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Federal Role in Responding to Potential Risks of Per- and Polyfluoroalkyl Substances (PFAS)

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Federal Role in Responding to Potential Risks of Per- and Polyfluoroalkyl Substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a group of fluorinated compounds that have been used for various purposes, including numerous commercial, industrial, and U.S. military applications. Some common uses include food packaging, nonstick coatings, and stain-resistance fabrics, and as an ingredient in fire suppressants in Aqueous Film Forming Foam (AFFF) used at U.S. military installations, at civilian airports, and by state and local fire departments, and elsewhere. PFAS persist in the environment and in humans, and studies on several PFAS indicate that exposures above certain levels are associated with various adverse health effects.

Some PFAS—primarily perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)—have been detected in soil, surface water, groundwater, and drinking water in numerous locations. These detections—associated with releases from federal and industrial facilities, civilian airports, and fire department facilities—have prompted calls for increased federal action and authority to prevent and mitigate releases of and exposures to PFAS.

Federal actions to address potential risks from PFAS have focused mostly on PFOS and PFOA because of past uses, prevalence in the environment, and availability of health effects research. These actions have been taken primarily under the authorities of the Toxic Substances Control Act (TSCA); the Safe Drinking Water Act (SDWA); and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and related Department of Defense (DOD) response authorities. The U.S. Environmental Protection Agency (EPA) has used various authorities to address PFAS in commerce, public water supplies, and in the environment.

Under TSCA, EPA has taken actions over recent decades to gather and assess existing information on the risks of PFOS, PFOA, and certain other PFAS. The agency has required manufacturers to develop new information to evaluate risks of various PFAS and has issued orders restricting the manufacture, processing, distribution, use, and/or disposal pending the development of new risk information. In addition, EPA worked with U.S. manufacturers as they voluntarily phased out production of PFOS, PFOA, and related substances.

Under SDWA, EPA is evaluating PFOA and PFOS to determine whether national drinking water regulations are warranted. EPA plans to propose preliminary determinations in 2019. Among other actions, EPA has issued nonenforceable health advisory levels for PFOA and PFOS, intended to be protective over a lifetime of daily exposure, and has used SDWA emergency powers to issue enforcement orders to require responses to drinking water contamination by PFAS.

DOD and other federal agencies have used CERCLA authorities to respond to releases of various PFAS at federal facilities, although such responses are not statutorily required. DOD administers the vast majority of federal facilities where PFAS has been detected. DOD has been responding to releases of PFOA and PFOS from the use of AFFF at active and decommissioned U.S. military installations under the Defense Environmental Restoration Program. DOD has been phasing out the use of AFFF that contains PFOA or PFOS to reduce the risks of future releases.

Several federal agencies, including EPA and the Agency for Toxic Substances and Disease Registry, have been evaluating potential health effects that may be associated with exposures to various PFAS. The U.S. Food and Drug Administration and the U.S. Department of Agriculture are addressing risks of PFAS in dairy milk, other foods, and food contact applications.

Various stakeholders have urged federal agencies to act more quickly and broadly to address potential PFAS risks and to provide assistance to address contamination. In the 116th Congress, more than 40 bills, including House- and Senate-passed National Defense Authorization Act (NDAA) bills for FY2020 (H.R. 2500 and S. 1790), would address PFAS through various federal agencies and authorities (see **Table 2**). Among other PFAS provisions, H.R. 2500 would establish liability for PFAS response costs though designation of PFAS as hazardous substances, both under CERCLA and through the Clean Water Act, while S. 1790 would expand DOD response requirements to include releases of any pollutant or contaminant. Unlike H.R. 2500, S. 1790 would amend SDWA to direct EPA to issue drinking water standards for PFAS and for other purposes. Both bills would address PFAS under other statutes and new authorities. Several bills, including H.R. 2500 and S. 1790, would variously authorize funds to be appropriated to assist communities in addressing contaminated water supplies.

SUMMARY

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Introduction

Per- and polyfluoroalkyl substances (PFAS) are a large, diverse group of fluorinated compounds that have been used in numerous commercial, industrial, and U.S. military applications. Among other uses, PFAS have been used in fire-fighting foams and in the processing and manufacture of many commercial products (e.g., nonstick cookware, stain- and water-resistant fabrics). PFAS are persistent in the environment, and studies of several PFAS suggest that exposures above certain levels may lead to adverse health effects.[1]

Detections of PFAS contamination in drinking water and the environment, have increased in recent years with the availability of new analytical methods and increased monitoring. PFAS—primarily perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)—have been detected in soil, surface water, groundwater, and public water supplies in numerous locations. These detections have been associated primarily with releases from manufacturing and processing facilities, and from U.S. military installations and other facilities that use firefighting foams (e.g., civilian airports and fire departments). These detections have prompted calls for increased federal action and authority to prevent and mitigate exposures to PFAS.

Federal actions to address potential health and environmental risks of exposure to PFAS have been taken primarily under the authorities of the following federal statutes:

- Toxic Substances Control Act (TSCA);
- Safe Drinking Water Act (SDWA); and
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and related U.S. Department of Defense (DOD) response authorities.

The U.S. Environmental Protection Agency (EPA) has used the authorities of these three statutes to take most of its actions to address potential risks of PFAS. DOD and other federal agencies have also used CERCLA authorities to respond to releases of various PFAS at federal facilities. Some federal actions have involved the private sector in complying with reporting and other requirements. Other actions have involved voluntary measures taken by some companies.

Although the federal government has taken a range of actions to address PFAS exposure, policymakers and stakeholders have urged federal agencies to act more quickly and broadly. For instance, some are calling for EPA to issue enforceable drinking water standards for some or all PFAS. Others want EPA to designate all PFAS as hazardous substances (and thus establish liability for responsible parties to pay response costs).

Multiple bills introduced in the 116th Congress would require EPA or other agencies to take various actions under existing law or would create new authorities. Some of these bills are incorporated into the House-passed and Senate-passed versions of the National Defense Authorization Act for FY2020 (H.R. 2500 and S. 1790). For example, among other PFAS provisions, H.R. 2500 would establish liability for PFAS response costs through designation of PFAS as hazardous substances under CERCLA and also indirectly through listing PFAS as toxic pollutants under the Clean Water Act, whereas S. 1790 would expand DOD statutory responsibilities for response actions to include releases of any other pollutant or contaminant without establishing enforceable liability under CERCLA for such chemicals. S. 1790 also would direct EPA to issue drinking water standards for PFAS and to take various actions for other

[1] Scientific studies have involved a small number of PFAS. These studies have focused mostly on risks associated with ingestion, and less on inhalation or skin contact (i.e., dermal exposure). See discussion under report section on "Health Effects Studies."

purposes. Bills related to the topics covered in this report are noted where relevant in the discussions, and these and other related bills are identified in this report in **Table 2**.

This report focuses on federal authorities under which EPA and other agencies have taken actions to address potential risks of PFAS. It does not discuss other laws under which EPA or other agencies may take additional actions, or actions under state laws.[2] The report begins with a brief discussion of the chemical properties, uses, and varying risks of PFAS, followed by discussions of federal actions, relevant legislation enacted in the 115th Congress, and relevant legislation in the 116th Congress.

Properties and Uses of PFAS

PFAS are a large group of synthesized chemical compounds that do not occur naturally. Chemical manufacturers have produced various types of PFAS for a range of commercial, industrial, and U.S. military applications since the 1940s. EPA identifies over 1,200 PFAS manufactured in the United States over time.[3] The specific types and quantities of PFAS produced and used have varied over time and continue to change.

PFAS are not a single chemical or a single compound, but refer to a group of compounds that share similar chemical structures. Any compound that has the chemical structure of at least one carbon atom attached to two or more fluorine atoms, or a chain of at least two carbon atoms attached to two or more fluorine atoms, may be considered a PFAS.[4] Individual PFAS vary in terms of the numbers of fluorinated carbon atoms. The extent to which a chain of carbon atoms is fluorinated would determine whether a chemical may be considered a perfluoroalkyl substance or a polyfluoroalkyl substance. Given the possible variations in the length of the carbon chain, number of fluorinated carbon atoms, and other atoms attached to the chain, PFAS potentially could include thousands of chemical compounds if every possible combination were created.[5]

Industry and government sources indicate that manufacturers have focused on producing PFAS with longer fluorinated carbon chains, primarily because they reduce the surface tension of liquids and resist heat.[6] Some longer chain PFAS have been used in chemical manufacturing processes to produce fluoropolymers designed for multiple consumer uses, including

[2] Other federal environmental laws also authorize EPA to regulate chemicals or wastes released into the environment (e.g., Clean Air Act, Clean Water Act, and Solid Waste Disposal Act). These laws are noted in the discussion of relevant legislation.

[3] EPA, *EPA's Per-and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 2019, p. 12, https://www.epa.gov/pfas/epas-pfas-action-plan.

[4] For chemical nomenclature principles, rules, and conventions, see Henri A. Favre and Warren H. Powell, *Nomenclature of Organic Chemistry, IUPAC Recommendations and Preferred Names 2013* (Cambridge: Royal Society of Chemistry, 2014). Scientists, industry, and regulators generally have used the recommendations of IUPAC (International Union of Pure and Applied Chemistry) for preferred names to standardize chemical nomenclature.

[5] A chain of fluorinated carbon atoms may be attached to different combinations of other atoms (i.e., functional groups), such as carboxyl, sulfonyl, or sulfonamyl constituents, to form different PFAS.

[6] For example, see 3M Company, *Fluorochemical Use, Distribution, and Release Overview*, May 26, 1999, https://www.regulations.gov/document?D=EPA-HQ-OPPT-2002-0043-0008, and "Addendum II, Background and Voluntary Activities" to Letter from APFO Users, to Stephen L. Johnson, EPA Assistant Administrator, March 14, 2003, https://www.regulations.gov /document?D=EPA-HQ-OPPT-2003-0012-0012. APFO Users refer to a group of fluoropolymer manufacturers that used a specific PFAS, ammonium perfluorooctanoate (APFO), as a processing aid to produce fluoropolymers. Also, see Agency for Toxic Substances and Disease Registry (ATSDR), *Toxicological Profile for Perfluoroalkyls, Draft for Public Comment*, June 2018, pp. 545-546, https://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=1117&tid=237.

- non-stick and heat-resistant coatings for cookware and food packaging, and
- treatment of clothing, leather, and other materials for soil, stain, and water resistance.

In some cases, PFAS may be used only as a processing aid to create a fluoropolymer-based product, and in other cases, PFAS may be a constituent in the resulting product. Fluoropolymer-based products may therefore contain varying amounts of PFAS depending on the manufacturing process. Fluoropolymers containing specific types of PFAS may also break down into other PFAS depending on the conditions.

Some PFAS have also been used as an ingredient in a variety of products, including

- fire suppressants in Aqueous Film Forming Foam (AFFF) used by U.S. military installations, other federal agencies, civilian airports, and local fire departments as Class B agents[7] to extinguish petroleum-based liquid fuel fires; and
- suppressants of oxidizing mist in industrial metal plating operations.

Such products generally contain relatively small concentrations of PFAS that require further dilution of the product for its intended use. For example, AFFF products that contain PFAS are designed to be diluted with water in their application to form an aqueous film that restricts oxygen to extinguish petroleum-based liquid fuel fires.[8]

Perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and certain other related perfluoroalkyl substances accounted for most of the historical production of PFAS prior to their phase-out, discussed below in "Regulation of PFAS in Commerce under TSCA." Manufacturers have transitioned away from these longer chain PFAS because of their potential toxicity and environmental persistence. Policymakers and stakeholders have continued to raise questions about the relative toxicity and persistence of shorter chain or less fluorinated PFAS in comparison to longer chain PFAS. Some policymakers and stakeholders have also expressed concern about the continued use and disposal of existing stocks of longer chain PFAS and products containing these chemicals, including the disposal of AFFF stocks by the federal government, civilian airport operators, and local fire departments, as they move to alternative firefighting foams.

Challenges in Assessing Potential Risks

Similar to other commercial chemicals, releases of PFAS may occur in multiple ways that could result in exposures. PFAS may be released from

- chemical manufacturing or processing operations;
- intended uses (such as the application of AFFF as a fire extinguishing agent);
- disposal of products or wastes containing these chemicals; or
- accidental spills or other unexpected incidents.

Occupational exposures may occur among workers in facilities that manufacture or process PFAS, among workers that use products containing these chemicals (such as firefighters that use AFFF), or among workers involved in disposal.

[7] Firefighting foams are formulated based on the type of fire that a foam is designed to extinguish. For a description of fire classes, see National Fire Protection Association, "Reporter's Guide: All about Fire," https://www.nfpa.org/News-and-Research/Publications-and-media/Press-Room/Reporters-Guide-to-Fire-and-NFPA/All-about-fire.

[8] National Fire Protection Association, *NFPA 11, Standard for Low-, Medium-, and High-Expansion Foam,* 2016 ed., https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=11.

Exposures among the general public would depend on whether a release may move through the environment in a manner that an individual could come into contact with these chemicals. Exposures may also occur among individuals who use a product containing these chemicals. As with any chemical, potential risks to human health and the environment would depend on the properties of the specific PFAS, the conditions under which exposure may occur, and the characteristics of the exposed individual.

How PFAS interact in the environment and in humans or animals would vary depending on the structure, toxicity, persistence, and other properties of the individual chemical. The breakdown rate of a particular chemical once released would determine how long it persists before reacting with other chemicals in the environment or in a human or animal that would produce new chemicals with different properties. Although some have characterized PFAS as "forever chemicals," persistence varies among longer chain versus shorter chain PFAS, and among more fluorinated versus less fluorinated PFAS. Toxicity and potential health effects may also vary. Whereas persistence would affect how long the properties of the chemical remain intact, the potential risks associated with exposure would depend on the toxicity of the specific chemical, the exposure pathway and other exposure factors. Given this variability, evaluating the potential risks of all PFAS as a singular category presents scientific (and regulatory) challenges.

Similarly, regulating all PFAS as a singular category would present challenges in developing a singular risk-based standard (i.e., a singular concentration level). Because of the diversity of the potential universe of these chemicals, designating all PFAS as a singular category for regulatory or reporting purposes would also present challenges in implementation to identify which chemicals would be subject to applicable requirements.

Studies of the potential human health and environmental effects of PFAS have focused on PFOA, PFOS, and certain other longer chain perfluoroalkyls because of their more predominant manufacture and use. Fewer studies have examined shorter chain perfluoroalkyls or polyfluoroalkyls. Although scientific understanding of the potential risks of these chemicals has been evolving, uncertainties remain about health effects that may be associated with exposures to various PFAS. Much of the attention among policymakers, stakeholders, and the general public has focused on drinking water sources. Studies of these chemicals have mostly focused on drinking water or contaminated food sources. Less is known about risks that may be associated with other exposure pathways, such as dermal contact or inhalation.

The Agency for Toxic Substances and Disease Registry (ATSDR)[9] and EPA[10] have developed guidelines for assessing chemical exposure risks under various agency programs. The National Research Council of the National Academy of Sciences has also established risk assessment guidelines and has examined some of the challenges, such as uncertainty stemming from data quantity and quality.[11] Each of these guidelines outlines factors to evaluate potential risks that may be associated with exposure to a specific chemical, including

- toxicity and other properties of the chemical;
- frequency, concentration, and duration of exposure (i.e., the dose);

[9] Agency for Toxic Substances and Disease Registry, *Public Health Assessment Guidance Manual*, 2005 Update, http://www.atsdr.cdc.gov/hac/PHAManual/toc.html.

[10] EPA has developed several guidance documents for assessing human health exposure risks that may be associated with chemical releases, available at https://www.epa.gov/risk/risk-assessment-guidelines.

[11] National Academy of Sciences, National Research Council, *Science and Decisions: Advancing Risk Assessment*, 2009, National Academies Press, Washington, DC, available at http://www.nap.edu/catalog/12209/science-and-decisions-advancing-risk-assessment. This report updates the previous National Research Council risk assessment guidelines issued in 1983.

- pathway of exposure (e.g., inhalation, ingestion, or skin contact);
- interaction with other chemicals that may be present in the environment; and
- age, overall health, and genetic and behavioral characteristics of the exposed individual.

Federal Actions to Address Potential Risks of PFAS

Federal actions to address potential risks from PFAS have primarily been taken under the authorities of TSCA, SDWA, and CERCLA. Most of these actions have focused on PFOS and PFOA, because of predominant past uses, prevalence in the environment stemming from these uses, and the greater availability of scientific research on potential health effects than for other PFAS. Congress has also authorized specific federal actions in separate legislation. See the section on "Relevant Legislation Enacted in the 115th Congress" for a list of these laws.

EPA has taken actions under TSCA over the past few decades to gather and assess existing information on the risks of PFOS, PFOA, and certain other PFAS. Based on the findings, TSCA authorizes EPA to require manufacturers to submit more information if needed to further evaluate potential risks, and the agency has done so. EPA has also required, or worked with, manufacturers to develop new information when existing information on a substance is insufficient to evaluate the risks. If EPA determines that the risks would meet the statutory threshold of "unreasonable" under TSCA, TSCA authorizes EPA to establish various regulatory controls if no other statute addresses the risks. EPA has not rendered a finding of unreasonable risk for any PFAS to date.

Following a series of voluntary industry phase-outs in the United States for the manufacture of PFOS, PFOA, and other related substances, EPA used TSCA authority to promulgate multiple significant new use rules (SNURs) that require manufacturers to notify the agency prior to reintroducing these substances into commerce. TSCA also requires manufacturers to notify EPA of the intent to produce any new PFAS. When information on potential risks is insufficient, EPA has issued orders that restrict the manufacture, processing, distribution, use, disposal or any combination of these activities pending the development of new information on risks. EPA has used information on PFAS gathered under TSCA to inform its actions under SDWA and CERCLA.

For over a decade, EPA has been evaluating PFOA and PFOS under SDWA to determine whether an enforceable Maximum Contaminant Level (MCL) for drinking water provided by public water systems may be warranted. EPA has also included four other PFAS among emerging contaminants being evaluated for potential regulation under SDWA. In 2009, EPA issued provisional health advisories for short-term exposures to PFOA and PFOS in drinking water. In 2016, EPA issued additional health advisories for exposures to these chemicals in drinking water over an individual's lifetime. These health advisories are not enforceable standards for public water systems. However, SDWA grants EPA "emergency powers" to issue enforceable orders to abate an imminent and substantial endangerment to health from a contaminant in drinking water—whether or not the contaminant is regulated under the act. EPA has issued such orders at certain sites where releases of PFOA or PFOS have threatened drinking water sources.

