The Fifth Unregulated Contaminant Monitoring Rule (UCMR 5) Data Summary: October 2024

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Overview

The U.S. Environmental Protection Agency has released the sixth set of data collected under the fifth Unregulated Contaminant Monitoring Rule (UCMR 5) for the 30 chemical contaminants (29 per- and polyfluoroalkyl substances [PFAS] and lithium) listed in Table 1. With this latest action, the data released to date represent approximately 55% of the total results that the EPA expects to receive by completion of data reporting in 2026. The agency will update the results quarterly in the UCMR 5 Data Finder and occurrence data text files in addition to updating this Data Summary. Data are added and possibly removed or updated over the course of this reporting cycle following further review by analytical laboratories, public water systems (PWSs), states, and the EPA. Before conducting your own assessment of the data, please review the Data Considerations section. For answers to common questions on accessing and understanding the UCMR 5 data, and on PFAS and lithium in drinking water, please review the UCMR 5 website.

The UCMR 5 dataset:

- Improves the EPA's understanding of the frequency that these contaminants are found in the nation's PWSs, and at what levels.
- Enables a better understanding of where and to what extent different PFAS co-occur with each other in drinking water.
- Helps the agency make determinations about future regulations and other actions to protect public health under the Safe Drinking Water Act (SDWA).
- Assists federal, state, and other researchers in prioritizing studies for health effects information, identifying data gaps, and determining the need for future studies to improve our understanding of the possible health risks associated with these contaminants in public drinking water.

On April 10, 2024, the EPA announced the final National Primary Drinking Water Regulation (NPDWR) for six PFAS; those six are among the 29 PFAS being monitored in UCMR 5. **Relevant information provided in this document is for technical assistance only and does not supersede the NPDWR requirements in 40 CFR 141 and 40 CFR 142**. Starting in April 2029, PWSs (specifically, community and non-transient non-community water systems) will be required to comply with the PFAS NPDWR Maximum Contaminant Levels (MCLs). Therefore, **UCMR 5 results for the regulated PFAS do not indicate compliance or noncompliance with the MCLs**. PWSs may work with their state to submit their UCMR 5 monitoring data to meet some or all of the PFAS NPDWR's initial monitoring requirements, which must be completed by April 2027. For more information on the MCLs and requirements, refer to the EPA's "PFAS NPDWR Monitoring and Reporting" Fact Sheet.

Starting in April 2029, compliance with the PFAS NPDWR MCLs will be determined by calculating the running annual average (RAA) of quarterly results for each sample point, based on compliance monitoring data reported to the primacy agency. With this in mind, and recognizing that the agency only has a partial set of UCMR 5 data, the EPA notes the following:

- For context, the EPA compared UCMR 5 results for the regulated PFAS to their associated MCLs if there were sufficient data available to calculate an annual average for a sampling location. Doing so requires a full set of UCMR 5 results (*i.e.*, two sample results for locations with ground water sources or four sample results for locations with surface water sources).
    - To date, 12% of the PWSs that have reported a full set of UCMR 5 results for at least one location had an average for one or more of the regulated PFAS that was greater than the respective MCL(s).

    - Five PFAS have individual MCLs associated with the EPA's PFAS NPDWR. To date, 9.4%, 7.8%, 0.02%, 0.8%, and 0.1% of PWSs that have reported a full set of UCMR 5 results for at least one location had an average that was greater than the individual MCLs for PFOS, PFOA, HFPO-DA, PFHxS, and PFNA, respectively.
    - Along with PFHxS, PFNA, and HFPO-DA, one additional PFAS (PFBS) is included in the Hazard Index (HI) MCL. To date, 0.9% of PWSs that have reported a full set of UCMR 5 results for at least one location had an average that was greater than the HI MCL.
- Two PFAS (PFBA and PFHxA) have non-regulatory health-based reference concentrations in drinking water (*i.e.*, U.S. Geological Survey [USGS] health-based screening levels [HBSLs] based on the EPA's Integrated Risk Information System [IRIS] assessments). No PWSs have reported PFBA or PFHxA results above their respective reference concentrations.
- Non-regulatory health-based reference concentrations in drinking water have not been established for the other 21 PFAS that are part of UCMR 5.
    - Sixteen of these 21 PFAS have been measured at or above their respective UCMR 5 minimum reporting levels (MRLs) in at least one sample from at least one PWS.
    - For the other five PFAS, no PWSs have reported results at or above their respective UCMR 5 MRLs.
- UCMR 5 data show that PFAS co-occur as mixtures in drinking water systems. For example, 65% of sampling locations with at least one PFAS result at or above the UCMR 5 MRL have results for multiple PFAS at or above the UCMR 5 MRL(s). The EPA will continue to evaluate the co-occurrence of PFAS in PWSs as the agency gathers more UCMR 5 monitoring data.
- The EPA established a non-regulatory health-based reference concentration for lithium (*i.e.*, EPA's health reference level [HRL]) for screening purposes. To date, 25.5% of PWSs have reported lithium results above the reference concentration.

Regulatory levels (*e.g.*, MCLs), health-based reference values, and other contaminant health effects information is provided in Table 2. Summary details for contaminant occurrence to date, including comparisons to the PFAS NPDWR MCLs and PFAS co-occurrence, are shown in Table 3, Table 4, and Table 5.

Background

The EPA uses the UCMR program to collect nationally representative data for contaminants that may be present in drinking water but are not currently subject to regulatory standards set under SDWA. This monitoring is used by the agency to understand the frequency and level of occurrence of unregulated contaminants in the nation's PWSs. Every five years, taking into consideration the EPA's Contaminant Candidate List (CCL), the agency develops a new list of UCMR contaminants for monitoring. SDWA, as amended by Section 2021 of America's Water Infrastructure Act of 2018, calls for the EPA to:

- Issue a list of unregulated contaminants to be monitored by certain PWS types[1] every five years.
- Require all large PWSs[1] (*i.e.*, those serving more than 10,000 people) to monitor their water for the contaminants.
- Require all small PWSs[1] serving between 3,300 and 10,000 people to monitor, subject to the availability of EPA appropriations and sufficient laboratory capacity.
- Require a nationally representative sample of small PWSs serving fewer than 3,300 people to monitor.
- Pay for the analysis of UCMR samples from participating PWSs serving 10,000 or fewer.
- Make analytical results available in a National Contaminant Occurrence Database (NCOD) for drinking water.

