION LIAISONS

- **Dr. Arthur S. Chang** - Chief Medical Officer, Division of Environmental Health Science and Practice, National Center for Environmental Health, Centers for Disease Control and Prevention
- **Dr. Vincent Hill** – Chief, Waterborne Disease Prevention Branch, Division of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention (Not Present)

Office of Ground Water and Drinking Water's Welcome

Mr. Eric Burneson began by welcoming and thanking the new and returning NDWAC members and emphasized the continued value of the council's input on the agency's program actions. Mr. Burneson extended congratulations to Mr. Elmore on his new position as Chair of the NDWAC and welcomed Ms. Tracey Ward as the new Designated Federal Official (DFO), following the recent retirement of Ms. Elizabeth Corr. Mr. Burneson concluded his introductory remarks by welcoming members of the public who joined the meeting as observers and extended an invitation for those attendees to provide public comment. He acknowledged challenges faced by attendees, expressing concern for those impacted by fires in Southern California and extreme cold and snow in the Southeastern United States. Finally, Mr. Burneson noted that the meeting was initially scheduled for January 9, 2025, but was rescheduled due to the National Day of Mourning for President Jimmy Carter.

Mr. Burneson outlined the purpose of the NDWAC: to provide input and recommendations to EPA on the implementation of the national drinking water program. Mr. Burneson explained that EPA staff consult with the NDWAC on key issues, including most recently the PFAS National Primary Drinking Water Regulation (NPDWR), the Consumer Confidence Report (CCR) Rule Revisions, the Lead and Copper Rule Improvements (LCRI), and the Microbial and Disinfection Byproduct (MDBP) Rule Revisions. He emphasized that the meeting's agenda was focused on discussing the proposed perchlorate regulation. He noted that EPA is currently in the proposal stage of the regulation with a requirement to propose the rule by November 2025. The agency is seeking input from the council to inform the development of the proposed rule. Mr. Burneson clarified that since no concrete proposal would be presented at this meeting, EPA plans to return to the council for further consultation once the proposal is finalized. Mr. Burneson prefaced the upcoming presentation on the proposed perchlorate rule, explaining that it would cover the key issues on which EPA is seeking and evaluating input. He mentioned that the NDWAC would be asked to consider several questions during the presentation and that a discussion session facilitated by Mr. Elmore would follow to address these questions. Mr. Burneson concluded his remarks by thanking the council members once again and emphasizing the value of their input before turning the program back over to Mr. Elmore.

Public Comments to the National Drinking Water Advisory Council

No verbal public comments were shared; however, two questions from the public that were received via email were read aloud by Mr. Elmore.

Mr. Elmore read: "*Has EPA already decided which model it will use (BBDR?) for the NPRM?*"

Mr. Burneson responded, explaining that "BBDR" refers to Biologically Based Dose-Response modeling, which pertains to the health effects analysis. He stated that EPA is not currently seeking advice on health effects from the NDWAC. However, the BBDR model was developed by the agency in response to recommendations from the agency's Science Advisory Board (SAB). EPA predicted the level of perchlorate that would result in thyroid hormone changes in a variety of populations, particularly in iodide-deficient pregnant mothers, to establish the MCLG. EPA continues to evaluate all of the available scientific research for the health effects of perchlorate and will utilize that information when establishing the MCLG. The BBDR model combined with epidemiological studies was the approach that the SAB recommended EPA to pursue. Mr. Burneson further explained that "NPRM" stands for National Proposed Rulemaking. While BBDR was one topic discussed in the 2019 NPRM, EPA is re-evaluating the available science to develop a new NPRM that the agency will release by November.

Mr. Elmore read the second question received: *"Since perchlorate can be destroyed into less toxic byproducts via biological methods, is there a way to harvest the chlorine byproducts for shocking purposes in drinking water on the next cycle of water distribution? Could this be a resource-saving method for chlorine?"*

Mr. Burneson responded by explaining that the biological treatment process breaks down perchlorate but did not think that this process produced a chlorine residual. Mr. Samuel Hernandez-Quinones agreed that he did not recall it being a byproduct.

Mr. Burneson elaborated further, clarifying that biological treatment breaks down perchlorate into chloride and oxygen. Therefore, he does not believe biological treatment would produce a disinfectant chlorine residual. He concluded by stating that biological treatment is a complex process for water systems to manage due to the need to maintain specific conditions for the microorganisms, which can be temperamental.

Consultation on a Proposed NPDWR for Perchlorate

Dr. Anne Lausier provided a presentation to the NDWAC with information on the sources and health effects of perchlorate and the regulatory history of perchlorate in drinking water. Within the presentation, Dr. Lausier described the three key areas on which EPA was seeking input: monitoring requirements, treatment technologies, and public notification. A brief discussion of cost information and funding considerations was also included. Dr. Lausier concluded by outlining EPA's timeline, and the

agency's commitment to proposing the rule by November 2025 and finalizing it by May 2027 per court orders.

Clarifying Questions from the NDWAC

Mr. Elmore opened the floor to the council for clarification questions. He specifically invited questions regarding areas where EPA is seeking input, including monitoring considerations, treatment considerations, and public notification and education considerations.

Mr. Kyle Jones asked what level of treatment the proposed technologies provide. Assuming someone is installing a system, what level does that get the perchlorate down to?

Mr. Burneson responded by explaining that the technologies identified by Dr. Lausier—ion exchange, reverse osmosis, and biological treatment—are all capable of achieving high levels of removal of perchlorate, depending on the influent concentration and operational characteristics. For instance, with ion exchange, other factors play a role such as the media's bed life and the frequency of media turnover before replacement. Mr. Burneson noted that the extent of removal also depends on where the Maximum Contaminant Level (MCL) is set. He clarified that no proposed MCL was presented to the council because the analysis is still ongoing. This analysis is informed by the statutory health goal that EPA is working towards. The MCL will be set as close as feasible to the health goal while also considering cost. Mr. Burneson added that, in 2019, EPA proposed an MCL of 56 µg/L and took public comments on alternative values, including 18 µg/L and higher levels. He emphasized that all identified technologies were capable of achieving those values.

Mr. Ramon Lucero asked for confirmation on his assumption that perchlorate was an emerging contaminant and would qualify for 100% grant under Bipartisan Infrastructure Law (BIL) funding.

Mr. Burneson confirmed that perchlorate is classified as an emerging contaminant under the definitions provided in the DWSRF and has been included on the Contaminant Candidate List (CCL). Regarding the possibility of a 100% grant, he clarified that such decisions are made on a case-by-case basis, but it remains a possibility.

Mr. Lucero asked for more details to be provided about the health effects of perchlorate.

Mr. Burneson explained that the health effects of perchlorate are closely tied to its interaction with the thyroid gland. Perchlorate competes with iodide for uptake by the thyroid, which relies on iodide to synthesize hormones. Because the thyroid cannot differentiate between iodide and perchlorate, it may mistakenly grab perchlorate to try to synthesize hormones, resulting in the failure to produce critical thyroid hormones. Mr. Burneson further explained that while the body has compensatory mechanisms, these are insufficient for individuals with low iodide levels. This is particularly concerning for pregnant women with developing fetuses who may not get enough iodide to synthesize the hormones that are critical for the fetus's development. The most sensitive lifestage is a pregnant woman and their developing fetus, as the fetus could experience neurodevelopmental effects as a result of insufficient thyroid hormones to ensure appropriate development. Mr. Burneson further explained that EPA's

ongoing analysis aims to determine the levels of perchlorate exposure that significantly impact that sensitive subpopulation. This was an area on which EPA has sought input from the SAB. Mr. Burneson stated that the agency is continuing its efforts to reevaluate and update its analysis of the health effects, which will be critical in determining the Maximum Contaminant Level Goal (MCLG), the level at which there are no adverse effects from perchlorate exposure, with an appropriate margin of safety.

