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PFAS and Drinking Water: Selected EPA and Congressional Actions

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SUMMARY

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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 address 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 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. EPA has not issued drinking water regulations for any PFAS but has taken various actions to address PFAS contamination.

In the 116th Congress, Members have introduced more than 35 bills to address PFAS through various means. Multiple bills would direct EPA to take regulatory and other actions to address these emerging contaminants under several environmental statutes, including SDWA. Several SDWA-related bills would direct EPA to establish a drinking water standard for one or more PFAS, require monitoring for PFAS in public water supplies, and authorize grants to communities to treat PFAS in drinking water.

In February 2019, EPA released its PFAS Action Plan, which discusses the agency's current and proposed actions to address these substances under its various statutory authorities. Regarding SDWA, the plan notes that EPA is following the statutory process for evaluating PFAS—particularly perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)—to determine whether national primary drinking water regulations are warranted. EPA is scheduled to propose preliminary regulatory determinations for PFOA and PFOS by the end of 2019 and to make final determinations by the end of 2020. The plan also reviews other SDWA authorities that the agency is using to address PFAS in drinking water.

The absence of a national health-based drinking water standard for any PFAS has increased interest in the SDWA process for regulating contaminants. The statute prescribes 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.

PFAS includes thousands of diverse chemicals, and setting scientifically sound drinking water standards for one or multiple 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 very few of these substances. Further, EPA may face challenges in developing test methods needed to evaluate PFAS occurrence and technologies to treat PFAS in drinking water. Contamination of drinking water by PFAS can pose challenges for states and communities, and some have called for EPA to establish a health-based standard. State drinking water regulators have noted that many states may face significant obstacles in setting their own standards.

For emerging contaminants not regulated under SDWA, EPA is authorized to issue health advisories, which provide information on health effects, testing methods, and treatment techniques for contaminants of concern. In 2016, EPA established health advisory levels for PFOA and PFOS in drinking water at 70 parts per trillion (separately or combined).

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 sites.

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Introduction

Detections of per- and polyfluoroalkyl substances (PFAS) in drinking water supplies and concerns about potential health effects associated with exposure to PFAS have increased congressional attention to the U.S. Environmental Protection Agency's (EPA) efforts to address the presence of these substances in public water supplies. 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. EPA has not issued SDWA regulations for any PFAS but has taken various actions to address PFAS contamination. Using SDWA authorities, in 2016, EPA issued non-enforceable health advisories for two PFAS—perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)—in drinking water.[1]

In the 116th Congress, Members have introduced more than 35 bills that would address PFAS exposure through various authorities and agencies. A number of bills would direct EPA to take regulatory and other actions under several environmental statutes, including SDWA. Of the SDWA bills, some would require EPA to establish drinking water standards for PFAS, require monitoring for more of these substances, or authorize grants to assist communities in treating PFAS in drinking water.

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 detection of certain PFAS in surface water, groundwater, and public water supplies in various locations has generated public concern and drawn attention to the use and federal regulation of these chemicals in commerce and in the environment. 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

[1] In May 2016, EPA established Lifetime Health Advisory levels for PFOA and PFOS at 70 parts per trillion, separately or combined. These non-enforceable 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 non-regulatory 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, Draft for Public Comment*, June 2018, https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1117&tid=237.

[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

a large portion of exposure to PFOA and PFOS, while drinking water can be an additional source in the small percentage of communities with contaminated water supplies.[6]

Among the thousands of different PFAS, few have sufficient health effects studies for determining a threshold at 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 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 of 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 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

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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.

[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 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, Draft for Public Comment*, June 2018, ch. 5, https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1117&tid=237.

[12] See for example, testimony of Tracy Mehan for the American Water Works Association before the Senate Committee on Environmental 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.

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]

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 PFAS for potential 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 various 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.

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

[13] See for example, testimony of Lisa Daniels for the Association of State Drinking Water Administrators before the Senate Committee on Environmental 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.

[14] See for example, testimony of Mehan.

[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.

to demonstrate the relative risk-reduction benefits compared to compliance costs to communities associated with regulating individual or multiple PFAS.[18] 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.

