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PFAS and Drinking Water: Selected EPA and Congressional Actions

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SUMMARY

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Elena H. Humphreys
Analyst in Environmental Policy

PFAS and Drinking Water: Selected EPA and Congressional Actions

Per- and polyfluoroalkyl substances (PFAS) are fluorinated chemicals that have been used in an array of commercial, industrial, and U.S. military applications for decades. Some of the more common applications include nonstick coatings, food wrappers, waterproof materials, and fire suppressants. Detections of some PFAS in drinking water supplies and uncertainty about potential health effects associated with exposure to particular PFAS above certain concentrations have increased calls for the U.S. Environmental Protection Agency (EPA) to control these substances in public water supplies. For those few PFAS for which scientific information is available, animal studies suggest that exposure to particular substances above certain levels may be linked to various adverse health effects, including developmental effects; changes in liver, immune, and thyroid function; and increased risk of some cancers. In 2009, EPA listed certain PFAS for formal evaluation under the Safe Drinking Water Act (SDWA) to determine whether regulations may be warranted. In 2016, EPA issued nonenforceable lifetime health advisory levels for two PFAS—perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in drinking water at 70 parts per trillion (ppt), separately or combined. In March 2021, EPA made a determination to issue drinking water regulations for PFOA and PFOS. In 2022, EPA issued revised interim lifetime health advisory levels for PFOA (i.e., 0.004 ppt) and PFOS (i.e., 0.02 ppt), as well as finalized lifetime health advisory levels for hexafluoropropylene oxide dimer acid and its ammonium salt (together referred to as "GenX chemicals") at 10 ppt and perfluorobutane sulfonic acid and its related compound potassium perfluorobutane sulfonate (together referred to as "PFBS") at 2,000 ppt. Among other actions, EPA issued a PFAS Action Plan, formed the EPA Council on PFAS to better understand the potential risks of PFAS, and issued a revised plan, a "PFAS Strategic Roadmap," which further identifies EPA planned actions using several statutory authorities.

EPA's determination to issue drinking water regulations for PFOA and PFOS has increased congressional attention to the SDWA regulation development process. The act requires a risk- and science-based process for evaluating and regulating contaminants in drinking water. The evaluation process includes identifying contaminants of potential concern, assessing health risks, collecting occurrence data (and developing reliable analytical methods necessary to do so), and making determinations as to whether a national drinking water regulation is warranted for a contaminant. Under SDWA, EPA is required to propose a regulation within 24 months of finalizing a regulatory determination (e.g., by March 2023 for PFOA and PFOS), and finalize the regulation within 18 months of publishing the proposal. The PFAS Strategic Roadmap states that the agency plans to propose a PFOA and PFOS drinking water regulation by fall 2022, and finalize by fall 2023.

PFAS include thousands of diverse chemicals, and setting drinking water standards for individual or groups of PFAS raises technical and scientific challenges. For example, SDWA requires EPA to make determinations and set standards using the best available peer-reviewed science and occurrence data. However, data on the potential health effects and occurrence are available for few of these substances. Contamination of drinking water by various PFAS can pose challenges for states and communities, and some have called for EPA to establish enforceable standards for these substances. State drinking water regulators have noted that many states may face significant obstacles in setting their own standards.

SDWA also authorizes EPA to take actions it deems necessary to abate an imminent and substantial endangerment to public health from a contaminant present in or likely to enter a public water system or an underground source of drinking water. Actions may include issuing orders requiring persons who caused or contributed to the endangerment to provide alternative water supplies or to treat contamination. Since 2002, EPA has used this authority to require responses to PFOA and/or PFOS contamination of water supplies associated with four sites, including three Department of Defense (DOD) sites.

In recent Congresses, numerous bills would address PFAS through various authorities and agencies. The 117th Congress has taken up legislation to address PFAS in a range of contexts. On July 21, 2021, the House passed H.R. 2467, the PFAS Action Act of 2021. As passed, H.R. 2467 would direct EPA to promulgate PFAS drinking water regulations on an accelerated timeline. Additionally, the Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58), enacted in November 2021, provides emergency appropriations for a grant program for public water systems to address PFAS and other emerging contaminants that was authorized by the National Defense Authorization Act (NDAA) for FY2020 (P.L. 116-92). The NDAA for FY2020 included multiple PFAS provisions regarding primarily the DOD, but several involve EPA and other federal agencies. Among the EPA provisions, Title LXXIII, Subtitle A, directs EPA to require public water systems to conduct additional monitoring for PFAS. Title LXXIII, Subtitle A, also authorizes the aforementioned grant program for public water systems to address PFAS and other emerging contaminants.

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Introduction

The detection of certain per- and polyfluoroalkyl substances (PFAS) in some public water supplies has generated public concern and increased congressional attention to the U.S. Environmental Protection Agency's (EPA's) efforts to address these substances. Over the past decade, EPA has been evaluating several PFAS under the Safe Drinking Water Act (SDWA) to determine whether national drinking water regulations may be warranted. Using SDWA authorities, EPA issued nonenforceable health advisories for two PFAS—perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)—in drinking water in 2016.[1] In March 2021, EPA made a determination to issue drinking water regulations for PFOA and PFOS.

PFAS are a large, diverse group of fluorinated compounds, some of which have been used for decades in a wide array of commercial, industrial, and U.S. military applications.[2] Since the 1940s, more than 1,200 PFAS compounds have been used in commerce, and about 600 are still in use today.[3] The chemical characteristics of PFAS have led to the widespread use of these substances for beneficial purposes (such as firefighting) and in the processing and manufacture of many commercial products, such as nonstick cookware, food wrapper coatings, stain-resistant carpets, waterproof clothing, and food containers.

The two PFAS most frequently detected in water supplies are PFOA and PFOS. Since 2002, U.S. manufacturers have phased out the production and most uses of PFOS.[4] In coordination with EPA, manufacturers completed the phase-out of PFOA production by 2015.[5] EPA reports that food and consumer products represent a large portion of exposure to PFOA and PFOS, while drinking water can be an additional source in the relatively small percentage of communities with contaminated water supplies.[6]

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[1] In May 2016, EPA established Lifetime Health Advisory levels for PFOA and PFOS at 70 parts per trillion (ppt), separately or combined. These nonenforceable levels are expected to protect the most sensitive subpopulations (e.g., nursing infants), with a margin of protection, over a lifetime of exposure. Health advisories are nonregulatory and are intended to help states, water suppliers, and others address contaminants for which federal (or state) drinking water standards have not been established.

[2] These chemical compounds consist of a chain of carbon atoms generally attached to varying numbers of fluorine atoms. Fully fluorinated chemicals are referred to as *perfluoroalkyl substances*, while partially fluorinated chemicals are referred to as *polyfluoroalkyl substances*. Among potentially thousands of PFAS, differences in the length of the carbon chain, number of fluorine atoms, and other structural parts of the PFAS suggest that there may also be differences in terms of their properties, uses, interactions with other chemicals in the environment, and health effects in humans. More information regarding the chemical and physical properties of certain PFAS are available in Chapter 4 of Agency of Toxic Substances and Disease Registry, *Toxicological Profile for Perfluoroalkyls*, May 2021, https://www.atsdr.cdc.gov/ToxProfiles/tp200.pdf.

[3] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, February 2019, p. 12, https://www.epa.gov/pfas/epas-pfas-action-plan.

[4] EPA, "Perfluoroalkyl Sulfonates; Significant New Use Rule," 67 *Federal Register* 11007, March 11, 2002.

[5] EPA initiated the 2010/2015 PFOA stewardship program in January 2006 (EPA-HQ-OPPT-2006-0621). EPA invited the eight companies manufacturing PFOA and associated chemicals to reduce their PFOA product content and emission by 95% by 2010 and eliminate their PFOA emissions and product content by 2015. EPA reported that all companies met the stewardship program's goals.