Mr. Elmore invited Dr. Arthur Chang to provide additional health information related to perchlorate.

Dr. Chang explained that potassium perchlorate was used as a medication in the 1960s to treat overactive thyroid conditions, although it was administered in much higher doses. He explained that this medication was taken off the market due to acute effects unrelated to thyroid function, such as aplastic anemia (issues with bone marrow) caused by large doses. Dr. Chang then posed a follow-up question, asking whether the 56 µg/L MCL proposed in 2019 aligns with the reference dose (RfD) level established in the 2008 National Academies report.

Mr. Burneson responded no. He explained that the National Academies provided EPA with advice in the mid-2000s on developing an RfD for perchlorate. The report recommended focusing on iodide uptake inhibition (i.e., the level of perchlorate exposure that causes the thyroid to be limited in its ability to take up iodide). In 2012, EPA went to the SAB for advice on how to develop a MCLG based on this RfD and point of departure. The SAB advised EPA to consider downstream effects and recommended using available physiologically based pharmacokinetic (PBPK) models to predict the levels that would result in thyroid hormone changes sufficient enough, based on epidemiological studies, to cause adverse neurological developmental effects. Mr. Burneson noted that there was a significant lapse in time while EPA worked with other agencies, including the Food and Drug Administration (FDA), to develop and implement these new models. EPA has since been using these models to associate levels of perchlorate exposure with thyroid hormone changes that are significant enough to result in neurological developmental impacts. This ongoing work will inform the development of the MCLG.

Mr. Eric Labelle inquired about the use of ion exchange for perchlorate treatment and specifically about downstream disposal at wastewater treatment plants. He questioned whether this process would require additional (secondary) treatment downstream at the wastewater treatment facility.

Mr. Burneson explained that if perchlorate is removed using ion exchange (a treatment that is not a destructive technology but removes perchlorate from the drinking water), the perchlorate is then contained in that media. He noted that most water systems utilizing ion exchange operate in "single-pass mode," meaning that they are disposing of the ion exchange resin rather than regenerating it. In cases where the ion exchange media is regenerated, a brine containing perchlorate is produced and would need to be disposed of. Mr. Burneson added that similar considerations apply to reverse osmosis, which also produces a brine that may contain perchlorate. He explained that, currently, EPA does not have specific water quality criteria or effluent guidelines that apply to brine disposal, but the agency evaluates and considers this factor as part of its cost evaluations for these treatment technologies. Mr. Burneson clarified that the costs of ion exchange presented by EPA assume single-pass disposal of that media,

which avoids the need to regenerate the media and the production of a brine stream requiring disposal. Mr. Burneson was not sure about EPA's assumptions for brine disposal related to reverse osmosis systems. There would potentially need to be some sort of treatment of that brine prior to its discharge back to a "Water of the U.S."

Mr. Jeffery Phillips raised concerns about the use of 2023 dollars for cost estimates, noting that industry prices have increased significantly for a lot of technology. He asked if EPA planned to update the cost estimates to reflect 2024 or 2025 costs, given that the final rule is not expected to be promulgated until 2027.

Mr. Burneson responded by acknowledging that EPA has heard concerns about supply chain issues and other factors affecting cost estimates. He explained that the cost estimates used for this discussion were based on the cost estimates initially developed for the 2019 proposal, with adjustments made using construction-inflation cost-estimating factors. However, Mr. Burneson assured the council that EPA is continuing to update these estimates both to see if the technology has evolved since the development of the original unit cost estimates and to see if improvements should be made to the work breakdown cost models. He also highlighted that the costs presented are annualized; they include capital costs (i.e., costs of constructing and installing the treatment technology) amortized over the useful life of the equipment, as well as operation and maintenance (O&M) costs for the treatment units. Mr. Burneson explained that the primary purpose of developing these cost estimates for the Safe Drinking Water Act (SDWA) is to inform an evaluation of the costs and benefits. Because costs are incurred initially and then over the operating life of the equipment while benefits (e.g., avoided adverse effects) accrue in the future, the estimates are annualized to facilitate a comparison of the costs and benefits. He concluded by reiterating that EPA intends to improve and enhance the cost estimates to account for advancements in technology and fluctuations in supply chain costs.

Ms. Jana Littlewood asked what initially brought perchlorate to EPA's attention, specifically questioning whether it was related to the first Unregulated Contaminant Monitoring Rule (UCMR 1). She further inquired about what percentage of UCMR 1 systems had perchlorate detections and how many water systems EPA anticipates will be affected by the perchlorate rule.

Mr. Burneson explained that perchlorate was included on the first CCL (CCL 1), where EPA identified it as a contaminant that may be in drinking water and may require regulation. It was monitored under UCMR 1 (2001–2005), during which approximately 4% of participating water systems across the country reported detections above the program's perchlorate Minimum Reporting Level (MRL) of 4 parts per billion (ppb). This monitoring placed perchlorate on EPA's consideration, eventually leading to the agency's 2011 decision to regulate perchlorate. Mr. Burneson reiterated points made in Dr. Lausier's presentation: After additional health effects and occurrence analyses, EPA decided in 2020 to withdraw the decision to regulate perchlorate. However, a court ruling directed EPA that it could not reverse a decision to regulate a contaminant. Once a decision is made, the agency has no discretion to decide not to issue a regulation. The agency's discretion now lies solely in determining the threshold at which to set an MCL or the treatment technique.

Ms. Littlewood followed up, asking about the 4% of systems having concentrations above 4 ppb and how many water systems EPA projects will be impacted by the rule.

Mr. Burneson clarified that 4 ppb was the MRL at the time of UCMR 1 and is not necessarily the MCL that EPA plans to set. He explained that in 2019, the proposed MCL was set at 56 ppb, and only two systems across the country had reported levels above that threshold. EPA is now reevaluating the health science, as well as occurrence and treatment information, which may result in different levels and a potentially different number of systems affected.

Mr. William Pickering asked whether there is any data demonstrating that the incidence of perchlorate detections might be trending downward, noting that the presentation mentioned that perchlorate is no longer permitted in certain products, such as fertilizers. He inquired if there is a belief that fewer systems would detect perchlorate today than did under UCMR 1.

Mr. Burneson responded by clarifying that perchlorate does occur in some natural fertilizers, such as Chilean nitrates, and he does not believe there has been a prohibition on the use of these fertilizers. However, he explained that there have been notable cleanup efforts of perchlorate that have impacted a significant number of water supplies. In particular, there has been cleanup in the Colorado River, which had been downstream of some contaminated sites. As a result of cleanup actions in those areas, levels of perchlorate in the Colorado River have dropped significantly. Mr. Burneson further explained that California promulgated its own perchlorate standard in 2007, as did Massachusetts in 2006, and these state-level standards have contributed to reductions in perchlorate levels. He added that EPA is currently reviewing available literature to identify any new studies that could give an indication of the trends in perchlorate occurrence and evaluating data from California and Massachusetts, which have ongoing monitoring as a result of their drinking water standards.