State and local officials may also use the UCMR data to assess the need for actions to protect public health. When evaluating the UCMR data, one should consider the following:

- UCMR monitoring generates a robust dataset that is representative of national occurrence in drinking water.
    - Once data reporting is complete, the UCMR 5 dataset will also be representative of occurrence at the state and local levels for all PWSs[1] serving ≥3,300 people.
- UCMR results are available after PWSs and the laboratories that support their monitoring have reported results to the EPA (up to four months after the samples are collected). Small PWS results may be available sooner relative to large PWS results since the laboratories contracted by the EPA to analyze small PWS samples are contractually obligated to report results within a shorter timeframe.
- There is information about health effects and treatment techniques to address some of these unregulated contaminants.

Through the Bipartisan Infrastructure Law, the EPA is helping states, Tribes, and especially small, rural, and disadvantaged communities to leverage billions of dollars in funding dedicated to investments in infrastructure solutions. Those investments will allow communities to remove emerging contaminants like PFAS from their drinking water. More information about available funding to assist with implementing PFAS testing and treatment at PWSs, including the Bipartisan Infrastructure Law Drinking Water State Revolving Fund Emerging Contaminant supplemental and the Emerging Contaminants in Small or Disadvantaged Communities Grant Program, can be found on the EPA's website. The EPA's free Water Technical Assistance Programs are also available to support communities to develop plans, build technical, managerial, and financial capacity, and access water infrastructure funding.

[1] UCMR 5 requirements apply to community water systems (CWSs) and non-transient non-community water systems (NTNCWSs). They do not apply to transient non-community water systems (TNCWSs). The use of "PWS" throughout this document refers to CWSs and NTNCWSs participating in UCMR monitoring. For more information on PWS types, visit the agency's website.

Table 1. Contaminants and Methods

Contaminant[1]	CASRN[2]	EPA Method	Contaminant Classification
lithium	7439-93-2	200.7	Metal/Pharmaceutical
perfluorooctanesulfonic acid (PFOS)	1763-23-1	533	PFAS
perfluorooctanoic acid (PFOA)	335-67-1	533	PFAS
hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX chemicals)	13252-13-6	533	PFAS
perfluorohexanesulfonic acid (PFHxS)	355-46-4	533	PFAS
perfluorononanoic acid (PFNA)	375-95-1	533	PFAS
perfluorobutanesulfonic acid (PFBS)	375-73-5	533	PFAS
perfluorobutanoic acid (PFBA)	375-22-4	533	PFAS
perfluorohexanoic acid (PFHxA)	307-24-4	533	PFAS
perfluorodecanoic acid (PFDA)	335-76-2	533	PFAS
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	533	PFAS
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	533	PFAS
1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	533	PFAS
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	533	PFAS
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	533	PFAS
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	533	PFAS
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	533	PFAS
perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	113507-82-7	533	PFAS
perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	533	PFAS
perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	533	PFAS
perfluorododecanoic acid (PFDoA)	307-55-1	533	PFAS
perfluoroheptanesulfonic acid (PFHpS)	375-92-8	533	PFAS
perfluoroheptanoic acid (PFHpA)	375-85-9	533	PFAS
perfluoropentanesulfonic acid (PFPeS)	2706-91-4	533	PFAS
perfluoropentanoic acid (PFPeA)	2706-90-3	533	PFAS
perfluoroundecanoic acid (PFUnA)	2058-94-8	533	PFAS
n-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	537.1	PFAS
n-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	537.1	PFAS
perfluorotetradecanoic acid (PFTA)	376-06-7	537.1	PFAS
perfluorotridecanoic acid (PFTrDA)	72629-94-8	537.1	PFAS

[1] UCMR 5 contaminants are being monitored under the UCMR Assessment Monitoring (AM) design. For more information, refer to the EPA's UCMR 5 website.

[2] CASRN – Chemical Abstracts Service Registry Number

Information About UCMR 5 Results

The purpose of this document is to (1) summarize UCMR 5 results reported to date and (2) provide context around UCMR 5 results in relation to EPA-established UCMR minimum reporting levels (MRLs) and, if available, health-based reference values (*e.g.*, non-regulatory reference concentrations and reference doses [RfDs]) and regulatory values (*e.g.*, MCLs).

The UCMR 5 MRLs are the lowest concentrations that laboratories may report to the EPA during UCMR 5 monitoring. UCMR MRLs are determined using data from multiple laboratories that participate in the EPA's MRL-setting studies and are not associated with contaminant health effects information. The EPA establishes UCMR MRLs to ensure consistency in the quality of the information reported to the agency.

Depending on the available health and toxicological information for a UCMR contaminant, a non-regulatory health-based reference concentration in drinking water may be available. Reference concentrations can be derived from an RfD (*i.e.*, a non-cancer endpoint) or an oral cancer slope factor (CSF) (*i.e.*, a cancer endpoint), if available, and consider additional assumptions about body weight and drinking water intake. Reference concentrations presented in this document do not represent regulatory limits or action levels and should not be interpreted as an indication of future agency actions.

Community water systems (CWSs) required to monitor under UCMR must inform their customers of UCMR results (including the average and range of results) in their annual Consumer Confidence Report (CCR). See 40 CFR 141.153(d)(7) for the CCR regulatory requirements and Section IV of the EPA's guidance Preparing Your Drinking Water Consumer Confidence Report for details on the content of the report. Additional resources are available on the EPA's CCR Compliance Help webpage. Non-transient non-community water systems (NTNCWSs) (*e.g.*, a school that operates its own drinking water system) and CWSs required to monitor under UCMR must inform their customers of the availability of UCMR results through Tier 3 Public Notification (PN). See 40 CFR 141.207 for the PN regulatory requirements and the EPA's PN Compliance Help webpage for guidance. CCR and PN requirements apply to all UCMR results (including results for the six UCMR 5 PFAS that are now subject to the NPDWR) and are separate from the PFAS NPDWR CCR and PN requirements.