[6] EPA, *Health Effects Support Document for Perfluorooctane Sulfonate (PFOS)*, May 2016; EPA, *Health Effects Support Document for Perfluorooctanoic Acid (PFOA)*, May 2016; and EPA, *PFOA & PFOS Drinking Water Health Advisories, Fact Sheet*, November 2016, p. 1. EPA required roughly 5,000 water systems (that serve approximately 82% of U.S. population) to monitor for six PFAS—including PFOA and PFOS—between January 2013 and December 2015. According to EPA, 63 water systems (1.3%) serving an estimated 5.5 million individuals detected PFOA and/or PFOS at levels above EPA's health advisory level of 70 ppt (separately or combined). Monitoring results for individual water systems are available at https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule.

Among the thousands of different PFAS, few have sufficient health effects studies for determining a threshold below which adverse effects are not expected to occur. Most studies of potential health effects of PFAS have focused on PFOA and PFOS because of their predominant historical use. For those PFAS for which scientific information is available, animal studies suggest that exposure to particular substances above certain levels may be linked to various health effects, including developmental effects; changes in liver, immune, and thyroid function; and increased risk of some cancers.[7] A discussion of these studies and their results is beyond the scope of this report.

In 2016, EPA reported that public water systems in 29 states had detected at least one PFAS in their water supplies.[8] In total, 63 public water systems serving approximately 5.5 million people reported detections of PFOA and PFOS (separately or combined) above EPA's 2016 health advisory level of 70 parts per trillion (ppt).[9] EPA has reported that PFAS contamination of drinking water "is typically localized and associated with a specific facility."[10] According to the Agency for Toxic Substances and Disease Registry, PFAS may have been released to surface or ground water from manufacturing sites, industrial use, use and disposal of PFAS-containing consumer products (e.g., unlined landfills), fire/crash training areas, wastewater treatment facilities, and the spreading of contaminated biosolids.[11] A discussion of PFAS use, including at U.S. military installations, and PFAS disposal is not included in this report.

Uncertainty about potential health effects that may be associated with exposure to specific PFAS above particular concentrations—combined with the absence of a federal health-based drinking water standard—has posed challenges and created uncertainty for states, water suppliers and their customers, homeowners using private wells, and others regarding treatment or other potential responses.[12] State drinking water regulators and others have called for greater federal leadership to address these substances through several federal laws and, specifically, have urged EPA to set federal drinking water standards for one or more PFAS under SDWA.[13] Representatives of public water systems have supported EPA's commitment to follow the statutory process for regulating contaminants in drinking water, which prioritizes regulating those that occur at levels and frequency of public health concern.[14]

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[7] EPA, *Health Effects Support Document for Perfluorooctane Sulfonate (PFOS)*, May 2016; EPA, Health Effects Support Document for Perfluorooctanoic Acid (PFOA), May 2016.

[8] Monitoring results for individual water systems are available at EPA, "Third Unregulated Contaminant Monitoring Rule," https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule.

[9] Email communication with EPA, May 30, 2019. This health advisory level is expected to be protective of sensitive subpopulations, with a margin of protection, assuming daily ingestion at this concentration over a lifetime (70 years).

[10] EPA, *PFOA & PFOS Drinking Water Health Advisories, Fact Sheet*, November 2016, p. 1.

[11] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Perfluoroalkyls, May 2021*, https://www.atsdr.cdc.gov/ToxProfiles/tp200.pdf.

[12] See, for example, testimony of Tracy Mehan for the American Water Works Association before the Senate Committee on Environment and Public Works, hearing on *Examining Legislation to Address the Risks Associated with Per- and Polyfluoroalkyl Substances (PFAS)*, May 22, 2019, https://www.epw.senate.gov/public/index.cfm/2019/5/examining-legislation-to-address-the-risks-associated-with-per-and-polyfluoroalkyl-substances-pfas.

[13] See, for example, Association of State Drinking Water Administrators, comment letter to EPA on PFAS National Leadership Summit and Engagement, July 20, 2018, https://www.asdwa.org/pfas/.

[14] See, for example, testimony of Tracy Mehan for the American Water Works Association before the Senate Committee on Environment and Public Works, hearing on *Examining Legislation to Address the Risks Associated with Per- and Polyfluoroalkyl Substances (PFAS)*, May 22, 2019, https://www.epw.senate.gov/public/index.cfm/2019/5/examining-legislation-to-address-the-risks-associated-with-per-and-polyfluoroalkyl-substances-pfas.

SDWA provides EPA with several authorities to address emerging contaminants in public water supplies and drinking water sources. These include the authority to (1) issue health advisories, (2) regulate contaminants in water provided by public water systems, and (3) issue enforcement orders in certain circumstances.[15] For more than a decade, EPA has been using SDWA authorities to evaluate several PFAS—particularly PFOA and PFOS—to determine whether national drinking water regulations may be warranted.[16] To date, EPA has not promulgated drinking water regulations for any PFAS but has taken a number of related actions.

In February 2019, EPA issued a PFAS Action Plan, which identifies and discusses the agency's current and proposed efforts to address PFAS through several statutory authorities, including SDWA.[17] These actions range from potential regulatory actions to public outreach on PFAS. Many of these actions support EPA's evaluation of various PFAS for regulation under SDWA. These include research and development of analytical methods needed to accurately measure substances in drinking water, development of additional toxicity information to increase understanding of potential health risks associated with exposures to different PFAS, and research on drinking water treatment effectiveness and costs for individual or groups of PFAS. EPA also plans to generate occurrence data for more PFAS to determine their frequencies and concentrations in public water supplies. Further, EPA is working with federal, state, and tribal partners to develop risk communication materials on PFAS and plans to develop an interactive map on potential PFAS sources and occurrence. **Table A-1** includes EPA's selected actions and associated timelines relevant to addressing PFAS in drinking water.

In April 2021, EPA announced the formation of the EPA Council on PFAS to build on the agency's ongoing work, as outlined in the PFAS Action Plan, to better understand the potential risks of PFAS.[18] As outlined in the announcement memorandum, the council is tasked with coordinating EPA activities using existing authorities, expertise, and partnerships to reduce the potential risk of PFAS to public health. The council is to develop a multiyear strategy to address PFAS; coordinate within EPA to address regionally specific PFAS challenges or to address PFAS in the range of environmental media; support the use of EPA financial assistance programs for PFAS treatment and "cleanup"; and engage with federal, state, and tribal partners to coordinate efforts, communication strategies, and identify solutions.

In October 2021, EPA issued a "PFAS Strategic Roadmap."[19] The PFAS Strategic Roadmap builds on the 2019 PFAS Action Plan. Among the SWDA-related actions, the roadmap states that

[15] SDWA Section 1412(b)(1)(F)—Title 42, Section 300g-1(b)(1)(F) of the *United States Code*—authorizes EPA to establish health advisories for emerging drinking water contaminants. SDWA Section 1412 (42 U.S.C. §300g-1) authorizes EPA to regulate contaminants in drinking water. SDWA Section 1431 (42 U.S.C. §300i) authorizes EPA to issue emergency orders to address drinking water contamination, under certain circumstances. SDWA provides additional tools to address emerging contaminants, such as source water assessment and protection programs.

[16] Using Toxic Substance Control Act (TSCA) authorities, EPA has issued several significant new use rules that require manufacturers (including importers) and processors of certain PFAS to notify EPA at least 90 days prior to resuming use of these substances. EPA then would review the potential health and environmental effects of the activity and make a determination whether to authorize the new use.

[17] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, February 2019, https://www.epa.gov/pfas/epas-pfas-action-plan. The plan also notes the agency's actions under the authority of other environmental statutes, including the Clean Air Act; the Clean Water Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Resource Conservation and Recovery Act; and TSCA.

[18] Letter from Michael Regan, EPA Administrator, April 27, 2021, https://www.epa.gov/sites/default/files/2021-04/documents/per-and_polyfluoroalkyl_substances.memo_.signed.pdf.

[19] EPA, *PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024*, October 18, 2021, https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf.

EPA will issue a PFOS and PFOA drinking water regulation under an accelerated time frame; require water systems to monitor for all PFAS for which a validated analytical method is available, as required by the National Defense Authorization Act (NDAA) for Fiscal Year 2020 (P.L. 116-92); publish health advisories for additional PFAS; and publish updates to analytical methods to detect additional PFAS in drinking water.[20] **Table B-1** includes EPA's selected actions and associated timelines relevant to addressing PFAS in drinking water.