EPA and other federal agencies have also responded to releases of PFAS under CERCLA. DOD administers the vast majority of federal facilities where PFAS has been detected. DOD has been responding to releases of PFOA and PFOS from the use of AFFF at active and decommissioned U.S. military installations under the Defense Environmental Restoration Program. DOD has been phasing out the use of AFFF that contains PFOA or PFOS to reduce the risks of future releases. EPA has responded to releases of PFOA and PFOS under the Superfund program at some sites

located on non-federal lands, in coordination with the states in which these sites are located. Sites addressed under the Superfund program have varied in terms of manufacturing or uses of PFAS.

In February 2019, EPA issued a *PFAS Action Plan* that established an administrative framework for multiple planned actions under TSCA, SDWA, CERCLA, and other related authorities, including

- determining whether to establish an MCL for PFOA and PFOS;
- proposing SDWA monitoring for additional PFAS under the fifth Unregulated Contaminant Monitoring Rule (UCMR5);
- proposing the designation of PFOA and PFOS as hazardous substances under CERCLA (or other related laws that trigger such designation);
- developing "groundwater cleanup recommendations" to guide decisions at Superfund sites and federal facilities under CERCLA (proposed in April 2019);
- proposing additional SNURs under TSCA for potential new uses;
- taking enforcement actions "as appropriate" under available authorities; and
- developing toxicity values and other risk assessment tools to inform decisions under multiple statutes.[12]

The status of federal actions to address potential risks of PFAS under TSCA, SDWA, CERCLA, and other related authorities are discussed in greater detail below.

Health Effects Studies

EPA and other federal agencies have been evaluating potential human health effects that may be associated with exposures to various PFAS. These agencies have revised some of their findings over time to reflect the developing scientific literature. EPA has gathered information about certain PFAS from manufacturers and others to evaluate whether regulation is warranted under TSCA. EPA has also been evaluating whether regulation is warranted under SDWA, and whether response actions are warranted under CERCLA at sites where certain PFAS have been released into the environment.

EPA has reported that studies of exposures to PFOA and PFOS in laboratory animals have identified reproductive and developmental, liver and kidney, and immunological effects, and that exposures to both chemicals have caused tumors in laboratory animals.[13] EPA has also referenced human epidemiology studies observing increased cholesterol levels among exposed populations, with more limited findings related to infant birth weights, effects on the immune system, cancer (for PFOA), and thyroid hormone disruption (for PFOS).[14] Although some studies have identified potential cancer risks, EPA has not classified any PFAS as a likely or known human carcinogen.

Other federal agencies have also been evaluating the risks of certain PFAS. The Centers for Disease Control and Prevention (CDC) has collected blood serum levels and other biomonitoring data from individuals selected for a long-term study of the prevalence of exposures to a range of chemicals, including several PFAS. The ATSDR, National Institute of Environmental Health Sciences (NIEHS), and the interagency National Toxicology Program (NTP), have also been researching potential health effects that may be associated with exposures to certain PFAS.

[12] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 2019, https://www.epa.gov/pfas/epas-pfas-action-plan.

[13] EPA, *Are there health effects from PFAS?*, https://www.epa.gov/pfas/basic-information-pfas#health.

[14] Ibid.

Although the roles of these agencies are not regulatory, data and findings of these studies may be used to inform regulatory decisions of other federal or state agencies.

The following sections discuss the CDC biomonitoring program, ATSDR studies of the toxicological properties of certain PFAS, ATSDR site-specific studies, and related joint CDC/ATSDR studies. EPA's actions to evaluate PFAS are discussed in "Regulation of PFAS in Commerce under TSCA," "Regulation of PFAS and Other Actions under SDWA," and "Environmental Remediation."

CDC Biomonitoring

For two decades, CDC has collected biomonitoring data for multiple environmental chemicals from a group of randomly-selected individuals intended to be representative of the general U.S. population.[15] These data have included blood serum levels for PFOA and PFOS and 14 other PFAS. This effort is part of the National Health and Nutrition Examination Survey (NHANES).[16] The biomonitoring data that CDC has collected generally indicate that blood serum levels for the selected group of perfluoroalkyl substances among participating individuals declined between 1999 and 2016 (the most recent year for which biomonitoring data are available for these specific chemicals). Declining blood serum levels for a particular chemical generally indicate reduced exposures. CDC tracks the biomonitoring data by age group, gender, and race/ethnicity, but not occupation. CDC cautions that "finding measureable amounts of PFAS in [blood] serum does not imply that the levels of PFAS cause an adverse health effect."[17] The likelihood that a specific amount of PFAS in blood serum may be associated with an adverse health effect requires further study. The actual levels of PFAS in blood serum among the broader U.S. population is also uncertain, as the sample size is relatively small.

ATSDR Draft Toxicological Profile

Section 104(i) of CERCLA authorizes ATSDR to prepare toxicological profiles for hazardous substances, pollutants, or contaminants found at contaminated sites that warrant federal attention.[18] Over the last decade, ATSDR has issued three draft Toxicological Profiles for perfluoroalkyls (i.e., perfluoroalkyl substances) to identify potential health effects that may be associated with exposures to certain chemicals within this group of compounds. ATSDR typically issues drafts for public comment prior to finalizing a Toxicological Profile for an individual chemical or a group of chemicals.[19] ATSDR has produced multiple drafts for perfluoroalkyls

[15] CDC has collected biomonitoring data for a total of 346 "environmental" chemicals, including PFOS, PFOA and 14 other PFAS. For the most recent presentation of CDC biomonitoring data, see CDC, *Fourth National Report on Human Exposure to Environmental Chemicals, Updated Tables,* January 2019, Volume One, https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Volume1_Jan2019-508.pdf.

[16] CDC began collecting biomonitoring data for NHANES in 1999 and has continued to collect data annually. CDC reports that approximately 7,000 randomly-selected individuals across the United States have the opportunity to participate in the latest NHANES each year. CDC indicates that participation in the survey is confidential and voluntary, and that selected participants receive a personal interview with a standardized physical examination. The survey results are intended to provide an objective assessment of the overall health of the general U.S. population based on the group of randomly-selected individuals. CDC, "National Health and Nutrition Examination Survey," https://www.cdc.gov/nchs/nhanes/index.htm.

[17] CDC, "Per- and Polyfluorinated Substances (PFAS) Factsheet," April 7, 2017, https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html.

[18] 42 U.S.C. §9604(i).

[19] For information on the development of Toxicological Profiles, see "Additional Resources" on the ATSDR website, https://www.atsdr.cdc.gov/toxprofiledocs/additional_resources.html/#Background.

without issuing a final version so far, reflecting continuing developments in the scientific literature. ATSDR issued its first draft Toxicological Profile for perfluoroalkyls in May 2009, its second draft in August 2015, and its third draft in June 2018.[20]

For its third draft, ATSDR determined that sufficient scientific information was available to evaluate 14 perfluoroalkyls, including PFOA and PFOS. ATSDR observed that scientific studies of this group of perfluoroalkyls have focused mostly on risks associated with ingestion, and less on inhalation or skin contact (i.e., dermal exposure). ATSDR determined that scientific information was sufficient to establish provisional ingestion Minimal Risk Levels (MRLs) for four of these 14 perfluoroalkyls:

- PFOA,
- PFOS,
- perfluorohexane sulfonic acid (PFHxS), and
- perfluorononanoic acid (PFNA).[21]

ATSDR proposed the following values for these MRLs in milligrams per kilograms per day (mg/kg/day) to quantify an intermediate exposure level (i.e., daily exposure from 15 to 364 days) for each chemical that accounts for variance in bodyweight among exposed individuals.[22]

- PFOA (3×10^{-6} mg/kg/day or 0.000003 mg/kg/day)
- PFOS (2×10^{-6} mg/kg/day or 0.000002 mg/kg/day)
- PFHxS (2×10^{-5} mg/kg/day or 0.00002 mg/kg/day)
- PFNA (3×10^{-6} mg/kg/day or 0.000003 mg/kg/day)

These values are smaller than in previous draft Toxicological Profiles and are among the smallest MRLs for the body of chemicals that ATSDR has evaluated.[23] Smaller values generally indicate greater toxicity in comparison to chemicals with larger values, given the same exposure. Although the proposed MRLs for the PFAS referenced above are relatively small, the values are based on conservative assumptions and incorporate uncertainty factors. The value of an MRL alone therefore does not necessarily indicate conclusiveness of the level of risk.

MRLs are estimates of daily human exposure to a chemical that is not expected to present an appreciable risk of adverse non-cancer health effects over a specified route (i.e., pathway) and duration of exposure.[24] MRLs are intended to serve only as screening levels to identify sites that warrant further evaluation to determine whether actions may be needed to mitigate risks. Some stakeholders have characterized the proposed MRLs as recommended standards for regulation or site remediation. However, ATSDR emphasized in its June 2018 draft that "MRLs are not intended to define clean-up or action levels."[25]

[20] ATSDR, *Toxicological Profile for Perfluoroalkyls: Draft for Public Comment*, June 2018, https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1117&tid=237.

[21] The 10 other PFAS that ATSDR evaluated have chains of fluorinated carbons that range from four to 12 carbon atoms.

[22] ATSDR calculates acute exposure levels based on daily exposure from 1 to 14 days, intermediate exposure levels based on daily exposure from 15 to 364 days, and chronic exposure levels based on daily exposure for 1 year or longer.

[23] See ATSDR, *Minimal Risk Levels (MRLs) List*, June 2019, https://www.atsdr.cdc.gov/mrls/mrllist.asp.

[24] For more information, see ATSDR "Minimal Risk Levels (MRLs)," https://www.atsdr.cdc.gov/minimalrisklevels/index.html.

[25] ATSDR, *Toxicological Profile for Perfluoroalkyls*: *Draft for Public Comment*, June 2018, p. A-1.

Although some perfluoroalkyls have been detected in ambient air at certain locations, ATSDR noted in its June 2018 draft that scientific information on exposure through inhalation is relatively limited. ATSDR concluded that the data were insufficient to establish provisional MRLs for inhalation exposures for any of these 14 perfluoroalkyls.

In its June 2018 draft, ATSDR also noted that findings from epidemiological studies that examined potential associations between serum PFAS levels and the occurrence of adverse health effects were not consistent across studies.[26] ATSDR examined a range of epidemiological studies, including those in which reported serum PFAS levels were hundreds or thousands of times that of the general population. Because the findings of epidemiological studies were inconsistent, ATSDR relied on animal studies to calculate provisional MRLs.[27]

ATSDR Site-Specific Studies

Under Section 104(i) of CERCLA, ATSDR has also conducted or funded multiple site-specific studies to examine potential health effects where certain PFAS were released into the environment.[28] State health departments performed some of these studies through cooperative agreements with ATSDR. These studies have focused on sites where PFOS, PFOA, and various other PFAS were manufactured, used, or disposed. ATSDR reports that the agency or a state health department has conducted site-specific studies for more than 20 sites across the United States.[29] Some of these sites are federal facilities, such as U.S. military installations, whereas other sites are privately owned.

Joint CDC and ATSDR Studies

In addition to ATSDR site-specific studies under CERCLA, Congress has authorized CDC and ATSDR to conduct joint scientific studies to better understand the potential risks associated with exposure to PFAS. Subject to annual appropriations, Section 316 of the National Defense Authorization Act for Fiscal Year 2018 (P.L. 115-91), as amended, authorizes CDC and ATSDR to conduct a joint study in consultation with DOD on the "human health implications" from potential exposure in "drinking water, ground water, and any other sources of water and relevant exposure pathways." Using appropriations made available to CDC and ATSDR for the joint study, the agencies have worked to develop procedures and methods for studying potential health risks at sites with PFAS contamination. In April 2019, ATSDR announced that it would fund epidemiological studies at multiple sites.[30] Section 316 also authorizes CDC and ATSDR to conduct exposure assessments at no fewer than eight current or former U.S. military installations where PFAS contamination has been discovered in drinking water, groundwater, or any other sources of water, and relevant exposure pathways. In February 2019, CDC and ATSDR announced the selection of eight military installations for such exposure assessments.[31]

[26] Ibid., p. 635.

[27] Ibid., pp. A-11 to A-109.

[28] 42 U.S.C. §9604(i).

[29] ATSDR, "How is ATSDR involved investigating PFAS in the environment?," https://www.atsdr.cdc.gov/pfas/atsdr_sites_involvement.html.

[30] ATSDR, "PFAS Research Notice of Funding Opportunity," https://www.atsdr.cdc.gov/pfas/PFAS-Research-NOFO.html.

[31] For a list of these military installations, see ATSDR, "PFAS Exposure Assessments," https://www.atsdr.cdc.gov/pfas/PFAS-Exposure-Assessments.html.

Regulation of PFAS in Commerce under TSCA

EPA's PFAS Action Plan includes over 1,200 PFAS out of approximately 85,000 chemicals in the inventory.[32] EPA added some of these PFAS to the inventory soon after the original enactment of TSCA in 1976, and added others over time as manufacturers notified the agency of the intent to introduce these PFAS into commerce. EPA reports that over 600 of these PFAS were produced in the United States between 2006 and 2016.[33]

Using the information gathering authorities of TSCA, EPA has obtained information on the risks of various PFAS to assess if such risks may be unreasonable to warrant regulation under the statute. In 2000, the sole manufacturer of PFOS and related perfluoroalkyl sulfonate chemicals (3M) reported to EPA that information it had obtained on the potential risks of these chemicals justified a voluntary phase-out of their production.[34] The phase-out occurred over several years. In 2006, EPA reached an agreement with a group of manufacturers that produced PFOA and related perfluoroalkyl carboxylate chemicals for the voluntary phase-out of these chemicals over a ten-year period.[35]

Subsequent to each phase-out, EPA promulgated "significant new use rules" (SNURs) under Section 5(a)(2) of TSCA to require any manufacturer to notify the agency before reintroducing these chemicals into commerce for historical uses.[36] Promulgating SNURs for phased-out uses of existing chemicals is not uncommon. EPA also promulgated SNURs to require notification of entirely new uses of existing PFAS. SNURs give EPA the opportunity to evaluate risks associated with planned uses before they occur.

Under Section 5(a)(1), EPA has also continued to evaluate the risks of new chemicals, including new PFAS, as manufacturers have notified the agency of their intent to produce new chemicals.[37] For some premanufacture notices, EPA has determined that the submitted information is not sufficient to assess whether risks associated with a new PFAS may be unreasonable. In such instances, EPA has issued orders under Section 5(e) to require the manufacturer to produce new information on the chemical.[38] EPA has also used Section 5(e) orders to place restrictions on a new PFAS until the manufacturer submits the requested information to EPA.

Section 6 of TSCA authorizes EPA to establish regulatory controls on any stage of the lifecycle of a chemical (i.e., manufacture, processing, distribution, use, and disposal) only if such controls would be necessary to mitigate "unreasonable risk of injury to health or the environment."[39] To

[32] EPA, *EPA's Per-and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 2019, pp. 11-12, https://www.epa.gov/pfas/epas-pfas-action-plan. EPA, "About the TSCA Chemical Substance Inventory," https://www.epa.gov/tsca-inventory/about-tsca-chemical-substance-inventory.

[33] Ibid.

[34] Letter from William A. Weppner, director of 3M, Specialty Materials Markets Group, Environmental Health, Safety, and Regulatory Affairs, to Charles Auer, EPA Director of Chemical Control Division, Office of Pollution Prevention and Toxics, "Re: Phase-out Plan for POSF-Based Products," July 7, 2000, https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OPPT-2002-0043-0009.

[35] For more information, see EPA, "Fact Sheet: 2010/2015 PFOA Stewardship Program," updated August 9, 2018, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program.

[36] 15 U.S.C. §2604(a)(2).

[37] 15 U.S.C. §2604(a)(1).

[38] 15 U.S.C. §2604(e).

[39] 15 U.S.C. §2605.

date, EPA has not rendered such finding of unreasonable risk for any PFAS to warrant regulatory controls under Section 6.

Voluntary Industry Phase-Out

Chemical manufacturers may choose to phase-out the production of a chemical as a business decision. Following negotiations with EPA, 3M—the sole manufacturer of PFOS and related perfluoroalkyl sulfonate chemicals—announced a voluntary phase-out of these chemicals in 2000 based on risk information that it had gathered.[40] Pursuant to Section 8(e) of TSCA, the manufacturer had submitted this information to EPA after it determined that the information met the statutory criteria for reporting.[41] In 2006, EPA initiated the PFOA Stewardship Program with eight major manufacturers to reduce the extent to which PFOA and related perfluoroalkyl carboxylate chemicals enters the environment by 95% below 2010 levels and to completely phase-out the manufacture of these chemicals by 2015. In 2017, EPA announced that all eight manufacturers had met their phaseout goals.[42]

Information Gathering

To evaluate chemicals for potential regulation, other provisions of Section 8 also authorize EPA to gather existing information from manufacturers, processors, and distributors. For example, EPA has used Section 8(a) to gather information on manufacturing volumes of PFAS above particular thresholds at chemical manufacturing facilities.[43] Under Section 8(d), EPA has required that chemical manufacturers, processors, and distributors submit lists of health and safety studies related to PFAS to the agency.[44]

If EPA finds that existing information is insufficient to evaluate risks, Section 4 of TSCA authorizes EPA to require manufacturers or processors to test a chemical and submit the findings to the agency.[45] In 2005, EPA determined that existing information on fluoropolymers and other fluorinated compounds that contain PFOA and related chemicals was insufficient to assess potential environmental effects.[46] To obtain new information, EPA entered into Section 4 consent orders with two industry organizations requiring them to test various PFAS-containing resins, dispersions, paper, and textiles for environmental effects.[47] In 2015, EPA concluded that the testing data were sufficient at that time to determine that these uses were unlikely to present unreasonable risks.[48]

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[40] EPA, "EPA and 3M Announce Phase Out of PFOS," Press Release, May 16, 2000, https://archive.epa.gov/epapages/newsroom_archive/newsreleases/33aa946e6cb11f35852568e1005246b4.html.

[41] 15 U.S.C. §2607(e). Section 8(e) requires chemical manufacturers, processors, and distributors to report any available information on "substantial risk of injury to human health or the environment" associated with any chemical that they produce, process, or distribute.

[42] Ibid.

[43] 15 U.S.C. §2607(a).

[44] 15 U.S.C. §2607(d).

[45] 15 U.S.C. §2603.

[46] EPA, "Final Enforceable Consent Agreement and Testing Consent Order for Two Formulated Composites of Fluorotelomer-based Polymer Chemicals; Export Notification," 70 *Federal Register* 39623-39630, July 8, 2005, and EPA, "Final Enforceable Consent Agreement and Testing Consent Order for Four Formulated Composites of Fluoropolymer Chemicals; Export Notification," 70 *Federal Register* 39630-39637, July 8, 2005.