This report provides an overview of EPA's ongoing and proposed actions to address PFAS under SDWA authorities, with particular focus on the statutory process for evaluating PFAS—particularly PFOA and PFOS—for potential regulation. It also reviews PFAS-related legislation introduced in the 116th Congress. 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 federal actions regarding other environmental statutes, such as the Toxic Substances Control Act (TSCA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[19]

Addressing PFAS Using SDWA Authorities

SDWA provides EPA with several authorities to address emerging 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.[20] 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.[21] In addition, if the appropriate state and local authorities have not acted to protect public health, SDWA authorizes EPA 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."[22]

Evaluating Emerging Contaminants for Regulation

SDWA specifies a multistep process for evaluating contaminants to determine whether a national primary drinking water regulation is warranted.[23] 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.

[18] 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).

[19] 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.

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

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

[22] SDWA §1431; 42 U.S.C. §300i.

[23] SDWA §1412; 42 U.S.C. §300g-1.

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.[24]

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.[25] 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.[26]

In 2009, EPA placed PFOA and PFOS on the third such list (CCL 3) for evaluation.[27] 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.[28]

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.[29]

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.[30] Only a representative sample of systems serving 10,000 or fewer people is required to conduct

[24] SDWA §1412(b)(1)(A); 42 U.S.C. §300g-1(b)(1)(A). The Administrator's determination whether or not to regulate a contaminant is not subject to judicial review (SDWA §1412(b)(1)(B)(ii)(IV); 42 U.S.C. 300g-1(b)(1)(B)(ii)(IV)).

[25] 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.

[26] 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).

[27] 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.

[28] 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.

[29] 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.

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

monitoring.[31] 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 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.[32]

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.[33] 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.[34]

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 health advisory level of 70 ppt for PFOA and PFOS.[35] EPA estimates that these 63 water systems serve approximately 5.5 million individuals. Of the 63 systems:

- Nine reported detections of both PFOS and PFOA above 70 ppt;
- Four reported detections of PFOA above 70 ppt;
- 37 reported detections of PFOS above 70 ppt; and

[31] 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).

[32] 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)).

[33] 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).

[34] 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.

[35] 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 non-enforceable 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.

- 13 reported detections of PFOA and PFOS (combined but not separately) above 70 ppt. [36]

Systems with PFOA or PFOS detections above 70 ppt were located in 21 states, the Pima-Maricopa Indian community, and two U.S. territories.[37]

EPA's PFAS Action Plan notes that the agency intends to propose monitoring requirements for other PFAS when it proposes the next UCMR (UCMR 5) in 2020.[38] As of June 2019, EPA has developed an analytical method to detect 18 PFAS in drinking water supplies.[39] The plan states that the agency would use the monitoring data gathered through UCMR 5 to evaluate the national occurrence of additional PFAS.[40] The agency is currently working to develop analytical methods to support monitoring for additional PFAS.

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.[41] 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.[42]

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.[43] SDWA directs EPA to publish a preliminary determination and seek public comment prior to making an RD.[44] 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.[45]

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

[37] 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 short report does not correlate levels of exposure based on individual served by these water systems.

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

[39] EPA, Determination of Selected Per- and Polyfluorinated Alkyl Substance in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry, November 2018, https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=537290&Lab=NERL.

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

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

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

[43] SDWA §1412(b)(1)(A); 42 U.S.C. §300g-1(b)(1)(A). The Administrator's determination whether or not to regulate a contaminant is not subject to judicial review (SDWA §1412(b)(1)(B)(ii)(IV); 42 U.S.C. 300g-1(b)(1)(B)(ii)(IV)).

[44] Section 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).