The EPA recognizes the high interest in timely access to UCMR results and is committed to publicly posting results on the agency's Occurrence Data webpage approximately quarterly (following large PWS review of their UCMR results and EPA review of small PWS results). The EPA manages the laboratory analyses for small PWSs and will work to communicate their results in a timely manner. Large PWSs wishing to have earlier access to their data should consider making arrangements with their UCMR 5 laboratory for early notification of UCMR results (*i.e.*, before their contracted laboratory posts the results to the UCMR web-based reporting system).

UCMR occurrence data are used to inform the agency's Regulatory Determination process (*i.e.*, the process that addresses potential regulatory actions for unregulated contaminants). States may also establish requirements or levels (regulatory or non-regulatory) for drinking water contaminants. PWSs are responsible for being aware of and complying with their state's requirements, if any.

Available drinking water treatment information for UCMR 5 contaminants can be found in the EPA's Drinking Water Treatability Database. The EPA's PFAS website provides additional information on agency actions to address PFAS contamination, describes current PFAS research, and identifies related tools and resources. The EPA has also published a PFAS Communication Toolkit to help PWSs and community leaders educate the public about PFAS, where they come from, their health risks, how to reduce exposure, and about the final PFAS NPDWR.

Health-Based Reference Values

Table 2 provides health-based reference values (*i.e.*, non-regulatory health-based reference concentrations and RfDs) for each contaminant monitored under UCMR 5, if available. To identify reference values, the EPA applied the following principles:

(1) Reference concentrations and RfDs were compiled from the following publicly available resources:
   a. EPA Technical Support Document for the Final CCL 5 – Contaminant Information Sheets and
   b. EPA Integrated Risk Information System (IRIS) Assessments
   c. U.S. Geological Survey (USGS) Health-Based Screening Levels (HBSLs)

   The above resources are the products (or compilation) of peer-reviewed health assessments. The reference values are subject to change as new health assessments are completed; they are not legally enforceable federal standards.

(2) If health information was available from more than one of the resources listed above, the most recent health information was used.

(3) If both cancer and non-cancer reference concentrations were available from the most recent resource, the lower of the two concentrations was used. Please review the references and footnotes in Table 2 for additional health effects information.

(4) If an RfD (*i.e.*, a non-cancer endpoint) was the basis for the reference concentration, and both chronic and subchronic/short-term exposure values were available from the most recent resource, the lower concentration (associated with the chronic exposure) was used. Please review the references and footnotes in Table 2 for additional health effects information (*e.g.*, additional subchronic or chronic values).

(5) For the contaminants that do not have a reference concentration available from a resource listed above, the RfDs from finalized health assessments are provided in Table 2, if available. If a health assessment is in process, a link to additional information about its status is provided in a footnote.

The EPA considers this a "living document" and will update Table 2 as new health-based information becomes available.

Table 2. UCMR 5 Minimum Reporting Levels (MRLs), Regulatory Levels, and Health-Based Reference Values

Contaminant [Note: to convert to ng/L or parts per trillion (ppt), multiply by 1,000]	UCMR 5 MRL (µg/L)[1]	Regulatory Level (µg/L)	Health-Based Reference Values		References
			Non-Regulatory Reference Concentration (µg/L)	RfD (mg/kg-day)	
lithium	9	-	HRL[2] = 10	subchronic and chronic provisional RfD = 2×10^{-3}	Technical Support Document for the Final CCL 5 - Contaminant Information Sheets
PFOS	0.004	MCL[3] = 0.0040	-	-	2024 Final PFAS NPDWR
PFOA	0.004	MCL[3] = 0.0040	-	-	2024 Final PFAS NPDWR
HFPO-DA (GenX chemicals)	0.005	MCL[3] = 0.01	-	-	2024 Final PFAS NPDWR
PFHxS[4]	0.003	MCL[3] = 0.01	-	-	2024 Final PFAS NPDWR
PFNA[4]	0.004	MCL[3] = 0.01	-	-	2024 Final PFAS NPDWR
PFBS[5]	0.003	-	-	-	2024 Final PFAS NPDWR
PFBA	0.005	-	HBSL[6] = 6	chronic RfD = 1×10^{-3} subchronic RfD = 6×10^{-3}	2024 USGS Health-Based Screening Level
PFHxA	0.003	-	HBSL[6] = 3	subchronic and chronic RfD = 5×10^{-4}	2024 USGS Health-Based Screening Level
PFDA	0.003	-		subchronic and chronic RfD = 2×10^{-9}	2024 IRIS Assessment
11Cl-PF3OudS	0.005	-	-	-	-
8:2 FTS	0.005	-	-	-	-
4:2 FTS	0.003	-	-	-	-

[1] UCMR MRL – EPA-established UCMR Minimum Reporting Level. Based on laboratory capability; not related to contaminant health effects information.

[2] HRL – Health Reference Level calculated as part of the CCL 5 process. See Terms and Definitions. The HRL for lithium is based on the RfD from the following health assessment: Provisional Peer-Reviewed Toxicity Values for Lithium (2008). For more information, see the EPA's Technical Fact Sheet on Lithium in Drinking Water for primacy agencies.

[3] MCL – Maximum Contaminant Level. See Terms and Definitions and the PFAS NPDWR section of this document.

[4] In process/draft EPA Integrated Risk Information System (IRIS) assessments for PFHxS and PFNA.

[5] PFBS has a Health-Based Water Concentration (HBWC) of 2 µg/L associated with the final PFAS NPDWR. PFBS is not regulated individually; it is included in the Hazard Index (HI) calculation when PFBS occurs in a mixture with one or more of HFPO-DA, PFHxS, and PFNA. See Terms and Definitions and the PFAS NPDWR section of this document.

[6] HBSL – USGS Health-Based Screening Level. See Terms and Definitions. The HBSLs are based on the RfDs from the EPA's IRIS Assessments for PFBA and PFHxA.