Mr. Burneson also noted that while fertilizer use is a well-known source, fireworks and solid rocket booster propellants are additional uses of perchlorate and EPA does not have information about the degree to which any of those uses may have declined. There is general information available that suggests the volume of firework sales has been increasing in the United States.

Dr. Chang added that lithium perchlorate, used as an electrolyte solution in lithium battery technology, could lead to potential increases in exposure due to the proliferation of lithium battery technologies.

Mr. Eagle Jones asked for clarification on the term "trace amounts" which an earlier slide mentioned can result from improper handling of degradation of hypochlorite solutions. He wondered whether it is possible for "trace amounts" to exceed 4 ppb and if there is any information about whether the degradation of hypochlorite solutions could be causing perchlorate to form within distribution systems.

Mr. Burneson responded that the primary concern with perchlorate formation involves formation during the storage of hypochlorite solutions prior to use as opposed to after their addition to drinking water. He explained that certain storage and handling recommendations, such as controlling temperature and limiting sunlight exposure, can reduce the degree to which chlorate and perchlorate form in those

solutions. Mr. Burneson further noted that perchlorate generation in hypochlorite solutions was a factor that Massachusetts considered when setting its standard for perchlorate, in part, due to concerns about whether small systems could meet their standards if they had hypochlorite solutions. Massachusetts set its standard at 2 ppb, determining that at this level, there would be no significant perchlorate formation as a result of hypochlorite. Their findings indicated that perchlorate formation in hypochlorite solutions does not exceed 2 ppb.

Mr. Hernandez-Quinones added that EPA included information on this topic in the 2019 perchlorate regulatory effort, which cited research on trace amounts of perchlorate. The research suggested that trace amounts were often less than 1 ppb when the solutions were improperly stored or handled.

Ms. Elin Betanzo questioned what specific conditions must be met for water systems to receive a monitoring waiver under the Standard Monitoring Framework (SMF). She followed up by asking if additional criteria would be added specifically for perchlorate monitoring waivers.

Mr. Burneson clarified that EPA is contemplating the use of the SMF for perchlorate and noted that EPA is requesting input on this topic.

Dr. Lausier reviewed the general approach for monitoring waivers for inorganic contaminants (IOCs). She explained that there is a difference in the number of rounds of monitoring that must be conducted for ground water vs. surface water systems before they can be considered for a waiver. For surface water systems, water systems must be monitored annually for at least three years, with all previous results below the MCL, before the state can determine eligibility for a waiver. For ground water systems, a minimum of three rounds of monitoring is required, which could span up to nine years, before a ground water system can ask the state to make a determination. Dr. Lausier emphasized that, when granting a waiver, states must consider factors such as the concentrations of monitoring results and known sources of perchlorate in the area. Additionally, waivers cannot exceed a nine-year period, and states are required to reevaluate and renew waivers at least once every nine years. A system with a waiver would need to monitor at least once every nine years. She also clarified that even without a waiver, systems may still be eligible for reduced frequency of monitoring. After surface water systems have collected a minimum of four quarterly samples, and ground water systems have collected a minimum of two quarterly samples, the state must determine that the system is "reliably and consistently" below the MCL in order for the system to qualify for reduced monitoring.

Mr. Jeffrey Szabo asked for information about states with existing perchlorate standards, including the levels they set and when those levels were established.

Mr. Burneson responded that there are currently two states with perchlorate MCLs. There are additional states with advisory and clean-up levels. California established an MCL of 6 ppb in 2007, while Massachusetts set an MCL of 2 ppb in 2006. He added that other states, such as New Jersey, had been contemplating setting an MCL for perchlorate but, to his knowledge, no additional states have promulgated state MCLs for perchlorate in drinking water.

Mr. Kyle Jones added further context, explaining that California initially set their MCL at 6 ppb, equal to the public health goal at the time, but that the state subsequently reduced its public health goal to 1 ppb. He noted that the state intends to revisit and potentially lower the MCL below 6 ppb but has not had the resources to make that change at this time. So, while the California MCL is at 6 ppb now, it is likely to be reduced in the future, reflecting updates in science.

Ms. Julie Waechter asked if there are any international precedents, e.g., whether other countries or regional groups have set standards for perchlorate.

Mr. Burneson stated that he was not aware of any international standards for perchlorate; however, he acknowledged that EPA had not conducted a recent search for other standards. During the meeting break, Mr. Burneson conducted a brief (non-comprehensive) search and found that Health Canada established a screening value of 4 µg/L for perchlorate as a contaminant not regularly occurring in Canada. The World Health Organization (WHO), an advisory rather than a regulatory body, issued a guideline of 70 µg/L (70 parts per billion) for perchlorate. He could not locate a European Union (EU) drinking water standard for perchlorate but noted that the EU has a food standard for perchlorate. Similarly, no standards were found for the United Kingdom, Japan, or Australia.

Ms. Waechter added that she found a similar food standard in her research and noted that Switzerland has a drinking water level of 4 µg/L.

Mr. Elmore added that Wisconsin has a groundwater standard of 1 ppb, which pertains more to cleanup, and is not a drinking water standard.

Mr. Elmore then asked about perchlorate laboratory methods, specifically wondering what methods are currently available, whether there have been changes, and whether existing analytical methods for inorganics could be used for reporting perchlorate.

Mr. Burneson stated that his recollection was that the 2019 proposed rule included the same ion chromatography method used in UCMR 1.

Mr. Hernandez-Quinones added that the method for perchlorate had been revised since its original use for UCMR purposes. The revised method allows for much lower detection levels compared to UCMR 1.

Mr. Burneson confirmed that in the 2019 proposed rule, EPA had included EPA Method 314, "Determination of Perchlorate in Drinking Water Using Ion Chromatography." He stated that there are a number of new methods available, including EPA Methods 314.1 and 314.2, which use inline column concentration chromatography and 2D ion chromatography with suppressed conductivity detection, as well as EPA Methods 331 and 332. Mr. Burneson explained that this provides some flexibility with regard to the methods used by water systems. He also clarified that these methods appear to be specific to perchlorate and would not already be in use for detecting other regulated analytes.

Mr. Elmore stated his understanding that perchlorate monitoring would involve separate sampling and analysis from existing IOC monitoring.

Discussion and Key Areas for Input

Monitoring Considerations

Ms. Shellie Chard discussed the types of systems that have had detections of perchlorate, referencing older UCMR data. She noted that a handful of larger ground water systems (5 to 6 systems) reported perchlorate levels ranging from 8–17 µg/L. Additionally, she pointed out the detections have occurred at systems near areas with rocket propulsion activities, including a facility in Oklahoma that has since transitioned to oil and gas operations. Significant cleanup efforts are underway in south-central Oklahoma, where perchlorate levels range widely, with one site as high as 170 µg/L and others below 0.04 µg/L. Ms. Chard emphasized the importance of the Standardized Monitoring Framework in helping to make sampling more manageable, particularly for smaller systems, and recommended that it remain as a consideration in EPA's discussions. She also recommended that EPA consider the use of historical monitoring data for initial monitoring going back two to three years rather than using only one year of data.