[47] Ibid.

[48] Letter from Wendy Cleland-Hammett, EPA, to Jessica S. Bowman, FluoroCouncil, "Re: Conclusion of Enforceable Consent Agreement for the Laboratory-Scale Incineration Testing of Fluorotelomer-Based Polymers," July 9, 2015,

EPA has promulgated multiple SNURs under Section 5(a)(2) to require notification of various PFAS for significant new uses.[49] EPA promulgated a SNUR in 1987 for any use of hexafluoropropylene oxide other than as an intermediate in the manufacture of fluorinated chemicals in an enclosed process.[50] Between 2002 and 2007, EPA promulgated SNURs that generally designated all uses of PFOS and 270 related perfluoroalkyl sulfonate chemicals as "significant new uses," except certain specialized existing uses.[51] In 2013, EPA promulgated a SNUR that designated uses of PFOA and related perfluoroalkyl carboyxlate chemicals in carpets or carpet treatments as significant new uses requiring notification.[52] In 2015, EPA proposed a SNUR that would designate all uses of PFOA and related perfluoroalkyl carboyxlate chemicals as "significant new uses."[53] *EPA's PFAS Action Plan* states that it "plans to follow up on the 2015 SNUR."[54]

Section 5(a)(1) authorizes the primary information gathering mechanism for new chemicals that have never been manufactured in commerce. Prior to producing a new chemical, a manufacturer must submit a premanufacture notice to EPA. In 1984, EPA determined under Section 5(h)(4) that most polymers entering into commerce do not present unreasonable risks and exempted them from premanufacture notification.[55] This exemption is commonly referred to as the "polymer exemption." In 2010, EPA determined that polymers containing perfluoroalkyl constituents may present unreasonable risk and promulgated a new rule requiring notification prior to their manufacture. This regulatory change became effective in 2012 and is intended to allow EPA to determine whether regulation of such polymers may be warranted.[56]

If EPA were to determine that information provided in a premanufacture notice is insufficient to assess risks, Section 5(e) authorizes EPA to issue an order that requires the manufacturer to develop new information on the new chemical. EPA has issued Section 5(e) orders for specific PFAS. For example, EPA issued a Section 5(e) consent order in 2009 for hexafluoropropylene

and letter from Wendy Cleland-Hammett, EPA, to Jessica S. Bowman, FluoroCouncil, "Re: Conclusion of Enforceable Consent Agreement for the Incineration Testing of Four Formulated Composites of Fluoropolymer Chemicals," July 9, 2015, https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OPPT-2004-0001-0139.

[49] SNURs, including those for PFAS, are consolidated and codified in federal regulations at 40 C.F.R. Part 721.

[50] 40 C.F.R. §721.4160.

[51] These rules are consolidated and codified in federal regulation at 40 C.F.R. §721.9582.

[52] 40 C.F.R. §721.10536.

[53] EPA, "Significant New Use Rules: Long-Chain Perfluoroalkyl Carboxylate and Perfluoroalkyl Sulfonate Chemical Substances," proposed rule, 80 *Federal Register* 2885-2898, January 21, 2015.

[54] EPA, *EPA's Per-and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 2019, p. 18, https://www.epa.gov/pfas/epas-pfas-action-plan.

[55] EPA, "Premanufacture Notification Exemptions; Exemptions for Polymers," final rule, 49 *Federal* Register 46066-46091, November 21, 1984.

[56] EPA, "Premanufacture Notification Exemption for Polymers; Amendment of Polymer Exemption Rule to Exclude Certain Perfluorinated Polymers," 75 *Federal Register* 4295-4305, January 27, 2010. The rule is codified at 40 C.F.R. §723.250. For the purpose of this rule, EPA defined the term "polymer" to mean "a chemical substance consisting of molecules characterized by the sequence of one or more types of monomer units and comprising a simple weight majority of molecules containing at least 3 monomer units which are covalently bound to at least one other monomer unit or other reactant and which consists of less than a simple weight majority of molecules of the same molecular weight. Such molecules must be distributed over a range of molecular weights wherein differences in the molecular weight are primarily attributable to differences in the number of monomer units. In the context of this definition, sequence means that the monomer units under consideration are covalently bound to one another and form a continuous string within the molecule, uninterrupted by units other than monomer units."

oxide dimer acid and its ammonium salt (i.e., the GenX chemicals).[57] According to its manufacturer, the GenX chemicals are used to make fluoropolymers without the use of PFOA.[58]

Risk Assessment

EPA has assessed the risks of PFOS, PFOA, and other PFAS on multiple occasions using information that the agency has collected under TSCA. In 2000, EPA's assessment of PFOS consisted of summarizing various animal studies and did not involve a formal determination on whether the risks were considered unreasonable.[59] In 2002, EPA issued a draft assessment for PFOA using a similar approach it took for PFOS.[60] As EPA has gathered more information, the agency has compared the findings of newer studies with those of existing studies to determine if the agency's understanding of the risks of PFAS warranted revision. For instance, EPA submitted an updated draft assessment for PFOA in 2005 to its Science Advisory Board for review.[61] These assessments have informed the agency's subsequent consideration of whether regulation of certain PFAS may be warranted under TSCA.

Regulatory Action

In 2009, EPA announced its intention to consider initiating a Section 6 rulemaking under TSCA to manage risks of long-chain PFAS.[62] EPA noted its intent to develop more detailed assessments to support a finding of unreasonable risk. If EPA were to make such a finding, Section 6 authorizes EPA to promulgate a rule to mitigate the unreasonable risk. In promulgating the rule, EPA may select among several regulatory options, including

- a prohibition or restriction on the manufacture, processing, distribution of the chemical or a limitation on the amount in which the chemical may be manufactured, processed, or distributed for all or particular uses;
- a requirement to label the chemical with clear and adequate warnings and instructions with respect to its use, distribution, or disposal;
- a requirement to track the processes used to manufacture or process the chemical or conduct tests that are reasonable and necessary to assure compliance with the rule;
- a prohibition or restriction on commercial use or disposal of a chemical; or

[57] EPA, "Regulation of New Chemical Substances Pending Development of Information, In the Matter of DuPont Company, Premanufacture Notice Numbers: P-08-508 and P-08-509, Consent Order and Determinations Supporting Consent Order," January 2009, https://chemview.epa.gov/chemview/proxy?filename=sanitized_consent_order_p_08_0508c.pdf. According to EPA, the agency assigned P-08-508 and P-08-509 to the GenX chemicals.

[58] Chemours, "Sustainability: GenX," https://www.chemours.com/Industrial_Bakery_Solutions/en_GB/sustainability/dibs_genx.html.

[59] Memorandum from Jennifer Seed, EPA, to Charlie Auer, EPA, "Hazard Assessment of PFOS," August 31, 2000, https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OPPT-2002-0043-0010.

[60] EPA, *Draft Hazard Assessment of Perfluorooctanoic Acid and its Salts*, February 20, 2002 (corrected April 15, 2002), https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OPPT-2002-0051-0004.

[61] EPA, *Draft Risk Assessment of the Potential Human Health Effects Associated with Exposure to Perfluorooctanoic Acid and its Salts*, SAB review draft, January 4, 2005.

[62] EPA, *Long-Chain Perfluorinated Chemicals (PFCs) Action Plan*, December 30, 2009, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/long-chain-perfluorinated-chemicals-pfcs-action-plan.

- a requirement for manufacturers and processors of the chemical to notify distributors, those in possession of, or exposed to, the chemical, and the public of the agency's unreasonable risk finding, and to replace or repurchase the chemical if requested.

If EPA were to find an "unreasonable risk," Section 9 requires EPA to determine whether other federal authorities may be available to mitigate the risk before establishing regulatory controls.[63]

Since its announcement in 2009 to consider a Section 6 rulemaking, EPA has not made an unreasonable risk finding for any PFAS. Additionally, none of the 10 chemicals that EPA prioritized in 2016 for risk evaluation under Section 6 are PFAS.[64]

Although EPA has not restricted existing PFAS through Section 6 rulemaking, the agency has issued Section 5(e) orders to restrict the manufacture, processing, distribution, use, and disposal of new PFAS reported to the agency under Section 5(a)(1). These restrictions remain effective until the manufacturer submits the new information requested by EPA. As an example, the Section 5(e) consent order for the two GenX chemicals noted above requires the manufacturer to "recover and capture (destroy) or recycle [both chemicals] at an overall efficiency of 99% from all effluent process streams and the air emissions (point source and fugitive)."[65]

Enforcement

Although EPA has not established Section 6 regulatory controls on any PFAS, the agency has used its enforcement authorities under TSCA to assess fines and penalties for violations of other statutory requirements. Section 15 of TSCA prohibits certain acts such as

- failure or refusal to comply with any requirement, rule, order, or consent agreement under Title I, or any requirement, rule, or order under Title II;
- use of a chemical for commercial purposes that violates any requirements established under Sections 5, 6, or 7;
- failure or refusal to establish or maintain records, submit reports, notices or other information, or permit access to or copying records, as required by TSCA; and
- failure or refusal to permit entry or inspection under Section 11.[66]

Section 16 authorizes civil and criminal penalties for taking actions that are prohibited under Section 15.[67] In 2005, EPA announced a settlement with DuPont for reporting violations under Section 8(e) of TSCA and the Resource Conservation and Recovery Act (RCRA) that involve PFOA. According to EPA, the settlement required DuPont to pay $10.25 million in civil penalties and perform Supplemental Environmental Projects valued at $6.25 million.[68] EPA has continued

[63] 15 U.S.C. §2608.

[64] EPA, "First Ten Chemicals for Risk Evaluation," https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluations-existing-chemicals-under-tsca#ten.

[65] EPA, "Regulation of New Chemical Substances Pending Development of Information, In the Matter of DuPont Company, Premanufacture Notice Numbers: P-08-508 and P-08-509, Consent Order and Determinations Supporting Consent Order," January 2009, p. 36, https://chemview.epa.gov/chemview/proxy?filename=sanitized_consent_order_p_08_0508c.pdf.

[66] 15 U.S.C. §2614.

[67] 15 U.S.C. §2615.

[68] EPA, "Reference News Release: EPA Settles PFOA Case Against DuPont for Largest Environmental Administrative Penalty in Agency History," Press Release, December 14, 2005, https://www.epa.gov/enforcement/reference-news-release-epa-settles-pfoa-case-against-dupont-largest-environmental. Such projects are intended to require the violator to

to take enforcement actions for other violations related to PFAS. For example, EPA sent a Notice of Violation to Chemours in February 2019 for alleged violations of Sections 5 and 8 of TSCA involving GenX chemicals.[69]

Regulation of PFAS and Other Actions under SDWA

SDWA authorizes EPA to promulgate national primary drinking water regulations for contaminants in water provided by public water systems.[70] These regulations generally include an enforceable standard (MCL) and associated monitoring, treatment, and reporting requirements. For substances that are not regulated under SDWA, EPA is authorized to issue health advisories that identify non-enforceable levels of contaminants in drinking water that are expected to be protective of sensitive populations.[71] For both regulated and unregulated contaminants, SDWA emergency powers authorize EPA to take actions to abate an imminent and substantial endangerment to public health.[72]

To date, EPA has not promulgated drinking water regulations for any PFAS but plans to propose preliminary regulatory decisions for PFOA and PFOS in 2019. In 2016, the agency issued non-enforceable Lifetime Health Advisories for PFOS and PFOA.[73] EPA also has used SDWA emergency powers to respond to releases of PFOA and PFOS detected in public water systems at several sites. The following sections further discuss these SDWA authorities and related actions.

Health Advisories

SDWA authorizes EPA to issue health advisories for contaminants that are not regulated under the act.[74] Health advisories include non-enforceable concentrations for contaminants in drinking water and often include values for different exposure durations (e.g., one day, a lifetime). These non-regulatory levels are intended to help water suppliers and others address contaminants for which EPA has not promulgated drinking water standards. Advisories provide technical guidance on identifying, measuring, and treating such contaminants. In May 2016, EPA established the Lifetime Health Advisory levels for PFOA and PFOS at 70 parts per trillion (ppt), separately or combined.[75] 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

provide an environmental benefit in addition to paying a monetary penalty as a punitive measure. See the discussion of "Supplemental Environmental Projects (SEPs)" in CRS Report RL34384, *Federal Pollution Control Laws: How Are They Enforced?*, by Robert Esworthy.

[69] EPA, "Chemours Toxic Substances Control Act Notice of Violation—February 14, 2019," https://www.epa.gov/nc/chemours-toxic-substances-control-act-notice-violation-february-14-2019.

[70] 42 U.S.C. §300g-1. SDWA does not cover residential wells.

[71] 42 U.S.C. §300g-1(b)(1)(F).

[72] 42 U.S.C. §300i.

[73] 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.

[74] 42 U.S.C. §300g-1(b)(1)(F).

[75] EPA, "Lifetime Health Advisories and Health Effects Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate," 81 *Federal Register* 33250, May 25, 2016. Further information on the advisories is available at https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos.

water and 80% is from diet, dust, air or other sources). These levels are intended to protect the most sensitive subpopulations (i.e., nursing infants), with a margin of protection, over a lifetime of daily exposure.[76] Previously in January 2009, EPA issued provisional health advisory levels of 400 ppt for PFOA and 200 ppt for PFOS to address short-term exposures to these substances from drinking water.

National Primary Drinking Water Regulations

For more than a decade, EPA has been assessing whether to promulgate national primary drinking water regulations for PFOA and PFOS. SDWA specifies a multistep process for evaluating contaminants to determine whether a national regulation is warranted.[77] 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.

Identifying Emerging Contaminants That May Warrant Regulation

Every five years, EPA is required to publish a contaminant candidate list (CCL) that identifies contaminants that are known or anticipated to occur in public water systems and that may require regulation under the act.[78] In 2009, EPA placed PFOA and PFOS on the third such list (CCL 3) for evaluation.[79] In 2016, EPA published the fourth list, CCL 4, which carried over PFOA and PFOS.[80] EPA carried forward these contaminants to continue evaluating health effects, gathering national occurrence data, and developing analytical methods.[81]

Monitoring for Emerging Contaminants in Public Water Systems

SDWA Section 1445 requires EPA to promulgate, every five years, an unregulated contaminant monitoring rule (UCMR) that requires public water systems to test for no more than 30 such contaminants.[82] A representative sample of systems serving 10,000 or fewer people is required to conduct monitoring.[83]

In 2012, EPA issued the third UCMR (UCMR 3), under which 4,864 public water systems tested their drinking water for 6 PFAS—including PFOA and PFOS—between January 2013 and December 2015.[84] Overall, 63 of the 4,864 (1.3%) water systems reported at least 1 sample with

[76] 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.

[77] 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).

[78] 42 U.S.C. §300g-1(b)(1)(B).

[79] EPA, "Drinking Water Contaminant 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.

[80] EPA, "Drinking Water Contaminant Candidate List 4—Final," 81 *Federal Register* 81099, November 17, 2016. For more information, see https://www.federalregister.gov/documents/2016/11/17/2016-27667/drinking-water-contaminant-candidate-list-4-final.

[81] EPA, "Drinking Water Contaminant Candidate List 4—Final," 81 *Federal Register* 81099, November 17, 2016.

[82] 42 U.S.C. §300j-4.

[83] 42 U.S.C. §300g-4(a)(2).

[84] EPA, *Data Summary of the Third Unregulated Contaminant Monitoring Rule*, January 2017, p. 11,

PFOA and/or PFOS (separately or combined) concentrations exceeding EPA's health advisory level of 70 ppt.[85] EPA estimates that these 63 water systems serve approximately 5.5 million individuals.[86]

According to *EPA's PFAS Action Plan*, the agency intends to propose monitoring requirements for other PFAS in the next UCMR in 2020. As of August 2019, EPA had developed an analytical method to detect 18 PFAS in drinking water supplies.[87] The plan states that the agency would use the monitoring data gathered through UCMR 5 to evaluate the national occurrence of additional PFAS.[88] The agency has been developing analytical methods for monitoring additional PFAS.

Regulatory Determinations

SDWA requires EPA, every five years, to make a regulatory determination (RD)—a determination of whether or not to promulgate a drinking water regulation—for at least five contaminants on the CCL.[89] To determine 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 public water systems.[90]

To meet the statutory criteria for making an RD, EPA requires a peer-reviewed risk assessment; a widely available analytical method for monitoring; and nationally representative occurrence data.[91]

https://www.epa.gov/dwucmr/data-summary-third-unregulated-contaminant-monitoring-rule.The PFAS for which monitoring was conducted include PFOA, PFOS, perfluorononanoic acid, perfluorohexanesulfonic acid, perfluoroheptanoic acid, and perfluorobutanesulfonic acid (PFBS). For additional details on monitoring requirements, see https://www.epa.gov/dwucmr.

[85] 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.

[86] Email communication with EPA, May 30, 2019. Monitoring results for individual water systems are available on EPA's UCMR 3 website: https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule.

[87] EPA, *Method 537.1, Determination of Selected Per- and Polyfluorinated Alkyl Substance in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)*, November 2018, https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=537290&Lab=NERL.

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

[89] 42 U.S.C. §300g-1(b)(1)(B)(ii).

[90] 42 U.S.C. §300g-1(b)(1)(A). A determination by the Administrator not to regulate a contaminant is subject to judicial review (42 U.S.C. §300g-1(b)(1)(B)(ii)(IV)).

[91] EPA, "Drinking Water Contaminant Candidate List 4—Final," 81 *Federal Register* 81102-81104, November 17, 2016.

During the third RD round in 2014, when EPA published preliminary RDs for contaminants on CCL 3 (which included PFOA and PFOS), UCMR 3 monitoring was underway and national occurrence data for PFOA and PFOS were not available. EPA would not have been able to include any PFAS for the third RD without such data. In 2016, EPA included PFOA and PFOS on the agency's list of unregulated contaminants that met EPA data availability requirements to make RDs.[92]

The fourth round of RDs is scheduled for 2021. SDWA does not prevent EPA from making determinations outside of that five-year cycle.[93] According to the *Spring 2019 Unified Regulatory Agenda*, EPA will propose preliminary RDs for PFOA and PFOS by the end of 2019 and make final determinations by the end of 2020.[94] Several bills in the 116th Congress would direct EPA to promulgate national primary drinking water regulations and establish an MCL for individual or total PFAS, including Senate-passed S. 1790, National Defense Authorization Act for FY2020; S. 1507; S. 1473; H.R. 2377, H.R. 4033, and S. 2466.

