EPA-820-N-24-007

United States Environmental Protection Agency

Spring 2024

FSTRAC Newsletter

FEDERAL-STATE TOXICOLOGY RISK ANALYSIS COMMITTEE

What Is FSTRAC?

FSTRAC's mission is to strengthen relationships and cooperation among the EPA, states and Tribes through the exchange of technical information primarily regarding water-related human health and risk assessment and also share information on ecological effects related to water quality criteria. FSTRAC is composed of current representatives from governmental agencies (state, Tribal, federal health and environmental agencies, and other regulatory authorities) and representatives from the Association of State Drinking Water Administrators (ASDWA) and the Association of Clean Water Administrators (ACWA). The goal of FSTRAC is to share information that supports the development of well-rounded, integrated approaches to effects assessment, risk assessment, risk management, risk communication, and standard-setting for drinking water, groundwater, and surface water contaminants. Specific objectives of FSTRAC include:

- To foster cooperation, consistency, and an understanding of goals and problems in human health and ecological risk assessment for contaminants in water.
- To allow the exchange of technical information, including toxicity/exposure data and analysis, and methodologies and assumptions related to the development and implementation of regulations, criteria, advisories, and other toxicity values under the Safe Drinking Water Act and the Clean Water Act, and other state and Tribal rules and policies as applicable.
- To allow the exchange of information on research priorities and results.
- To share science policy concerns regarding water-related human health and ecological risk assessment.

Recent Webinars

FSTRAC holds several webinars each year to share information through presentations and discussions regarding human health risk analysis and water quality issues.

Spring 2024

Health and Ecological Criteria Division Update on FY24 Priorities (presented by Colleen Flaherty, HECD/OST/OW/EPA). Ms. Flaherty described the major accomplishments of the EPA's Office of Science and Technology, Health and Ecological Criteria Division (OST/HECD) for the current fiscal year (FY), including publishing the *Final PFAS National Primary Drinking Water Rule*, developing *Technical Support Materials: Developing Alternative Recreational Criteria for Waters Contaminated by Predominantly Non-Human Fecal Sources*, releasing the Metals Aquatic Life Criteria and Chemistry Map with U.S. Geological Survey–National Water Information System (USGS–NWIS)-based states layers, and publishing

The purpose of this newsletter is to update Federal-State Toxicology and Risk Analysis Committee (FSTRAC) members on current developments in toxicology, risk analysis, and water quality criteria and standards. This newsletter also provides information on recent FSTRAC webinars and upcoming events. Please share this newsletter with those who may be interested in these topics. If you are interested in joining FSTRAC, please contact the FSTRAC Co-Chairs, Dr. Shamima Akhter (Akhter.Shamima@epa.gov) or Ms. Katie Fallace (Katie.Fallace@state.mn.us).

Understanding Lagoon Requirements Under 40 C.F.R. Part 503: Best Management Practices for Use or Disposal of Sewage Sludge, Part 1 – Land Application of Sewage Sludge Removed from Lagoons. She mentioned that the EPA OST/HECD's priorities for the current FY include developing final perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) aquatic life criteria, per- and polyfluoroalkyl substances (PFAS) acute aquatic life benchmarks for eight chemicals, human health criteria for PFAS (PFOA, PFOS, hexafluoropropylene oxide dimer acid [HFPO-DA]), perfluorobutane sulfonic acid [PFBS]), and additional quantitative polymerase chain reaction (qPCR) recreational water quality criteria (enterococci). Ms. Flaherty mentioned that additional OST/HECD priorities for the current FY including providing support for Safe Drinking Water Act (SDWA) processes including Contaminant Candidate List 6, Regulatory Determination 5, and Six Year Review 4; state-specific nutrient criteria development projects; the EPA's National Harmful Algal Bloom Program and the Interagency Working Group for Harmful Algal Bloom and Hypoxia Research Control Act: South Florida Assessment and National Assessment; streamlining development and implementation of biological condition gradients; and developing a draft risk assessment for PFOA and PFOS in biosolids.

ToMEx: Toxicity of Microplastics Explorer (presented by Leah Thornton Hampton, Southern California Coastal Water Research Project). Dr. Thornton Hampton mentioned that the Southern California Coastal Water Research Project (SCCWRP) held a microplastics health effects workshop (beginning in fall 2020 with a public webinar series) which assembled experts from across the world in government, industry, and academia. The workshop focused on determining how microplastics negatively impact aquatic organisms, prioritizing the microplastic characteristics of greatest biological concern, and identifying health-based thresholds for microplastics. SCCWRP developed ToMEx, which is a tool that summarizes, explores, and analyzes microplastics data, to meet specific workshop goals. ToMEx is useful for other research applications and informing management decisions, including identifying gaps in knowledge, describing toxicity patterns across studies, and modeling exercises. ToMEx provides information on effects studies, plastic leachate, chemical sorption, and chemical co-exposures. ToMEX 1.0 (for both aquatic organisms and human health) is available at https://microplastics.sccwrp.org. Dr. Hampton mentioned that an updated version of ToMEx (2.0) will be released publicly later this year with data from 290 manuscripts on aquatic organisms and 78 manuscripts on human health.