Mr. Kyle Jones reviewed California's data on perchlorate levels but did not find information on how many systems were complying with the current regulations. He noted that some systems had levels as high as 180,000 ppb. When California lowered the reporting standard to approximately 2 ppb, about 33 systems reported levels between 2 and 6 ppb, which required them to take action.

Ms. Betanzo emphasized the importance of ensuring that sampling is conducted under conditions with the highest likelihood of finding perchlorate. She noted studies showing temporary increases in contamination in ground water near fireworks displays. Sampling after high-risk events like these seems more appropriate than relying on generic quarterly sampling schedules. She suggested that tying the sampling schedule to high-risk activities would better capture the range of perchlorate in source water. Ms. Betanzo also expressed interest in learning more about how sampling is conducted in states that currently regulate perchlorate.

Mr. Elmore added an example from Wisconsin, west of Madison near the Middleton Airport, where a study included testing of both ground water and surface water for perchlorate. The study, published in a United States Geological Survey (USGS) report, was prompted by concerns about fireworks displays launched near the airport. Perchlorate was detected at levels between 1 and 2 ppb in both surface water and ground water. Mr. Elmore shared the link to the publication: https://pubs.usgs.gov/sir/2024/5113/sir20245113.pdf.

Mr. Eagle Jones supported Ms. Chard's suggestion of using the Standardized Monitoring Framework for sampling. Speaking from the perspective of a rural water system, he noted that quarterly monitoring would be appropriate for initial monitoring. Ground water systems typically monitor for the inorganics every three years, which he believes is sufficient. He was unsure of the feasibility of sampling during

high-risk activities, such as fireworks displays around the Fourth of July or New Year's, but he suggested that perchlorate contamination from these events would likely be captured during quarterly monitoring.

Mr. Elmore stated his support for monitoring with new methods, if available. He suggested the latest methods with the lowest detection limits should be used for required monitoring. He further suggested that monitoring waiver criteria should be addressed and EPA should not simply adopt the criteria used for other IOCs. Perchlorate, like many other contaminants, is unique and should have criteria based on use scenarios and past sample results to qualify for monitoring waivers. Mr. Elmore stated that monitoring conducted under state laws should be accepted for initial monitoring unless there is a clear reason not to do so. He recommended that EPA's proposal include flexibility to include state data for initial monitoring, with an expectation that states later adapt to the NPDWR.

Ms. Waechter referenced the Wisconsin study shared earlier and explained that the elevated levels of perchlorate in surface water were caused not by fireworks themselves but rather by rainfall following the fireworks. She suggested that monitoring efforts should be timed based on subsequent rainfall rather than based on the timing of fireworks events themselves.

Ms. Betanzo expressed agreement with Mr. Elmore's earlier comments that waivers should be based on different criteria than what is used for the other IOCs. She added that there could be an opportunity to make use of existing data sets, as states are developing more reliable geographic information system (GIS) data regarding sources of perchlorate contamination. She suggested that waivers could be issued with an annual review of new potential perchlorate sources that may have emerged. Since significant changes can occur over nine years, the EPA should make the most of existing data sets that could identify new sources of perchlorate contamination in areas where it was not previously detected.

Mr. Burneson stated that several valuable points were raised regarding monitoring considerations, particularly about reevaluating technologies and associated costs. He reminded the council that the cost estimates presented earlier are preliminary and EPA intends to update these estimates as part of the development of the proposed rule. Additionally, he invited the NDWAC to share any suggestions of data or sources of information that could be used by the agency.

Treatment Considerations

Ms. Chard began by addressing two points. First, she discussed point-of-use (POU) filters, stating that while they have their place and can be appropriate in certain circumstances, she does not believe they should be promoted or recommended for systems of any size. For instance, if a single house requires POU filters due to a specific situation, that may be acceptable, but widespread installation of such filters across even a small system could result in significant challenges. Specifically, a problem with under-the-sink POU filters is that people often drink water from other faucets in their homes, such as in bathrooms.

She further highlighted operational challenges, pointing out that POU filters would need to be owned and maintained by the water system. This would require individual homeowners to authorize water system staff to enter their homes to check, replace, and provide service for the filters. Even if current

homeowners agree to these arrangements, future property owners might not be willing to allow water system staff into their homes. Additionally, tracking compliance would pose a significant problem. Although there has been an effort to modernize tracking with the Safe Drinking Water Information System (SDWIS), questions remain about whether states would track this information in the federal data system and how compliance issues would be addressed if they do not. In summary, Ms. Chard emphasized that POU filters are complex and introduce numerous challenges.

Second, Ms. Chard addressed the issue of cost and funding for treatment. She mentioned that the State Revolving Fund (SRF) has been diminished by approximately 50% due to congressionally directed spending. While EPA has no control over this, it impacts the prioritization of projects, which are often determined by discussions between elected officials and their constituents rather than based on need. She cautioned EPA to be careful when suggesting that the SRF will serve as a reliable funding source. Ms. Chard also noted that while funding from the Infrastructure Investment and Jobs Act (IIJA) is helpful, it is not unlimited. By the time this rule is promulgated and in effect, those funds may no longer be available. She stressed the importance of the EPA being mindful of these limitations and urged the agency to consider how to provide support to small, rural, isolated, and disadvantaged communities.

Mr. Kyle Jones agreed with Ms. Chard's comments regarding POU devices, describing them as a treatment method of last resort. He appreciated the staff outlining requirements and guidance around maintaining such devices but noted that significant challenges remain. He also highlighted concerns related to tenants. He referenced past instances where landlords refused to consent to the installation of POU devices on their properties, which could perpetuate inequities. Mr. Kyle Jones asked that if POU devices continue to be considered as a potential treatment option that EPA provide guidance on when POU treatment would be appropriate versus other treatment options such as interconnections, blending, new source water wells, etc. He emphasized the importance of systems taking a holistic approach when evaluating their options to avoid settling for imperfect solutions (e.g., POU devices that might appear less expensive on the front end). Additionally, Mr. Kyle Jones raised the need for guidance on how public outreach could be conducted to educate communities about POU devices if they are selected. He noted that best practices for implementing POU programs would help small water systems better manage such solutions if that is the direction EPA chooses to pursue. Furthermore, he acknowledged the limited funding available and emphasized that this should not deter EPA from doing everything it can to protect public health. He asked whether EPA could make recommendations to Congress to increase funding levels, ensuring greater awareness of the necessity of this regulation to protect vulnerable populations, particularly pregnant individuals and children. He stressed that it is not acceptable for people to have to choose between safe or affordable drinking water, and the EPA should take every possible step to make both a reality.

Ms. Littlewood stated that it was difficult to answer the questions being posed since there is very little available information on treatment methods for perchlorate. Very few states currently regulate perchlorate, and as a result very few water systems are actually treating for it. She noted that if EPA decides to move forward, small water systems that need to install treatment will likely rely on ion exchange as it is the most cost-effective option. However, she emphasized that consideration must be

given to how these systems will dispose of the spent media and whether it will be accepted at waste disposal sites. This is anticipated to be a significant issue with the new PFAS rule, and should be considered for perchlorate as well.

Mr. Elmore reiterated that this is a “once through” treatment and the media are not regenerated.

Mr. Labelle pointed out that PFAS are being recognized as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Landfills and wastewater facilities are being identified as potential candidates responsible for some of the PFAS that are being passed through. Mr. Labelle stated that he could also see this happening with perchlorate.