Standard Setting

Once the EPA Administrator makes a determination to regulate a contaminant, SDWA requires EPA to propose a rule within 24 months and promulgate a "national primary drinking water regulation" within 18 months after the proposal.[95] When proposing a regulation, EPA must also propose a non-enforceable maximum contaminant level goal (MCLG), at which no known or anticipated adverse health effects are expected to occur and which allows an adequate margin of safety.[96] 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.[97] This level is further reduced to be protective of sensitive populations.

Drinking water regulations generally include an MCL—an enforceable limit for a contaminant in public water supplies.[98] SDWA requires EPA to set the MCL as close to the MCLG as feasible.[99] When assessing feasibility, the law directs EPA to consider the best available (and field-demonstrated) treatment technologies, taking cost into consideration.[100] Regulations also include

[92] EPA, "Drinking Water Contaminant Candidate List 4—Final," 81 *Federal Register* 81102-81104, November 17, 2016.

[93] 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.

[94] 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.

[95] 42 U.S.C. §300g-1(b)(2). EPA may extend the deadline to publish a final rule for up to nine months, by notice in the *Federal Register*.

[96] 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." 42 U.S.C. §300g-1(b)(4)(A).

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

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

[99] 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 (42 U.S.C. §300g-1(b)(7)(A)).

[100] 42 U.S.C. §300g-1(b)(4)(D).

monitoring, treatment, and reporting requirements. EPA has promulgated regulations that cover several similar contaminants and typically establishes an individual 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.[101] The law directs EPA to review—and if necessary revise—each regulation every six years. A revision may maintain or provide greater health protection, but it may not reduce protection.[102]

Several bills in the 116th Congress would direct EPA to promulgate national primary drinking water regulations and establish an MCL for individual or total PFAS, including Senate-passed S. 1790, National Defense Authorization Act for FY2020; S. 1507; S. 1473; H.R. 2377, and H.R. 4033. Among other amendments to SDWA, S. 1790, Title LXVII, Subtitle B and S. 1507 reported, would also establish a standard-setting process specifically for PFAS.

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.[103] 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 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 contamination of drinking water supplies in four cases, three of which involved DOD sites.[104] Required actions included treating drinking water, offering connection to a public water system, or providing bottled water where PFOA or PFOS concentrations were above 70 ppt.

SDWA Section 1431 emergency orders can require a person to perform an action to abate an imminent and substantial danger to public health. However, such orders do not establish liability in a manner comparable in scope to CERCLA, nor do such orders create or otherwise trigger liability under CERCLA.

For additional discussion of drinking water issues related to PFAS, see CRS Report R45793, *PFAS and Drinking Water: Selected EPA and Congressional Actions*, by Elena H. Humphreys and Mary Tiemann.

Environmental Remediation

As with other chemicals, the federal role under CERCLA in remediating environmental contamination from releases of PFAS has focused on releases from federal facilities, and releases

[101] 42 U.S.C. §300g-1(b)(10).

[102] 42 U.S.C. §300g-1(b)(9).

[103] 42 U.S.C. §300i.

[104] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 14, 2019, pp. 55-56, https://www.epa.gov/pfas/epas-pfas-action-plan.

at sites on non-federal lands designated for priority federal attention under the Superfund program in coordination with the states in which the sites are located. The vast majority of PFAS known to be released from federal facilities has occurred from the use of AFFF at U.S. military installations, some of which have involved National Guard facilities. DOD has been responding to these releases under the Defense Environmental Restoration Program, pursuant to CERCLA and to SDWA emergency powers orders at the three U.S. military installations referenced above. The National Aeronautics and Space Administration (NASA) has also responded to releases of PFOA and PFOS from the use of AFFF detected at the Wallops Flight Facility in Virginia.[105] As for other chemicals, the states have generally played a more prominent role under state law in responding to releases of PFAS at sites on non-federal lands that are not designated under the Superfund program. Authorities of CERCLA, and actions related to PFAS under the EPA Superfund program and DOD Defense Environmental Restoration Program, are discussed below.[106]

CERCLA Response Authority

Section 104 of CERCLA authorizes the President to respond to releases of hazardous substances into the environment, and releases of other pollutants or contaminants that may present an imminent and substantial danger to public health or welfare.[107] Response actions may include "removal" actions to address more immediate hazards and stabilize site conditions, and more extensive "remedial" actions intended to provide a more permanent solution. This Presidential response authority is delegated by executive order to EPA under the Superfund program for releases at sites on non-federal lands, and to other departments and agencies that administer federal facilities from which a release occurs.[108] EPA is also responsible for designating sites on the National Priorities List (NPL)[109] and for overseeing response actions at federal facilities performed by departments and agencies that administer those facilities.

The federal response framework involves coordination with the states in which the sites are located, and state cost-shares for the use of Superfund appropriations to pay for remedial actions at sites on non-federal lands. Section 104(c) of CERCLA generally requires states to match 10% of the construction costs of remedial actions, and 100% of the costs of operation and maintenance once a remedial action is in place and operating as intended, with the exception of the treatment of groundwater or surface water for which the federal government may pay 100% of the costs for the first 10 years.[110] More limited "removal" actions are not subject to state cost-shares and may be fully federally funded. Response actions for releases from federal facilities are not subject to state cost-shares. The availability of federal funding at Superfund sites or federal facilities is

[105] For information on the status of response actions, see NASA, "Background, Latest Information on PFAS at NASA Wallops," https://www.nasa.gov/feature/background-latest-information-on-pfas-at-nasa-wallops.

[106] For a broader discussion of the authorities of CERCLA, see CRS Report R41039, *Comprehensive Environmental Response, Compensation, and Liability Act: A Summary of Superfund Cleanup Authorities and Related Provisions of the Act*, by David M. Bearden.

[107] 42 U.S.C. §9604.

[108] Executive Order 12580, Superfund Implementation, January 23, 1987, 52 *Federal Register* 2923.

[109] The NPL identifies sites that EPA has designated for priority federal attention in coordination with the states in which the sites are located to investigate potential risks of contamination and determine the type and level of remediation that may be warranted to protect human health and the environment.

[110] 42 U.S.C. §9604(c).

subject to annual appropriations. Section 111 of CERCLA generally restricts the use of Superfund appropriations at federal facilities funded with separate appropriations.[111]

CERCLA Liability

Section 107 of CERCLA establishes liability for response costs, natural resource damages, and the costs of ATSDR public health studies at release sites.[112] Categories of parties who may be held liable for these costs generally include

- current and former site owners and operators;
- persons who arranged for the treatment or disposal of a hazardous substance;
- persons who arranged for the transport of a hazardous substance for treatment or disposal; and
- persons who transported a hazardous substance for treatment or disposal and selected the receiving site.

However, the statute exempts various categories of parties, including

- persons who acquired a site with preexisting contamination in certain circumstances and did not cause or contribute to the contamination;
- persons who contributed very small quantities or only household wastes to a site;
- persons who released a hazardous substance in accordance with a federal permit issued under certain other laws (including state permits issued with delegated federal authorities) referred to as "federally permitted releases;" and
- certain other categories of parties.

Section 107 authorizes actions to recover response costs for which a party is liable. Section 106 also authorizes enforcement orders to require a liable party to perform a response action under federal oversight to avoid the need for federal and state funds upfront.[113] Section 122 authorizes an additional mechanism under which liable parties may enter into negotiated settlements with the federal government to perform or pay for response actions.[114] CERCLA Section 106 orders are similar in principle to SDWA Section 1431 emergency powers orders in terms of requiring a person to perform a specific action to mitigate potential risks. However, SDWA does not establish broader liability comparable to CERCLA and does not include cost-recovery or settlement authorities. CERCLA also is not limited to drinking water exposures and may address additional pathways through which exposures to contamination may occur.

The scope of liability under CERCLA is more limited than response authority under the statute. Liability only applies to releases of designated hazardous substances, and not to other pollutants or contaminants. EPA has not designated any PFAS as hazardous substances to date.[115] CERCLA authorizes federal actions to respond to releases of PFAS as pollutants or contaminants, but does

[111] 42 U.S.C. §9611.

[112] 42 U.S.C. §9607.

[113] 42 U.S.C. §9606.

[114] 42 U.S.C. §9622.

[115] The list of hazardous substances designated under CERCLA, and the reportable quantity for releases of each hazardous substance, are codified in federal regulation at 40 C.F.R. Part 302.

not establish liability for such releases to compel the party that caused or contributed to a release to pay for or perform response actions.

The scope of liability under CERCLA for hazardous substances does not include product liability, or liability for personal injury or property damages, both of which vary under state tort law. The Federal Tort Claims Act (FTCA) authorizes tort claims against the United States government for personal injury, death, or property damages that may be caused by negligent or wrongful federal acts or omissions, but authorizes a defense for discretionary functions of federal departments and agencies in carrying out their respective missions.[116]

CERCLA Hazardous Substances

EPA's PFAS Action Plan indicated that the agency is developing a rule to designate PFOA and PFOS as hazardous substances under Section 102 of CERCLA or other related laws that trigger a hazardous substance designation.[117] Section 101(14) of CERCLA defines the term "hazardous substance" to include chemicals designated for regulation or enforcement under the following federal statutes:[118]

- hazardous substances designated under Section 311(b)(2)(A) of the Clean Water Act;[119]
- toxic pollutants designated under Section 307(a) of the Clean Water Act;[120]
- characteristic or listed hazardous wastes under Section 3001 of the Solid Waste Disposal Act (commonly referred to as the Resource Conservation and Recovery Act or RCRA);[121]
- hazardous air pollutants designated under Section 112 of the Clean Air Act;[122] and
- any imminently hazardous chemical substance or mixture for which EPA has taken a civil action in the appropriate U.S. District Court of jurisdiction under Section 7 of TSCA.[123]

Contaminants for which EPA has promulgated an MCL under SDWA are not included in this definition. The designation of an MCL for any PFAS would therefore not trigger a hazardous substance designation under CERCLA.

EPA's authority to designate hazardous substances is not restricted to chemicals designated under the laws referenced in Section 101(14) of CERCLA. Section 102(a) also authorizes EPA to promulgate regulations designating other chemicals as a hazardous substance if the chemical may present substantial danger to the public health or welfare or the environment when released into

[116] 28 U.S.C. §§2671-2680. For a discussion of this statute, see CRS Report R45732, *The Federal Tort Claims Act (FTCA): A Legal Overview*, by Kevin M. Lewis.

[117] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 14, 2019, p.2, https://www.epa.gov/pfas/epas-pfas-action-plan.

[118] 42 U.S.C. §9601(14).

[119] 33 U.S.C. §1321(b)(2)(A).

[120] 33 U.S.C. §1317(a).

[121] 42 U.S.C. §6921.

[122] 42 U.S.C. §7412.

[123] 15 U.S.C. §2606.

the environment.[124] If PFAS were designated as hazardous substances, releases into the environment would be subject to liability and release reporting requirements under CERCLA to the same extent as other hazardous substances. Section 120 of CERCLA generally applies liability and other requirements of the statute to federal facilities to the same extent as other entities.[125]

Multiple bills introduced in the 116th Congress would require EPA to designate PFAS as hazardous substances under CERCLA, whereas some bills requiring differing designations under other statutes would have the effect of a CERCLA hazardous substance designation. H.R. 535 and S. 638 would require EPA to designate "all" PFAS as hazardous substances under Section 102(a) of CERCLA within one year of the date of enactment. Section 330O of House-passed H.R. 2500 includes similar language. Section 330A of House-passed H.R. 2500, H.R. 3616, and H.R. 2605 would also have the effect of a CERCLA hazardous substance designation for PFAS. Section 330A of House-passed H.R. 2500 and H.R. 3616 would require EPA to list PFAS as toxic pollutants under Section 307(a)(1) of the Clean Water Act[126] within 30 days of enactment, and would exempt PFAS from the listing criteria of that provision. H.R. 2605 would require EPA to list "all" PFAS as hazardous air pollutants under Section 112(b) of the Clean Air Act[127] within 180 days of enactment. As noted above, Section 101(14) of CERCLA defines hazardous substances to include such pollutants designated under the Clean Water Act and Clean Air Act, and certain other statutes. The lists of hazardous substances, toxic pollutants, and hazardous air pollutants are codified in federal regulation.[128] Revisions to these lists have been subject to federal rulemaking procedures.

If PFAS were designated as hazardous substances, some potentially responsible parties (PRPs) may include the federal government at U.S. military installations and other federal facilities, civilian airport owners and operators, and local fire departments that released PFAS from the use of AFFF. Owners and operators of landfills could be PRPs if PFAS-containing products and wastes migrated into the environment. Chemical manufacturers and processors that release PFAS at sites they own or operate could also be PRPs. CERCLA does not more broadly establish product liability for companies that manufacture or process PFAS. Although CERCLA authorizes some exemptions from liability, these exemptions focus primarily on situations in which the site owner did not cause or contribute to the contamination or the party contributed very small quantities of waste or only household wastes to a site. Fertilizer applications of biosolids (i.e., treated sewage sludge) that may contain PFAS would generally not be subject to CERCLA because of the statutory exclusion of the "normal application of fertilizer."[129]

Although PFAS are presently not subject to liability under CERCLA, states may establish liability for releases of these chemicals under their own laws. Section 120(a)(4) of CERCLA waives federal sovereign immunity to allow the application of state remediation laws to federal facilities that are not on the NPL.[130] State laws establishing liability for PFAS may be applied to such

[124] 42 U.S.C. §9602(a).

[125] 42 U.S.C. §9620.

[126] 33 U.S.C. §1317(a)(1).

[127] 42 U.S.C. §7412(b).

[128] The list of hazardous substances designated under CERCLA is codified at 40 C.F.R. Part 302. The list of toxic pollutants designated under the Clean Water Act is codified at 40 C.F.R. Part 401. The list of hazardous air pollutants designated under the Clean Air Act is codified at 40 C.F.R. Part 61.

[129] 42 U.S.C. §9601(22).

[130] 42 U.S.C. §9620(a)(4).

facilities. Although federal sovereign immunity is not waived at federal facilities on the NPL, Section 121 of CERCLA requires the state in which a site is located to be provided the opportunity for involvement in the selection of remedial actions regardless of whether the site is on the NPL.[131] This provision allows states to oversee remedial actions at federal facilities on the NPL, but not to enforce state law at such facilities.

Superfund Program

Absent a hazardous substance designation, EPA has responded to releases of PFAS under the Superfund program using CERCLA response authorities for pollutants and contaminants at certain sites on non-federal lands, in coordination with the states in which the sites are located. Sites where EPA has been involved under the Superfund program have typically been contaminated not only from PFAS but also releases of designated hazardous substances. For example, EPA added the Saint-Gobain Performance Plastics site in Hoosick Falls, NY to the NPL in August 2017 based on potential risks associated with multiple hazardous substances detected at that site in addition to PFOA.[132]

Without a hazardous substance designation, *EPA's PFAS Action Plan* indicated that the agency would continue to consider its use of CERCLA response authorities for pollutants and contaminants to respond to PFAS contamination, or the use of SDWA Section 1431 emergency powers or RCRA Section 7003 enforcement authorities applicable to solid or hazardous wastes.[133] PFAS could be considered a solid waste under RCRA if released in a manner that constituted discarding, pursuant to the definition of "solid waste" in RCRA Section 1004(27).[134] Hazardous waste is a subset of solid waste as defined in Section 1004(5) of RCRA.[135] All solid wastes are therefore not necessarily hazardous wastes. EPA has not listed any PFAS as hazardous waste to date.[136] The constituents for characterizing the toxicity of hazardous waste under RCRA also do not include any PFAS.[137]

On April 25, 2019, EPA proposed interim groundwater cleanup recommendations for PFOA and PFOS at Superfund sites, U.S. military installations, and other federal facilities.[138] The public comment period closed on June 10, 2019. These recommendations would establish screening

[131] 42 U.S.C. §9621.

[132] EPA, "National Priorities List: Final Rule," 82 *Federal Register* 36095-36100, August 23, 2017.

[133] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 14, 2019, p.15, https://www.epa.gov/pfas/epas-pfas-action-plan.

[134] 42 U.S.C. §6903(27). The term "solid waste" includes "any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) [42 U.S.C. 2011 et seq.]."

[135] 42 U.S.C. §6903(5). The term "hazardous waste" is defined to mean "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

[136] 40 C.F.R. Part 261, Subpart D, identifies listed hazardous wastes under RCRA.

[137] 40 C.F.R. §261.24.

[138] EPA, *Draft Interim Recommendations for Addressing Groundwater Contaminated with PFOA and PFOS*, April 25, 2019, https://www.epa.gov/pfas/draft-interim-recommendations-addressing-groundwater-contaminated-pfoa-and-pfos.

levels to identify sites for evaluation, and a preliminary remediation goal (PRG) as a starting point to inform site-specific remediation decisions under CERCLA. EPA proposed a concentration of 40 ppt in groundwater as a screening level, and a concentration of 70 ppt as a PRG for groundwater that is a current or potential source of drinking water at sites where no state, tribal, or other applicable, relevant, and appropriate requirement exists. The proposed 70 ppt PRG is the same concentration as the EPA Lifetime Health Advisory for PFOA or PFOS in drinking water. If EPA were to promulgate an MCL under SDWA, the concentration may be applied as a standard for remedial actions under Section 121 of CERCLA to protect current or potential sources of drinking water.[139]

EPA indicated that its proposed groundwater cleanup recommendations may also be used to evaluate risks at RCRA corrective action sites. However, as noted above, EPA has not listed any PFAS as hazardous waste under RCRA to date.

Defense Environmental Restoration Program

DOD has responded to releases of various PFAS from the use of AFFF at current and former U.S. military installations under the Defense Environmental Restoration Program in conjunction with its delegated CERCLA response authorities. DOD response actions taken under this program are subject to the requirements of CERCLA.[140] These program authorities apply to releases at facilities or sites that are or were owned by, leased to, or otherwise possessed by the federal government, and under the jurisdiction of DOD at the time of the release.[141] DOD is required to respond to releases of hazardous substances at such facilities or sites. DOD may also respond to releases of other pollutant or contaminants, but is not required to do so consistent with CERCLA liability applying only to hazardous substances.[142] Section 319(b) of Senate-passed S. 1790 would amend these program authorities to require DOD to respond to releases of either hazardous substances, pollutants, or contaminants at DOD facilities or sites, but without enforceable liability under CERCLA. Regardless of such statutory obligation, funding for DOD response actions would remain subject to annual appropriations.