Final Human Health Toxicity Assessments for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS) (presented by Brittany Jacobs and Casey Lindberg, HECD/OST/OW/EPA). Dr. Jacobs mentioned that there was a need to develop PFOA and PFOS toxicity assessments to support the PFAS National Primary Drinking Water Regulation (NPDWR). She described the timeline for developing these toxicity assessments, starting in March 2021 with the final positive regulatory determination for PFOA and PFOS. Dr. Jacobs described the overall process for developing the NPDWR including the assessment conclusions that directly impact the process (evaluating data availability, establishing the Maximum Contaminant Level Goal [MCLG], and developing rule analyses) and the assessment conclusions that indirectly impact the process (setting the standard as closely as feasible to the MCLG and benefit-cost information). To develop the PFOA and PFOS toxicity assessments, an EPA Science Working Group was formed, best available science and systematic review methods were used, human health risk assessment guidance and methods were followed, and the draft toxicity assessments underwent external peer review by the EPA Science Advisory Board (SAB) PFAS Review Panel and a 60-day public comment period. Dr. Jacobs described the process for synthesizing PFOA and PFOS health effects using the best available science, with evidence indicating health effects in five health outcomes after PFOA exposure and five health outcomes after PFOS exposure. She mentioned that PFOA and PFOS were each classified as *Likely to Be Carcinogenic to Humans* via the oral route of exposure according to agency guidance, noncancer toxicity values indicate that adverse effects are observed after low dose exposure in humans, and cancer toxicity values indicate that PFOA and PFOS are likely potent carcinogens.

ORD Human Health Toxicity Value for Perfluoropropanoic Acid (PFPrA) (presented by Beth Owens, CPHEA/ORD/EPA). Dr. Owens presented on the initiation and publication of the recent *ORD Human Health Toxicity Value for Perfluoropropanoic Acid (PFPrA)* assessment. Wastewater sampling data around an active manufacturing plant from 2020 to 2021 revealed that PFPrA was among the PFAS with the highest concentrations and unknown toxicological impacts. The EPA's Office of Enforcement and Compliance Assurance (OECA) requested technical support from EPA's Office of Research and Development (ORD) and nominated PFPrA for evaluation. ORD reviewed publicly available and industry toxicological information on PFPrA. This informed the development of a toxicity assessment for site-specific evaluation of chemicals under the SDWA in support of preliminary water screening of PFAS contamination. Dr. Owens noted that ORD modeled the PFPrA assessment after the Provisional Peer Reviewed Toxicity Value (PPRTV) assessment format. The development of this fit for purpose assessment product followed the PPRTV process and leveraged existing literature databases. She described the literature search and screening used and the candidate PFPrA point of departure human equivalent doses (POD_{HEDs}) for chronic reference dose (RfD) derivation, with increased relative liver weight in adult males selected as the endpoint. Dr. Owens mentioned that the human health toxicity value for PFPrA underwent internal peer review by EPA ORD scientists and a contractor-led, independent letter external peer review. She noted that this process serves as an example for deriving human health reference values for site-specific evaluation of chemicals under SDWA.

Elevated Levels of Ultrashort- and Short-Chain Perfluoroalkyl Acids in US Homes, Water, and People (presented by Amina Salamova and Stephanie Eick, Emory University, Rollins School of Public Health). Dr. Salamova noted that the purpose of this study was to examine the current exposure patterns of PFAS in households and their residents, as well as to examine the associations between PFAS levels in different matrices to understand exposure pathways. She described that paired dust, drinking water (tap and well), blood serum, and urine samples were collected from 81 homes in Indiana from August to December 2020. Dr. Salamova noted that samples were analyzed using liquid chromatography tandem mass spectrometry for 47 PFAS. She mentioned that ultrashort- and short-chain PFAS were the most abundant PFAS in all matrices (dust, drinking water, serum, urine), with trifluoroacetic acid (TFA) and PFPrA together contributing up to ~95% of the total PFAS levels. Dr. Salamova noted that dust ingestion and consumption of drinking water could be important pathways for the ultrashort- and short-chain PFAS and that associations between the levels of precursors in dust and the ultrashort- and short-chain PFAS in serum suggest common sources.