Mr. Eagle Jones asked about the feasibility of biological treatment as a removal option, assuming it could be introduced in a conventional surface water treatment plant. Mr. Eagle Jones expressed doubt about its applicability to small water systems.

Mr. Burneson responded by stating that biological treatment is feasible and has been demonstrated in the field as a method for removing perchlorate. However, he acknowledged that it would be challenging for a small water system to operate. He noted that in 2019, the EPA did not list biological treatment as a Small System Compliance Technology (SSCT). Instead, the EPA identified reverse osmosis POU devices as a potential option. He also acknowledged Ms. Chard's earlier point that treating only one tap may not sufficiently reduce exposure. Mr. Burneson explained that when POU devices are listed as a compliance option, SDWA requires they must be owned and maintained by the water system, which presents barriers to implementation. However, he emphasized that when the EPA designates a Best Available Technology (BAT) or a SSCT, it does not obligate systems to use those technologies. Ultimately, it is the decision of the water system in coordination with the state primacy agency how best to achieve compliance with the MCL. Responding to Mr. Kyle Jones's earlier point, Mr. Burneson explained that the EPA’s general guidance on POU devices was developed when the Arsenic Rule was promulgated in the early 2000s. He acknowledged the need to update this guidance if POU is listed as a treatment technology for perchlorate. Finally, in response to Mr. Labelle's comments on waste disposal and PFAS, Mr. Burneson clarified that the CERCLA hazardous substance designation does not require a specific disposal mechanism. For PFAS residuals, CERCLA primarily addresses reporting, cleanup liability, and other requirements. He also noted that when the EPA issued the CERCLA hazardous substance designation, colleagues in the Office of Enforcement and Compliance (OECA) issued an enforcement discretion memo highlighting that public water supply systems are not a priority for enforcement actions under this program.

Ms. Yolanda Barney expressed concern about the lack of a clear understanding of where perchlorate contamination exists. She emphasized that supporting and promoting source water protection could help identify the presence and prevalence of perchlorate, similar to efforts undertaken for PFAS. Ms. Barney raised concerns about perchlorate entering wastewater treatment plants, being discharged, and potentially creating a significant issue. She also highlighted the financial challenges faced by small water systems. Ms. Barney noted that the additional requirements associated with addressing perchlorate

would impose a further burden on these systems, which are already struggling with limited funding for sampling. While she acknowledged that providing an incentive for waiver applications could be beneficial, she pointed out that the initial sampling costs would need to be covered.

Ms. Olivia Wein asked if there is a formalized approach for considering whether existing technologies already in use for other contaminants might also work for perchlorate, or if each contaminant is treated in isolation, requiring its own unique treatment solution.

Mr. Burneson responded by explaining that the statute provides two primary drivers when it comes to treatment technologies. First, EPA must establish a health goal that represents the level at which no adverse effects occur, with an added margin of safety. Then, EPA determines how close the enforceable MCL can be set to the MCLG, using a feasibility evaluation. Feasibility is defined in the statute as using available technologies that are both field-demonstrated (not just laboratory-based) and cost-effective. To assess treatment technologies, EPA first looks at those already in use by public water systems (PWSs) to evaluate their efficacy in removing the particular contaminant of concern. They also assess whether these technologies might co-remove other contaminants as part of their benefits evaluation. For example, in the case of PFAS, EPA found that granular activated carbon (GAC) not only removed PFAS but also precursor compounds that could form disinfection byproducts (DBPs), offering additional benefits. In the case of perchlorate and ion exchange resins, the market has shifted toward perchlorate-selective resins. These resins are designed specifically for perchlorate removal but are not as effective at removing other contaminants. A water system might have the ability to consider other resins that could address multiple contaminants. Technologies like reverse osmosis, while effective at removing a wide range of contaminants, come with higher costs and other challenges, which may make them less desirable for many water systems. Mr. Burneson also highlighted that for small water systems, EPA must identify SSCTs that are both effective in achieving compliance with the MCL and are affordable. In this context, POU technologies must be considered. The EPA goes through a metric to evaluate their affordability on a household basis.

Mr. Elmore followed up by requesting that EPA investigate whether perchlorate-specific resins have any issues adsorbing and releasing other contaminants that may be co-occurring. He noted that with PFAS-specific resins, there can be cases where a resin adsorbs PFAS but later releases some of the PFAS because there is another contaminant that is more preferentially adsorbed by that resin. He suggested the EPA examine how resins perform in systems with both perchlorate and PFAS, as well as whether nitrate or other contaminants are released under certain conditions in ion exchange and GAC systems. Mr. Elmore encouraged the EPA to review treatment system examples from California. He also urged EPA to evaluate the availability of perchlorate-specific resins, as sourcing treatment products has recently been a challenge for utilities. Given that these resins are used in single-pass systems and require regular replacement, he emphasized the importance of ensuring their affordability and availability in the market.

Mr. Elmore noted that while the council has not provided specific cost information, they have raised some questions and challenges. He pointed EPA to California as a source of information since they

currently have a state standard for perchlorate and about one-third of the occurrence observed in the UCMR sampling was in California.

Ms. Wein followed up by asking what happens if technology evolves after a standard is set and newer, more cost-effective or efficient technologies become available. She questioned whether the NDWAC would need to revisit the issue to incorporate these new technologies into the list of acceptable treatment options.

Mr. Burneson clarified that EPA does not need to take action to enable water systems to adopt new technologies to meet the MCL. If a newer technology emerges that is more efficient or cost-effective, states have the authority to approve modifications to treatment facilities, provided the new technology is deemed acceptable. EPA does not need to revise the standard for systems to adopt the new technology. However, EPA can incorporate such technologies into the BAT list in the future if needed. He provided an example from the early 2000s with the Arsenic Rule, where the most effective technology available at the time was activated alumina. After the rule was promulgated, a new technology—ferric media, colloquially referred to as "buckets of rust"—emerged as highly effective in adsorbing arsenic. Many systems adopted this technology; it was not necessary for EPA to revise the Arsenic Rule.

Public Notification and Education Considerations

Ms. Littlewood asked EPA about the severity of the health risks and what the studies or data have shown. She noted that without a clearer understanding of the health impacts, it's difficult to determine the appropriate level of public notification or education. Specifically, she pointed out that if perchlorate does not have acute health effects, requiring a Tier 1 public notice would be an unreasonable and excessive burden. The follow-on public notices would be 30-day (Tier 2) or the annual CCR notification. The council needs more health information to make informed recommendations.

Ms. Chard agreed and emphasized the importance of being cautious about overusing 24-hour Tier 1 notices. She explained that if notifications are issued too frequently, the public might stop paying attention and begin to think, "If we're hearing about this so often, it must not be a big deal." Ms. Chard highlighted that without a clear understanding of the health impacts of perchlorate, it is difficult to decide whether notification should occur immediately (within 24 hours), within 30 days, or annually in the CCR. She encouraged EPA to provide the council with that information to enable a more informed discussion.

Mr. Elmore highlighted that while the council had received information on the health impacts of perchlorate, the EPA has not yet clarified whether these impacts are related to lifetime exposure or shorter exposure time periods.

Ms. Waechter expanded on this point, noting that while the council understands that perchlorate interferes with thyroid function at certain levels, more detailed information is needed on the duration, the level of exposure, and the resulting impact.