Releases caused by a state National Guard unit operating at a facility or site that DOD owns, leases, or possesses may be eligible for DOD response actions, but the contractual agreement with the state may relieve federal responsibility for actions of a state National Guard unit. National Guard facilities that are state-owned and state-operated have generally been ineligible for funding under the Defense Environmental Restoration Program, consistent with the statutory criteria of eligibility restricted to DOD facilities or sites.[143] House-passed H.R. 2500 and Senate-passed S. 1790 both include provisions that would address the eligibility of DOD funding to respond to releases of PFAS at National Guard facilities.

DOD actions to respond to PFAS contamination at eligible sites have ranged from providing bottled water or other alternative water supplies to treating contaminated water sources. The

[139] 42 U.S.C. §9621.

[140] 10 U.S.C. §2701. For a discussion of the authorities of the Defense Environmental Restoration Program, see "Cleanup Authorities Specific to Military Facilities" in CRS Report R41039, *Comprehensive Environmental Response, Compensation, and Liability Act: A Summary of Superfund Cleanup Authorities and Related Provisions of the Act*, by David M. Bearden.

[141] 10 U.S.C. §2701(c).

[142] 10 U.S.C. §2701(b).

[143] DOD, *Defense Environmental Restoration Program (DERP) Management*, DOD Manual 4715.20, March 9, 2012, Incorporating Change 1, August 31, 2018, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/471520m.pdf.

availability of funding for response actions under the Defense Environmental Restoration Program is subject to annual appropriations to multiple accounts. Each account funds a different inventory of sites, including Defense Environmental Restoration accounts of the U.S. Air Force, U.S. Army, U.S. Navy, and Defense-wide sites. A fifth Defense Environmental Restoration account funds Formerly Used Defense Sites (FUDS) decommissioned prior to 1986. The Defense Base Closure account funds sites closed under consolidated Base Realignment and Closure (BRAC) rounds in 1988, 1991, 1993, 1995, and 2005.

The Explanatory Statement accompanying the Consolidated Appropriations Act, 2017 (P.L. 115-31) "encouraged" DOD to establish procedures for prompt and cost-effective remediation of contamination from perfluorinated chemicals (PFCs, i.e., PFAS) released as a result of the use of AFFF at current and former U.S. military installations.[144] The Explanatory Statement also directed DOD to submit a report to Congress assessing the number of current and former installations where AFFF was or is used, and the impact of contamination in drinking water on surrounding communities. The Explanatory Statement further directed DOD to develop plans for "prompt" community notification of such contamination and procedures for "timely" remediation. DOD issued this report in October 2017 identifying an initial inventory of release sites and stating

> Addressing elevated levels of PFOS and PFOA from DoD activities is a priority for DoD. The DoD Components have taken action to ensure safe drinking water for people living and working on their military installations and in the surrounding communities. Following the CERCLA process, DoD is addressing its cleanup responsibility and promptly notifying affected communities. DoD is also taking steps to remove and replace AFFF containing PFOS in the supply chain, and is committed to finding a fluorine-free alternative that safeguards its troops and military assets, meets critical mission requirements, and protects human health and the environment.[145]

In March 2018, DOD issued a presentation on the status of its efforts to respond to releases of PFOA and PFOS.[146] The House Committee on Armed Services directed DOD to provide a status update, in its report accompanying the National Defense Authorization Act for Fiscal Year 2018 (P.L. 115-91).[147] DOD identified 401 U.S. military installations with known or suspected releases of PFOA or PFOS from the use of AFFF. DOD detected PFOA or PFOS in groundwater wells above the EPA Lifetime Health Advisory of 70 ppt at 90 of these installations. DOD identified planned actions at these installations under the CERCLA site response process, subject to annual appropriations and prioritization of funding among eligible sites. DOD has been remediating contamination from hazardous substances and unexploded ordnance under the Defense Environmental Restoration Program for years at many of these same installations. Detections of PFOA or PFOS in groundwater are a more recent development that adds to existing challenges.

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[144] U.S. Congress, House Committee on Appropriations, *Consolidated Appropriations Act, 2017: Legislative Text and Explanatory Statement*, committee print, 115th Cong., 1st sess., 2017 (Washington: GPO, 2017), pp. 336-337.

[145] DOD, Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, *Aqueous Film Forming Foam Report to Congress*, October 2017, cleared for open publication on November 3, 2017, p. 6, https://www.denix.osd.mil/derp/home/documents/aqueous-film-forming-foam-report-to-congress.

[146] DOD, *Addressing Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)*, March 2018, https://www.denix.osd.mil/derp/home/documents/pfos-pfoa-briefing-to-the-hasc.

[147] U.S. Congress, House Committee on Armed Services, *National Defense Authorization Act for FY2018*, report to accompany H.R. 2810, 115th Cong., 1st sess., July 6, 2017, H.Rept. 115-200 (Washington: GPO, 2017), pp. 117-119.

Disposal

Some stakeholders have expressed concern about the potential for environmental contamination from the disposal of PFAS. As with many other types of wastes, incineration and landfilling have been the two principal methods of disposal available for wastes containing PFAS. Incineration offers the potential to reduce the toxicity and volume of wastes, but generates air emissions and combustion residuals that necessitate disposal. Determining what temperatures are necessary to break down PFAS and ensuring that potential combustion byproducts are acceptable also have been issues for incineration. Wastewater discharges or sludge from industrial facilities and sewage treatment plants may contain PFAS depending on the constituency of the waste source. As industry transitions to shorter chain PFAS, some policymakers and stakeholders have also expressed concern about the disposal of existing stocks of longer chain PFAS and products containing these chemicals. For example, DOD, other federal agencies, civilian airport operators, and local fire departments face disposal needs for existing stocks of AFFF as they transition to alternatives. Waste streams generated from the treatment of PFAS in drinking water, or the remediation of PFAS contamination, also necessitate disposal.

The disposal of PFAS wastes is regulated under multiple federal and state laws. EPA has not promulgated contaminant-specific standards for the disposal of PFAS to date. The disposal of PFAS wastes has been regulated similarly to other types of wastes for which contaminant-specific standards are not established. Although not presently listed as hazardous wastes, the disposal of PFAS wastes in landfills would generally be subject to RCRA Subtitle D solid waste criteria considering the breadth of the definition of "solid waste" in applying to garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material.[148] Incineration facilities are also subject to RCRA for the disposal of combustion residuals, and to hazardous air pollutants standards under the Clean Air Act (CAA). Whereas these CAA standards are not specific to PFAS, some of them apply to related chemicals that may be created during combustion, such as hydrogen fluoride. Although EPA has not established effluent limitations or pretreatment standards for PFAS in wastewater, the Clean Water Act generally requires permits for the discharge of any pollutant into U.S. waters.

Section 330D of House-passed H.R. 2500 would require DOD to ensure that PFAS is eliminated and not emitted into the air when using incineration to dispose of AFFF or other materials containing these chemicals. This House provision would also require DOD to ensure that applicable CAA requirements are met, the selected incineration facility has not violated the CAA within the past 12 months, and AFFF or other PFAS materials designated for disposal are stored in accordance with RCRA Subtitle C hazardous waste requirements. As a practical matter, DOD would be required to select incinerators designed for hazardous wastes that operate at temperatures sufficient to destroy carbon and fluorine bonds in PFAS. However, Section 330D would not designate PFAS as hazardous waste.

The PFAS Waste Incineration Ban Act of 2019 (H.R. 2591) would require EPA to promulgate regulations no later than six months after enactment that would prohibit the use of incineration to dispose of AFFF containing PFAS. H.R. 2591 would also require EPA to promulgate regulations no later than one year after enactment to identify other categories of PFAS wastes for which

[148] 42 U.S.C. §6903(27). The term "solid waste" includes "any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) [42 U.S.C. 2011 et seq.]."

incineration would be prohibited if necessary to protect human health and the environment, and to review and revise these waste categories at least every four years. If incineration were prohibited, landfilling could increase if other disposal methods do not become more widely available.

For wastewater discharges, Section 330A of House-passed H.R. 2500 would require EPA to list PFAS as toxic pollutants under the Clean Water Act within 30 days of enactment, and to establish effluent limitations and pretreatment standards for PFAS no later than January 1, 2022.

Transition to Fluorine-Free Class B Firefighting Foams

DOD has revised its Military Specification for AFFF as a step in its transition away from the use of Class B firefighting foams containing PFOA and PFOS. Military Specifications provide instructions to U.S. military departments and agencies that establish standards and parameters for specific products that DOD has determined are suitable for procurement to meet U.S. military needs for DOD to carry out its mission. DOD Military Specifications are internal guidelines developed for U.S. military procurement, and are not binding and enforceable regulations.[149]

DOD initially issued its Military Specification on AFFF (MIL-F-24385) in 1969, specifying the use of "fluorocarbon surfactants" based on their effectiveness in extinguishing petroleum-based liquid fuel fires.[150] DOD subsequently revised MIL-F-24385 for various purposes in the 1970s, 1980s, and 1990s, and on September 7, 2017, under MIL-PRF-24385F to address the amount of PFOA and PFOS and other criteria.[151] DOD guidelines generally require reviews of Military Specifications at least once every five years.[152] The next scheduled review of MIL-PRF-24385F is September 6, 2022. DOD issued a similar version of this Military Specification for the Naval Sea Systems Command on May 7, 2019.[153] Both versions specify AFFF containing fluorocarbon surfactants for use as Class B fire extinguishing agents, but restrict the content of PFOA or PFOS to 800 parts per billion (ppb) or micrograms per liter. Neither version limits the content of other PFAS. Previous versions stated that AFFF must contain "fluorocarbon surfactants" but did not restrict the concentration of any PFAS.

Section 6.6 of both the September 2017 version and the May 2019 version include the following DOD policy statement on the long-term objective to transition to the use of fluorine-free AFFF:

> The DoD's goal is to acquire and use a non-fluorinated AFFF formulation or equivalent firefighting agent to meet the performance requirements for DoD critical firefighting needs. The DoD is funding research to this end, but a viable solution may not be found for several years. In the short term, the DoD intends to acquire and use AFFF with the lowest demonstrable concentrations of two particular PFAS; specifically PFOS and PFOA. The DoD intends to be open and transparent with Congress, the Environmental Protection Agency (EPA), state regulators, and the public at large regarding DoD efforts to address these matters. AFFF manufacturers and vendors are encouraged to determine the levels of

[149] For additional information on DOD Military Specifications, see Defense Logistics Agency, "Types of Defense Standardization Program (DSP) Documents," https://www.dsp.dla.mil/Specs-Standards/Types-of-DSP-Documents/.

[150] The 1969 version and subsequent revisions are available through the Defense Logistics Agency's Assist database, https://quicksearch.dla.mil/qsDocDetails.aspx?ident_number=17270.

[151] DOD, *Performance Specification: Fire Extinguishing Agent, Aqueous Film-Forming Foam (AFFF) Liquid Concentrate, for Fresh and Sea Water*, MIL-PRF-24385F, September 7, 2017 (with Amendment 2).

[152] DOD Manual 4120.24, *Defense Standardization Program (DSP) Procedures*, September 24, 2014, Incorporating Change 2, Effective October 15, 2018, pp. 47-48, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/412024m.pdf.

[153] DOD, *Performance Specification: Fire Extinguishing Agent, Aqueous Film-Forming Foam (AFFF) Liquid Concentrate, for Fresh And Sea Water*, MIL-PRF-24385F, May 7, 2019 (with Amendment 3).

> PFOS, PFOA, and other PFAS in their products and work to drive these levels toward zero while still meeting all other military specification requirements.

DOD has funded the research and development of fluorine-free AFFF under its Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP).[154] In June 2018, DOD issued a report examining the status of alternatives to AFFF that contain PFOA and PFOS, and the plans of DOD for the phase-out and disposal of its existing stocks of AFFF that contain these chemicals.[155] The report also discussed projects funded under SERDP and ESTCP. Section 1059 of the National Defense Authorization Act for Fiscal Year 2018 (P.L. 115-91) required DOD to issue this report to the House and Senate Committees on Armed Services. House-passed H.R. 2500 includes multiple provisions related to phasing out the use of AFFF for land-based application at U.S. military installations and replacement with fluorine-free foams. Senate-passed S. 1790 also includes a phase-out provision for land-based application at U.S. military installations.

The Federal Aviation Administration (FAA) has been using the DOD Military Specification for AFFF as criteria for civilian airport operators to demonstrate compliance with certification requirements for Class B fire extinguishing agents.[156] Section 332 of the FAA Reauthorization Act of 2018 (P.L. 115-254) directed FAA to stop recommending the use of fluorinated AFFF for civilian airport certification, no later than three years from the date of enactment (October 5, 2018). On January 17, 2019, FAA updated its guidelines to reference the September 2017 version of the DOD Military Specification for AFFF that restricted the maximum content of PFOA or PFOS.[157] The FAA noted that it is researching potential alternatives for fluorine-free AFFF to comply with P.L. 115-254, but observed

> Currently, fluorine-free foams on the market do not match the performance of their fluorinated counterparts, and they require more agent to extinguish fires quickly. Fluorine-free foams are not able to provide the same level of fire suppression, flexibility, and scope of usage as MIL-PRF-24385 AFFF firefighting foam.[158]

The statutory deadline under P.L. 115-254 for FAA to allow the use of fluorine-free firefighting foams for civilian airport certification is October 5, 2021.

PFAS in Dairy Milk, Foods, and Food Contact Applications

Federal efforts to address potential health risks of PFAS have also focused on the potential for these chemicals to be present in foods, which may occur through interactions with environmental contamination or food contact applications. The U.S. Food and Drug Administration (FDA) has been evaluating potential exposures to PFAS in dairy milk, dairy products, other foods, and food contact applications, using its authorities under the Federal Food, Drug, and Cosmetic Act (FFDCA).[159] The FDA has not established regulatory standards for specific concentrations of

[154] For information on each project, see DOD SERDP and ESTCP, "Per- and Polyfluoroalkyl Substances (PFASs)," https://www.serdp-estcp.org/Featured-Initiatives/Per-and-Polyfluoroalkyl-Substances-PFASs.

[155] DOD, Office of Under Secretary of Defense for Acquisition and Sustainment, *Alternatives to Aqueous Film Forming Foam Report to Congress*, June 2018, https://www.denix.osd.mil/derp/home/documents/alternatives-to-aqueous-film-forming-foam-report-to-congress.

[156] 14 C.F.R. Part 139.

[157] FAA, *Aqueous Film Forming Foam (AFFF) Testing at Certificated Part 139 Airports*, "CertAlert" No. 19-01, January 17, 2019, https://www.faa.gov/airports/airport_safety/certalerts/media/part-139-cert-alert-19-01-AFFF.pdf.

[158] Ibid., p. 2.

[159] 21 U.S.C. §301 et seq.

PFAS in milk or other foods to date. Federal safety standards for milk have generally been established in the Pasteurized Milk Ordinance.[160]

The FDA has examined multiple ways in which PFAS may become present in foods:

- PFAS may be present in dairy milk and dairy products from livestock that consume contaminated water.
- PFAS similarly may be present in meat from livestock that consume contaminated water.
- PFAS may be present in food crops if grown in contaminated soils or irrigated with contaminated water sources.
- PFAS may be present in fish and shellfish from contaminated water bodies.
- Food contact applications (e.g., cookware, food packaging, and processing) that contain PFAS are another potential source of contamination in foods.

These situations are not unique to PFAS. They may present potential pathways of human exposure to any contaminant present in the environment that may interact with foods or that may be present in food contact applications. The uptake of PFAS or other chemicals in food would depend on the properties of the specific chemical, the conditions in which interaction with food occurs, and potentially other factors. As with drinking water, potential risks from PFAS or other contaminants in food would depend on the toxicity of the specific chemical, the conditions of exposure, and the characteristics of the exposed individual.

The FDA has been assessing PFAS in foods from specific sites where PFAS contamination has been detected, certain foods with an increased likelihood of PFAS contamination not associated with specific sites, and foods more generally.[161] The FDA has also regulated the uses of PFAS in food contact applications, and has been reviewing these regulations as more information becomes available.[162] The FDA has generally found no or relatively low concentrations of PFAS in the foods that it has sampled. The FDA concluded that the sampled foods with detectable concentrations of PFAS were low enough not to present a human health concern. Of dairy milk sampled, FDA found elevated levels of certain PFAS in milk produced from livestock that consumed water from a contaminated well at a dairy farm in New Mexico.[163] The FDA reports that the contaminated milk was discarded and did not enter the food supply.[164]

The U.S. Department of Agriculture (USDA) provided financial assistance to this affected New Mexico dairy farm through the Dairy Indemnity Payment Program (DIPP) for removing the contaminated milk from the commercial market.[165] The USDA Agricultural Research Service (ARS) has also been examining blood and tissue samples from the contaminated livestock.[166]

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[160] FDA, *Grade "A" Pasteurized Milk Ordinance*, 2017 Revision, https://www.fda.gov/media/114169/download.

[161] FDA, "Per and Polyfluoroalkyl Substances (PFAS): Assessing Food for PFAS through Sampling," https://www.fda.gov/food/chemicals/and-polyfluoroalkyl-substances-pfas.

[162] FDA, "Per and Polyfluoroalkyl Substances (PFAS): Reviewing the Limited Authorized Uses of PFAS in Food Contact Applications," https://www.fda.gov/food/chemicals/and-polyfluoroalkyl-substances-pfas.

[163] FDA, "Per and Polyfluoroalkyl Substances (PFAS): Analytical Results of Testing for PFAS in Foods," https://www.fda.gov/food/chemicals/and-polyfluoroalkyl-substances-pfas.

[164] FDA, *Analytical Results for PFAS in 2018-2019 Dairy Sampling (Parts Per Trillion)*, https://www.fda.gov/media/127850/download.

[165] DIPP assistance is available for any milk or milk product where the presence of chemical or toxic residue warrants its removal from the market, 7 U.S.C. §§4551-4553.

[166] USDA, Agricultural Research Service, "Research Project: Evaluation of Blood and Tissue PFAs Levels in

ARS reports that the USDA Food Safety and Inspection Service notified state animal health officials that cattle from the New Mexico dairy farm should not be shipped to a federally inspected establishment and are not eligible to be processed for human food.[167]

The FDA reports that it conducts a safety assessment when discovering PFAS in foods "using the best available current science to evaluate whether the levels present a possible human health concern" considering the quantity of food consumed and the toxicity of the contaminants.[168] The FDA has used EPA's reference dose (RfD) of 0.00002 mg/kg/day for ingestion of PFOA and PFOS as a toxicity value for its food safety assessments.[169] The EPA lifetime health advisories of 70 ppt for PFOA and PFOS in drinking water are derived from this RfD,[170] but are not intended for addressing other exposure scenarios. EPA did not recommend 70 ppt as an acceptable concentration of PFOA or PFOS individually or combined in milk or other foods.