Contaminant [Note: to convert to ng/L or parts per trillion (ppt), multiply by 1,000]	UCMR 5 MRL (µg/L)[1]	Regulatory Level (µg/L)	Health-Based Reference Values		References
			Non-Regulatory Reference Concentration (µg/L)	RfD (mg/kg-day)	
6:2 FTS	0.005	-	-	-	-
ADONA	0.003	-	-	-	-
9Cl-PF3ONS	0.002	-	-	-	-
NFDHA	0.02	-	-	-	-
PFEESA	0.003	-	-	-	-
PFMPA	0.004	-	-	-	-
PFMBA	0.003	-	-	-	-
PFDoA	0.003	-	-	-	-
PFHpS	0.003	-	-	-	-
PFHpA	0.003	-	-	-	-
PFPeS	0.004	-	-	-	-
PFPeA	0.003	-	-	-	-
PFUnA	0.002	-	-	-	-
NEtFOSAA	0.005	-	-	-	-
NMeFOSAA	0.006	-	-	-	-
PFTA	0.008	-	-	-	-
PFTrDA	0.007	-	-	-	-

Table 3. October 2024 UCMR 5 Data Summary for Unregulated Contaminants[1]

Contaminant	UCMR 5 MRL[2] (µg/L)	Ref Conc[3] (µg/L)	Total number of results	Number of results ≥MRL	Number of results >Ref Conc[4]	% of total results >Ref Conc	Total number of PWSs with results	Number of PWSs with results ≥MRL	Number of PWSs with results >Ref Conc[4]	% of PWSs with results >Ref Conc
lithium	9	10	38,490	10,747	7,478	19.4%	7,211	2,552	1,837	25.5%
PFBA	0.005	6	37,677	3,129	0	0.0%	7,168	1,275	0	0.0%
PFHxA	0.003	3	37,696	3,512	0	0.0%	7,168	1,194	0	0.0%
PFDA	0.003	-	37,705	18	-	-	7,169	8	-	-
11Cl-PF3OUdS	0.005	-	37,705	0	-	-	7,169	0	-	-
8:2 FTS	0.005	-	37,701	6	-	-	7,169	6	-	-
4:2 FTS	0.003	-	37,705	2	-	-	7,169	2	-	-
6:2 FTS	0.005	-	37,691	168	-	-	7,168	121	-	-
ADONA	0.003	-	37,705	4	-	-	7,169	3	-	-
9Cl-PF3ONS	0.002	-	37,681	1	-	-	7,169	1	-	-
NFDHA	0.02	-	37,699	4	-	-	7,169	3	-	-
PFEESA	0.003	-	37,704	0	-	-	7,169	0	-	-
PFMPA	0.004	-	37,705	3	-	-	7,169	2	-	-
PFMBA	0.003	-	37,705	2	-	-	7,169	1	-	-
PFDoA	0.003	-	37,698	3	-	-	7,169	3	-	-
PFHpS	0.003	-	37,705	2	-	-	7,169	2	-	-
PFHpA	0.003	-	37,704	884	-	-	7,168	371	-	-
PFPeS	0.004	-	37,701	70	-	-	7,169	37	-	-
PFPeA	0.003	-	37,688	4,002	-	-	7,168	1,341	-	-
PFUnA	0.002	-	37,697	5	-	-	7,169	4	-	-
NEtFOSAA	0.005	-	38,250	1	-	-	7,204	1	-	-
NMeFOSAA	0.006	-	38,252	0	-	-	7,204	0	-	-
PFTA	0.008	-	38,251	0	-	-	7,204	0	-	-
PFTrDA	0.007	-	38,250	0	-	-	7,204	0	-	-

[1] This data summary represents approximately 55% of total results that the EPA expects to receive by completion of data reporting in 2026. Analytical results from the UCMR program are reported by laboratories and provided by the agency in micrograms/liter (µg/L, or parts per billion). To convert results in µg/L to nanograms/liter (ng/L, or parts per trillion), multiply the value by 1,000. The UCMR results represented by this table are single measurements and do not represent a running annual average (RAA). For information on results to date for the regulated PFAS, see the PFAS NPDWR section of this document. The total number of results and total number of PWSs with results for the regulated PFAS are similar to the other EPA Method 533 PFAS (*i.e.*, approximately 37,700 results from 7,170 PWSs).

[2] UCMR MRL – EPA-established UCMR Minimum Reporting Level. Based on laboratory capability; not related to contaminant health effects information.

[3] Ref Conc – Reference Concentration. Based on contaminant health effects information; non-regulatory and non-enforceable. The EPA's CCL 5 Health Reference Level (HRL) for lithium and the USGS Health-Based Screening Levels (HBSLs) for PFBA and PFHxA. See Terms and Definitions.

[4] The HRL and the HBSLs are expressed with one significant digit; comparison of UCMR results to those levels is therefore based on one significant digit. Results >15 µg/L for lithium round to 20 µg/L; results >6.5 µg/L for PFBA round to 7 µg/L; and results >3.5 µg/L for PFHxA round to 4 µg/L and are identified as above the reference concentrations.

Final PFAS NPDWR

In April 2024, the EPA established legally enforceable standards for five individual PFAS: PFOA, PFOS, PFNA, PFHxS, and HFPO-DA (known as GenX chemicals). The agency's regulatory determination for PFNA, PFHxS, and HFPO-DA is based on their substantial likelihood to occur in PWSs with a frequency and at levels of health concern. The EPA also established an enforceable standard for mixtures containing two or more of PFNA, PFHxS, HFPO-DA, and PFBS. Please refer to the PFAS NPDWR website for more information. **UCMR 5 results for the regulated PFAS do not indicate current compliance or noncompliance with the MCLs.** Compliance with the PFAS regulatory MCLs will be determined by calculating the running annual average (RAA) of quarterly results for each sample point based on compliance monitoring data reported to the primacy agency.

The EPA currently has a partial UCMR 5 dataset, with approximately 4,200 PWSs reporting full sets of results for approximately 10,900 sampling locations (*i.e.*, two sample results for locations with ground water sources or four sample results for locations with surface water sources). Recognizing that the UCMR 5 results have no direct implications for PWS MCL compliance, but that many are interested in comparing UCMR 5 data to the MCLs, the EPA calculated annual averages for the UCMR 5 results where such a calculation was possible. The agency then compared those averages to the NPDWR MCLs. Table 4 presents the UCMR 5 results to date using sampling location averages and the MCLs from the PFAS NPDWR. Approximately 12% of the PWSs in this group had one or more sampling location averages greater than the MCL for an individual PFAS or the HI. Please note: if a particular PWS had averages greater than multiple MCLs, that PWS was counted in this table multiple times (*i.e.*, once in each row for the respective MCLs). If this is not considered by those assessing the data in these rows, it would result in "double counting." For more information on calculating averages for the PFAS MCLs, please refer to Section VIII of the final PFAS NPDWR *Federal Register* notice, 40 CFR 141.903, and the PFAS NPDWR website.