The challenges of regulating individual substances or categories of PFAS in drinking water are multifaceted and may raise several policy and scientific questions. Technical issues involve availability of data, detection methods, and treatment techniques for related but diverse contaminants. Scientific questions exist about health effects attributed to many individual PFAS and whether health effects can be generalized from one or a category of PFAS to others. Policy and regulatory considerations may involve setting priorities among numerous unregulated contaminants, the value of establishing uniform national drinking water standards, and the ability to demonstrate the relative risk-reduction benefits compared to compliance costs to communities associated with regulating individual or multiple PFAS.[21] The absence of a federal health-based standard can pose challenges for states and communities with PFAS contamination. State drinking water regulators have noted that many states may face significant obstacles in setting their own standards.

The 117th Congress has taken up legislation to address PFAS in a range of contexts. On July 21, 2021, the House passed H.R. 2467, the PFAS Action Act of 2021. As passed, H.R. 2467 would direct EPA to promulgate PFAS drinking water regulations on an accelerated timeline. Additionally, some bills would establish grant programs to assist communities in addressing PFAS. Enacted in November 2021, the Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58) provides emergency appropriations for a grant program for public water systems to address PFAS and other emerging contaminants that was authorized by the 2020 NDAA.

The 116th Congress held hearings on PFAS issues and passed legislation to address PFAS use, disposal, contamination, and regulation through several departments and agencies. The National Defense Authorization Act (NDAA) for Fiscal Year 2020 (P.L. 116-92) included several PFAS provisions involving the Department of Defense (DOD) and other federal agencies.[22] Of the EPA provisions related to drinking water, Title LXXIII, Subtitle A, directs EPA to require public water system operators to conduct additional monitoring for PFAS and authorizes a grant program for public water systems to address PFAS and other emerging contaminants. The NDAA for FY2021 (P.L. 116-283) included a number of DOD PFAS provisions.

This report provides an overview of EPA's actions to address PFAS under SDWA authorities, with particular focus on the statutory process for evaluating and regulating two PFAS—PFOA and PFOS—in drinking water. This report does not address the status of scientific research on health effects that may be associated with exposure to one or more PFAS, nor does it discuss

[20] EPA, *PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024*, October 18, 2021, https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf.

[21] When developing regulations, SDWA requires EPA to (1) use the best available peer-reviewed science and supporting studies and data and (2) make publicly available a risk assessment document that discusses estimated risks, uncertainties, and studies used in the assessment. When proposing drinking water regulations, EPA must publish a "health risk reduction and cost analysis." For each drinking water standard and each alternative standard being considered for a contaminant, EPA must publish and take comment on quantifiable and nonquantifiable health-risk-reduction benefits and costs and also conduct other specified analyses (SDWA §1412(b); 42 U.S.C. §300g-1(b)).

[22] See CRS Report R45986, *Federal Role in Responding to Potential Risks of Per- and Polyfluoroalkyl Substances (PFAS)*, coordinated by David M. Bearden.

federal actions regarding other environmental statutes, such as the Toxic Substances Control Act (TSCA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[23]

Addressing PFAS Using SDWA Authorities

SDWA provides EPA with several authorities to address contaminants in drinking water supplies and sources. The act authorizes EPA to promulgate regulations that include enforceable standards and monitoring requirements for contaminants in water provided by public water systems.[24] Under this authority, EPA finalized determinations to regulate two PFAS in drinking water in March 2021. For contaminants that are not regulated under the act, SDWA authorizes EPA to issue contaminant-specific health advisories that include technical guidance and identify concentrations that are expected to be protective of sensitive populations.[25] In addition, SDWA authorizes EPA in certain circumstances to take actions to abate an "imminent and substantial endangerment" to public health from "a contaminant that is present in or is likely to enter a public water system or an underground source of drinking water."[26] This emergency authority is available if the appropriate state and local authorities have not acted to address substantial threats to public health.

Evaluating Emerging Contaminants for Regulation

SDWA specifies a multistep process for evaluating contaminants to determine whether a national primary drinking water regulation is warranted.[27] The evaluation process includes identifying contaminants of potential concern, assessing health risks, collecting occurrence data (and developing reliable analytical methods necessary to do so), and making determinations as to whether or not regulatory action is needed for a contaminant.

To make a positive determination that a national drinking water regulation is warranted for a contaminant, EPA must find that

- a contaminant may have an adverse health effect;
- it is known to occur or there is a substantial likelihood that it will occur in public water systems with a frequency and at levels of public health concern; and
- in the sole judgment of the EPA Administrator, regulation of the contaminant presents a meaningful opportunity for health risk reduction for persons served by water systems.[28]

[23] For more information on the regulation of chemicals in commerce under TSCA, see CRS Report RL31905, *The Toxic Substances Control Act (TSCA): A Summary of the Act and Its Major Requirements*, by Jerry H. Yen.

[24] SDWA §1412; 42 U.S.C. §300g-1. SDWA does not cover residential wells.

[25] SDWA §1412(b)(1)(F); 42 U.S.C. §300g-1(b)(1)(F).

[26] SDWA §1431; 42 U.S.C. §300i.

[27] SDWA §1412; 42 U.S.C. §300g-1. The 104th Congress established the current regulatory structure with the Safe Drinking Water Amendments of 1996 (P.L. 104-182).

[28] SDWA §1412(b)(1)(A); 42 U.S.C. §300g-1(b)(1)(A). The Administrator's determination not to regulate a contaminant is subject to judicial review (SDWA §1412(b)(1)(B)(ii)(IV); 42 U.S.C. §300g-1(b)(1)(B)(ii)(IV)). For a detailed discussion of the federal process for regulating contaminants in drinking water, see CRS Report R46652, *Regulating Contaminants Under the Safe Drinking Water Act (SDWA)*, by Elena H. Humphreys.

Identifying Contaminants That May Warrant Regulation

SDWA Section 1412(b) requires EPA to publish, every five years, a list of contaminants that are known or anticipated to occur in public water systems and may require regulation under the act.[29] Before publishing a final contaminant candidate list (CCL), EPA is required to provide an opportunity for public comment and consult with the scientific community, including the Science Advisory Board.[30]

In 2009, EPA placed PFOA and PFOS on the third such list (CCL 3) for evaluation.[31] In preparing the CCL 3, EPA considered over 7,500 chemical and microbial contaminants and screened these contaminants based on their potential to occur in public water systems and potential health effects. EPA selected 116 of the contaminants on the proposed CCL based on more detailed evaluation of occurrence, health effects, expert judgement, and public input.[32]

In 2016, EPA published the fourth list, CCL 4, which carried over many CCL 3 contaminants, including PFOA and PFOS. EPA carried forward these contaminants to continue evaluating health effects, gathering national occurrence data, and developing analytical methods.[33]

Monitoring for Emerging Contaminants in Public Water Systems

To generate data on the nationwide occurrence of emerging contaminants in public water supplies, EPA is required to administer a monitoring program for unregulated contaminants. SDWA directs EPA to promulgate, every five years, an unregulated contaminant monitoring rule (UCMR) that requires public water systems to test for no more than 30 contaminants.[34] Only a representative sample of systems serving 10,000 or fewer people is required to conduct monitoring.[35] EPA uses data collected through UCMRs to estimate whether the occurrence of the contaminant in public water supplies is local, regional, or national in scope.

UCMRs set a minimum reporting level (MRL) for each contaminant. MRLs are not health based; rather, they establish concentrations for reporting and data collection purposes. EPA makes the UCMR monitoring results available to the public and reports the number of detections above the MRL and also detections above EPA's health-based reference levels (discussed below), where

[29] SDWA §1412(b)(1)(B)(i); 42 U.S.C. §300g-1(b)(1)(B)(i). Nothing in statute precludes EPA from modifying the list outside the five-year timeline. See EPA, "Announcement of the Drinking Water Contaminant Candidate List," 63 *Federal Register* 10274, March 2, 1998, https://www.govinfo.gov/content/pkg/FR-1998-03-02/html/98-5313.htm.