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

EPA has issued RDs for CCL 1 through CCL 3.[46] EPA published final determinations that no regulatory action was appropriate or necessary for nine contaminants on CCL 1 (2003) and 11 contaminants (including perchlorate) on CCL 2 (2008). In the most recent RD (2016), EPA determined that regulation was not needed for four of the 116 contaminants listed on CCL 3. EPA delayed a determination on a fifth contaminant, strontium, "in order to consider additional data and decide whether there is a meaningful opportunity for health risk reduction by regulating strontium in drinking water."[47]

In 2014, when EPA published preliminary RDs for contaminants on CCL 3 (including PFOA and PFOS), UCMR 3 monitoring was underway 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.[48]

The next round of RDs is scheduled for 2021, although SDWA does not prevent EPA from making determinations outside of that five-year cycle.[49] EPA states in the *Spring 2019 Unified Regulatory Agenda* that it plans to propose preliminary determinations for two PFAS—PFOA and PFOS—by the end of 2019 and make final determinations by the end of 2020.[50]

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.[51] SDWA authorizes EPA to extend the deadline to publish a final rule for up to nine months, by notice in the *Federal Register*.[52]

For each contaminant that EPA determines to regulate, EPA is required to establish a non-enforceable 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.[53] An MCLG is based solely on health effects data and does not reflect cost or technical feasibility

[46] EPA, "Announcement of Regulatory Determinations for Priority Contaminants on the Contaminant Candidate List," 68 *Federal Register* 42898, July 18, 2003; EPA, "Drinking Water: Regulatory Determinations Regarding Contaminants on the Second Drinking Water Contaminant Candidate List—Preliminary Determinations," 72 *Federal Register* 24016, May 1, 2007; EPA, "Announcement of Final Regulatory Determinations for Contaminants on the Third Drinking Water Contaminant Candidate List," 81 *Federal Register* 18, January 4, 2016.

[47] EPA, "Announcement of Final Regulatory Determinations for Contaminants," 81 *Federal Register* 13, January 4, 2016, https://www.epa.gov/ccl/regulatory-determination-3.

[48] 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."

[49] For example, EPA made an out-of-cycle determination—reversing its 2008 decision—and published a determination to regulate perchlorate in 2011 between the second and third *Federal Register* notices of final RDs.

[50] For more information on *Spring 2019 Unified Regulatory Agenda*, see Office of Management and Budget, Office of Information and Regulatory Affairs, "Spring 2019 Unified Agenda of Regulatory and Deregulatory Actions," https://www.reginfo.gov/public/do/eAgendaMain.

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

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

[53] 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).

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.[54] 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 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.[55]

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.[56] SDWA requires EPA to set the MCL as close to the MCLG as feasible.[57] When assessing feasibility, the law directs EPA to consider the best available (and field-demonstrated) treatment technologies, taking cost into consideration.[58] 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.[59]) 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.[60]

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.[61] These advisories provide information on a contaminant's health effects, chemical

[54] EPA follows this process to evaluate non-carcinogenic effects. For carcinogens, EPA typically sets the MCLG at zero.

[55] 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.

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

[57] SDWA §1412(b)(4)(B); 42 U.S.C. 300g-1(b)(4)(B). If the treatment of a contaminant is not feasible—technologically or economically—EPA may establish a treatment technique in lieu of an MCL (§1412(b)(7)(A); 42 U.S.C. 300g-1(b)(7)(A).

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

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

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

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

properties, occurrence, and exposure. They also provide technical guidance on identifying, measuring, and treating contaminants.

Health advisories include non-enforceable 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., one-day, 10-day, or lifetime).[62] These non-regulatory levels are intended to help states, water suppliers, and others address contaminants 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.[63]

In May 2016, EPA issued non-enforceable health advisory levels for lifetime exposure to PFOA and PFOS in drinking water.[64] These replaced provisional advisories EPA issued in 2009 for PFOA (400 ppt) and PFOS (200 ppt).[65] EPA established the Lifetime Health Advisory level for PFOA and PFOS at 70 ppt, separately or combined.[66] 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).[67] These levels are intended to protect the most sensitive subpopulations (e.g., nursing infants), with a margin of safety, over a lifetime of exposure.

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.[68] This authority is available to

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

[63] 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.

[64] 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.

[65] For more information on PFOA and PFOS provisional 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.

[66] EPA, "Lifetime Health Advisories and Health Effects Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate," 81 *Federal Register* 33250, May 25, 2016. The advisories and related documents are available at https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos.