Table 4. October 2024 Comparison of UCMR 5 Average Results and the MCLs for Regulated PFAS

Regulated PFAS	MCL (µg/L)[1]	Total number of locations with a full set of results[2]	Number of locations with an average greater than MCL	% of locations with an average greater than MCL	Total number of PWSs with location(s) with a full set of results	Number of PWSs with average(s) greater than MCL	% of PWSs with average(s) greater than MCL
PFOS	0.0040	10,858	665	6.1%	4,177	394	9.4%
PFOA	0.0040	10,858	581	5.4%	4,178	327	7.8%
HFPO-DA (GenX chemicals)	0.01	10,862	1	0.01%	4,179	1	0.02%
PFHxS	0.01	10,858	45	0.4%	4,178	34	0.8%
PFNA	0.01	10,862	3	0.03%	4,179	3	0.1%
Hazard Index (HI) (HFPO-DA, PFHxS, PFNA, PFBS)	1 (unitless)	10,852	48	0.4%	4,174	38	0.9%
Total number of unique PWSs with one or more averages greater than MCL = 498 of 4,180 (12%)							

[1] MCLs for PFOA and PFOS are expressed with two significant digits; MCLs for HFPO-DA, PFHxS, PFNA, and the HI are expressed with one significant digit. Comparison of UCMR 5 averages to MCLs is based on the corresponding number of significant digits. An average is counted as greater than the MCL for PFOS or PFOA if it is ≥0.00405 µg/L. An average is counted as greater than the MCL for HFPO-DA, PFHxS, or PFNA if it is ≥0.015 µg/L. An average is counted as greater than the HI MCL if it is ≥1.5 and at least two PFAS included in the average are measured at or above the UCMR 5 MRL.

[2] For UCMR 5 monitoring, PWSs may have multiple sampling locations, for which there are either two or four sample events over a period of 12 months (for locations with ground water or surface water sources, respectively). Sampling locations were only considered in the comparison to each MCL if they had a corresponding full set of UCMR 5 results (*i.e.*, two or four results). Note: compliance with the PFAS NPDWR MCLs will be determined by calculating the running annual average of four quarterly results for each sample point. When calculating annual averages using UCMR 5 results for comparison with the MCLs, the average for locations with ground water sources is based on two semi-annual results and the average for locations with surface water sources is based on four quarterly results.

UCMR 5 PFAS Co-occurrence in Drinking Water

The EPA's examination of drinking water data shows that different PFAS can often be found together and in varying combinations as mixtures (for additional discussion, please see the EPA's PFAS Occurrence and Contaminant Background Support Document). Additionally, decades of research show mixtures of different chemicals can have additive health effects, even if the individual chemicals are each present at lower levels. The EPA established drinking water standards for certain PFAS to provide health protection against these individual and co-occurring PFAS in PWSs. In cases where the PFAS included in the final PFAS NPDWR occur at concentrations above their respective regulatory standards, there is also an increased probability of co-occurrence of additional unregulated PFAS. As discussed in the final PFAS NPDWR, the EPA expects that compliance actions taken under the final rule will remove unregulated co-occurring PFAS contaminants and provide additional public health protection and benefits because the best available drinking water treatment technologies have been demonstrated to co-remove other PFAS and non-PFAS contaminants that may have adverse health effects.

Table 5 provides a general assessment of UCMR 5 PFAS co-occurrence by location (*i.e.*, considering all available PFAS results to date for a sampling location). For UCMR 5 monitoring, PWSs may have multiple sampling locations. Each sample event includes sample collection for 29 PFAS. This table presents the count of sampling locations for which "N or more" unique PFAS were found at or above the UCMR 5 MRL, where N is 1-13 in Table 5. The table stops at 13 (and not 29) because 13 was the maximum number of unique PFAS found to co-occur at a sampling location (*i.e.*, same PWS, facility, and sample point). Results were included in the location-level counts regardless of whether results were available for all 29 PFAS for a sampling location.

Table 5. October 2024 UCMR 5 PFAS Co-occurrence Counts by Sampling Location

Number (N) of Unique PFAS ≥UCMR 5 MRL[1]	1	2	3	4	5	6	7	8	9	10	11	12	13
Number of Sampling Locations with N or More PFAS[2]	4,281	2,797	2,092	1,543	1,085	703	441	217	61	13	5	1	1
Number of Unique PWSs Associated with Locations[3]	*3,284*	*2,173*	*1,641*	*1,209*	*838*	*542*	*332*	*163*	*50*	*13*	*5*	*1*	*1*

[1] Represents the number (N) "or more" count of unique PFAS found at or above their UCMR 5 Minimum Reporting Level (MRL). UCMR MRLs are based on laboratory capability and are not related to contaminant health effects information.

[2] Represents the number of individual sampling locations with the corresponding number of unique PFAS found across all available results to date for the location. For example, 2,092 sampling locations each had three or more different PFAS occur; these 2,092 sampling locations were from 1,641 unique PWSs.

[3] Represents the number of unique PWSs associated with the number of sampling locations for each count. For example, 1,641 different PWSs each had at least one sampling location with three or more different PFAS occur.