PFAS Sampling Project at Public Water Systems in Oregon (presented by Gregg Baird, Oregon Health Authority and Julie Harvey, Oregon Department of Environmental Quality). Ms. Harvey noted that the objective of the PFAS sampling project at public water systems (PWSs) in Oregon was to ensure that customers were not being exposed to harmful levels of PFAS in their drinking water. She mentioned that the study targeted smaller PWSs serving fewer than 10,000 people near suspected PFAS sources that had not been sampled previously. Mr. Baird mentioned that the Oregon drinking water health advisory levels (HALs) for PFAS of 30 parts per trillion (ppt) for PFOS, PFOA, perfluorononanoic (PFNA), and perfluorohexanesulfonic acid (PFHxS) were used to evaluate the sampling results, and that these values have since been retired in lieu of the new PFAS Maximum Contaminant Levels (MCLs) released by the EPA. During the initial round of sampling in October 2021 through March 2022, he noted that PFAS was not detected (with a reporting limit of approximately 10 ppt) in 153 of the 160 samples analyzed using EPA Method 533, and that the remaining 7 samples had PFAS detections at or below 30 ppt. Mr. Baird noted that after this time, the laboratory was able to achieve lower minimum reporting limits (MRLs) (approximately 4 ppt) and resampling was performed in 2023 at PWSs that had detections below the MRL in the initial round. Of the 35 samples collected during resampling, 17 had PFAS detections, with one sample that had concentrations above the HALs. In total, 16 out of 143 PWSs sampled had PFAS detections. Ms. Harvey mentioned that 63% of the 143 PWSs sampled for this project are considered disadvantaged communities (under Oregon Health Authority's criteria) and that 71% of the PWSs with detections are in disadvantaged communities. She mentioned that Oregon plans to perform additional sampling at PWSs serving less than 3,300 people and that approximately 55% of these PWSs are considered disadvantaged.

Drinking Water Quality and Social Vulnerability Linkages at the System Level in the United States (presented by Bridget R. Scanlon, University of Texas at Austin, Jackson School of Geosciences). Dr. Scanlon mentioned that under the Infrastructure Investments and Jobs Act (IIJA), $31 billion has been allocated over 5 years for drinking water concerns, and that 49% of this funding has been targeted for disadvantaged communities (DACs). She noted that the definition of DACs is currently based primarily on median household income and that the EPA and the White House environmental justice tools for water are based mostly on proximity to point sources, Superfund sites, hazardous waste, underground storage, and wastewater discharge. To evaluate drinking water and social vulnerability linkages at the system level in the United States, Dr. Scanlon used community water system service area boundaries, health-based (HB) violations from the EPA's Safe Drinking Water Information System (SDWIS), and a modified social vulnerability index (mSVI) using CDC data for socioeconomics, race and language, and demographics and housing. She described the main findings for this study, including that HB violations in community water systems are dominated by nonpoint source contaminants (inorganics including arsenic, radionuclides, nitrate) with low impacts from point sources from organic contaminants (0.6%), and that HB violations were found primarily in small systems in rural settings. She noted that community water systems with HB violations disproportionately impact socially vulnerable communities, with 70% of community water systems having HB violations ranked in high mSVI. Dr. Scanlon recommended that the DAC definition should consider other parameters beyond median household income and that the EPA and the White House should consider modifying their environmental justice tools to consider nonpoint source contaminants.

Scanlon, B.R., Fakhreddine, S., Reedy, R.C., Yang, Q. & Malito, J.G. 2022. Drivers of spatiotemporal variability in drinking water quality in the United States. *Environmental Science & Technology* 56:12965-12974 doi:10.1021/acs.est.1c08697.

Scanlon, B.R., Reedy, R.C., Fakhreddine, S., Yang, Q. & Pierce, G. Drinking water quality and social vulnerability linkages at the system level in the United States. 2023. *Environmental Research Letters* 18, 094039 doi:10.1088/1748-9326/ace2d9.

Information from EPA, States and Tribes Developing Guidance for Specific Chemicals

Criteria Values

PFAS National Primary Drinking Water Regulation

On April 26, 2024, the EPA published in the Federal Register the final National Primary Drinking Water Regulation for per- and polyfluoroalkyl substances (PFAS). The regulation establishes (1) legally enforceable maximum contaminant levels (MCLs) for PFOA, PFOS, PFHxS, PFNA, and hexafluoropropylene oxide dimer acid (HFPO-DA) individually, and (2) a Hazard Index MCL for PFAS mixtures containing at least two or more of PFHxS, PFNA, HFPO-DA, and PFBS.

The NPDWR establishes non-enforceable maximum contaminant level goals (MCLG) of zero for PFOA and PFOS. This reflects the latest science showing that there is no level of exposure to these two PFAS without risk of health impacts. The enforceable MCLs for PFOA and PFOS individually are 4.0 ppt. This standard will reduce exposure from these two PFAS in drinking water to the lowest levels that are feasible for effective implementation. For PFNA, PFHxS, and HFPO-DA (GenX Chemicals), the EPA established the MCLs of 10 ppt, the same as the MCLGs for these three PFAS.

Decades of research show mixtures of different chemicals can have additive health effects, even if the individual chemicals are each present at lower levels. Therefore, mixtures of two or more of PFNA, PFHxS, PFBS, and GenX Chemicals will be regulated with a Hazard Index MCL of 1 and used to determine if the combined levels pose a potential risk for non-cancer health effects. The hazard quotients that make up the Hazard Index MCL consist of the level of each PFAS measured in drinking water to the specific PFAS health-based water concentrations. The Hazard Index MCL will protect communities from the additive health effects of multiple PFAS when they occur together.