EPA stated in November 2016 that these health advisories "only apply to exposure scenarios involving drinking water" and "are not appropriate for use in identifying risk levels for ingestion of food sources, including: fish, meat produced from livestock that consumes contaminated water, or crops irrigated with contaminated water."[171] In a November 2016 agency memorandum, EPA also clarified these health advisories in relation to food:

> In the development of the health advisories, EPA took into consideration sources of exposure to PFOA and PFOS other than drinking water, including: air, food, dust, and consumer products. Thus, to be protective of exposure, the calculation of the health advisory accounts for the relative exposure to PFOA and PFOS from a variety of sources, including food. Calculation of specific risk levels for foods would require development of entirely different exposure assumptions and is not a part of the HA [health advisory] derivation methodology.[172]

Multiple bills in the 116th Congress would address agricultural uses of water contaminated with PFAS, including provisions in the FY2020 NDAA bills. Section 323 of House-passed H.R. 2500 and Section 1073 of Senate-passed S. 1790 would authorize the use of DOD Operation and Maintenance accounts to fund alternative water sources or treat water contaminated with PFOA or PFOS at sites where U.S. military activities caused contamination of a water source used to produce agricultural products for human consumption. These provisions in both bills would authorize such DOD actions in these situations where PFOA or PFOS

- is detected in a water source at a concentration that exceeds EPA's May 2016 lifetime health advisories for PFOA or PFOS, or

Unintentionally Contaminated Dairy Animals," https://www.ars.usda.gov/research/project/?accnNo=436179.

[167] Ibid.

[168] FDA, "Per and Polyfluoroalkyl Substances (PFAS): Assessing Food for PFAS through Sampling," https://www.fda.gov/food/chemicals/and-polyfluoroalkyl-substances-pfas.

[169] Ibid. The FDA cited the EPA RfD in micrograms as 0.02 micrograms/kilograms/day of bodyweight. EPA used milligrams as a unit of measure for its RfD, equivalent to 0.00002 milligrams/kilograms/day of bodyweight. Both amounts are the same dose level expressed in different units of measure.

[170] EPA RfDs are estimates of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. RfDs account for variance in bodyweight among exposed individuals.

[171] EPA, *Fact Sheet: PFOA & PFOS Drinking Water Health Advisories*, EPA 800-F-16-003, November 2016, p. 4, https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf.

[172] EPA, Office of Ground Water and Drinking Water, *Clarification about the Appropriate Application of the PFOA and PFOS Drinking Water Health Advisories*, November 15, 2016, https://www.epa.gov/sites/production/files/2016-11/documents/clarification_memo_pfoapfos_dw_has.pdf.

- is equal to or exceeds any future FDA regulatory standard for PFOA or PFOS in raw agricultural commodities and milk associated with a contaminated water source.

Section 323 of House-passed H.R. 2500 also would authorize alternative water sources or treatment of contaminated water in situations where PFOA of PFOS in raw agricultural commodities and milk exceeds a promulgated enforceable state standard, whereas Section 1073 of Senate-passed S. 1790 does not include such state standards. Section 4 of H.R. 1567 and Section 4 of S. 675 similarly would authorize DOD to provide alternative water sources or treat agricultural water sources contaminated with PFOA or PFOS, but do not include exceedances of state standards for raw agricultural commodities or milk as a threshold for DOD action. Use of the EPA lifetime health advisories for PFOA or PFOS in drinking water as a threshold for taking actions to address contamination of agricultural water sources may also be an issue from a scientific standpoint, as discussed above.

Other legislation would address PFAS in food contact applications. H.R. 2566 would require EPA to revise the "Safer Choice Standard" to provide for a Safer Choice label for pots, pans, and cooking utensils that do not contain PFAS. H.R. 2827 would amend Section 409(h) of FFDCA[173] to deem any PFAS used as a food contact substance as unsafe, beginning on January 1, 2022. Section 330B of House-passed H.R. 2500 would prohibit the DOD Defense Logistics Agency, beginning October 1, 2020, from procuring meals ready-to-eat (MREs) for U.S. military use that are assembled or packaged with any food contact substances that contain PFAS.

Relevant Legislation Enacted in the 115th Congress

In the 115th Congress, multiple bills of broader purposes containing provisions related to PFAS were enacted. Some of these provisions were included in annual defense authorization legislation to authorize the CDC, ATSDR, and DOD to conduct additional health effects studies, and require DOD to submit reports to Congress related to the use of AFFF containing PFAS. Other provisions related to PFAS were included in Federal Aviation Administration (FAA) reauthorization legislation to allow the use of fluorine-free firefighting foams for civilian airport certification, and in a "farm bill" to authorize technical assistance for rural water systems.

Table 1 on the following page identifies each of these laws, the specific provisions related to PFAS, the date of enactment, and a summary of the purpose of each relevant provision. Various appropriations acts have also allocated funding for DOD response actions at current and former U.S. military installations, joint CDC/ATSDR health effects studies, and certain other federal actions not identified in the table below. Multiple bills introduced in the 116th Congress would also require EPA to take actions related to PFAS under various existing laws or would create new authorities, but none of these bills have been enacted to date.[174]

[173] 21 U.S.C. §348(h).

[174] For a discussion of legislation in the 116th Congress to address PFAS in drinking water, see "PFAS Legislation in the 116th Congress" in CRS Report R45793, *PFAS and Drinking Water: Selected EPA and Congressional Actions*, by Elena H. Humphreys and Mary Tiemann.

Table 1. Authorizing Legislation Related to PFAS Enacted in the 115th Congress

Public Law, Section	Public Law Short Title	Date of Enactment	Purpose
P.L. 115-91	National Defense Authorization Act for Fiscal Year 2018	December 12, 2017	
Section 316			Authorizes joint CDC and ATSDR multi-site study of potential health effects from exposure to PFAS in water, and exposures assessments at eight or more U.S. military installations.
Section 1059			Requires DOD to report to the House and Senate Armed Services Committees on alternatives to PFOS- or PFOA-containing firefighting foams.
P.L. 115-141, Section 8131	Consolidated Appropriations Act, 2018	March 23, 2018	Amended Section 316 of P.L. 115-91 to expand the authorization of appropriations for both of the CDC and ATSDR studies related to PFAS.
P.L. 115-232, Section 315	John S. McCain National Defense Authorization Act for Fiscal Year 2019	August 13, 2018	Requires DOD to report to the congressional defense committees on a plan to remediate releases of PFAS at U.S. military installations if EPA were to promulgate a regulation for PFAS in drinking water. Requires DOD to study potential health effects from exposure to PFAS among U.S. military personnel and the feasibility of establishing a registry of exposed individuals.
P.L. 115-254, Section 332	FAA Reauthorization Act of 2018	October 5, 2018	Requires the FAA to allow the use of non-fluorinated firefighting foam for civilian airport certification, within three years of enactment.

Public Law, Section	Public Law Short Title	Date of Enactment	Purpose
P.L. 115-334, Section 6404	Agriculture Improvement Act of 2018 (commonly referred to as the 2018 "Farm Bill")	December 20, 2018	Authorizes rural water technical assistance and training to address emerging contaminants, such as PFAS, in drinking water and surface water supplies.

Source: CRS identified the enacted legislation listed in the table above based on a search of selected terms relevant to PFAS in Congress.gov. This list therefore may not necessarily be comprehensive of all relevant enacted legislation that may have contained differing terms.

Relevant Legislation in the 116th Congress

More than 40 bills have been introduced in the 116th Congress to address PFAS through a broad range of actions and federal agencies, but none of these bills have been enacted to date. Among these bills, the House- and Senate-passed NDAA bills (S. 1790 and H.R. 2500) contain numerous PFAS provisions specific to DOD. For example, some provisions involve the use, phase out, and disposal of AFFF, while others address DOD remediation of PFAS-contaminated drinking water, groundwater, and surface water. Multiple bills would require EPA to take actions related to PFAS under various existing laws or would create new authorities. The apparent intent of many of these bills is to reduce exposures to PFAS in drinking water and prevent or remediate the contamination of environmental media from releases of these substances. **Table 2** identifies each of these bills and their status, the specific provisions related to PFAS, and a summary of the purpose of each relevant provision.

Table 2. Authorizing Legislation Related to PFAS in the 116th Congress

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
H.R. 535 *(Introduced January 14, 2019)*	PFAS Action Act of 2019	Would require EPA to designate "all" PFAS as hazardous substances within one year of enactment under Section 102(a) of CERCLA (42 U.S.C. 9602(a)). (Similar to H.R. 2500, Sec. 330O and S. 638. See also H.R. 2500, Section 330A; H.R. 2605; and H.R. 3616 that would have the effect of a hazardous substance designation.)
H.R. 1417 *(Introduced February 28, 2019)*	Water Affordability, Transparency, Equity, and Reliability Act of 2019	Among other provisions, Section 8 would authorize states to use a portion of their Drinking Water State Revolving Funds (DWSRF) annual grants to provide assistance to community water systems, and households with wells, to treat PFAS contamination in drinking water. (Similar to S. 611, Sec. 8)

Bill Number (Status)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
H.R. 1567 *(Introduced March 6, 2019)*	Prompt and Fast Action to Stop Damages Act of 2019	Section 4 would authorize the use of DOD Operation and Maintenance accounts to fund alternative water sources or treat water contaminated with PFOA or PFOS at sites where U.S. military activities caused contamination of a water source used to produce agricultural products for human consumption, if the concentration of PFOA or PFOS in a water source exceeds the EPA May 2016 lifetime health advisories for drinking water, or if PFOA or PFOS in raw agricultural commodities or milk exceeds an FDA standard. (Similar to S. 675, Sec. 4; and S. 1790, Sec. 1073; and see similar provisions in H.R. 2500, Sec. 323 that also would apply state regulatory standards for raw agricultural commodities or milk) Section 5 would authorize the U.S. Air Force to use FY2020 appropriations, or unobligated balances of prior appropriations, for military construction to acquire real property (including improvements and personal property) and provide federal relocation assistance within the vicinity of an Air Force base that has "shown signs" of PFOA and PFOS contamination due to activities on base, if the acquisition would expand the contiguous geographic footprint of the base and increase force protection standoff near critical infrastructure and runways. Subject to annual appropriations, would require the U.S. Air Force to remediate PFOA and PFOS contamination on acquired real property as necessary. (Similar to S. 675, Sec. 5 and S. 1790, Sec. 1074; also see a Sense of Congress provision in H.R. 2500, Sec. 323) Section 6 would require DOD, within 180 days of enactment, to submit to Congress a remediation plan for cleanup of all water at or adjacent to a military base that is contaminated with PFOA or PFOS. Would require DOD to conduct a study of PFOA or PFOS contamination of water at military bases in preparation for the plan. Would also require DOD to ensure that each budget of the President submitted to Congress requests funding to address remediation efforts identified by the plan. (Similar to S. 675, Sec. 6 and S. 1790, Sec. 1075)
H.R. 1863 *(Introduced March 25, 2019)*	To require the Secretary of Defense to provide blood testing for firefighters of the Department of Defense to determine potential exposure to perfluoroalkyl and polyfluoroalkyl substances, and for other purposes	Would require DOD to provide testing for PFAS in blood among military firefighters during the DOD annual physical exam for each firefighter. (Similar to H.R. 2500, Sec. 708; S. 858; and S. 1790, Sec. 704. See also H.R. 4295.)
H.R. 1976 *(Introduced March 28, 2019)*	PFAS Detection Act of 2019	Would require the U.S. Geological Survey (USGS) to establish a performance standard for detecting multiple PFAS in the environment, conduct nationwide sampling of water and soil for PFAS using this standard, and consult with the states and EPA in identifying areas for sampling. Would authorize $5 million in FY2020 and $10 million annually from FY2021 to FY2024 for the development of the performance standard and nationwide sampling. (Similar to S. 950; S. 1507, Title III; and S. 1790, Sec. 6731-6736. Also similar in purpose to H.R. 2500, Section 330G, but this bill would not authorize appropriations for USGS and instead would authorize DOD to transfer up to $5 million to USGS to conduct nationwide sampling.)
H.R. 2102 *(Introduced April 4, 2019)*	VET PFAS Act	Would establish a presumptive service connection for veterans health care and disability compensation for certain disease and health conditions that may be associated with exposures to PFOA or other PFAS. (Similar to S. 1023)

Bill Number (Status)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
H.R. 2195 *(Introduced April 10, 2019)*	PFAS Registry Act of 2019	Would require the Department of Veterans Affairs (VA), in coordination with DOD, to establish a registry to identify and monitor U.S. military personnel and veterans who may have been exposed to PFAS due to AFFF use. Would also require the VA to enter into an agreement with an independent scientific organization to prepare reports to Congress on aspects of the registry and, in consultation with DOD and EPA, recommend additional chemicals exposures that may warrant tracking in the registry. (Similar to S. 1105)
H.R. 2377 *(Introduced April 29, 2019)*	Protect Drinking Water from PFAS Act of 2019	Would require EPA to publish a maximum contaminant level goal and promulgate a national primary drinking water regulation for total PFAS within two years of enactment. (Similar to S. 1473; S. 1507, Sec. 201; and S. 1790, Sec. 6721. See also H.R. 4033 and S. 2466.)
H.R. 2500 *(Passed by the House July 12, 2019)*	National Defense Authorization Act for Fiscal Year 2020	(See also S. 1790)
Sec. 315	Five-year authority for National Guard Environmental Restoration Projects for environmental responses	For a temporary period of five years after enactment, would authorize DOD to carry out environmental restoration projects to respond to releases of PFOA or PFOS regardless of whether the site where the released occurred is or was owned by, leased to, or otherwise possessed by the federal government, and under DOD jurisdiction at the time of the release. This exception could allow DOD response actions for PFOA or PFOS releases at state-owned and operated National Guard facilities that are not eligible in current law.
Sec. 317	Transfer authority for funding of study and assessment on health implications of per- and polyfluoroalkyl substances contamination in drinking water by Agency for Toxic Substances and Disease Registry	Would extend DOD authority to transfer funds through FY2021 to support CDC and ATSDR PFAS multi-site study and exposure assessments as authorized in the FY2018 NDAA, as amended. (Similar to S. 1790, Sec. 317. See also H.R. 2500, Sec. 735 for additional authorization of appropriations.)
Sec. 318	Replacement of fluorinated aqueous film forming foam with fluorine-free firefighting agent	Would require the U.S. Navy to publish a military specification for use of fluorine-free firefighting agents at U.S. military installations by January 31, 2023, and prohibit the use of fluorinated AFFF at U.S. military installations on or after September 30, 2025, or before such date, if possible, unless DOD notifies congressional defense committees of a waiver and the basis for the continued use of fluorinated AFFF.
Sec. 319	Prohibition of uncontrolled release of fluorinated aqueous film forming foam at military installations	Would direct DOD to prohibit the uncontrolled release of fluorinated AFFF at U.S. military installations, unless the release is associated with (1) an emergency response, or (2) non-emergency purposes involving the testing of equipment or training of personnel if containment, capture, and disposal mechanisms are in place to ensure that no AFFF is released into the environment.
Sec. 320	Prohibition on use of fluorinated aqueous film forming foam for training exercises	Would direct DOD to prohibit the use of fluorinated AFFF for training exercises at U.S. military installations.

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
Sec. 323	Provision of uncontaminated water for agricultural use on land contaminated by PFOS and PFOA used on military installations	Would authorize the use of DOD Operation and Maintenance accounts to fund alternative water sources or treat water contaminated with PFOA or PFOS at sites where U.S. military activities caused contamination of a water source used to produce agricultural products for human consumption, if the concentration of PFOA or PFOS in a water source exceeds the EPA May 2016 lifetime health advisories for drinking water, or if PFOA or PFOS in raw milk or agricultural commodities exceeds an FDA or state regulatory standard. (See also H.R. 1567, Sec. 4; S. 675, Sec. 4; and S. 1790, Sec. 1073, but none of which would apply state regulatory standards for raw agricultural commodities or milk) Would express the Sense of Congress for DOD to "explore" existing authorities to acquire lands adjacent to U.S. military installations from owners who have experienced impacts to their "livelihood" because of PFOA or PFOS contamination from an adjacent installation. (See also H.R. 1567, Sec. 5; S. 675, Sec. 5; and S. 1790, Sec. 1074)
Sec. 330A	PFAS designation, effluent limitations, and pretreatment standards	Would require EPA to add PFAS to the list of toxic pollutants under Section 307(a)(1) of the Clean Water Act (33 U.S.C. 1317(a)(1)) within 30 days of enactment, and would exempt PFAS from the listing criteria of that provision. Also would require EPA to publish effluent standards and pretreatment standards for PFAS under Section 307 of the Clean Water Act no later than January 1, 2022. (Similar to H.R. 3616.) Also would have the effect of designating PFAS as hazardous substances under CERCLA, as the term "hazardous substance" is defined in CERCLA (42 U.S.C. 9601(14)) to include toxic pollutants designated under the Clean Water Act. (See also H.R. 535; H.R. 2500, Sec. 330O; H.R. 2605; and S. 638 regarding hazardous substance designation.)
Sec. 330B	Prohibition on Perfluoroalkyl Substances and Polyfluoroalkyl Substances in Meals Ready-to-Eat Food Packaging	Would require the DOD Defense Logistics Agency, by October 1, 2020, to ensure that meals ready-to-eat (MREs) for U.S. military use are not packaged or assembled with any food contact substances that contain PFAS.
Sec. 330C	Comptroller General study on PFAS contamination	Would require the Government Accountability Office (GAO) to review DOD efforts to "clean up" PFAS contamination in and around U.S. military bases and to mitigate public health impacts of the contamination. Would require GAO to inform congressional defense committees and certain other committees of related jurisdiction of the preliminary findings within one year of enactment and the final results of the study at a time mutually agreed upon with the committees.
Sec. 330D	Disposal of materials containing per- and polyfluoroalkyl substances or aqueous film forming foam	Would require DOD to ensure that PFAS is eliminated and not emitted into the air when using incineration to dispose of AFFF or other materials containing PFAS. Would also require DOD to ensure that applicable Clean Air Act (CAA; 42 U.S.C. 7401 et seq.) requirements are met, the selected incineration facility has not violated CAA within the past 12 months, and AFFF or other PFAS materials designated for disposal are stored in accordance with RCRA Subtitle C hazardous waste requirements.