Terms and Definitions

a) **HBSL** – USGS non-cancer Health-Based Screening Level. HBSLs are non-enforceable water quality benchmark concentrations of contaminants in water developed using the latest EPA methods for establishing drinking water guidelines and the most recent EPA peer-reviewed toxicity information. Non-cancer HBSLs are maximum concentrations that are not expected to cause adverse non-carcinogenic health effects over a lifetime of exposure.

b) **HBWC** – Health-Based Water Concentration. The level below which there are no known or anticipated adverse health effects over a lifetime of exposure, including sensitive populations and life stages, and allows for an adequate margin of safety.

c) **HI** – Hazard Index. A long-established approach that the EPA regularly uses to understand health risk from a chemical mixture (*i.e.*, exposure to multiple chemicals). The HI is made up of a sum of fractions. Each fraction compares the level of each PFAS measured in the water to the HBWC. The HI is the sum of component hazard quotients, which are calculated by dividing the measured PFAS component contaminant concentration in water [*e.g.*, expressed as parts per trillion (ppt) or nanograms per liter (ng/L)] by the associated HBWC expressed in the same units as the measured concentration (*e.g.*, ppt or ng/L). The HI MCL for the PFAS NPDWR is set at 1 (unitless).

d) **HRL** – Health Reference Level. Derived during the EPA's Contaminant Candidate List (CCL) process for screening purposes. HRLs are used in the EPA's Regulatory Determination process as risk-derived concentrations against which to evaluate occurrence data to determine if contaminants occur at levels of public health concern. HRLs are not final determinations about the level of a contaminant in drinking water that is necessary to protect any particular population and, in some cases, are derived prior to development of a complete exposure assessment using the best available data. HRLs are not legally enforceable federal standards. To determine the HRL for a chemical, the agency considers adverse health effects that may pose a greater risk to specific life stages and other sensitive groups which represent a meaningful portion of the population. For more information on HRL derivation, please see the Technical Support Document for the Final CCL 5 – Contaminant Information Sheets.

e) **MCL** – Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

f) **MCLG** – Maximum Contaminant Level Goal. The level of a contaminant in drinking water at which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.

g) **Ref Conc** – Reference Concentration. Based on publicly available health information found in the following resources: EPA CCL 5 Contaminant Information Sheets [*i.e.*, Health Reference Levels (HRLs)], USGS Health-Based Screening Levels (HBSLs). Reference concentrations are derived from peer-reviewed health assessments published by the EPA or other governmental agencies. They are not legally enforceable federal standards and are subject to change as new health assessments are completed. Depending on available health effects information, a reference concentration in drinking water can be derived from a reference dose (RfD) (*i.e.*, a non-cancer endpoint) or a cancer slope factor (CSF) (*i.e.*, a cancer endpoint), and considers additional assumptions about body weight and drinking water intake.

h) **RfD** – Oral Reference Dose. A non-cancer estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It is typically derived by dividing a point-of-departure (POD) from a selected dose-response study (*e.g.*, no-observed-adverse-effect level [NOAEL], lowest-observed-adverse-effect level [LOAEL], benchmark dose [BMD]) by the uncertainty factors (UFs) applied to reflect limitations of the data used. Chronic RfDs are typically derived from animal toxicological studies with an exposure duration of months to years, representing a lifetime exposure in humans. Subchronic RfDs are typically derived from animal toxicological studies with an exposure duration of 31 to 90 days, representing a less than lifetime exposure in humans (up to 10% of average lifespan). Visit the EPA's IRIS website for more information about RfD derivation.

i) **UCMR MRL** – EPA-established UCMR Minimum Reporting Level. The lowest concentration that laboratories may report to the EPA during UCMR 5 monitoring. MRLs are not associated with health effects information. More specifically, an MRL is the quantitation limit for a contaminant that is considered achievable, with 95% confidence, by at least 75% of laboratories nationwide using a specified analytical method (recognizing that individual laboratories may be able to measure at lower levels). **[Note: The Agency for Toxic Substances and Disease Registry (ATSDR) uses the term "MRL" for a different purpose (*i.e.*, to describe "Minimal Risk Level"). The UCMR term and the ATSDR term have no relationship to each other.]**

Data Considerations

The UCMR 5 analytical results are publicly available through the UCMR 5 Data Finder and as text files.

The UCMR 5 Data Finder allows people to easily search for, summarize, and download the available UCMR 5 analytical results. Results can be filtered using multiple data fields, including PWS, PWS size, state, EPA Region, contaminant, source water type, results at or above UCMR 5 MRLs, and results above health-based reference concentrations (data definitions provided in Table 6). The UCMR 5 Data Finder can be used by federal, state, and local agencies as well as the public to easily locate and retrieve specific results and assist with answering questions regarding UCMR 5 monitoring. Selected results can be viewed online or downloaded as a Microsoft Excel file (.xlsx). A video demonstration of the UCMR 5 Data Finder is available here.

For those interested in large-scale data processing using statistical or data analysis software, the EPA recommends using the occurrence data text files containing the UCMR 5 analytical results as well as additional information reporting during monitoring. Data are provided in tab delimited text files (.txt) (see below for descriptions), with field names included in the first row of each file and no text qualifier. The EPA recommends importing all ID fields into your choice of software as text since some of the IDs can otherwise be misinterpreted as long integer field types when they contain alpha characters.

- To download the occurrence data text files (data definitions provided in Table 7), select one of the following zip (.zip) files from UCMR 5 (2023-2025) Occurrence Data:
    - **UCMR 5 Occurrence Data Text Files** to view all the analytical results to date (*i.e.*, results for all contaminants reported by all PWSs). The **UCMR5_All.txt** file will likely become too large to be imported into Excel once the majority of the UCMR 5 results are reported, in which case you can try other applications (*e.g.*, Microsoft Access) or import a subset of the data as described below.
    - **UCMR 5 Occurrence Data Text Files by State** to view all the analytical results to date, organized by Tribes and states. Within that zip file, one text file (**UCMR5_All_Tribes_AK_LA.txt**) will have all results for Tribal PWSs and for the states starting alphabetically with A through L; another file (**UCMR5_All_MA_WY.txt**) will have all results for the states starting alphabetically with M through W. The results are organized this way to address file size limitations and streamline data management.
    - **UCMR 5 Occurrence Data Text Files by Method Classification** to view all the analytical results to date, organized by analytical method. Within that zip file, you will find individual text files with results organized by method (*e.g.*, a Method 200.7 file with results for lithium).
- The following text files for **additional data elements** (*i.e.*, information beyond analytical results for the 30 UCMR 5 contaminants) are also contained in each of the above zip files:
    - **UCMR5_ZIPCodes.txt** – U.S. Postal Service ZIP Code(s) for all areas served by a PWS (data definitions provided in Table 8)
    - **UCMR5_AddtlDataElem.txt** – Disinfectant Type, Treatment Information, Lithium Occurrence, Lithium Treatment, PFAS Occurrence, PFAS Treatment, Potential PFAS Sources, Potential PFAS Sources Detail (data definitions provided in Table 9)
        - The EPA is not asking PWSs for a formal, in-depth, source water evaluation for potential PFAS sources and recognizes that some PWSs will have more complete information than others. The agency's PFAS Analytic Tools can serve as a starting point to answer this question and are accessible here. UCMR 5 data will be updated in the PFAS Analytic Tools soon after each quarterly data release.