In addition to the standards, the final rule requires the following:

- Community water systems (CWS) and non-transient non-community water systems (NTNCWS) must monitor for these PFAS at every entry point to the distribution system.
- Initial monitoring must be completed within 3 years, or by April 26, 2027, followed by ongoing compliance monitoring.
- Starting in 2027, public notification is required by water systems for monitoring and testing violations.
- Starting in 2027, community water systems must provide the public with information on the levels of these PFAS in their drinking water in annual Consumer Confidence Reports (CCRs).
- CWS and NTNCWS have 5 years (by 2029) to meet the MCLs. Actions to meet the MCLs could include removing these chemicals through treatment, or switching to an alternative water supply that meets the standards.
- Starting in 2029, public notification is required by water systems that have PFAS in drinking water which violates one or more of these MCLs.

The EPA expects that over many years the final rule will prevent PFAS exposure in drinking water for approximately 100 million people, prevent thousands of deaths, and reduce tens of thousands of serious PFAS-attributable illnesses.

The PFAS rule homepage contains fact sheets, commonly asked questions, webinar recordings and presentation materials, and a copy of the Federal Register Notice.

California Office of Environmental Health Hazard Assessment's Adoption of Public Health Goals for PFOA and PFOS

On April 5, 2024, the Office of Environmental Health Hazard Assessment (OEHHA) of the California Environmental Protection Agency adopted and published Public Health Goals (PHGs) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) in drinking water. The PHG of 0.007 parts per trillion (ppt) for PFOA is based on kidney cancer in humans and the PHG of 1 ppt for PFOS is based on liver and pancreatic tumors in laboratory animals. The PHGs are set at a level of risk of one additional cancer case per one million persons exposed over a lifetime. The document also presents health-protective drinking water concentrations for noncancer health effects. The noncancer health-protective concentrations are 3 ppt for PFOA, based on increased risk of liver damage in humans and 2 ppt for PFOS, based on increased total cholesterol in humans. For additional information, refer to: https://oehha.ca.gov/water/report/perfluorooctanoic-acid-pfoa-and-perfluorooctane-sulfonic-acid-pfos-drinking-water

California State Water Resources Control Board Adopted a Maximum Contaminant Level for Hexavalent Chromium

On April 17, 2024, the California State Water Resources Control Board adopted a Maximum Contaminant Level (MCL) of 10 parts per billion (ppb) for hexavalent chromium (Cr(VI)) in drinking water. Implementation of the MCL will occur over the next two to four years, depending on the size of the water system. Prior to this recent MCL adoption, Cr(VI) was regulated under the California MCL of 50 ppb for total chromium.

Cr(VI) is a carcinogen, and has been associated with numerous adverse noncancer effects, including liver, kidney, and reproductive toxicity. The California Office of Environmental Health Hazard Assessment's (OEHHA) Public Health Goal (PHG) for Cr(VI), established in 2011, is 0.02 ppb based on cancer effects. A Public Health Goal is the level of a chemical contaminant in water that does not pose a significant risk to health. A noncancer health-protective concentration (HPC) of 2 ppb, based on liver toxicity, was also established. California state law mandates that MCLs must be set as close to the PHG as possible, while taking economic and technological feasibility into account.

OEHHA is currently updating the PHG for Cr(VI), and has proposed an updated noncancer HPC of 5 ppb using current risk assessment methodologies. An updated cancer assessment is anticipated sometime later in the year. The lower of the two HPC values will be selected as the PHG.

The new MCL will reduce affected Californians' potential exposure to hexavalent chromium and is a major step forward in protecting the public health of Californians.

Technical Information

Now Available: Application of Weight-of-Evidence Methods for Transparent and Defensible Numeric Nutrient Criteria

The U.S. Environmental Protection Agency released a report titled "Application of Weight-of-Evidence Methods for Transparent and Defensible Numeric Nutrient Criteria". This report complements existing numeric nutrient criteria (NNC) guidance. It presents weight-of-evidence methods that enable rigorous and transparent development and integration of multiple lines of evidence. Given that nutrient pollution continues to be a widespread problem in aquatic systems, the development of NNC as part of water quality standards are a priority to enhance prospects for managing excess nutrients and their effects. This publication is designed for teams of planners, decision-makers, technical advisors, and scientific researchers who are developing or reviewing processes for deriving NNC or NNC conclusions. For more information, please visit the report's webpage.