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
Sec. 330E	Prohibition on use of perfluoroalkyl substances and polyfluoroalkyl substances for land-based applications of firefighting foam	Would prohibit DOD from procuring firefighting foam containing more than one part per billion of PFAS after October 1, 2022 for use at U.S. military installations, and prohibit DOD from using existing stocks of such firefighting foam no later than October 1, 2023 at U.S. military installations. Would exempt the procurement and use of firefighting foam containing PFAS in excess of one part per billion for military use solely onboard ocean-going vessels. (Also see S. 1790, Sec. 316 and S.Res. 334)
Sec. 330F	Agreements to share monitoring data related to perfluoroalkyl and polyfluoroalkyl substances and other contaminants of concern	Would require DOD to seek to enter into agreements with municipalities or municipal drinking water utilities located adjacent to U.S. military installations to share monitoring data on PFAS or other emerging contaminants of concern.
Sec. 330G	Detection of perfluorinated chemicals	Would require USGS to establish a performance standard for detecting multiple PFAS in the environment, conduct nationwide sampling of water and soil for PFAS using this standard, and consult with the states and EPA in identifying areas for sampling. Would authorize DOD to transfer up to $5 million to USGS for the nationwide sampling. (Similar in purpose to H.R. 1976; S. 950; S. 1507, Title III; and S. 1790, Sec. 6731-6736. However, none of these other bills would authorize the transfer of DOD funds to USGS, and instead would authorize appropriations of $5 million in FY2020 and $10 million annually from FY2021 through FY2024 for USGS to develop the performance standard and conduct nationwide sampling.)
Sec. 330H	Cooperative agreements with States to address contamination by perfluoroalkyl and polyfluoroalkyl substances	Upon the request of a state, would require DOD to "work expeditiously" toward finalizing or amending a cooperative agreement under existing authorities at 10 U.S.C. 2701(d) to fund testing, monitoring, removal, or remedial actions for PFAS contamination in drinking water, groundwater, or surface water originating from DOD activities at an active or decommissioned U.S. military installation, including a National Guard facility. Would apply the most stringent applicable standard among: (1) an enforceable state standard described in Section 121(d) of CERCLA in effect in that state, (2) an enforceable federal standard described in Section 121(d) of CERCLA, or (3) a SDWA federal health advisory to determine actions funded under such agreements. Would require DOD to report annually, beginning on February 1, 2020, to the congressional defense committees and Members representing the state and district where a site is located, if a cooperative agreement is not finalized within one year of a state's request. Would authorize DOD to enter into additional cooperative agreements, grants agreements, or contracts to fund eligible DOD response actions for groundwater or surface water contaminated from releases of perfluorinated compounds with state, local, or tribal governments, or local water authorities with "jurisdiction" over a contamination site. (See also H.R. 2626; S. 1372; S. 1790, Sec. 318 and Sec. 5318; and S. 1507, Sec. 501)
Sec. 330O	Designation as hazardous substances	Would require EPA to designate "all" PFAS as hazardous substances within one year of enactment under Section 102(a) of CERCLA (42 U.S.C. 9602(a)). (Similar to H.R. 535 and S. 638. See also H.R. 2500, Sec. 330A; H.R. 2605; and H.R. 3616 that would have the effect of a hazardous substance designation.)

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
Sec. 708	Provision of blood testing for firefighters of Department of Defense to determine exposure to perfluoroalkyl and polyfluoroalkyl substances	Would require DOD to provide testing for PFAS in blood among military firefighters during the DOD annual physical exam for each firefighter. (Similar to H.R. 1863; S. 858; and S. 1790, Sec. 704. See also H.R. 4295.)
Sec. 735	Funding for CDC ATSDR PFAS health study increment	Would authorize appropriations of $5 million for the DOD Defense Health Program in addition to the $10 million in Sec. 4501 (a total of $15 million) to support CDC and ATSDR PFAS multi-site study and exposure assessments authorized in the FY2018 NDAA, as amended. (See also Sec. 317.)
Sec. 748	Training on health effects of burn pits and other airborne hazards	Would direct DOD to provide mandatory training to DOD medical providers on the potential health effects of burn pits and other airborne hazards, including PFAS and other substances, and the early detection of such health effects.
H.R. 2533 *(Introduced May 7, 2019)*	Providing Financial Assistance for Safe Drinking Water Act	Would establish a grant program for community water system infrastructure projects to treat PFAS contamination. Would authorize appropriations of $500 million annually from FY2021 through FY2025 to support the grant program. (Similar to H.R. 2741, Title II)
H.R. 2566 *(Introduced May 7, 2019)*	To require the Administrator of the Environmental Protection Agency to revise the Safer Choice Standard to provide for a Safer Choice label for pots, pans, and cooking utensils that do not contain PFAS, and for other purposes	Would direct EPA, within one year of enactment, to identify requirements for pots, pans, or cooking utensils to meet the standard for a Safer Choice label, including a requirement that any such pot, pan, or cooking utensil not contain PFAS.
H.R. 2570 *(Introduced May 8, 2019)*	PFAS User Fee Act of 2019	Would direct EPA to establish a PFAS manufacturing fee, would establish a trust fund to support an EPA grant program for community water systems and publicly owned treatment works for operations and maintenance costs of PFAS removal. Amounts in the trust fund would be available without further appropriation.
H.R. 2577 *(Introduced May 8, 2019)*	PFAS Right-To-Know Act	Would amend Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11023) to direct EPA to add all PFAS on the TSCA Inventory to the list of toxic chemicals subject to annual reporting requirements. Reporting involves disclosure of the locations of certain industrial facilities where such PFAS are present in excess of 1,000 pounds due to manufacturing, importation, processing, or use for purposes of public disclosure on EPA's Toxics Release Inventory. (See also S. 1790, Sec. 6711)
H.R. 2591 *(Introduced May 8, 2019)*	PFAS Waste Incineration Ban Act of 2019	Would require EPA to promulgate regulations no later than six months after enactment that would prohibit the use of incineration for disposal of AFFF containing PFAS. Would also require EPA to promulgate regulations no later than one year of enactment to identify other categories of PFAS wastes for which incineration would be prohibited if necessary to protect human health and the environment, and to review and revise these waste categories at least every four years.

Bill Number (Status)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
H.R. 2596 *(Introduced May 8, 2019)*	Protecting Communities from New PFAS Act	Would amend Section 5 of TSCA (15 U.S.C. 2604) to not allow EPA to exempt notices for newly manufactured PFAS or "significant new uses" of PFAS. Upon receipt of such notice, EPA would be required to issue an order prohibiting "the manufacture, processing, distribution in commerce" of such substances.
H.R. 2600 *(Introduced May 8, 2019)*	Toxic PFAS Control Act	Would amend Section 6 of TSCA (15 U.S.C. 2605) to establish a statutory phase-out of the manufacture and processing of PFAS in varying stages over three years and to promulgate a rule prescribing the manner and methods for disposal of PFAS.
H.R. 2605 *(Introduced May 8, 2019)*	Prevent Release Of Toxics Emissions, Contamination, and Transfer Act of 2019	Would direct EPA to promulgate a rule within 180 days of enactment to list "all" PFAS as hazardous air pollutants under Section 112(b) of the Clean Air Act (42 U.S.C. 7412(b)), and within 365 days after the issuance of the final rule, to identify major and area source categories of PFAS under Section 112(c) of the Clean Air Act (42 U.S.C. 7412(c)) for the development of emission standards. Also would have the effect of designating PFAS as hazardous substances under CERCLA, as the term "hazardous substance" is defined in CERCLA (42 U.S.C. 9601(14)) to include hazardous air pollutants designated under Section 112 of the Clean Air Act. (See also H.R. 535; H.R. 2500, Sec. 330A and Sec. 330O; H.R. 3616; and S. 638 regarding hazardous substance designation.)
H.R. 2608 *(Introduced May 9, 2019)*	PFAS Testing Act of 2019	Would amend Section 4 of TSCA (15 U.S.C. 2603) to direct EPA, within 60 days of enactment, to require comprehensive toxicity testing of PFAS. Would also amend Section 8 of TSCA (15 U.S.C. 2607) to direct EPA, within 60 days of enactment, to require that PFAS manufacturers and processors submit certain records and studies to the agency.
H.R. 2626 *(Ordered to be Reported June 26, 2019)*	PFAS Accountability Act of 2019	Upon the request of a state, would require a federal department or agency to "work expeditiously" toward finalizing or amending a cooperative agreement to fund testing, monitoring, removal, or remedial actions for drinking water, groundwater, surface water, or surface or subsurface soil contaminated by PFAS originating from a federal facility. Would define a federal facility for this purpose to include active and decommissioned U.S. military installations, other current and former federal facilities, and state-owned and operated National Guard facilities that receive DOD funding. Would apply the most stringent applicable standard among: (1) an enforceable state standard described in Section 121(d) of CERCLA that is in effect in that state, (2) a SDWA federal health advisory, or (3) other federal standards under certain other laws to determine actions funded under such agreements. Would require the President to report annually to certain committees of environmental and general government oversight jurisdiction and to Members representing the state and district where a site is located, if a cooperative agreement is not finalized within one year of a state's request. Would authorize additional cooperative agreements, grants agreements, or contracts with state, local, or tribal governments, or local water authorities with "jurisdiction" over a contamination site to respond to contamination in groundwater or surface water by PFAS originating from a federal facility. (Similar to S. 1372. See also H.R. 2500, Sec. 330H; S. 1790, Sec. 318 and Sec. 5318; and S. 1507, Sec. 501)

Bill Number (Status)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
H.R. 2638 *(Introduced May 9, 2019)*	To direct the Administrator of the Environmental Protection Agency to issue guidance on minimizing the use of firefighting foam containing PFAS, and for other purposes	Would direct EPA to issue guidelines no later than one year after enactment on minimizing the use of firefighting foam and other equipment containing PFAS, without jeopardizing firefighting efforts.
H.R. 2741 *(Introduced May 15, 2019)*	Leading Infrastructure for Tomorrow's America Act (Title II)	Would establish a grant program for community water system infrastructure projects to treat PFAS contamination. Would authorize appropriations of $500 million annually from FY2020 through FY2024 to support the grant program. (Similar to H.R. 2533)
H.R. 2800 *(Introduced May 16, 2019)*	PFAS Monitoring Act of 2019	Would direct EPA to promulgate regulations requiring public water systems to monitor for at least 30 PFAS within one year of enactment. Would require monitoring for total PFAS within two years. (Also see S. 1790, Sec. 6722)
H.R. 2827 *(Introduced May 17, 2019)*	Keep Food Containers Safe from PFAS Act of 2019	Would amend Section 409(h) of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 348(h)) to deem any PFAS used as a food contact substance as unsafe, beginning on January 1, 2022.
H.R. 3226 *(Introduced June 12, 2019)*	Safe Water for Military Families Act	Would direct DOD, by January 1, 2029, to ensure that the Department uses only non-fluorinated firefighting foam that does not contain certain PFAS. Would also require DOD to conduct a study of the best practices to clean up ground contaminated by PFAS.
H.R. 3616 *(Introduced July 2, 2019)*	Clean Water Standards for PFAS Act of 2019	Would require EPA to add PFAS to the list of toxic pollutants under Section 307(a)(1) of the Clean Water Act (33 U.S.C. 1317(a)(1)) within 30 days of enactment, and would exempt PFAS from the listing criteria of that provision. Also would require EPA to publish effluent standards and pretreatment standards for PFAS under Section 307 of the Clean Water Act no later than January 1, 2022. (Similar to H.R. 2500, Sec. 330A.) Also would have the effect of designating PFAS as hazardous substances under CERCLA, as the term "hazardous substance" is defined in CERCLA (42 U.S.C. 9601(14)) to include toxic pollutants designated under the Clean Water Act. (See also H.R. 535; H.R. 2500, Sec. 330O; H.R. 2605; and S. 638 regarding hazardous substance designation.)
H.R. 4033 *(Introduced July 25, 2019)*	Water Justice Act	Section 309 would require EPA to promulgate an interim national primary drinking water regulation within two years of enactment for each PFAS with a validated test method for detection in drinking water and for which EPA has established a health advisory or a toxicity value, and an interim national primary drinking water regulation within four years of enactment for a class of such other PFAS if EPA has not established a health advisory or toxicity value for those substances. (Similar to S. 2466. Also see H.R. 2344; S. 1473; S. 1507, Sec. 201; and S. 1790, Sec. 6721)
H.R. 4295 *(Introduced September 12, 2019)*	Protect Our Military Children Act	Would require the DOD Defense Health Agency to complete a pilot program by October 1, 2023, to offer tests for PFAS in blood among children under the age of 18 who are dependents of members of the Armed Forces serving at U.S. military installations where PFAS exposures could have occurred within10 years prior to enactment. Would require DOD to use blood testing standards of the ATSDR and CDC, provide results of blood tests to parents or guardians of tested children, and submit a report to the congressional defense committees on the results of the pilot program by January 1, 2024. (See also H.R. 1863; H.R. 2500, Sec. 708; S. 858; and S. 1790, Sec. 704)

Bill Number (Status)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
S. 611 *(Introduced February 28, 2019)*	Water Affordability, Transparency, Equity, and Reliability Act of 2019	Among other provisions, Section 8 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. (Similar to H.R. 1417, Sec. 8)
S. 638 *(Introduced February 28, 2019)*	PFAS Action Act of 2019	Would require EPA to designate "all" PFAS as hazardous substances within one year of enactment under Section 102(a) of CERCLA (42 U.S.C. 9602(a)). (Similar to H.R. 535 and H.R. 2500, Sec. 330O. See also H.R. 2500, Sec. 330A; H.R. 2605; and H.R. 3616 that would have the effect of a hazardous substance designation.)
S. 675 *(Introduced March 6, 2019)*	Prompt and Fast Action to Stop Damages Act of 2019	Section 4 would authorize the use of DOD Operation and Maintenance accounts to fund alternative water sources or treat water contaminated with PFOA or PFOS at sites where U.S. military activities caused contamination of a water source used to produce agricultural products for human consumption, if the concentration of PFOA or PFOS in a water source exceeds the EPA May 2016 lifetime health advisories for drinking water, or if PFOA or PFOS in raw agricultural commodities or milk exceeds an FDA standard. (Similar to H.R. 1567, Sec. 4 and S. 1790, Sec. 1073; and see similar provisions in H.R. 2500, Sec. 323 that also would apply state regulatory standards for raw agricultural commodities or milk) Section 5 would authorize the U.S. Air Force to use FY2020 appropriations, or unobligated balances of prior appropriations, for military construction to acquire real property (including improvements and personal property) and provide federal relocation assistance within the vicinity of an Air Force base that has "shown signs" of PFOA and PFOS contamination due to activities on base, if the acquisition would expand the contiguous geographic footprint of the base and increase force protection standoff near critical infrastructure and runways. Subject to annual appropriations, would require the U.S. Air Force to remediate PFOA and PFOS contamination on acquired real property as necessary. (Similar to H.R. 1567, Sec. 5 and S. 1790, Sec. 1074; also see a Sense of Congress provision in H.R. 2500, Sec. 323) Section 6 would require DOD, within 180 days of enactment, to submit to Congress a remediation plan for cleanup of all water at or adjacent to a military base that is contaminated with PFOA or PFOS. Would require DOD to conduct a study of PFOA or PFOS contamination of water at military bases in preparation for the plan. Would also require DOD to ensure that each budget of the President submitted to Congress requests funding to address remediation efforts identified by the plan. (Similar to H.R. 1567, Sec. 6 and S. 1790, Sec. 1075)
S. 858 *(Introduced March 25, 2019)*	Protecting Military Firefighters from PFAS Act	Would require DOD to provide testing for PFAS in blood among military firefighters during the DOD annual physical exam for each firefighter. (Similar to H.R. 1863; H.R. 2500, Sec. 708; and S. 1790, Sec. 704; also see H.R. 4295)

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
S. 950 *(Introduced March 28, 2019)*	PFAS Detection Act of 2019	Would require USGS to establish a performance standard for detecting multiple PFAS in the environment, conduct nationwide sampling of water and soil for PFAS using this standard, and consult with the states and EPA in identifying areas for sampling. Would authorize $5 million in FY2020 and $10 million annually from FY2021 to FY2024 for the development of the performance standard and nationwide sampling. (Similar to H.R. 1976; S. 1507, Title III; and S. 1790, Sec. 6731-6736. Also similar in purpose to H.R. 2500, Section 330G, but this bill would not authorize appropriations for USGS and would authorize DOD to transfer up to $5 million to USGS to conduct nationwide sampling.)
S. 1023 (*Introduced April 3, 2019)*	Veterans Exposed to Toxic PFAS Act	Would establish a presumptive service connection for veterans health care and disability compensation for certain disease and health conditions that may be associated with exposures to PFOA or other PFAS. (Similar to H.R. 2102)
S. 1105 *(Introduced April 10, 2019)*	PFAS Registry Act of 2019	Would require the VA, in coordination with DOD, to establish a registry to track U.S. military personnel and veterans who may have been exposed to PFAS due to AFFF use. Would also require the VA to enter into an agreement with an independent scientific organization to prepare reports to Congress on aspects of the registry and, in consultation with DOD and EPA, recommend additional chemicals exposures that may warrant tracking in the registry. (Similar to H.R. 2195)
S. 1251 *(Introduced April 30, 2019)*	Safe Drinking Water Assistance Act of 2019	Would direct EPA to develop a strategic plan to improve federal efforts to develop treatment methods and assist states in responding to health risks posed by emerging contaminants and require EPA to develop a program to provide technical assistance and support to states for testing emerging contaminants. Would direct EPA and the Department of Health and Human Services to establish a federal working group to coordinate analyses of health effects of emerging drinking water contaminants. Would direct the White House Office of Science and Technology Policy to establish a National Emerging Contaminant Research Initiative. (Similar to S. 1507, Title IV, and S. 1790, Sec. 6741-6742)