For step-by-step details on using the UCMR 5 Data Finder and occurrence data text files, please refer to the document Instructions for Accessing UCMR Results. Additional reference material, including common questions and answers on accessing and understanding the UCMR 5 data, is available on the UCMR 5 website.

Table 6. Data Definitions for the UCMR 5 Data Finder

Field Name	Definition
PWS ID	Public Water System (PWS) Identification Code. The code used to identify each PWS. The code begins with the standard 2-character postal state abbreviation or Region code for Tribes; the remaining 7 numbers are unique to each PWS in the state. Utah PWS IDs begin with 4 letters (UTAH) followed by 5 numbers
PWS Name	Name of the PWS
Contaminant	The UCMR 5 contaminant analyzed
Result (µg/L)	Numeric value of the analytical result in µg/L for the contaminant. Results less than the UCMR 5 MRL are indicated by **<MRL**
Health-Based Ref Conc (µg/L)	Non-regulatory Health-Based Reference Concentration in µg/L for the contaminant, if available (see Terms and Definitions)
Collection Date	Date of sample collection (month, day, year)
Facility ID	Identification code for each applicable facility associated with water treatment or delivery at the PWS
Facility Name	Name of the facility at the PWS
Sample Point ID	Identification code for each sample point location at the PWS
Sample Point Name	Name of the sample point at the PWS
Sample Event Code	Identification code for each sample event**:** **SE1**, **SE2**, **SE3**, **SE4**
Sample ID	Identification code for each sample
Method ID	Identification code of the analytical method
PWS Size	Size category of the PWS for UCMR 5, based on retail population as indicated by the Safe Drinking Water Information System (Federal) (SDWIS/FED) as of February 1, 2021: **S** (≤ 10,000), **L** (> 10,000)
Facility Water Type	Source of water at the facility: **SW** (surface water), **GW** (ground water), **GU** (ground water under the direct influence of surface water), **MX** (any combination of SW, GW, and GU)
Sample Point Type	Sampling Point Type Code: **EP** (entry point to the distribution system)
EPA Region	EPA Region (states): **Region 1** (CT, ME, MA, NH, RI, VT), **Region 2** (NJ, NY, PR [Puerto Rico], VI [Virgin Islands]), **Region 3** (DE, DC, MD, PA, VA, WV), **Region 4** (AL, FL, GA, KY, MS, NC, SC, TN), **Region 5** (IL, IN, MI, MN, OH, WI), **Region 6** (AR, LA, NM, OK, TX), **Region 7** (IA, KS, MO, NE), **Region 8** (CO, MT, ND, SD, UT, WY), **Region 9** (AZ, CA, HI, NV, AS [American Samoa], GU [Guam], MP [Northern Marianas Islands], NN [Navajo Nation]), **Region 10** (AK, ID, OR, WA)
State	State abbreviation. Tribal PWSs without primacy are attributed to an EPA Region (01, 02, 03, 04, 05, 06, 07, 08, 09, 10)
UCMR Minimum Reporting Level (MRL, µg/L)	Minimum Reporting Level defined by UCMR 5 in µg/L for the contaminant. Based on laboratory capability; not related to contaminant health effects information (see Terms and Definitions)

Table 7. Data Definitions for Text Files: UCMR5_All, UCMR5_All_Tribes_AK_LA, UCMR5_All_MA_WY, and UCMR5_*MethodNumber*

Field Name	Definition
PWSID	Public Water System (PWS) Identification Code. The code used to identify each PWS. The code begins with the standard 2-character postal state abbreviation or Region code for Tribes; the remaining 7 numbers are unique to each PWS in the state. Utah PWS IDs begin with 4 letters (UTAH) followed by 5 numbers
PWSName	Name of the PWS
Size	Size category of the PWS for UCMR 5, based on retail population as indicated by the Safe Drinking Water Information System (Federal) (SDWIS/FED) as of February 1, 2021: **S** (≤ 10,000), **L** (> 10,000)
FacilityID	Identification code for each applicable facility associated with water treatment or delivery at the PWS
FacilityName	Name of the facility at the PWS
FacilityWaterType	Source of water at the facility: **SW** (surface water), **GW** (ground water), **GU** (ground water under the direct influence of surface water), **MX** (any combination of SW, GW, and GU)
SamplePointID	Identification code for each sample point location at the PWS
SamplePointName	Name of the sample point at the PWS
SamplePointType	Sampling Point Type Code: **EP** (entry point to the distribution system)
AssociatedFacilityID	Null for UCMR 5
AssociatedSamplePointID	Null for UCMR 5
CollectionDate	Date of sample collection (month, day, year)
SampleID	Identification code for each sample
Contaminant	The UCMR 5 contaminant analyzed
MRL	Minimum Reporting Level (MRL) defined by UCMR 5 in µg/L for the contaminant. Based on laboratory capability; not related to contaminant health effects information (see Terms and Definitions)
Units	Units of the UCMR 5 MRL and analytical results: **µg/L**
MethodID	Identification code of the analytical method
AnalyticalResultsSign	Sign indicating whether the analytical result is less than (**<**) the UCMR 5 MRL or equal to (**=**) a numeric value at or above the UCMR 5 MRL
AnalyticalResultValue	Numeric value of the analytical result in µg/L for the contaminants. Null (or blank) values represent results less than the UCMR 5 MRL
SampleEventCode	Identification code for each sample event**:** **SE1**, **SE2**, **SE3**, **SE4**
MonitoringRequirement	**AM** (Assessment Monitoring)
Region	EPA Region (states): **1** (CT, ME, MA, NH, RI, VT), **2** (NJ, NY, PR [Puerto Rico], VI [Virgin Islands]), **3** (DE, DC, MD, PA, VA, WV), **4** (AL, FL, GA, KY, MS, NC, SC, TN), **5** (IL, IN, MI, MN, OH, WI), **6** (AR, LA, NM, OK, TX), **7** (IA, KS, MO, NE), **8** (CO, MT, ND, SD, UT, WY), **9** (AZ, CA, HI, NV, AS [American Samoa], GU [Guam], MP [Northern Marianas Islands], NN [Navajo Nation]), **10** (AK, ID, OR, WA)
State	State abbreviation. Tribal PWSs without primacy are attributed to an EPA Region (01, 02, 03, 04, 05, 06, 07, 08, 09, 10)
UCMR1SampleType	Null for UCMR 5