[30] The 1978 Environmental Research, Development, and Demonstration Authorization Act (P.L. 95-477) directed EPA to establish the Science Advisory Board to provide scientific advice to the Administrator (42 U.S.C. §4365).

[31] EPA, "Drinking Water Contaminant Candidate List 3—Final," 74 *Federal Register* 51850, October 8, 2009. For more information on CCL 3, see EPA, "Contaminant Candidate List 3—CCL 3," https://www.epa.gov/ccl/contaminant-candidate-list-3-ccl-3.

[32] EPA, "Drinking Water Contaminant Candidate List 4—Final," 81 *Federal Register* 81101-81103, November 17, 2016. Discussion of the CCL 3 process is included in this *Federal Register* notice.

[33] EPA, "Drinking Water Contaminant Candidate List 4—Final," 81 *Federal Register* 81099, November 17, 2016. For more information on CCL 4, see EPA, "Contaminant Candidate List 4—CCL 4," https://www.epa.gov/ccl/contaminant-candidate-list-4-ccl-4-0.

[34] SDWA §1445(a)(2); 42 U.S.C. §300g-4(a)(2).

[35] SDWA §1445(a)(2); 42 U.S.C. §300g-4(a)(2). EPA estimates that approximately 82% of the population receives water from public water systems that serve more than 10,000 individuals. Section 2021 of America's Water Infrastructure Act (P.L. 115-270) amended Section 1445 to require public water systems serving between 3,300 and 10,000 individuals to monitor for unregulated contaminants—subject to the availability of appropriations—to support costs associated with monitoring for these systems. This requirement enters into effect three years after the date of enactment of P.L. 115-270 (i.e., October 23, 2021).

available. The act includes an authorization of appropriations to cover monitoring and related costs for small systems (serving 10,000 persons or fewer). However, large systems pay UCMR monitoring and laboratory costs.[36]

In 2012, EPA issued the third UCMR (UCMR 3), under which 4,864 public water systems tested their drinking water for six PFAS—including PFOA and PFOS—between January 2013 and December 2015.[37] Among these systems, EPA reported the following monitoring results for PFOA and PFOS:

- 117 of the public water systems reported detections of PFOA at levels above the MRL of 20 ppt, and
- 95 reported detections of PFOS at concentrations above the MRL of 40 ppt.[38]

Overall, 63 of the 4,864 (1.3%) water systems that conducted PFAS monitoring reported at least one sample with PFOA and/or PFOS (separately or combined) concentrations exceeding EPA's 2016 health advisory level of 70 ppt for PFOA and PFOS.[39] Actual exposures among individuals served by these systems would be expected to vary depending on water use and consumption. EPA estimates that these 63 water systems serve approximately 5.5 million individuals. Of the 63 systems,

- 9 reported detections of both PFOS and PFOA above 70 ppt;
- 4 reported detections of PFOA above 70 ppt;
- 37 reported detections of PFOS above 70 ppt; and
- 13 reported detections of PFOA and PFOS (combined but not separately) above 70 ppt.[40]

Systems with PFOA or PFOS detections above 70 ppt were located in 21 states, the Pima-Maricopa Indian community, and 2 U.S. territories.[41]

[36] SDWA Section 1445(a)(2)(H)—Title 42, Section 300g-4(a)(2)(H) of the *United States Code*—authorizes appropriations of $10 million for each of FY2019-FY2021 for EPA to pay the reasonable costs of testing and laboratory analysis for small systems. Additionally, SDWA directs EPA to reserve $2 million from the Drinking Water State Revolving Fund appropriation to pay the costs of small system UCMR monitoring (SDWA §1452(o); 42 U.S.C. §300j-12(o)).

[37] EPA, "Revisions to the Unregulated Contaminant Monitoring Regulation (UCMR 3) for Public Water Systems: Final Rule," 77 *Federal Register* 26072-26101, May 2, 2012. This rule required monitoring for 29 unregulated contaminants. The PFAS for which monitoring was conducted include PFOA, PFOS, perfluorononanoic acid, perfluorohexanesulfonic acid, perfluoroheptanoic acid, and perfluorobutanesulfonic acid (PFBS).

[38] EPA, *Data Summary of the Third Unregulated Contaminant Monitoring Rule*, January 2017, p. 11, https://www.epa.gov/dwucmr/data-summary-third-unregulated-contaminant-monitoring-rule.

[39] Testimony of Peter Grevatt, Director, Office of Ground Water and Drinking Water, EPA, before the House Committee on Energy and Commerce, Subcommittee on Environment; hearing on *Perfluorinated Chemicals in the Environment: An Update on the Response to Contamination and Challenges Presented*, September 6, 2018. In May 2016, EPA issued nonenforceable health advisory levels for lifetime exposure, with a margin of safety, to PFOA and PFOS in drinking water. EPA established the Lifetime Health Advisory level for PFOA and PFOS at 70 ppt, separately or combined.

[40] Email communication with EPA, May 30, 2019.

[41] Monitoring results for individual water systems (listed by state) are available on EPA's UCMR 3 website, https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule. This report does not correlate levels of exposure based on individuals served by these water systems.

EPA's PFAS Action Plan noted that the agency intended to propose monitoring requirements for other PFAS in the next UCMR (UCMR 5).[42] Further, the 2020 NDAA directs EPA to include on UCMR 5 every PFAS for which EPA has identified a validated test method. EPA's plan also states that the agency would use the monitoring data gathered through UCMR 5 to evaluate the national occurrence of additional PFAS.[43] In December 2021, EPA finalized UCMR 5, which would require all water systems serving 3,300 or more people to monitor for 29 PFAS and lithium.[44] As amended by America's Water Infrastructure Act of 2018 (P.L. 115-270), SDWA requires EPA to pay the reasonable costs of testing and laboratory analysis for water systems serving between 3,300 and 10,000 individuals.[45] Accordingly, the agency stated that the inclusion of such systems would be dependent on appropriations.[46] Public water systems are required to conduct monitoring during a 12-month period from January 2023 through December 2025, and report final results through 2026.[47]

Regulatory Determinations

SDWA requires EPA, every five years, to make a regulatory determination—a determination of whether or not to promulgate a national primary drinking water regulation—for at least five contaminants on the CCL.[48] In March 2021, EPA finalized positive regulatory determinations for PFOA and PFOS.[49] To consider a contaminant for a regulatory determination (RD), EPA requires, at a minimum, a peer-reviewed risk assessment and nationally representative occurrence data. In selecting contaminants for an RD, SDWA requires EPA to give priority to those that present the greatest public health concern while considering a contaminant's health effects on specified subgroups of the population (e.g., infants, children, pregnant women) who may be at greater risk of adverse health effects due to exposure to a contaminant.[50]

As noted above, to make a positive determination to regulate a contaminant, EPA must find that (1) a contaminant may have an adverse health effect; (2) it is known to occur or there is a substantial likelihood that it will occur in public water systems with a frequency and at levels of public health concern; and (3) in the sole judgment of the EPA Administrator, regulation of the contaminant presents a meaningful opportunity for health risk reduction for persons served by water systems. SDWA directs EPA to publish a preliminary determination and seek public

[42] EPA did not require monitoring for any PFAS in UCMR 4.

[43] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, February 14, 2019, p. 21, https://www.epa.gov/pfas/epas-pfas-action-plan.

[44] EPA, "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5) for Public Water Systems and Announcement of Public Meeting," 86 *Federal Register* 73131-73157, December 27, 2021.

[45] SDWA §1445(j); 42 U.S.C. §300j-4(j). Section 2021(a) of America's Water Infrastructure Act of 2018 (AWIA; P.L. 115-270) expanded unregulated contaminant monitoring requirements to include public water systems serving 3,300-10,000 individuals—subject to the availability of appropriations for this purpose and lab capacity. This section authorizes $15.0 million to be appropriated for each year from FY2019 through FY2021 to support the expanded monitoring.