Mr. Burneson recognized that the agency has not shared the outcome of the new analysis and resulting MCLG. He did, however, reiterate that the life stage of highest concern is the fetus of the pregnant woman, particularly in the first trimester. The concern centers on low-iodine pregnant women exposed to perchlorate, as this can adversely affect fetal development. EPA has not classifying this as acute exposure or lifetime exposure but has referred to it as subchronic in the past.

Mr. Kyle Jones noted that in California, based on their MCL for perchlorate, public notifications are Tier 1, as even short-term exposures can have permanent developmental impacts. Given that, he did not feel that an annual notice would be sufficient for perchlorate. Mr. Kyle Jones leaned toward recommending Tier 1 notifications given the severity of potential impacts, but emphasized the need for precise information on exposure levels and impacts before making a formal recommendation.

Mr. Pickering asked about the call to action for customers in Tier 1 and Tier 2 notices. For the customers receiving the notice, he wondered if they would need to rely on an alternative water source or if they could change their individual household plumbing to address the issue, especially if they are high-risk.

Ms. Betanzo pointed out the difficulty in building and maintaining trust with customers when they do not learn about elevated exposure and violations until a year later. Delayed notifications erode trust between customers and water utilities. She advocated for timely notifications (i.e., Tier 2 or potentially Tier 1), especially for pregnant individuals, to enable them to take the appropriate measures to prevent that exposure.

Ms. Wein spoke from personal experience about trust issues in the immigrant community around tap water. She emphasized the need for transparency in public communication. She also asked how the information would be transmitted to customers, noting the reality of the digital divide and the challenges for those on the wrong side of the digital divide (by income, education, location, etc.).

Mr. Eagle Jones emphasized the importance of public notification and shared insights from his experience in small communities. He stated that knowing the potential MCLG would determine the appropriate notification tier. Based on the comments provided in the meeting, he suggested that a Tier 1 notification may be necessary, which is scary since it effectively tells people not to drink their water. He stressed that this decision hinges on clear communication from EPA about the health impacts. Additionally, Mr. Eagle Jones raised concerns about exposure beyond drinking water, such as through showering, which he felt should be addressed before the proposed rule is finalized.

Ms. Waechter underscored the need to provide alternatives beyond bottled water for individuals notified about perchlorate contamination. She noted that consumers may instinctively turn to bottled water, which lacks the same reporting requirements. Therefore, she recommended that if EPA pursues Tier 1 or Tier 2 notifications, these should be accompanied by detailed information on how consumers can make their water safer without resorting to alternatives that may be equally or more unsafe.

Mr. Elmore provided a general comment about CCRs and public notices, emphasizing the need for effective consumer notification. If there is a specific impact (e.g., to in utero fetuses), then it is important

to consider ways to target the population of pregnant mothers. He urged the EPA to involve social science to develop communication strategies and to not rely on a blanket notice, such as website postings, which may not adequately reach the at-risk consumers.

Mr. Lucero shared an example from New Mexico, where 88% of PWSs serve populations under 500. These small systems face capacity challenges in addressing regulatory requirements. New Mexico has addressed this by organizing regional meetings for community water systems (CWSs) and inviting partners from different sectors to present information to CWS board members and certified operators. This approach has been effective in spreading information through word of mouth in rural communities. He suggested that similar partnerships, such as with community health clinics, could help spread information about perchlorate concerns.

Closing Remarks

Mr. Elmore wrapped up the meeting, acknowledging the good engagement of the group and expressing gratitude for the council members' dedication to protecting drinking water and public health. He invited feedback on how he and the advisory council could better support EPA and facilitate efficient communication on these topics. He thanked both new and returning members for their contributions and then turned the discussion over to Mr. Burneson.

Mr. Burneson congratulated Mr. Elmore on his first meeting as chair and praised his efficiency in leading the discussion. He also commended the council for their robust input, particularly thanking the new members for their participation. He emphasized that this meeting was not the final opportunity for the council to provide input on perchlorate. EPA will make use of the NDWAC's input, as well as input from other organizations and stakeholders, to develop a proposal by November. EPA will then return to the NDWAC in late 2025 or early 2026 for further consultations on perchlorate.

APPENDIX A:

PRESENTATION: Proposed National Primary Drinking Water Regulation for Perchlorate

NDWAC

January 10, 2025

Proposed National Primary Drinking Water Regulation for Perchlorate

NDWAC Consultation Meeting
January 10, 2025

EPA United States Environmental Protection Agency

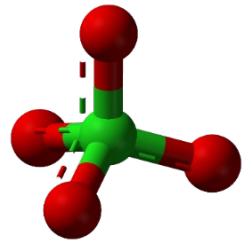
Office of Water

Purpose and Overview

- To provide the National Drinking Water Advisory Council (NDWAC) with information on the development of the proposed perchlorate National Primary Drinking Water Regulation (NPDWR).
- Discuss background of perchlorate in drinking water
- Discuss potential provisions of a proposed perchlorate NPDWR
- Discuss cost information
- Solicit input from NDWAC members on key areas of the development of the proposed perchlorate NPDWR
- Provide information about next steps

Background

Sources of Perchlorate



- Perchlorate (ClO_4^-) is an anion that is highly stable and mobile in the aqueous environment.
- Perchlorate occurs naturally and is also manufactured. Perchlorate is commonly used in solid rocket propellants, munitions, fireworks, airbag initiators for vehicles, matches, and signal flares.
- Perchlorate has also been associated with imported fertilizer that was widely applied in the United States.
- Trace amounts of perchlorate can result from improper handling and degradation of hypochlorite solutions that are used for drinking water treatment.

Perchlorate Health Effects

- EPA has determined that exposure to perchlorate may cause effects on human health.
- At certain levels, perchlorate interferes with the thyroid gland by inhibiting iodide uptake, which can affect thyroid hormone production.
- Thyroid hormones help regulate metabolism and are critical for normal growth and development. Impairment of thyroid function in pregnant people is linked to delayed development and decreased learning capability in their children.

Regulating Perchlorate in Drinking Water

- On February 11, 2011, EPA issued a final determination to regulate perchlorate in drinking water under SDWA.
- EPA completed peer reviewed scientific analyses on perchlorate as recommended by the agency's Science Advisory Board (SAB).
- In 2019, EPA proposed an NPDWR for perchlorate. EPA proposed an MCLG/MCL of 56 µg/L and requested comment on 18 µg/L and 90 µg/L. EPA also requested public comment on withdrawing the regulatory determination for perchlorate based on low occurrence at levels of health concern.
- In July 2020, EPA withdrew the regulatory determination for perchlorate and did not promulgate a final NDPWR for perchlorate.
- In 2023, the D.C. Circuit vacated and remanded EPA's July 2020 withdrawal of its determination to issue drinking water regulations for perchlorate.
- As a result of this decision, EPA has committed to proposing an NPDWR for perchlorate by November 21, 2025, and promulgating a final rule by May 21, 2027, per consent decree.

SDWA: Proposing an NPDWR

- An NPDWR establishes requirements applicable to public water systems (PWSs).
- A PWS provides water for human consumption to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year.
- EPA defines three types of PWSs:
  - *Community Water System* (CWS): Serves the same population year-round.
  - *Non-Transient Non-Community Water System* (NTNCWS): Regularly supplies water to at least 25 of the same people at least 6 months per year (e.g., school).
  - *Transient Non-Community Water System* (TNCWS): Serves water where people do not remain for long periods of time (e.g., gas station).
    - EPA does not anticipate that the perchlorate NPDWR will affect TNCWSs.