Risk Assessment

Drinking Water

EPA's Unregulated Contaminant Monitoring Rule (UCMR): Fourth Quarterly Release of Nationwide Data on 29 PFAS and Lithium, Future Rule Development, and Archival Data Finder

On May 16th, the EPA published the fourth set of drinking water data collected at public water systems (PWSs) for 29 PFAS and lithium under the fifth UCMR (UCMR 5). The agency will continue to publish results quarterly until completion of data reporting in 2026. The data collected under UCMR 5 will ensure science-based decision-making and help the EPA better understand national-level exposure to the 29 PFAS and lithium, where and to what extent PFAS co-occur with each other, and if communities are disproportionately impacted by these contaminants. Monitoring results, which can be easily searched for and downloaded using the UCMR 5 Data Finder or accessed via data text files, are available for 4,875 PWSs to date and represent approximately 35% of the total results expected. The UCMR 5 Data Summary and UCMR 5 website with answers to common questions have also been updated to reflect that six of the 29 PFAS for which monitoring data are being collected are included in the EPA's April 2024 final National Primary Drinking Water Regulation (NPDWR).

The next cycle, the sixth UCMR (UCMR 6) is already in early development, with an anticipated proposed rule publication by mid to late 2025, final rule publication by late 2026, and monitoring timeframe from 2027 to 2031. The EPA hosted a pre-proposal webinar in April 2024 (provided here) to discuss potential UCMR 6 monitoring approaches and related aspects including the status of drinking water analytical methods (as discussed in this *Federal Register* notice), contaminants being considered, sampling design, and laboratory approval.

Additionally, to improve accessibility and transparency of the data from past UCMR monitoring (UCMR 1-4), the EPA has developed the UCMR Archival Data Finder and standardized the fields across the data text files.

North Carolina Department of Environmental Quality Submits Human Health Risk Assessment on 1,4-Dioxane

On May 1, 2024, the North Carolina Department of Environmental Quality has prepared and submitted a human health risk assessment of 1,4-dioxane in drinking water, as directed by the General Assembly (Session Law 2023-137, Section 9(b).). 1,4-dioxane is a clear liquid primarily used as a solvent in manufacturing processes. It mixes easily with water and degrades slowly. The chemical is classified as a likely carcinogen by the U.S. Environmental Protection Agency, the U.S. Department of Health and Human Services, and the International Agency for Research on Cancer. North Carolina ranks as a leading state in measured concentrations of 1,4-dioxane in public water systems. The assessment examines the risk of 1,4-dioxane exposure in drinking water as there are currently no federal drinking water standards for 1,4-dioxane. Protection for North Carolinians from 1,4-dioxane in drinking water would need to come from surface water quality standards that limit the amount of 1,4-dioxane entering drinking water supplies. https://www.deq.nc.gov/news/press-releases/2024/05/01/deq-submits-human-health-risk-assessment-14-dioxane

Clean Water

Technical Support Materials: Developing Alternative Recreational Criteria for Waters Contaminated by Predominantly Non-Human Fecal Sources

The EPA has published a new document online entitled, *Technical Support Materials: Developing Alternative Recreational Criteria for Waters Contaminated by Predominantly Non-Human Fecal Sources*. This peer-reviewed document is expected to assist states and Tribes in conducting a risk-based approach for developing recreational water quality criteria for water bodies mainly affected by non-human fecal contamination (e.g., birds, runoff from animal farms and wildlife sanctuaries). The document includes:

- A summary of the available science on health risks from fecal contamination from different sources.
- Characterization of human health risks from non-human sources of fecal contamination using reference and index pathogens.
- A decision framework incorporating a sanitary survey and quantitative microbial risk assessment (QMRA) analyses to evaluate and inform alternative criteria development.

The resulting alternative water quality criteria will protect human health at the same level as EPA's 2012 recommended water quality criteria for the protection of recreational uses. Access additional information about recreational criteria.

Metals Aquatic Life Criteria and Chemistry Map (MetALiCC-MAP v1.0)

The EPA released the Metals Aquatic Life Criteria and Chemistry Map (MetALiCC-MAP v1.0). This map application provides access to water chemistry-derived aquatic life criteria for specific U.S. Geological Survey–National Water Information System (USGS–NWIS) stations and Integrated Compliance Information System–National Pollutant Discharge Elimination System (ICIS–NPDES) facilities permitted features (discharge points or outfalls). NWIS location data are derived from USGS-NWIS sources. ICIS-NPDES facility location data are derived from the Enforcement and Compliance History Online (ECHO) NPDES database. These maps were designed to support the EPA Regions, states, Tribes, and other stakeholders in accessing input data to run bioavailability-based criteria derivation models, and criteria values derived from the collected water chemistry data. All water chemistry parameters (temperature, dissolved organic carbon, pH, hardness, calcium, magnesium, sodium, potassium, alkalinity, sulfate, and chloride) for a sample were concurrently measured, and thus reflect actual environmental conditions. All water chemistry parameter values are for the dissolved form. Water chemistry and derived aquatic life criteria are presented at various levels of organization (state, USGS NWIS station, Ecoregion Level III and Strahler Stream Order within ecoregions) and at various percentile values (5th, 10th, 20th and 25th).