[46] EPA, "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5) for Public Water Systems and Announcement of Public Meeting," 86 *Federal Register* 73131-73157, December 27, 2021.

[47] EPA, "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5) for Public Water Systems and Announcement of Public Meeting," 86 *Federal Register* 73131-73157, December 27, 2021.

[48] SDWA §1412(b)(1)(B)(ii); 42 U.S.C. §300g-1(b)(1)(B)(ii).

[49] EPA, "Announcement of Final Regulatory Determinations for Contaminants on the Fourth Drinking Water Contaminant Candidate List," 86 *Federal Register* 12272-12291, March 3, 2021.

[50] SDWA §1412(b)(1)(C); 42 U.S.C. §300g-1(b)(1)(C).

comment prior to making an RD.[51] EPA may also make RDs for contaminants not listed on the CCL if EPA finds that the statutory criteria regarding health effects and occurrence are satisfied.[52]

In 2014, when EPA published preliminary RDs for contaminants on CCL 3 (including PFOA and PFOS), UCMR 3 monitoring was under way and national occurrence data were not available. EPA did not include any PFAS among the contaminants selected for the third RD. In November 2016, EPA included PFOA and PFOS on the agency's list of unregulated contaminants for which sufficient health effect and occurrence data were available to make RDs.[53] For the fourth cycle, EPA proposed and finalized regulatory determinations for contaminants on CCL 4, determining to regulate PFOA and PFOS and not to regulate six other chemicals.

Developing Regulations and Standards for Emerging Contaminants

Once the Administrator makes a determination to regulate a contaminant, SDWA allows EPA 24 months to propose a "national primary drinking water regulation" and request public comment. EPA is required to promulgate a final rule within 18 months after the proposal.[54] SDWA authorizes EPA to extend the deadline to publish a final rule for up to nine months, by notice in the *Federal Register*.[55] With the SDWA time frame triggered by the March 2021 RDs, EPA is required to propose PFOA and PFOS drinking water regulations within 24 months—by March 2023—and finalize such regulations within 18 months of publishing the proposed rule. While SDWA outlines time frames for EPA to follow to propose and finalize a regulation, EPA notes in its PFAS Strategic Roadmap that the agency intends to propose a PFOA and PFOS drinking water regulation by fall 2022, and finalize such regulation by fall 2023.[56]

For each contaminant that EPA determines to regulate, EPA is required to establish a nonenforceable maximum contaminant level goal (MCLG) at a level at which no known or anticipated adverse health effects occur and which allows an adequate margin of safety.[57] An MCLG is based solely on health effects data and does not reflect cost or technical feasibility considerations. EPA derives an MCLG based on an estimate of the amount of a contaminant that a person can be exposed to on a daily basis that is not anticipated to cause adverse health effects over a lifetime.[58] This amount is derived using the best available peer-reviewed studies and incorporates uncertainty factors to provide a margin of protection for sensitive subpopulations. In developing an MCLG, EPA also estimates the general population's exposure to a contaminant from drinking water and other sources (e.g., food, dust, soil, and air). After considering other

[51] SDWA §1412(b)(1)(B)(ii); 42 U.S.C. §300g-1(b)(1)(B)(ii). The act authorizes EPA to promulgate an interim national primary drinking water regulation without making a regulatory determination or completing the other analyses to respond to an urgent threat to public health (SDWA §1412(b)(1)(D); 42 U.S.C. §300g-1).

[52] SDWA §1412(b)(1)(B)(ii)(III); 42 U.S.C. §300g-1(b)(1)(B)(ii)(III).

[53] EPA, "Drinking Water Contaminant Candidate List 4—Final," 81 *Federal Register* 81102-81104, November 17, 2016. For more information on CCL 4, see EPA, "Contaminant Candidate List 4—CCL 4."

[54] SDWA §1412(b)(3); 42 U.S.C. §300g-1(b)(3).

[55] SDWA §1412(b)(1)(E); 42 U.S.C. §300g-1(b)(1)(E).

[56] EPA, *PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024*, October 18, 2021, p. 12, https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf.

[57] When developing regulations, EPA is required to (1) use the best available peer-reviewed science and supporting studies and data and (2) make publicly available a risk assessment document that discusses estimated risks, uncertainties, and studies used in the assessment. Concurrent with proposing a regulation, SDWA requires EPA to publish a "health risk reduction and cost analysis." SDWA §1412(b)(4)(A); 42 U.S.C. §300g-1(b)(4)(A).

[58] EPA follows this process to evaluate noncarcinogenic effects. For contaminants that may have carcinogenic effects, EPA typically sets the MCLG at zero.

exposure routes, EPA estimates the proportion of exposure attributable to drinking water (i.e., the relative source contribution). When exposure information is not available, EPA uses a default assumption that 20% of exposure to a contaminant is attributable to drinking water. EPA applies the relative source contribution to ensure that an individual's total exposure from all sources remains within the estimated protective level.[59]

The MCLG provides the basis for calculating a drinking water standard. Thus, EPA's ability to develop a drinking water regulation for a contaminant is dependent, in part, on the availability of peer-reviewed scientific studies.

Drinking water regulations generally specify a maximum contaminant level (MCL)—an enforceable limit for a contaminant in public water supplies.[60] SDWA requires EPA to set the MCL as close to the MCLG as feasible.[61] When assessing feasibility, the law directs EPA to consider the best available (and field-demonstrated) treatment technologies, taking cost into consideration.[62] If the treatment of a contaminant is not feasible—technologically or economically—EPA may establish a treatment technique in lieu of an MCL.[63] Each regulation also establishes associated monitoring, treatment, and reporting requirements. These regulations can cover multiple contaminants and, generally, establish an MCL for each contaminant covered by the regulation.

Regulations generally take effect three years after promulgation. EPA may allow up to two additional years if the Administrator determines that more time is needed for public water systems to make capital improvements. (States have the same authority for individual water systems.[64]) The law directs EPA to review—and if necessary revise—each regulation every six years and requires that any revision maintain or provide greater health protection.[65]

Health Advisories

For emerging contaminants of concern, data may be limited, particularly regarding a contaminant's potential health effects and occurrence in public water supplies. SDWA authorizes EPA to issue health advisories for contaminants in drinking water that are not regulated under the act.[66] These advisories provide information on a contaminant's health effects, chemical properties, occurrence, and exposure. They also provide technical guidance on identifying, measuring, and treating contaminants, but are not enforceable by EPA under SDWA.

Health advisories include nonenforceable levels for concentrations of contaminants in drinking water. EPA sets health advisories at levels that are expected to protect the most sensitive subpopulations (e.g., nursing infants) from any deleterious health effects, with a margin of protection, over specific exposure durations (e.g., 1-day, 10-day, or lifetime).[67] These nonregulatory levels are intended to help states, water suppliers, and others address contaminants

[59] EPA, *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*, May 2016, p. 32, https://www.epa.gov/ground-water-and-drinking-water/supporting-documents-drinking-water-health-advisories-pfoa-and-pfos.

[60] SDWA does not prohibit states from setting stricter standards.

[61] SDWA §1412(b)(4)(B); 42 U.S.C. §300g-1(b)(4)(B).

[62] SDWA §1412(b)(4)(D); 42 U.S.C. §300g-1(b)(4)(D).

[63] SDWA §1412(b)(7)(A); 42 U.S.C. §300g-1(b)(7)(A).

[64] SDWA §1412(b)(10); 42 U.S.C. §300g-1(b)(10).

[65] SDWA §1412(b)(9); 42 U.S.C. §300g-1(b)(9).

[66] SDWA §1412(b)(1)(F); 42 U.S.C. §300g-1(b)(1)(F).

[67] EPA, *2018 Edition of the Drinking Water Standards*, pp. 17-25.

for which federal (or state) drinking water standards have not been established. Some states may use health advisories to inform their own state-specific drinking water regulations.