SDWA: Proposing an NPDWR

- A *maximum contaminant level goal* (MCLG) is a non-enforceable health-based level at which no known or adverse effects on the health of persons occur and allows for an adequate margin of safety. An MCLG does not account for limits of detection and treatment technology effectiveness.
- An enforceable *maximum contaminant level* (MCL) is set as close as feasible to the MCLG (taking costs and benefits into consideration).
- The agency is currently evaluating information to develop a proposed MCL and MCLG for the forthcoming proposed perchlorate NPDWR.
- EPA is also currently evaluating occurrence and treatment information to inform development of regulatory options.

Potential NPDWR Requirements

Opportunities for Input on Potential NPDWR Requirements

- EPA is considering monitoring options, treatment technology feasibility, and public notification as part of developing perchlorate MCL requirements.
- EPA is interested in input related to implementation challenges and ways to reduce water system burden in complying with a perchlorate MCL.
- EPA is specifically interested in input related to the following areas:
  - Monitoring and reporting requirements, including eligibility and criteria for reduced monitoring and waivers
  - Treatment and compliance options
  - Public notification requirements

Monitoring Considerations

- EPA is evaluating requirements for PWSs to conduct initial water quality monitoring to determine future compliance monitoring requirements.
- In the 2019 proposal, EPA proposed the following:
  - Systems collect four quarterly samples at each entry point to the distribution system.
  - States can approve use of recent, previously acquired perchlorate drinking water data to satisfy initial monitoring requirements.
  - State can waive final two quarters of initial monitoring at a sampling point if results from previous two quarters are below the detection limit.
  - Staggered sampling schedule based on system size.
- EPA is interested in additional ways to streamline initial monitoring.

Monitoring Considerations

- Based on initial monitoring results, regulated inorganic contaminants are frequently monitored under the Standardized Monitoring Framework (SMF).

	1st Period			2nd Period			3rd Period		
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
Ground Water Source									
Waiver	*								
≤ MCL and no Waiver	*			*			*		
Reliably and Consistently (R&C) < MCL	*			*			*		
> MCL or not R&C < MCL	****	****	****	****	****	****	****	****	****
Surface Water Source									
Waiver	*								
≤ MCL and no Waiver	*	*	*	*	*	*	*	*	*
Reliably and Consistently (R&C) < MCL	*	*	*	*	*	*	*	*	*
> MCL or not R&C < MCL	****	****	****	****	****	****	****	****	****

Treatment

- Systems that exceed drinking water standards must select a treatment or non-treatment option to bring their water systems into compliance.
- EPA has identified the following technologies as potential treatments to remove perchlorate from drinking water:
  - Ion Exchange
  - Biological Treatment
  - Centralized Reverse Osmosis
- EPA has also identified potential non-treatment options in lieu of installing and operating treatment technologies, including blending existing water sources, replacing a contaminated source with a new source, or purchasing water from another system.
- Point-of-Use (POU) Reverse Osmosis is also a potential small system compliance option for systems serving 3,300 or fewer persons.

Treatment

- *Ion Exchange*: a technology where ion contaminants (such as perchlorate) present in liquids are exchanged with non-contaminant ions (typically chloride) bound to an exchange media; when exhausted, media must be replaced or activated; shown to achieve high removal efficiency for perchlorate especially with perchlorate-selective resin.
- *Biological treatment*: process by which bacteria are used to reduce perchlorate to chlorate, chlorite, chloride, and oxygen; offers complete destruction of the perchlorate ion; may need to be used with other treatment processes to ensure finished water quality.
- *Reverse Osmosis*: high-pressure separation process where some water (a permeate) is forced across a membrane while dissolved and suspended solids are removed as concentrate; does not destroy the perchlorate ion; large volumes of concentrate may restrict application on a system-specific basis.
- *Point-of-Use Reverse Osmosis*: a water filtration device connected to a single fixture (e.g., under a kitchen sink) that uses the process of reverse osmosis to remove contaminants from the water supplied to that fixture.

Public Notification and Education Considerations

- PWSs may be required to issue public notification (PN) of a violation to customers at risk of elevated perchlorate in drinking water if the system exceeds regulatory standards.
- Under the PN Rule, there are three tiers of PN:
  - Tier 1: Immediate notice where there is potential for human health to be immediately impacted; water suppliers have 24 hours to notify consumers
  - Tier 2: Notice as soon as possible where does not pose immediate risk to human health; within 30 days of violation
  - Tier 3: Annual notice, does not have direct impact on public health
- EPA is currently considering which tier of PN will be required for the proposed perchlorate NPDWR.
- CWSs conducting monitoring would also be required to include perchlorate monitoring results in their annual Consumer Confidence Report (CCR).

Cost Information and Funding Considerations

Cost Information

- The proposed perchlorate NPDWR will not uniformly impact every PWS.
  - A perchlorate NPDWR will likely require PWSs to conduct initial and routine monitoring to determine the level of perchlorate in drinking water.
  - Costs will vary depending on monitoring results.
  - Some PWSs may have to take action as necessary to reduce perchlorate concentrations in drinking water to comply with an MCL, provide information about perchlorate in the system's CCR, and issue public notifications about perchlorate violations.
  - Point-of-use (POU) treatment options may be more cost effective for some small systems than centralized treatment.
- EPA has estimated some preliminary costs associated with potential requirements.

Cost Information

- The preliminary costs presented in the following slides will be further revised prior to proposal.
- These preliminary cost estimates give a sense of the cost associated with potential requirements.
- The purpose of providing these preliminary cost estimates is to request input/data on costs that systems and States have experienced.

Monitoring Cost Information

- EPA preliminarily estimates that monitoring would cost systems $124 per sampling event (2023$ updated from 2017$). This includes sample collection and analysis.
- The actual costs to systems would be dependent on perchlorate monitoring results, number of sampling points, and the extent to which systems must conduct and pay for monitoring.
- EPA preliminarily estimates that the average annualized monitoring and administration would be $104* for systems serving fewer than 10,000 people and $267* for large systems.

*updated from the 2019 proposal to 2023$ and 2% discount rate.

Treatment Cost Information

Preliminary Annual Cost per System for Perchlorate Treatment (2023$, 2% discounting)[a]

Population Served	Ion Exchange[b]	Biological Treatment[c]	Reverse Osmosis (RO)[d]	Point-of-Use RO[e]
≤500	$24,200 ($20,800 - $28,800)	Not Applicable	Not Applicable	$29,800 ($3,700 - $55,600)
501 to 3,300	$84,900 ($77,000 - $100,400)	$331,400 ($293,600 - $365,900)	$494,400 ($461,400 - $492,000)	$207,700 ($55,700 - $359,000)
3,301 to 10,000	$333,000 ($311,300 - $380,400)	$710,300 ($656,200 - $788,400)	$1,131,600 ($1,085,800 - $1,135,200)	Not Applicable
10,001 to 50,000	$835,900 ($800,000 - $941,200)	$1,541,900 ($1,432,400 - $1,674,900)	$3,923,000 ($3,859,900 - $3,929,600)	Not Applicable
50,001 to 100,000	$2,254,400 ($2,237,900 - $2,469,700)	$3,434,500 ($3,377,900 - $3,756,600)	$11,387,200 ($11,345,200 - $11,415,100)	Not Applicable
100,001 to 500,000	$7,047,100 ($6,996,000 - $7,687,300)	$8,516,700 ($8,292,600 - $8,982,900)	$34,749,300 ($34,675,600 - $34,794,900)	Not Applicable