New York State Department of Environmental Conservation Releases Draft Water Quality Guidance to Address Emerging Contaminants from Publicly Owned Treatment Works

On January 10, 2024, New York State Department of Environmental Conservation (DEC) Commissioner Basil Seggos released new water quality guidance that will advance New York state's regulation of the emerging contaminants perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and 1,4-dioxane. The draft guidance for publicly owned treatment plants builds upon guidance released last year for industrial discharges and supports the state's ongoing efforts to protect public health and the environment and prevent exposure to emerging contaminants through the protection of drinking water sources.

For additional information, refer to: https://dec.ny.gov/news/press-releases/2024/1/dec-releases-draft-water-quality-guidance-to-address-emerging-contaminants-from-publicly-owned-treatment-works

Publications

Understanding Lagoon Requirements Under 40 C.F.R. Part 503: Best Management Practices for Use or Disposal of Sewage Sludge, Part 1 – Land Application of Sewage Sludge Removed from Lagoons

In February 2024, the EPA published Part 1 – Land Application of Sewage Sludge Removed from Lagoons to explain the management of sewage sludge removal from wastewater treatment lagoons for land application. The document that provides wastewater operators with best management practices for complying with the Clean Water Act (CWA) when land applying sewage sludge that has been removed from lagoon treatment systems. As excess sewage sludge accumulates in these lagoons over time, their functionality and effectiveness are reduced. Excess accumulated sludge requires periodic removal to maintain full functioning capacity of the wastewater treatment process within the lagoon. Removal of sludge also allows operators to make critical infrastructure repairs and upgrades. The document also identifies some funding opportunities available to wastewater operators when cleaning out their lagoons.

Publication of Clean Water Act Laboratory Methods for PFAS (Method 1633 and Method 1621)

The Clean Water Act Methods Program led the charge to create the first method capable of measuring PFAS in a variety of environmental matrices (wastewater, surface water, groundwater, landfill leachate, soil, sediment, biosolid, and marine tissue). The CWA Methods Team collaborated with EPA's Office of Land and Emergency Management (OLEM), ORD, and the Department of Defense's (DOD's) Strategic Environmental Research and Development Program to design and execute a method validation study that met CWA and Resource Conservation and Recovery Act (RCRA) method programs and serve DOD's need for a validated method. The Office of Water has recommended use of Method 1633 for use in NPDES permits as a monitoring requirement for many categories of industrial wastewater dischargers.

While EPA Method 1633 is capable of measuring 40 of the most common PFAS contaminants, there are thousands more PFAS in use or already in the environment. To fill this analytical need, the Clean Water Act Methods Program, in collaboration with ORD and ASTM International, developed EPA Method 1621 to measure Adsorbable Organic Fluorine (AOF) in wastewater. AOF is not typically found in nature and combined with characterization data about the source of a particular wastewater, AOF analysis is a useful surrogate measurement to identify total PFAS in environmental samples, offering a valuable screening tool for use together with Method 1633. The development and completion of these two methods is a critical step towards addressing PFAS discharges from industrial sources; data collected using these high-quality methods will be the underpinning of the forthcoming regulations of industrial dischargers, including PFAS Manufacturers and Metal Finishing Operations.

Refer to the CWA Analytical Methods for Per- and Polyfluorinated Alkyl Substances (PFAS) webpage for additional information.

Publication of Draft Clean Water Act Laboratory Method for 6PPD-q (Method 1634)

The EPA announced on January 30, 2024 the publication of a draft testing method (EPA Method 1634) that will enable government agencies, Tribes, and other groups to determine where and when 6PPD-quinone is present in local stormwater and surface waters. Used for more than six decades in tires, 6PPD is also found in other rubber products such as footwear, synthetic turf infill, and synthetic playground surfaces. 6PPD reacts with ozone in the air to form 6PPD-quinone, which the EPA-funded research in 2020 found to be linked to the deaths of coho salmon in urban Puget Sound streams.

Exposures occur when runoff containing the chemical is washed from parking lots and streets into streams and other bodies of water. Widespread availability of a draft EPA analytical method for 6PPD-quinone provides Tribes and local governments with an important tool for better understanding stormwater and surface water quality, to inform how and where to put in place protections for sensitive salmon, trout, and other aquatic life from potentially dangerous run-off. The agency's draft testing method is available for use now.

Refer to the 6PPD-q Using Liquid Chromatography with Tandem Mass Spectroscopy (LC/MS/MS) - Method 1634 (Not yet approved) webpage for additional information.

Water Reuse

The EPA Water Reuse Program publishes a monthly newsletter. Topics covered in the April 2024 newsletter included:

- Onsite Water Reuse Summit: Integration of Science, Policy and Operation for Safe and Effective Implementation
- Water Research Foundation (WRF) Publishes Report: Occurrence of PFAS Compounds in U.S. Wastewater Treatment Plants

Refer to the April 2024 WRAP monthly update for additional information.