[67] Also in May 2016, EPA released health effects support documents for these two PFAS, which summarize the scientific literature that EPA evaluated to establish these advisories. For the accompanying health effects documents for PFOA and PFOS, see EPA, "Supporting Documents for Drinking Water Health Advisories for PFOA and PFOS," https://www.epa.gov/ground-water-and-drinking-water/supporting-documents-drinking-water-health-advisories-pfoa-and-pfos.

[68] 42 U.S.C. §300i.

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 the Department of Defense (DOD).[69]

- *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.[70]
- *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.
- *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.
- *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. However, CERCLA establishes liability only for releases of hazardous substances. No PFAS is designated as a hazardous substance (42 U.S.C. 9621(d)).

As announced in its PFAS Action Plan, EPA proposed guidance in April 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 proposed PFOA and PFOS screening levels of 40 ppt and preliminary remediation goals of 70 ppt (EPA's 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.

[69] 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 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.

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

PFAS Legislation in the 116th Congress

For several years, congressional attention has focused on whether or not EPA might set drinking water standards for PFOA, PFOS, or other PFAS. The conference report accompanying the Consolidated Appropriations Act, 2019 (P.L. 116-6, enacted February 15, 2019), directed EPA to brief specific 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.[71] On June 27, 2019, the Senate passed a substitute amendment to S. 1790, the National Defense Authorization Act (NDAA) for Fiscal Year 2020 (S.Amdt. 764). Among multiple other PFAS provisions, this legislation, as discussed below, would direct EPA to set drinking water standards for PFOA, PFOS, and potentially other PFAS.

Members in the 116th Congress have introduced more than 35 bills to address PFAS through a range of actions and federal agencies. The intent of many of these bills is to reduce exposures to PFAS in drinking water and to prevent or remediate the contamination of groundwater and drinking water by these substances. These bills continue efforts from the 115th Congress that included the enactment of the Agriculture Improvement Act of 2018—known as the 2018 farm bill (P.L. 115-334)—which contained several provisions to address PFAS contamination in drinking water of rural communities.[72]

This discussion focuses on legislation that would amend SDWA or otherwise directly affect public water systems. **Table 1** includes drinking-water-related bills offered in the 116th Congress. Among these, S. 1473 and H.R. 2377 would direct EPA to establish an MCL for PFAS. H.R. 2800 would expand monitoring for PFAS in drinking water. Several bills—including H.R. 2741 S. 611, H.R. 1417, H.R. 2533, and H.R. 2570—would authorize grants for water systems and/or households to treat PFAS in drinking water.

The House-reported and Senate-passed versions of the NDAA for FY2020 (S. 1790, as amended, and H.R. 2500) contain various PFAS provisions specific to DOD, some paralleling free-standing bills (e.g., H.R. 2626 and S. 1372). The Senate-passed bill would address PFAS through multiple federal agencies and authorities. Amending SDWA, Title LXVII, Subtitle B, of the Senate bill would require EPA to promulgate regulations for certain PFAS, authorize states to use their Drinking Water State Revolving Funds (DWSRF) to provide grants to public water systems for PFAS treatment, and require monitoring for additional PFAS as analytical methods become available.

Other subtitles of Title LXVII of the Senate-passed NDAA broadly parallel several other PFAS-related bills. Subtitle A would amend the Emergency Planning and Community Right-to-Know

[71] 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.

[72] P.L. 115-334 includes several provisions to address PFAS in rural communities' drinking water. 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 of the 2018 farm bill 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). Additionally, 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 these programs, see CRS Report RL30478, *Federally Supported Water Supply and Wastewater Treatment Programs*, coordinated by Jonathan L. Ramseur.

Act of 1986 to direct EPA to list certain PFAS on the Toxics Release Inventory. Subtitle C would direct the U.S. Geological Survey to conduct nationwide sampling for PFAS in water and soil. Subtitle D would require federal agencies to coordinate PFAS research and direct EPA to develop a technical assistance program to states with respect to emerging contaminants in drinking water. Subtitle E includes provisions that would address PFAS under TSCA and would require EPA to publish guidance on PFAS disposal.