Health advisories may be used to address various circumstances: to provide interim guidance while EPA evaluates a contaminant for possible regulation, to provide information for contaminants with limited or localized occurrence that may not warrant regulation, and to address short-term incidents or spills. EPA has issued health advisories for more than 200 contaminants to address different circumstances and subsequently established regulations for many of these contaminants.[68]

In May 2016, EPA issued health advisory levels for lifetime exposure to PFOA and PFOS in drinking water.[69] EPA established the Lifetime Health Advisory level for PFOA and PFOS at 70 ppt, separately or combined.[70] In calculating the health advisory level, EPA applied a relative source contribution of 20% (i.e., an assumption that 20% of PFOS and/or PFOA exposure is attributable to drinking water and 80% is from diet, dust, air, or other sources).[71] These levels are intended to protect the most sensitive subpopulations (e.g., nursing infants), with a margin of safety, over a lifetime of daily exposure. The Lifetime Health Advisories replaced Provisional Health Advisories that EPA issued in 2009 to address short-term exposures to PFOA and PFOS.[72]

In June 2022, EPA announced revised interim Lifetime Health Advisories for PFOA and PFOS, and final Lifetime Health Advisories for hexafluoropropylene oxide dimer acid and its ammonium salt (together referred to as "GenX chemicals") and perfluorobutane sulfonic acid and its related compound potassium perfluorobutane sulfonate (together referred to as "PFBS").[73] As with the 2016 Lifetime Health Advisories, the revised and new advisories identify specific levels of PFAS that are intended to protect the most sensitive subpopulations (e.g., lactating women, childbearing women, or children), with a margin of protection, from adverse health effects over a lifetime of daily exposure.

EPA finalized Lifetime Drinking Water Health Advisory levels for PFBS and GenX chemicals at 2,000 ppt and 10 ppt, respectively. EPA issued interim Lifetime Drinking Water Health Advisory levels at 0.004 ppt for PFOA and 0.02 ppt for PFOS, significantly lower than the 2016 Lifetime Advisory levels of 70 ppt, separately or combined. Similar to the 2016 advisories, in calculating the health advisory levels, EPA applied a relative source contribution of 20% (i.e., an assumption that 20% of PFOA, PFOS, PFBS, or GenX chemical exposure is attributable to drinking water and 80% is from diet, dust, air, or other sources). The interim PFOA and PFOS Lifetime Drinking

[68] EPA, *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*, p. 11. See also EPA, *2018 Edition of the Drinking Water Standards and Health Advisories Tables*, March 2018, https://www.epa.gov/sites/production/files/2018-03/documents/dwtable2018.pdf.

[69] EPA, "Fact Sheet: PFOA and PFOS Drinking Water Health Advisories," 2016, https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf.

[70] EPA, "Lifetime Health Advisories and Health Effects Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate," 81 *Federal Register* 33250, May 25, 2016.

[71] Also in May 2016, EPA released health effects support documents for these two PFAS, which summarize the scientific literature that EPA evaluated to establish the 2016 advisories. For the accompanying health effects documents for PFOA and PFOS, see EPA, "Supporting Documents for Drinking Water Health Advisories for PFOA and PFOS."

[72] In 2009, EPA established a Provisional Health Advisory level of 400 ppt for PFOA and 200 ppt for PFOS. For more information on these health advisories, see EPA, "Provisional Health Advisories for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS)," https://www.epa.gov/sites/production/files/2015-09/documents/pfoa-pfos-provisional.pdf.

[73] EPA, "Lifetime Drinking Water Health Advisories for Four Perfluoroalkyl Substances," 87 *Federal Register* 36848, June 21, 2022.

Water Health Advisory levels are based on draft health effect analyses under review by the EPA Science Advisory Board (SAB).[74] Using new and existing human epidemiological and experimental animal study data, EPA developed draft health effect analyses that identified a different "most sensitive non-cancer effect" (i.e., decreased immunity) than the health effect (i.e., developmental effects) that the agency used to derive the 2016 Lifetime Drinking Water Health Advisories.[75] As these analyses are still under SAB review, EPA notes that the interim PFOA and PFOS levels may change based on potential revisions after the SAB completes its review, and other feedback.[76] Such interim levels are below the level at which analytical methods can detect PFOS or PFOA in drinking water.[77]

Emergency Powers Orders

SDWA Section 1431 grants EPA "emergency powers" to issue orders to abate an imminent and substantial endangerment to public health from "a contaminant that is present in or is likely to enter a public water system or an underground source of drinking water" and if the appropriate state and local authorities have not acted to protect public health.[78] This authority is available to address both regulated and unregulated contaminants. The EPA Administrator "may take such actions as he may deem necessary" to protect the health of persons who may be affected. Actions may include issuing orders requiring persons who caused or contributed to the endangerment to provide alternative water supplies or to treat contamination. When using this authority, EPA generally coordinates closely with states.

EPA reports that it has used its emergency powers under Section 1431 to require responses to PFOA and/or PFOS releases and related contamination of drinking water supplies at four sites, three of which involved DOD.[79]

1. **Warminster Naval Warfare Center, Pennsylvania.** In 2014, EPA issued an administrative enforcement order directing the U.S. Navy to address PFOS in three drinking water supply wells at and near this National Priorities List site.[80]

[74] Ibid.

[75] EPA, *Technical Fact Sheet: Drinking Water Health Advisories for Four PFAS (PFOA, PFOS, GenX chemicals, and PFBS)*, EPA 822-F-22-002, Washington, DC, June 2022, https://www.epa.gov/system/files/documents/2022-06/technical-factsheet-four-PFAS.pdf. In May 2016, EPA released health effects support documents for these two PFAS, which summarize the scientific literature that EPA evaluated to establish the 2016 advisories. For the accompanying health effects documents for PFOA and PFOS, see EPA, "Supporting Documents for Drinking Water Health Advisories for PFOA and PFOS."

[76] EPA, *Technical Fact Sheet: Drinking Water Health Advisories for Four PFAS (PFOA, PFOS, GenX chemicals, and PFBS)*, EPA 822-F-22-002, Washington, DC, June 2022, https://www.epa.gov/system/files/documents/2022-06/technical-factsheet-four-PFAS.pdf.

[77] Ibid.

[78] 42 U.S.C. §300i.

[79] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, pp. 55-56. In April 2019, EPA responded to CRS, listing specific federal and state enforcement actions taken to address PFAS under various statutory authorities. These actions include the four examples of the use of SDWA Section 1431 emergency powers and also orders under the authority of TSCA and the Resource Conservation and Recovery Act. According to EPA's Enforcement and Compliance History Online tool, which identifies enforcement actions since 2009, EPA has issued 119 orders using the SDWA Section 1431 authority to respond to imminent and substantial endangerment as of May 2019. Of the 119 orders, EPA issued 113 orders to public water systems for a variety of circumstances, including corrosive pipes, discovery of disease vectors in finished water storage, and MCL violations, among others.

[80] CERCLA directs EPA to maintain a National Priorities List to identify the most hazardous sites for the purpose of prioritizing cleanup actions.

2. **Former Pease Air Force Base, New Hampshire.** In August 2015, EPA issued an administrative enforcement order to require the U.S. Air Force to design and construct a system to treat water systems contaminated from releases of PFOA and PFOS at the former Pease Air Force Base in New Hampshire.
3. **Horsham Air Guard Station/Willow Grove, Pennsylvania.** In 2015, EPA issued an order directing the Air Guard/Air Force to treat onsite drinking water wells and to provide treatment for private offsite wells.
4. **Chemours Washington Works Facility, West Virginia/Ohio.** EPA issued three emergency orders to this facility in 2002, 2006, and 2009—and amended the 2009 order in 2017 to incorporate the 2016 Lifetime Health Advisory level—requiring DuPont and Chemours to offer water treatment, connection to a public water system, or bottled water where PFOA concentrations exceeded 70 ppt.

MCLs and Remedial Actions

Under CERCLA (or "Superfund"), MCLs may be considered in selecting remedial actions for releases of hazardous substances, pollutants, and other contaminants (42 U.S.C. §9621(d)). However, CERCLA establishes liability only for releases of hazardous substances, as defined in CERCLA (42 U.S.C. §9601(14)). No PFAS has been federally designated as a hazardous substance (42 U.S.C. §9602(a)). EPA's PFAS Strategic Roadmap states that EPA plans to propose to designate PFOA and PFOS as hazardous substances in spring 2022, and finalize by summer 2023.