Cyanobacterial Harmful Algal Blooms: Using Tools from the Cyanobacteria Assessment Network to Reduce Exposure

ORD researchers John M. Johnston and Blake Schaeffer co-authored a column on "Cyanobacterial Harmful Algal Blooms: Using Tools from the Cyanobacteria Assessment Network to Reduce Exposure" in the May 2024 issue of NEHA's *Journal of Environmental Health*. This article provides background on the Cyanobacteria Assessment Network, highlights tools developed through the project, shares an example of how ORD's tools informed local environmental manager decision-making, and discusses next steps in cyanobacterial modeling.

Brunelle, L., A. Batt, A. Chao, S. Glassmeyer, N. Quinete, D. Alvarez, D. Kolpin, E. Furlong, M. Mills, and D. Aga. 2024. De facto water reuse – Investigating the fate and transport of chemicals of emerging concern from wastewater discharge through drinking water treatment using non-targeted analysis and suspect screening. *Environmental Science & Technology* 58(5):2468–2478. https://doi.org/10.1021/acs.est.3c07514.

Carberry, C., J. Bangma, L. Koval, D. Keshava, H. Hartwell, M. Sokolsky, R. Fry, and J. Rager. 2024. Extracellular vesicles altered by a per- and polyfluoroalkyl substance mixture: in vitro dose-dependent release, chemical content, and microRNA signatures involved in liver health. *Toxicological Sciences* 197(2):155–169. https://doi.org/10.1093/toxsci/kfad108.

EPA (U.S. Environmental Protection Agency). 2024. *Protocol for the Uranium IRIS Assessment (Oral) (Preliminary Assessment Materials)*. EPA/635/R-24/013. EPA, Washington, DC. https://iris.epa.gov/Document/&deid=342366.

Glassmeyer, S., E. Burns, M. Focazio, E. Furlong, M. Gribble, M. Jahne, S. Keely, A. Kennicutt, D. Kolpin, E. Medlock Kakaley, and S. Pfaller. 2023. Water, water everywhere, but every drop unique: Challenges in the science to understand the role of contaminants of emerging concern in management of drinking water supplies. *GeoHealth* 7(12):e2022GH000716. https://doi.org/10.1029/2022GH000716.

Ibrahim, M.A., H. Wei, and S. Andreescu. 2024. Sensors for emerging water contaminants: overcoming roadblocks to innovation. *Environmental Science & Technology* 58(6):2636–2651. https://doi.org/10.1021/acs.est.3c09889.

Isaacs, K., T. Wall, K. Paul-Friedman, J. Franzosa, H. Goeden, A. Williams, K. Dionisio, J. Lambert, M. Linnenbrink, A. Singh, J. Wambaugh, A. Bogdan, and C. Greene. 2024. Screening for drinking water contaminants of concern using an automated exposure-focused workflow. *Journal of Exposure Science and Environmental Epidemiology* 34:136–147. https://doi.org/10.1038/s41370-023-00552-y.

Kotlarz, N., T. Guillette, C. Critchley, D. Collier, S. Lea, J. McCord, M. Strynar, M. Cuffney, Z. Hopkins, D. Knappe, and J. Hoppin. 2024. Per- and polyfluoroalkyl ether acids in well water and blood serum from private well users residing by a fluorochemical facility near Fayetteville, North Carolina. *Journal of Exposure Science and Environmental Epidemiology* 34:97–107. https://doi.org/10.1038/s41370-023-00626-x.

Kotlarz, N., J. McCord, N. Wiecha, R. Weed, M. Cuffney, J. Enders, M. Strynar, D. Knappe, B. Reich, and J. Hoppin. 2024. Reanalysis of PFO5DoA levels in blood from Wilmington, North Carolina, residents, 2017–2018. *Environmental Health Perspectives* 132(2):27701. https://doi.org/10.1289/EHP13339.

Liggett, J., B. Gonzalez, D. Lytle, J. Pressman, D. Dionysiou, W. Lee, S. Harmon, and D. Wahman. 2024. Applying microelectrodes to investigate aged ductile iron and copper coupon reactivity during free chlorine application. *Water Research* 253:121324. https://doi.org/10.1016/j.watres.2024.121324.

Schaeffer, B., N. Reynolds, H. Ferriby, W. Salls, D. Smith, J. Johnston, and M. Myer. 2024. Forecasting freshwater cyanobacterial harmful algal blooms for Sentinel-3 satellite resolved U.S. lakes and reservoirs. *Journal of Environmental Management* 349:119518. https://doi.org/10.1016/j.jenvman.2023.119518.

Teuschler, L., R. Hertzberg, T. McDonald, Y. Sey, and J. Simmons. 2024. Evaluation of a proportional response addition approach to mixtures risk assessment and predictive toxicology using data on four trihalomethanes. *Toxics* 12(4):240. https://doi.org/10.3390/toxics12040240.

Verma, S., B. Mezgebe, C. Hejase, E. Sahle-Demessie, and M. Nadagouda. 2024. Photodegradation and photocatalysis of per- and polyfluoroalkyl substances (PFAS): A review of recent progress. *Next Materials*: 2:100077. https://doi.org/10.1016/j.nxmate.2023.100077.