As noted, several bills would direct EPA to issue drinking water regulations for specific PFAS or all PFAS. Prior Congresses have directed EPA to regulate specific contaminants in drinking water in lieu of following the act's contaminant assessment and selection process.[73] This approach has been used to prompt EPA to act on specific contaminants of concern 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 a science-based and risk-driven process.[74] As regulatory compliance costs are borne by communities, water utilities have urged that regulations be based on sound science to better ensure risk reduction benefits.[75] Others are urging federal leadership to provide more certainty to states and communities with water supplies.[76] State drinking water regulators have noted that some states may lack the resources or authority to assess and regulate drinking water contaminants, including PFAS. A further concern is that state-by-state actions could create public confusion regarding the safety of drinking water.[77]

Table 1. Legislation to Address PFAS in Drinking Water in the 116th Congress

Bill Number, Most Recent Action	Short Title (If Provided)	SDWA § Amended	Key Provisions/Notes
H.R. 1417 and S. 611 Introduced, February 28, 2019 (See companion bill, S. 611)	Water Affordability, Transparency, Equity, and Reliability Act of 2019	§1452(k)(1)	Would authorize states to use a portion of their DWSRF annual grants to provide assistance to community water systems, and households with wells, to treat PFAS contamination in drinking water.
H.R. 2377 Introduced, April 29, 2019	Protect Drinking Water from PFAS Act	§1412(b)(12)	Would require EPA to publish an MCL goal and promulgate a national primary drinking water regulation for total PFAS.
H.R. 2533 Introduced, May 7, 2019	Providing Financial Assistance for Safe Drinking Water Act	Adds §1459E	Would establish a grant program for community water systems' capital infrastructure to treat PFAS contamination. Would authorize appropriations of $500 million to support the grant program.
H.R. 2570 Introduced, May 8, 2019	PFAS User Fee Act of 2019	N/A	Would direct EPA to establish a fee to manufacture PFAS, would establish a grant program for community water systems and publicly owned treatment works for operations and maintenance cost of PFAS removal.

[73] 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)).

[74] See, for example, testimony of Mehan.

[75] See, for example, testimony of Mehan.

[76] See for example, testimony of Daniels.

[77] 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.

Bill Number, Most Recent Action	Short Title (If Provided)	SDWA § Amended	Key Provisions/Notes
H.R. 2741 Introduced, May 15, 2019 (Title II contains the same provisions as H.R. 2533)	Leading Infrastructure for Tomorrow's America Act	Adds §1459E	Would establish a grant program for community water systems' capital infrastructure to treat PFAS contamination. Would authorize appropriations of $500 million to support the grant program.
H.R. 2800 Introduced, May 16, 2019	PFAS Monitoring Act of 2019	Adds §1445(k)	Would require public water systems to monitor for 30 PFAS initially, increasing to all PFAS in two years.
S. 1251 Introduced, April 30, 2019	Safe Drinking Water Assistance Act of 2019	N/A	Would direct EPA to coordinate federal efforts related to emerging contaminants, among other provisions.
S. 1473 Introduced, May 15, 2019	Protect Drinking Water from PFAS Act of 2019	§1412(b)(12)	Would require EPA to publish an MCL goal and promulgate a national primary drinking water regulation for total PFAS.
S. 1507 Reported, amended, June 19, 2019	PFAS Release Disclosure Act	§1412(b)(2), §1452	Would direct EPA to (1) issue MCLs for PFAS (PFOA and PFOA at a minimum) within two years of enactment, (2) require monitoring for all PFAS with validated test methods in UCMR 5, and (3) issue more PFAS health advisories. It would authorize states to use DWSRFs for grants for public water systems to address PFAS and would authorize appropriations for that purpose. As reported, this bill parallels S.Amdt. 764.
Subtitle B of Title LXVII of the modified amendment S.Amdt. 764, in the nature of a substitute to S. 1790 Passed by the Senate June 27, 2019 (see also S. 1507, as reported)	To Amend National Defense Authorization Act for Fiscal Year 2020	§1412(b)(2), §1452	Would direct EPA to (1) issue MCLs for PFOS and PFOA and potentially other PFAS within two years of enactment, (2) require monitoring for all PFAS with validated test methods in UCMR 5, and (3) issue more PFAS health advisories. It would authorize states to use DWSRFs for grants for public water systems to address PFAS and would authorize appropriations for that purpose.