EPA issued interim recommendations in December 2019 for PFOA and PFOS groundwater screening levels and preliminary remediation goals for evaluating potential risks at sites under CERCLA and sites subject to corrective action under the Resource Conservation and Recovery Act. EPA recommends using PFOA and PFOS screening levels of 40 ppt and preliminary remediation goals of 70 ppt (EPA's 2016 Lifetime Health Advisory level). This guidance would supplement existing CERCLA guidance, which EPA uses to assess risks and inform the selection of site-specific response actions. In May 2022, EPA issued additional screening levels for several PFAS that supplement the December 2019 groundwater recommendations. For more information regarding PFAS and other environmental statutes, see CRS Report R45986, *Federal Role in Responding to Potential Risks of Per- and Polyfluoroalkyl Substances (PFAS)*, coordinated by David M. Bearden.

Recent Congressional Action

Recent Congresses have held hearings and introduced and passed legislation to address PFAS in drinking water. In the 117th Congress, more than 60 bills have been introduced to address PFAS in a broad range of contexts. Several bills would authorize financial assistance programs to help communities pay for infrastructure improvements to treat PFAS in wastewater effluent and/or drinking water. The National Defense Authorization Act (NDAA) for Fiscal Year 2022 (P.L. 117-81) includes several provisions related to PFAS that would build upon certain requirements enacted in prior NDAAs, which are specific to DOD or related to DOD activities.

Enacted in November 2021, the Infrastructure Investment and Jobs Act (P.L. 117-58) includes water-related PFAS provisions:

- Division J, Title VI provides $4 billion in emergency appropriations over five fiscal years to address emerging contaminants with a focus on PFAS in drinking water through the grant program within the DWSRF that was added to SDWA by the National Defense Authorization Act for Fiscal Year 2020 (P.L. 116-92) within EPA's State and Tribal Assistance Grants (STAG) account.[81]

[81] SDWA §1452(a)(2)(G); 42 U.S.C. §300j-12(a)(2)(G).

- Division J, Title VI provides $1 billion in emergency appropriations over five fiscal years to address emerging contaminants in wastewater in EPA's STAG account.[82]

Among the drinking water-related bills, the PFAS Action Act of 2021 (H.R. 2467), which parallels H.R. 535 from the 116th Congress, contains a range of provisions that would address PFAS using multiple authorities, including several EPA-administered laws. Passed by the House on July 22, 2021, the bill includes several drinking water provisions, some of which would amend SDWA:

- Section 5 would amend SDWA to require EPA, within two years of enactment, to promulgate a national primary drinking water regulation for PFAS with standards for PFOA and PFOS at a minimum. It would establish a separate regulatory process for PFAS with shorter time frames to accelerate EPA's promulgation of drinking water standards. Among other provisions, this section would require EPA to propose a regulation for a PFAS within 18 months (rather than 24 months) of making a determination to regulate it. This section would allow EPA, when developing regulations, to rely on health risk information for one PFAS to "extrapolate reasoned conclusions" regarding the health risks of other PFAS. It would also direct EPA to issue a health advisory within a year of finalizing a toxicity value for a single PFAS or class of PFAS.
- Section 6 would prohibit EPA (but not states) from imposing penalties for violations of PFAS drinking water regulations until five years after the date of promulgation (to allow systems time to make capital improvements as needed for compliance).
- Section 7 would add SDWA Section 1459E to direct EPA to establish a competitive grant program to assist community water systems with installing treatment technologies to address PFAS contamination. To support this program, Section 7 would authorize annual appropriations of $125 million for FY2020 and FY2021 and $100 million for FY2022-FY2024. EPA would be required to give funding priority to community water systems that (1) serve a "disadvantaged community or a disproportionately exposed community," (2) provide at least a 10% cost share, or (3) demonstrate the capacity to maintain the treatment technology.[83]

In the 116th Congress, more than 40 bills were introduced to address PFAS through a broad range of actions and federal agencies.[84] The NDAA for FY2020 (P.L. 116-92) contains PFAS provisions specific to DOD, EPA, and several other federal agencies. Some NDAA provisions involve the use of aqueous film-forming foam, while others address DOD remediation of PFAS-contaminated

[82] For additional discussion, see CRS Report R46892, *Infrastructure Investment and Jobs Act (IIJA): Drinking Water and Wastewater Infrastructure*, by Elena H. Humphreys and Jonathan L. Ramseur.

[83] Section 14 would direct EPA to establish a household well water testing website to host various resources for private well owners to identify services and test and treat their well water for PFAS.

[84] In the conference report accompanying the Consolidated Appropriations Act, 2019 (P.L. 116-6, enacted February 15, 2019), the conferees directed EPA to brief the committees within 60 days of enactment (i.e., April 16, 2019) on the agency's plans to evaluate the need for an MCL for PFAS. U.S. Congress, House of Representatives, Conference Committee, *Conference Report to Accompany H.J.Res. 31, Making Further Continuing Appropriations for the Department of Homeland Security for Fiscal Year 2019, and for Other Purposes*, committee print, 116th Cong., 1st sess., February 13, 2019, H.Rept. 116-9 (Washington: GPO, 2019), p. 741.

drinking water, groundwater, and surface water.[85] Among the EPA provisions, the FY2020 NDAA addresses drinking water as follows:

- Section 7311 requires EPA to add to UCMR 5 all PFAS or categories of PFAS with validated test methods.
- Section 7312 amended SDWA to authorize appropriations for grants within the Drinking Water State Revolving Fund to assist water systems in addressing emerging contaminants, with an emphasis on PFAS. Section 7312 authorized appropriations of $100 million annually for FY2020 through FY2024 for this purpose.

Among other bills in the 116th Congress, House-passed H.R. 535 included provisions intended to reduce exposures to PFAS in drinking water and to prevent or remediate the contamination of groundwater, surface water, and drinking water supplies from releases of these substances.[86] The Senate did not act on H.R. 535. Further, the NDAA for FY2021 (P.L. 116-283) included DOD-specific PFAS provisions.[87]

In the context of SDWA, congressional attention has focused primarily on EPA setting of drinking water standards (MCLs) for PFOA and PFOS, or potentially other PFAS. SDWA directs EPA to follow a regulatory development process for contaminants, which includes consideration of technical feasibility and the assessment of health-risk-reduction benefits and costs, among other factors.

Several bills have proposed a separate, and accelerated, regulatory development process for PFAS. In the 117th Congress, provisions of H.R. 2467 and H.R. 3684 would allow EPA to extrapolate the health effects from one PFAS to a group of PFAS, thereby potentially reducing the number of peer-reviewed health effects studies needed to evaluate such substances. These bills would also direct EPA to finalize drinking water regulations for PFAS in shorter time frames than what is currently required under SDWA.[88]

On occasion, Congress has directed EPA to promulgate a regulation for a particular contaminant within a specified time frame.[89] Congress has used this approach to prompt EPA to regulate

[85] For further discussion of DOD-related PFAS legislation, see CRS Report R45986, *Federal Role in Responding to Potential Risks of Per- and Polyfluoroalkyl Substances (PFAS)*, coordinated by David M. Bearden.

[86] In the 115th Congress, the Agriculture Improvement Act of 2018 (P.L. 115-334)—known as the 2018 farm bill—contains several provisions to address PFAS in rural communities' drinking water. P.L. 115-334, Section 6404, expands an existing program to authorize qualified nonprofit entities to provide technical assistance to rural communities to address contamination of drinking water and surface water supplies by emerging contaminants, including PFAS (7 U.S.C. §1926(a)(14)); Section 6409 authorizes loans and grants for installation of water treatment to address ground well water contamination at individual households (7 U.S.C. §1926e); Section 6407(a) authorizes the use of U.S. Department of Agriculture (USDA) Emergency Water Assistance grants to address contamination that poses human health or environmental risks and was caused by circumstances beyond the control of the applicant (7 U.S.C. §1926a); and Section 6407(b) directs USDA to coordinate an interagency task force on drinking water in rural communities located near military bases. For more information on USDA water infrastructure assistance programs, see CRS Report RL30478, *Federally Supported Water Supply and Wastewater Treatment Programs*, coordinated by Jonathan L. Ramseur.