Source of cost functions: *Technologies and Costs for Treating Perchlorate-Contaminated Waters* (2019) for ground water scenarios. Values are rounded to nearest $100. Range in costs reflect variations in component cost levels (low, mid, high). Number of entry points was assumed to be one (1) for systems serving 500 or fewer people and two (2) for systems serving 501 or more people. Assumed treatment at all entry points for each system. Actual costs would depend on number of entry points exceeding the MCL. Costs include indirect costs (e.g., construction management, administration) and add-on costs (e.g., permitting, pilot study, land). Costs assume all water is treated. Blending would reduce costs.

b. Assumed use of disposable perchlorate-selective resin with average capacity of 170,000 bed volumes for two pressure vessels in series. Assumes 90% removal at all entry points.

c. Assumed fixed-bed gravity basins, electron donor dose of 10 mg/L acetic acid, and nutrient addition of 1 mg/L phosphorus.

d. Assume low-pressure RO membranes to treat high-quality water (i.e. otherwise deliverable).

e. Assumes systems would purchase, install, and maintain certified point-of-use (POU) devices for all customers. The costs also include development of a public education program and monitoring of POU devices. Estimates based on the minimum, median, and maximum population served divided by average household size of 2.58 people to approximate the number of connections requiring an RO device. In the 2019 proposal, EPA determined that implementing and maintaining this option for perchlorate for systems larger than 3,300 people (greater than 1 MGD design flow) is likely to be impractical.

Treatment Cost Information

Preliminary Annual Cost per System for Perchlorate Non-Treatment Options (2023$, 2% discounting)[a]

Population Served	New Well Construction[b]	Interconnection[c]
≤500	$35,500 ($33,100 - $36,000)	$53,300 ($52,700 - $53,700)
501 to 3,300	$96,300 ($92,700 - $97,500)	$251,300 ($250,300 - $251,500)
3,301 to 10,000	$255,100 ($245,400 - $257,900)	$850,800 ($849,800 - $851,400)
10,001 to 50,000	N/A[d]	N/A
50,001 to 100,000	N/A	N/A
100,001 to 500,000	N/A	N/A

a. Source of cost functions: *Technologies and Costs for Treating Perchlorate-Contaminated Waters* (2019) for ground water scenarios. Values are rounded to nearest $100. Range in costs reflect variations in component cost levels (low, mid, high). Cost estimates assume that systems choosing nontreatment options have an alternative source that will not require additional treatment to address raw water quality. Costs include indirect costs (e.g., construction management, administration) and add-on costs (e.g., permitting, pilot study, land). Costs assume all water is treated. Blending would reduce costs.

b. New well construction cost estimates assume a 250-ft well depth. This option depends on the availability of an uncontaminated ground water source.

c. Interconnection cost estimates assume an interconnection distance of 10,000 feet, that no booster pumps will be necessary, and a unit cost of $2.00 per thousand gallons. This option depends on the availability of a wholesale water system.

d. Nontreatment options are less likely to be available for larger systems because of the quantity of water required. EPA's nontreatment cost model is only applicable for systems serving less than 10,000 people.

Funding Considerations

- The Drinking Water State Revolving Fund (DWSRF) provides below market rate loans to fund infrastructure improvements to water systems to protect public health and ensure compliance with the Safe Drinking Water Act.
  - Eligible projects related to addressing perchlorate in drinking water may include the installation, upgrade, and replacement of treatment technologies and/or facilities, finished water storage facilities, transmission and distribution systems, and any associated planning and design activities.
- The Infrastructure Investment and Jobs Act (IIJA) provides $9 billion to invest in communities with drinking water impacted emerging contaminants like perchlorate. This includes $4 billion to the Drinking Water State Revolving Fund (DWSRF) and $5 billion through the EPA's Emerging Contaminants in Small or Disadvantaged Communities Grant Program. Utilities may also use the additional nearly $12 billion in the DWSRF dedicated under IIJA, and funds Congress annually has provided to fund DWSRF loans.
- Established by the Water Infrastructure Improvements for the Nation (WIIN) Act, the Small, Underserved, and Disadvantaged Communities (SUDC) grant awards funding to States, territories, and Tribes to support water systems in meeting SDWA requirements.
  - Since 2019, the program has allocated over $130 million to States, territories and Tribes. On May 21, 2024, EPA announced the availability of $25 million in funding for FY24.

Discussion and Key Areas for Input

Monitoring Considerations

- What input do NDWAC members have related to monitoring requirements for perchlorate?
  - What levels of perchlorate are you aware of systems experiencing?
  - What are some advantages and disadvantages of applying the Standardized Monitoring Framework for inorganic contaminants to perchlorate?
  - How should previously acquired perchlorate drinking water monitoring data be considered in the initial monitoring requirements and should there be a cut-off date?
  - What are some ways to streamline monitoring requirements and reduce burden on systems and States?

Treatment Considerations

- What input do NDWAC members have related to treatment for perchlorate?
  - Is there information on the cost and availability of perchlorate treatment technologies?
  - Is there any additional information on the effectiveness of the identified technologies in reducing levels of perchlorate in drinking water?
  - Are there additional technologies that have been demonstrated to reduce perchlorate levels?
  - Is there any information on the impact of co-occurring contaminants on treatment efficacy or operating costs?

Public Notification and Education Considerations

- What input do NDWAC members have related to potential perchlorate public notification and education requirements?
  - How quickly should water systems be required to notify the public following a violation of the perchlorate standard?
  - What information should be included in Consumer Confidence Reports regarding perchlorate in drinking water?

Next Steps

Next Steps

- In addition to this consultation, EPA is seeking input from other key stakeholders to inform the proposed perchlorate NPDWR.
  - Federalism, Small Business Advocacy Review Panel, tribal officials, and other stakeholders.
  - EPA will also provide for a public comment period following the development of the rule proposal.
- EPA anticipates publishing the proposed rule for public comment by November 21, 2025.
- EPA will consult with the NDWAC following the proposed rule.
- EPA expects to promulgate a final rule by May 21, 2027.

APPENDIX B:

NDWAC Meeting Participants

NDWAC

January 10, 2025

NDWAC Meeting Participants
January 10, 2025

National Drinking Water Advisory Council Members

- Steven Elmore
- Yolanda Barney
- Elin Betanzo
- Shellie Chard
- Eagle Jones
- Kyle Jones
- Eric Labelle
- Jana Littlewood
- Ramón Lucero
- Jeffrey Phillips
- William Pickering
- Alex Rodriguez
- Jeffrey Szabo
- Julie Waechter
- Olivia Wein

Centers for Disease Control Liaisons

- Arthur Chang

U.S Environmental Protection Agency Meeting Speakers

- Tracey Ward, NDWAC Designated Federal Officer, Office of Ground Water and Drinking Water (OGWDW)
- Eric Burneson, Director, Standards and Risk Management Division (SRMD), OGWDW
- Samuel Hernandez-Quinones, Supervisor, Regulatory Assessment and Development Branch, SRMD, OGWDW
- Anne Lausier, Regulatory Assessment and Development Branch, SRMD, OGWDW