Source: Compiled by CRS from Congress.gov.

Notes: The bills included in the table are those that are related to drinking water. Other bills have been introduced for other purposes.

Several bills would address PFAS at U.S. military installations, create a registry of veterans who may have been exposed to PFAS, or require labeling of food packaging manufactured with PFAS, among other purposes. Many of the bills listed below were offered as amendments to S. 1790. Listed below are bills that would amend other environmental statutes or take other environmental actions to address PFAS contamination of water resources:

- H.R. 535 and S. 638 would require EPA to designate all PFAS as hazardous substances under CERCLA. Such designations would establish cleanup liability for releases of PFAS into the environment and create reporting requirements for such releases.

- H.R. 1976 and S. 950 would direct the U.S. Geological Survey to carry out nationwide sampling of water and soil for PFAS and establish a performance standard for detecting multiple PFAS in water, among other provisions.
- H.R. 2500 (the FY2020 NDAA bill) would reauthorize appropriations to support a study on the health implications of PFAS in drinking water for the Agency of Toxic Substances and Disease Registry; require the Navy to publish military specifications for a fluorine-free fire-fighting agent by January 1, 2025; prohibit the use of any aqueous film-forming foam on U.S. military installations on or after September 30, 2029; and prohibit non-emergency and training uses of aqueous film-forming foam at U.S. military installations; among other purposes.
- H.R. 2591 would amend the Solid Waste Disposal Act to require EPA to promulgate regulations that prohibit the incineration of PFAS-containing fire-fighting foam, among other purposes.
- Several bills (e.g., H.R. 2596, H.R. 2600, and H.R. 2608) would amend TSCA to require EPA to further regulate PFAS in commerce, among other purposes.
- H.R. 2605 would direct EPA to list PFAS as hazardous air pollutants under the Clean Air Act.
- H.R. 2626 and S. 1372 would encourage federal agencies to enter into cooperative agreements with states for the removal or remediation of PFAS contamination from water and soil.
- S. 1507, as reported, broadly parallels a substitute amendment to S. 1790, the National Defense Authorization Act for FY2020 (S.Amdt. 764).
- In addition to the non-DOD related PFAS provisions described above, the Senate-passed substitute amendment to S. 1790 would direct DOD to enter into a cooperative agreement with states to address PFAS testing, monitoring, removal, and remedial actions for drinking, surface, or ground water; reauthorize appropriations to support a study on PFAS contamination in drinking water for the Agency for Toxic Substances and Disease Registry; prohibit DOD after October 1, 2022, from procuring fire-fighting foam, which contains more than 1 part per billion of PFAS; and authorize DOD environmental restoration activities on real property leased to or operated by a state for National Guard training. Among other provisions, this bill would also require DOD to cease using PFAS fire-fighting foam and dispose of existing stocks not later than October 1, 2023.

Appendix. Selected EPA Drinking-Water-Related Actions

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

Action	Description	Timeframe
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 non-enforceable levels at which or below 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
Research for Drinking Water Treatment	Conduct experiments to evaluate performance and cost (capital and maintenance operations) of treatment and potential unintended effects of using specific technologies; test granular activated carbon and ion exchange treatment technologies	Anticipated Fall 2019
Regulatory Determination 4	Propose a regulatory determination for PFOA and PFOS	Anticipated December 2019[b]
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	Anticipated 2019
Unregulated Contaminant Monitoring Rule 5	Develop unregulated contaminant monitoring rule for additional PFAS using the new validated analytical method to detect more PFAS at lower concentrations	Anticipated 2020-2025

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. As stated in the *Spring 2019 Unified Regulatory Agenda*, EPA plans to make final regulatory determination for PFOA and PFOS in December 2020.

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