[87] See CRS Report R46714, *FY2021 National Defense Authorization Act: Context and Selected Issues for Congress*, by Pat Towell, for an additional discussion.

[88] See CRS Report R46652, *Regulating Contaminants Under the Safe Drinking Water Act (SDWA)*, by Elena H. Humphreys, for a discussion of SDWA regulatory development provisions.

[89] For example, in the Safe Drinking Water Amendments of 1996 (P.L. 104-182), the 104th Congress directed EPA to regulate radon, propose a new arsenic standard, and evaluate sulfate for regulation (SDWA §1412(b)(12); 42 U.S.C. §300g(b)(12); SDWA §1412(b)(13); 42 U.S.C. §300g(b)(13)).

certain contaminants already under review and/or to specify a deadline for issuing regulations under development. In the case of PFAS, representatives of public water systems and others have cautioned against bypassing SDWA's science-based and risk-driven process.[90] As regulatory compliance costs are borne by communities, public water suppliers have urged that regulations be data-driven to better ensure risk-reduction benefits.[91] Others have urged "federal leadership" to provide more certainty to states and communities with contaminated water supplies.[92] State drinking water regulators have noted that some states may lack the resources to assess and/or the authority to regulate drinking water contaminants that are not federally regulated, including PFAS. As with certain other contaminants, some states have urged EPA to set national standards. A further concern is that state-by-state actions could create public confusion regarding the safety of drinking water.[93]

[90] See, for example, testimony of Tracy Mehan for the American Water Works Association before the House Committee on Energy and Commerce, Subcommittee on Environment and Climate Change, hearing on *Protecting Americans at Risk of PFAS Contamination and Exposure*, May 15, 2019, https://energycommerce.house.gov/committee-activity/hearings/hearing-on-protecting-americans-at-risk-of-pfas-contamination-exposure.

[91] See, for example, American Water Works Association, Association of Metropolitan Water Agencies, National Association of Water Companies, and the National Rural Water Association, joint letter to the House Committee on Armed Services and the Senate Committee on Armed Services, on the 2020 National Defense Authorization Act, August 8, 2019, https://www.awwa.org/AWWA-Articles/awwa-and-partners-send-pfas-letter-to-us-congress.

[92] See, for example, testimony of Lisa Daniels for the Association of State Drinking Water Administrators before the Senate Committee on Environment and Public Works, hearing on *Examining Legislation to Address the Risks Associated with Per- and Polyfluoroalkyl Substances (PFAS)*, May 22, 2019, https://www.epw.senate.gov/public/index.cfm/2019/5/examining-legislation-to-address-the-risks-associated-with-per-and-polyfluoroalkyl-substances-pfas.

[93] Association of State Drinking Water Administrators, comment letter to EPA on draft human health toxicity assessments for GenX chemicals and PFBS, EPA Docket No. #EPA-HQ-OW-2018-0614, January 22, 2019.

Appendix A. Selected PFAS Drinking-Water-Related Actions in EPA's PFAS Action Plan

Table A-1. Selected Drinking-Water-Related Actions in EPA's PFAS Action Plan

Action	Description	Time Frame
Provisional Health Advisories	Developed provisional health advisory values for short-term exposure to PFOA and PFOS at 400 ppt and 200 ppt, respectively	Completed January 2009
Analytical Method Development	Developed an analytical method (Method 537) for measuring PFOA, PFOS, and 12 other PFAS in drinking water	Completed September 2009
Contaminant Candidate List 3	Included PFOS and PFOA on the third contaminant candidate list	Completed October 2009
Unregulated Contaminant Monitoring Rule 3	Monitored for unregulated contaminants, including six PFAS in public water supplies using analytical methods developed by EPA	Completed between 2013 and 2015
Lifetime Health Advisories for PFOA and PFOS	Developed Health Advisories for PFOA and PFOS that identify nonenforceable levels at or below which adverse health effects are not anticipated to occur	Completed May 2016
Contaminant Candidate List 4	Included PFOS and PFOA on the fourth contaminant candidate list	Completed November 2016
Analytical Method Development	Expanded Method 537 to Method 537.1, which measures four short-chain PFAS, including GenX compounds[a]	Completed November 2018
Water Contaminant Information Tool: Profiles for PFOA and PFOS	Developed contaminant profiles for PFOA and PFOS for EPA's Water Contaminant Information Tool, which is used by the water sector to prepare for, respond to, or recover from drinking water incidents	Completed December 2018
Point-of-Entry and Point-of-Use Home Treatment Systems	Evaluated commercially available reverse osmosis and granular activated carbon units that can serve households through point-of-use or point-of-entry treatment applications for PFAS	Completed October 2018
Treatability Cost Models	Update Drinking Water PFAS Treatability cost models	Ongoing
Drinking Water Treatability Database	Update Drinking Water Treatability Database for effective drinking water treatment processes for PFOA, PFOS, and additional PFAS	Ongoing

Action	Description	Time Frame
Research for Drinking Water Treatment	Conducted experiments to evaluate performance and cost (capital and maintenance operations) of treatment and potential unintended effects of using specific technologies; tested granular activated carbon and ion exchange treatment technologies	Completed October 2020[b]
Regulatory Determination 4	Proposed a regulatory determination for PFOA and PFOS	Completed March 2021
Analytical Method Development	Develop new validated analytical method for short-chain PFAS, which are currently not measured by the Method 537 or Method 537.1	Ongoing. As of July 2021, EPA had developed Method 533 that measures 11 short-chain PFAS.
Unregulated Contaminant Monitoring Rule (UCMR) 5	Developed unregulated contaminant monitoring rule for additional PFAS using the new validated analytical method to detect more PFAS at lower concentrations	On December 27, 2021, EPA issued UCMR 5 to require water systems to monitor for 29 PFAS and lithium between 2023 and 2025.

Source: Compiled by CRS from EPA's PFAS Action Plan.

Notes: This table includes only EPA's actions directly related to drinking water. The Action Plan includes other EPA efforts to address PFAS under other environmental statutes.

a. GenX is a chemical process used to create fluoropolymers.

b. See EPA website "Treating PFAS in Drinking Water" at https://www.epa.gov/pfas/treating-pfas-drinking-water.

Appendix B. Drinking-Water-Related Actions in EPA's PFAS Strategic Roadmap

Table B-1. Selected Drinking-Water-Related Actions in EPA's PFAS Strategic Roadmap

Action	Description	Time Frame
Unregulated Contaminant Monitoring Rule (UCMR) 5	Collect additional data on PFAS occurrence through an unregulated contaminant monitoring rule to determine the frequency that 29 PFAS are found in drinking water systems and at what levels	Expected fall 2021 *(on December 27, 2021, EPA finalized UCMR 5)*[a]
National Primary Drinking Water Regulations	Develop, propose, and finalize a National Primary Drinking Water Regulation for PFOA and PFOS	Propose a regulation by fall 2022, and finalize such a regulation by fall 2023
Publish Health Advisories for GenX[b] and Perfluorobutane sulfonic acid (PFBS)	Develop nonenforceable and nonregulatory drinking water health advisories GenX and PFBS to help inform whether state and local actions are required.	June 2022
Analytical Methods for Additional PFAS	Update and validate analytical methods to monitor additional PFAS in drinking water	Expected fall 2024

Source: Compiled by CRS from EPA's PFAS Strategic Roadmap.

Notes: This table includes only EPA's actions directly related to drinking water. The Strategic Roadmap includes other EPA efforts to address PFAS under other environmental statutes.

a. EPA, "Revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5) for Public Water Systems and Announcement of Public Meeting," 86 *Federal Register* 73131-73157, December 27, 2021.

b. GenX is a chemical process used to create fluoropolymers.

Author Information

Elena H. Humphreys
Analyst in Environmental Policy

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