Table 8. Data Definitions for Text File: UCMR5_ZIPCodes

Field Name	Definition
ZIPCODE	U.S. Postal Service ZIP Code(s) for all areas served by a PWS. This is entered by the PWS

Table 9. Data Definitions for Text File: UCMR5_AddtlDataElem

Additional Data Element	Definition and Response Options
DisinfectantType	All of the disinfectants/oxidants that have been added prior to and at the entry point to the distribution system. Please select ALL that apply. **PEMB** = permanganate, **HPXB** = hydrogen peroxide, **CLGA** = gaseous chlorine, **CLOF** = offsite generated hypochlorite (stored as a liquid form), **CLON** = onsite generated hypochlorite, **CAGC** = chloramine (formed with gaseous chlorine), **CAOF** = chloramine (formed with offsite hypochlorite), **CAON** = chloramine (formed with onsite hypochlorite), **CLDB** = chlorine dioxide, **OZON** = ozone, **ULVL** = ultraviolet light, **OTHD** = other types of disinfectant/oxidant, **NODU** = no disinfectant/oxidant used
TreatmentInformation	Treatment information associated with the sample point. Please select ALL that apply. **CON** = conventional (non-softening, consisting of at least coagulation/sedimentation basins and filtration), **SFN** = softening, **RBF** = river bank filtration, **PSD** = pre-sedimentation, **INF** = in-line filtration, **DFL** = direct filtration, **SSF** = slow sand filtration, **BIO** = biological filtration (operated with an intention of maintaining biological activity within filter), **UTR** = unfiltered treatment for surface water source, **GWD** = ground water system with disinfection only, **PAC** = application of powder activated carbon, **GAC** = granular activated carbon adsorption (not part of filters in CON, SFN, INF, DFL, or SSF), **AIR** = air stripping (packed towers, diffused gas contactors), **POB** = pre-oxidation with chlorine (applied before coagulation for CON or SFN plants or before filtration for other filtration plants), **MFL** = membrane filtration, **IEX** = ionic exchange, **DAF** = dissolved air floatation, **CWL** = clear well/finished water storage without aeration, **CWA** = clear well/finished water storage with aeration, **ADS** = aeration in distribution system (localized treatment), **OTH** = other types of treatment, **NTU** = no treatment used, **DKN** = do not know
LithiumOccurrence	A yes or no answer provided by the PWS for each entry point to the distribution system. Question: Have you tested for the contaminant in your drinking water in the past? **YES** = If yes, did you modify your treatment and if so, what types of treatment did you implement? (see **LithiumTreatment**); **NO** = have never tested for the contaminant; **DK** = do not know
LithiumTreatment	If yes, select ALL that apply: **PAC** = application of powder activated carbon, **GAC** = granular activated carbon adsorption (not part of filters in CON, SFN, INF, DFL, or SSF), **IEX** = ionic exchange, **NRO** = nanofiltration and reverse osmosis, **OZN** = ozone, **BAC** = biologically active carbon, **MFL** = membrane filtration, **UVL** = ultraviolet light, **OTH** = other, **NMT** = not modified after testing
PFASOccurrence	A yes or no answer provided by the PWS for each entry point to the distribution system. Question: Have you tested for the contaminant in your drinking water in the past? **YES** = If yes, did you modify your treatment and if so, what types of treatment did you implement? (see **PFASTreatment**); **NO** = have never tested for the contaminant; **DK** = do not know
PFASTreatment	If yes, select ALL that apply: **PAC** = application of powder activated carbon, **GAC** = granular activated carbon adsorption (not part of filters in CON, SFN, INF, DFL, or SSF), **IEX** = ionic exchange, **NRO** = nanofiltration and reverse osmosis, **OZN** = ozone, **BAC** = biologically active carbon, **MFL** = membrane filtration, **UVL** = ultraviolet light, **OTH** = other, **NMT** = not modified after testing
PotentialPFASSources	A yes or no answer provided by the PWS for each entry point to the distribution system. Question: Are you aware of any potential current and/or historical sources of PFAS that may have impacted the drinking water sources at your water system? **YES** = If yes, select ALL that apply (see **PotentialPFASSourcesDetail**); **NO** = not aware of any potential current and/or historical sources; **DK** = do not know
PotentialPFASSourcesDetail	If yes, select ALL that apply: **MB** = military base, **FT** = firefighting training school, **AO** = airport operations, **CW** = car wash or industrial launderers, **PS** = public safety activities (*e.g.,* fire and rescue services), **WM** = waste management, **HW** = hazardous waste collection, treatment, and disposal, **UW** = underground injection well, **SC** = solid waste collection, combustors, incinerators, **MF** = manufacturing, **FP** = food packaging, **TA** = textile and apparel (*e.g.,* stain- and water-resistant, fiber/thread, carpet, house furnishings, leather), **PP** = paper, **CC** = chemical, **PR** = plastics and rubber products, **MM** = machinery, **CE** = computer and electronic products, **FM** = fabricated metal products (*e.g.*, nonstick cookware), **PC** = petroleum and coal products, **FF** = furniture, **OG** = oil and gas production, **UT** = utilities (*e.g.,* sewage treatment facilities), **CT** = construction (*e.g.,* wood floor finishing, electrostatic painting), **OT** = other