Upcoming Events and Conferences

Upcoming FSTRAC Webinar

The next FSTRAC Webinar is scheduled for fall 2024. Additional details, including the date of the next FSTRAC Webinar, will be provided to FSTRAC members in the coming weeks.

SETAC North America Annual Meeting – Society of Environmental Toxicology and Chemistry

SETAC will be holding its 45th annual North America meeting on October 20–24, 2024 in Fort Worth, Texas. Additional information is provided on the SETAC website: https://www.setac.org/discover-events/global-meetings/setac-north-america-45th-annual-meeting.html.

SOT Annual Meeting – Society of Toxicology

SOT will be holding its 64th annual meeting on March 16–20, 2025 in Orlando, Florida. Additional information is provided on the SOT website: https://www.toxicology.org/events/am/AM2025/index.asp.

SRA Annual Meeting – Society for Risk Analysis

SRA will be holding its 2024 annual meeting in Austin, Texas from December 8–12, 2024. Additional information is provided on the SRA website: https://www.sra.org/events-webinars/annual-meeting/.

ASDWA Annual Conference: 2024 – Association of State Drinking Water Administrators

ASDWA will host its 2024 Annual Conference in St. Louis, Missouri from September 30–October 2, 2024. Additional information is provided on ASDWA's website: https://www.asdwa.org/event/asdwa-annual-conference-2024/.

AWRA, UCOWR, NIWR 60th Anniversary Joint Water Resources Conference – American Water Resources Association, the Universities Council on Water Resources, and the National Institutes for Water Resources

AWRA, UCOWR, and NIWR will host their 60th Anniversary Joint Water Resources Conference. The conference will be hosted in St. Louis, Missouri from September 30–October 2, 2024. Additional information is provided on AWRA's website: https://www.awra.org/AWRA/Members/Events_and_Education/Events/2024-Joint-Conference/2024_Joint_Conference.aspx.

ECOS – Environmental Council of the States

The ECOS will be holding its 2024 ECOS Fall Meeting in Newport, Rhode Island on September 4–6, 2024. Additional information is provided on the ECOS website: https://www.ecos.org/event/2024-ecos-fall-meeting/.

The ECOS will be holding its 2025 ECOS Spring Meeting in Arlington, Virginia on March 23–26, 2025. Additional information is provided on the ECOS website: https://www.ecos.org/vent/2025-ecos-spring-meeting/.

ITRC Webinar – Interstate Technology Regulatory Council

ITRC is holding the following trainings in late 2024:

- September 5: 1,4-Dioxane: Science, Characterization & Analysis, and Remediation
- September 24: Pump & Treat Optimization
- October 8: Optimizing Injection Strategies and In Situ Remediation Performance
- October 17: Managed Aquifer Recharge (MAR)
- October 22: Contaminants of Emerging Concern (CEC)
- November 7: Microplastics
- November 21: Sediment Cap Chemical Isolation

Additional information is provided on the ITRC website: https://itrcweb.org/events/calendar.

NACWA 2024 Utility Leadership Conference & 54th Annual Meeting – National Association of Clean Water Agencies

NACWA will host its 2024 Utility Leadership Conference and 54th Annual Meeting in Buffalo, New York from July 23–26, 2024. More information will be provided on NACWA's website: https://www.nacwa.org/conferences-events/2024-utility-leadership-conference

EPA OGWDW Upcoming Events

EPA Drinking Water Training

The EPA OGWDW hosts several trainings and webinars for drinking water professionals, public officials, and anyone interested in gaining knowledge and skills related to compliance with the Safe Drinking Water Act, Building the Capacity of Drinking Water Systems, Drinking Water Grant Opportunities, Water Technical Assistance, and more. The webinars are free of charge and open to the public. Additional information, schedules, and registration can be found on the website here.

EPA ORD Upcoming Events

Upcoming EPA Research Webinars

Registration and additional information is posted to the series-specific websites closer to the scheduled date, but people can sign up for email notifications when registration opens. Marie Schneider is a POC for the webinars.

- **June 25th from 2:00 to 3:30 p.m. ET:** Small Drinking Water Systems Webinar Series: Inorganics Treatment: Arsenic and Nitrate
- **June 26th from 2:00 to 3:15 p.m. ET:** Water Research Webinar Series: Ecosystem and Human Health Risks from Tires as a Complex Pollutant
- **July 31st from 2:00 to 3:00 p.m. ET:** Harmful Algal Blooms, Hypoxia, and Nutrients Research Webinar Series: Nutrients and Climate Interactions

EPA New Approach Methodologies Conference

The EPA will be hosting the 4th New Approach Methodologies (NAMs) Conference on November 5–6, 2024 on NAMs to Reduce Vertebrate Animal Testing. This will be a hybrid meeting in Research Triangle Park, North Carolina. Additional information is provided on the EPA's NAMs Conference website: https://www.epa.gov/chemical-research/epa-nams-conference.