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
S. 1372 *(Introduced May 8, 2019)*	PFAS Accountability Act of 2019	Upon the request of a state, would require a federal department or agency to "work expeditiously" toward finalizing or amending a cooperative agreement to fund testing, monitoring, removal, or remedial actions for drinking water, groundwater, surface water, or surface or subsurface soil contaminated by PFAS originating from a federal facility. Would define a federal facility for this purpose to include active and decommissioned U.S. military installations, other current and former federal facilities, and state-owned and operated National Guard facilities that receive DOD funding. Would apply the most stringent applicable standard among: (1) an enforceable state standard described in Section 121(d) of CERCLA that is in effect in that state, (2) a SDWA federal health advisory, or (3) other federal standards under certain other laws to determine actions funded under such agreements. Would require the President to report annually to certain committees of environmental and general government oversight jurisdiction and to Members representing the state and district where a site is located, if a cooperative agreement is not finalized within one year of a state's request. Would authorize additional cooperative agreements, grants agreements, or contracts with state, local, or tribal governments, or local water authorities with "jurisdiction" over a contamination site to respond to contamination in groundwater or surface water by PFAS originating from a federal facility. (Similar to H.R. 2626. See also H.R. 2500, Sec. 330H; S. 1790, Sec. 318 and Sec. 5318; and S. 1507, Sec. 501)
S. 1473 *(Introduced May 15, 2019)*	Protect Drinking Water from PFAS Act of 2019	Would require EPA to publish a maximum contaminant level and promulgate a national primary drinking water regulation for total PFAS, among other purposes. (Similar to H.R. 2377; S. 1507, Sec. 201; and S. 1790, Sec. 6721)

S. 1507 *(Reported without a written report June 19, 2019)*	PFAS Release Disclosure Act	(Similar to S. 1790, Title LXVII) Title I would designate specific PFAS subject to reporting to EPA for public disclosure on the Toxics Release Inventory (TRI) under Section 313 of EPCRA (42 U.S.C. 11023). Beginning January 1of the calendar year following enactment, certain industrial classes of facilities that manufacture, process, or use more than100 pounds of each designated PFAS within a calendar year would be required to report releases into any environmental media. EPA would be required to determine whether revision of this reporting threshold is warranted, and if warranted, to initiate the revision within five years of enactment. Would also establish criteria for EPA to add other PFAS to the list of toxic chemicals subject to TRI reporting, with an initial 100 pound reporting threshold subject to revision by EPA. Would authorize the protection of confidential business information to prevent the public disclosure of the chemical identity of specific PFAS in accordance with protections provided under Section 14(f) of TSCA. (Similar to S. 1790, Sec. 6711; also see H.R. 2577) Title II, Section 201 would require EPA, within two years of enactment, to promulgate a PFAS drinking water regulation that includes, at a minimum, MCLs for PFOA and PFOS. (Similar to H.R. 2377; S. 1473; and S. 1790, Sec. 6721). Would establish a standard-setting process specifically for PFAS. Title II, Section 202 would require EPA to add to UCMR 5 all unregulated PFAS or categories of PFAS for which EPA has validated methods to measure these substances. (Similar to S. 1790, Sec. 6722; also see H.R. 2800) Title II, Section 203 would prohibit EPA from imposing penalties for violations of federal drinking water regulations for PFAS until five years after the date of promulgation. Enforcement actions by delegated states and citizen suits would remain available. (Similar to S. 1790, Sec. 6723) Title II, Section 204 would establish a grant program within the DWSRF to assist public water systems in addressing emerging contaminants, with emphasis on PFAS. Would authorize appropriations of $100 million annually for FY2020 through FY2024 for this purpose. (Similar to S. 1790, Sec. 6724) Title III would require USGS to establish a performance standard for detecting multiple PFAS in the environment, conduct nationwide sampling of PFAS in surface water, groundwater, soil, and wells using this standard, and consult with the states and EPA in identifying areas for sampling. Would authorize $5 million in FY2020 and $10 million annually from FY2021 to FY2024 for the development of the performance standard and nationwide sampling. (Similar to H.R. 1976, S. 950, and S. 1790, Sec. 6731-6736. Also similar in purpose to H.R. 2500, Section 330G, but this bill would not authorize appropriations for USGS and would authorize DOD to transfer up to $5 million to USGS to conduct nationwide sampling.) Title IV would direct EPA to develop a strategic plan to improve federal efforts to develop treatment methods and assist states in responding to health risks posed by emerging contaminants, and would require EPA to develop a program to provide technical assistance and support to states for testing emerging contaminants. Would direct EPA and the Department of Health and Human Services to establish a federal working group to coordinate assessments of health effects of emerging drinking water contaminants. Would direct the White House Office of Science and Technology Policy to establish a National Emerging Contaminant Research Initiative. (Similar to S. 1251 and S. 1790, Sec. 6741-6742)

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
		Title V, Section 501 would authorize DOD to enter into cooperative agreements, grants agreements, or contracts to fund eligible DOD response actions for groundwater or surface water contaminated from releases of perfluorinated compounds with state, local, or tribal governments, or local water authorities with "jurisdiction" over a contamination site. (Similar to S. 1790, Sec. 5318. See also H.R. 2500, Sec. 330H; H.R. 2626; and S. 1372.) Title V, Section 502 would amend Section 8 of TSCA (15 U.S.C. 2607) to direct EPA to promulgate a rule by January 1, 2023, requiring manufacturers to report certain information to the agency for PFAS manufactured since January 1, 2006. (Similar to S. 1790, Sec. 6751) Title V, Section 503 would direct EPA to take final action no later than June 22, 2020 on a proposed "significant new use rule" under TSCA that would require notification to the agency for the manufacture or processing of long-chain perfluoroalkyl carboxylate and perfluoroalkyl sulfonate chemical substances for previously discontinued uses (80 Federal Register 2885, January 21, 2015). (Similar to S. 1790, Sec. 6752) Title V, Section 504 would require EPA to publish interim guidance within one year of enactment for the destruction and disposal of PFAS, AFFF, and certain other materials containing PFAS. Would require EPA to revise the guidance as appropriate at least once every three years. (Similar to S. 1790, Sec. 6753) Title V, Section 505 would direct EPA's Office of Research and Development to (1) further study the effects of PFAS on human health and the environment, (2) develop a process to prioritize specific PFAS or classes of PFAS for additional research or regulation, (3) develop new tools to characterize PFAS in the environment (including drinking water, wastewater, surface water, groundwater, solids, and air), (4) evaluate PFAS remediation approaches, and (5) develop and implement public outreach tools and materials on PFAS. Section 505 would authorize appropriations of $15 million annually from FY2020 to FY2024 for these activities. (Similar to S. 1790, Sec. 6754)
S. 1534 *(Introduced May 16, 2019)*	A bill to require the Secretary of Defense to conduct an assessment of quantum computing technology to address problems associated with exposure to PFAS, and for other purposes	Would direct DOD, within one year of enactment, to complete an assessment of quantum computing technology to address PFAS exposures.
S. 1790 *(Passed by the Senate June 27, 2019)*	National Defense Authorization Act for Fiscal Year 2020	(See also H.R. 2500)
Sec. 240	Use of funds for Strategic Environmental Research Program, Environmental Security Technical Certification Program, and Operational Energy Capability Improvement	Among other provisions, would require DOD to expend $10 million from funds appropriated for the Strategic Environmental Research Program for "the development, demonstration, and validation of non-fluorine based firefighting foams."

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
Sec. 316	Prohibition on use of perfluoroalkyl substances and polyfluoroalkyl substances for land-based applications of firefighting foam	Would prohibit DOD from procuring firefighting foam containing more than one part per billion of PFAS after October 1, 2022 for use at U.S. military installations, prohibit DOD from using existing stocks of such firefighting foam no later than October 1, 2023 at U.S. military installations, and affirm the applicability of the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.) to the disposal of such existing stocks. Would exempt the procurement and use of firefighting foam containing PFAS in excess of one part per billion for military use solely onboard ocean-going vessels. (See also H.R. 2500, Sec. 330E and S.Res. 334)
Sec. 317	Transfer authority for funding of study and assessment on health implications of per- and polyfluoroalkyl substances contamination in drinking water by Agency for Toxic Substances and Disease Registry	Would extend DOD authority to transfer funds through FY2021 to support CDC and ATSDR PFAS multi-site study and exposure assessments as authorized in the FY2018 NDAA, as amended. (Similar to H.R. 2500, Sec. 317)
Sec. 318	Cooperative agreements with States to address contamination by perfluoroalkyl and polyfluoroalkyl substances	Upon the request of a state, would require DOD to "work expeditiously" toward finalizing or amending a cooperative agreement under existing authorities at 10 U.S.C. 2701(d) to fund testing, monitoring, removal, or remedial actions for PFAS contamination in drinking water, groundwater, or surface water originating from DOD activities at an active or decommissioned U.S. military installation, including a National Guard facility. Would apply the most stringent applicable standard among: (1) an enforceable state standard described in Section 121(d) of CERCLA in effect in that state or (2) an enforceable federal standard described in Section 121(d) of CERCLA to determine actions funded under such agreements. Would require DOD to report annually, beginning on February 1, 2020, to the congressional defense committees and Members representing the state and district where a site is located, if a cooperative agreement is not finalized within one year of a state's request. (See also S. 1790, Sec. 5318; H.R. 2500, Sec. 300H; H.R. 2626; S.1372; and S. 1507, Sec. 501)
Sec. 319	Modification of Department of Defense environmental restoration authorities to include Federal Government facilities used by National Guard	Would authorize DOD environmental restoration activities on real property licensed to or operated by a state for National Guard training and expand DOD responsibility for CERCLA response actions to include pollutants or contaminants as well as hazardous substances.
Sec. 704	Provision of blood testing for firefighters of Department of Defense to determine exposure to perfluoroalkyl and polyfluoroalkyl substances	Beginning in FY2021, would require DOD to provide testing for PFAS in blood among military firefighters during the DOD annual physical exam for each firefighter. (Similar to H.R. 1863; H.R. 2500, Sec. 708; and S. 858; also see H.R. 4295)

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
Sec. 1073	Provision of water uncontaminated with perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) for agricultural purposes	Would authorize the use of DOD Operation and Maintenance accounts to fund alternative water sources or treat water contaminated with PFOA or PFOS at sites where U.S. military activities caused contamination of a water source used to produce agricultural products for human consumption, if the concentration of PFOA or PFOS in a water source exceeds the EPA May 2016 lifetime health advisories for drinking water, or if PFOA or PFOS in raw agricultural commodities or milk exceeds an FDA standard. (Similar to H.R. 1567, Sec. 4 and S. 675, Sec. 4; and see similar provisions in H.R. 2500, Sec. 323 that also would apply state regulatory standards for raw agricultural commodities or milk)
Sec. 1074	Acquisition of real property by Air Force	Would authorize the U.S. Air Force to use FY2020 appropriations, or unobligated balances of prior appropriations, for military construction to acquire real property (including improvements and personal property) and provide federal relocation assistance within the vicinity of an Air Force base that has "shown signs" of PFOA and PFOS contamination due to activities on base, if the acquisition would expand the contiguous geographic footprint of the base and increase force protection standoff near critical infrastructure and runways. Subject to annual appropriations, would require the U.S. Air Force to remediate PFOA and PFOS contamination on acquired real property as necessary. (Similar to H.R. 1567, Sec. 5 and S. 675, Sec. 5; also see a Sense of Congress provision in H.R. 2500, Sec. 323)
Sec. 1075	Remediation plan	Would require DOD, within 180 days of enactment, to submit to Congress a remediation plan for cleanup of all water at or adjacent to a military base that is contaminated with PFOA or PFOS. Would require DOD to conduct a study of PFOA or PFOS contamination of water at military bases in preparation for the plan. Would also require DOD to ensure that each budget of the President submitted to Congress requests funding to address remediation efforts identified by the plan. (Similar to H.R. 1567, Sec. 5 and S. 675, Sec. 6)
Sec. 5318	Cooperative agreements with States to address contamination by perfluoroalkyl and polyfluoroalkyl substances	Would authorize DOD to enter into cooperative agreements, grants agreements, or contracts to fund eligible DOD response actions for groundwater or surface water contaminated from releases of perfluorinated compounds with state, local, or tribal governments, or local water authorities with "jurisdiction" over a contamination site. (See S. 1790, Sec. 318; H.R. 2500, Sec. 300H; H.R. 2626; S.1372; and S. 1507, Sec. 501)
Title LXVII	PFAS Release, Disclosure, Detection, and Safe Drinking Water Assistance	(Similar to S. 1507)
Sec. 6701		
Subtitle A	PFAS Release Disclosure	(Similar to S. 1507, Title I; also see H.R. 2577)

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
Sec. 6711	Additions to toxics release inventory	Would designate specific PFAS subject to reporting to EPA for public disclosure on the Toxics Release Inventory (TRI) under Section 313 of EPCRA (42 U.S.C. 11023). Beginning January 1of the calendar year following enactment, certain industrial classes of facilities that manufacture, process, or use more than100 pounds of each designated PFAS within a calendar year would be required to report releases into any environmental media. EPA would be required to determine whether revision of this reporting threshold is warranted, and if warranted, to initiate the revision within five years of enactment. Would also establish criteria for EPA to add other PFAS to the list of toxic chemicals subject to TRI reporting, with an initial 100 pound reporting threshold subject to revision by EPA. Would authorize the protection of confidential business information to prevent the public disclosure of the chemical identity of specific PFAS in accordance with protections provided under Section 14(f) of TSCA.
Subtitle B (Sec. 6721-6724)	Drinking Water	(Similar to S. 1507, Title II)
Sec. 6721	National primary drinking water regulation for PFAS	Would require EPA, within two years of enactment, to promulgate a PFAS drinking water regulation that includes, at a minimum, MCLs for PFOA and PFOS. (Similar to H.R. 2377; S. 1473; and S. 1507, Sec. 201) Would establish a standard-setting process specifically for PFAS.
Sec. 6722	Monitoring and detection	Would require EPA to add to UCMR 5 all unregulated PFAS or categories of PFAS for which EPA has validated methods to measure these substances. (Similar S. 1507, Sec. 202; also see H.R. 2800)
Sec. 6723	Enforcement	Would prohibit EPA from imposing penalties for violations of federal drinking water regulations for PFAS until five years after the date of promulgation. Enforcement actions by delegated states and citizen suits would remain available. (Similar to S. 1507, Sec. 203)
Sec. 6724	Drinking water state revolving funds	Would establish a grant program within the DWSRF to assist public water systems in addressing emerging contaminants, with emphasis on PFAS. Would authorize appropriations of $100 million annually for FY2020 through FY2024 for this purpose. (Similar to S. 1507, Sec. 204)
Subtitle C (Sec. 6731-6736)	PFAS Detection	Would require USGS to establish a performance standard for detecting multiple PFAS in the environment, conduct nationwide sampling of PFAS in surface water, groundwater, soil, and wells using this standard, and consult with the states and EPA in identifying areas for sampling. Would authorize $5 million in FY2020 and $10 million annually from FY2021 to FY2024 for the development of the performance standard and nationwide sampling. (Similar to H.R. 1976; S 950; and S. 1507, Title III. Also similar in purpose to H.R. 2500, Section 330G, but this bill would not authorize appropriations for USGS and would authorize DOD to transfer up to $5 million to USGS to conduct nationwide sampling.)

Bill Number (*Status*)	Short Title (or Long Title if not specified)	Purpose of PFAS-Related Provisions
Subtitle D (Sec. 6741-6742)	Safe Drinking Water Assistance	Would direct EPA to develop a strategic plan to improve federal efforts to develop treatment methods and assist states in responding to health risks posed by emerging contaminants and require EPA to develop a program for technical assistance and support to states to test emerging contaminants. Would direct EPA and the Department of Health and Human Services to establish a federal working group to coordinate assessment of health effects of emerging drinking water contaminants. Would direct the White House Office of Science and Technology Policy to establish a National Emerging Contaminant Research Initiative. (Similar to S. 1251 and S. 1507, Title IV)
Subtitle E	Miscellaneous	(Similar to S. 1507, Title V)
Sec. 6751	PFAS data call	Would amend Section 8 of TSCA (15 U.S.C. 2607) to direct EPA, by January 1, 2023, to promulgate a rule requiring manufacturers of PFAS since January 1, 2006, to report certain chemical-specific information to the agency. (Similar to S. 1507, Sec. 502)
Sec. 6752	Significant new use rule for long-chain PFAS	Would direct EPA, not later than June 22, 2020, to take final action on a proposed "significant new use rule" under TSCA (15 U.S.C. 2601 et seq.) that would require notification to the agency for the manufacture or processing of long-chain perfluoroalkyl carboxylate chemical substances for discontinued uses (80 *Federal Register* 2885, January 21, 2015). (Similar to S. 1507, Sec. 503)
Sec. 6753	PFAS destruction and disposal guidance	Would require EPA to publish interim guidance on PFAS destruction and disposal within one year of enactment. (Similar to S. 1507, Sec. 504)
Sec. 6754	PFAS research and development	Would direct EPA's Office of Research and Development to (1) study the effects of PFAS on human health and the environment, (2) develop a process to prioritize one or more PFAS for research or regulation, (3) develop new tools to characterize PFAS in the environment (e.g., drinking water, wastewater, surface water, groundwater, solids, and air), (4) evaluate PFAS remediation approaches, and (5) develop public outreach materials on PFAS. This section also would authorize appropriations of $15 million annually for FY2020 through FY2024 to support these activities. (Similar to S. 1507, Sec. 505)
S. 2353 *(Introduced July 31, 2019)*	Protecting Firefighters from Adverse Substances Act of 2019 or PFAS Act of 2019	Would direct the Federal Emergency Management Agency (FEMA), in consultation with the U.S. Fire Administration, EPA, the National Institute for Occupational Safety and Health, and other relevant agencies, to issue guidance on avoiding releases of, and exposure to, PFAS from firefighting foam. Would also direct FEMA to review this guidance and issue updates as appropriate.
S. 2466 *(Introduced September 11, 2019)*	Water Justice Act	Section 309 would require EPA to promulgate an interim national primary drinking water regulation within two years of enactment for each PFAS with a validated test method for detection in drinking water and for which EPA has established a health advisory or a toxicity value, and an interim national primary drinking water regulation within four years of enactment for a class of such other PFAS if EPA has not established a health advisory or toxicity value for those substances. (Similar to H.R. 4033. Also see H.R. 2344; S. 1473; S. 1507, Sec. 201; and S. 1790, Sec. 6721)

S. 2525 *(Introduced September 19, 2019)*	Guaranteeing Equipment Safety for Firefighters Act of 2019	Would require the National Institute of Standards and Technology to begin a study within 90 days of enactment in consultation with the National Institute for Occupational Safety and Health to identify the content of PFAS in new and unused personal protective equipment for firefighters, releases from degradation and normal use of the equipment, and potential risks of exposures among firefighters. Would require a report to Congress within one year of enactment on the findings of the study and recommendations for additional research or technical improvements to avoid "unnecessary" occupational exposures to PFAS among firefighters. Subject to annual appropriations, would require the National Institute of Standards and Technology to award grants within 540 days of enactment for research to carry out these recommendations and develop "safe" alternatives to PFAS in personal protective equipment, with total grant awards limited to $5 million each fiscal year.
S.Res. 334 *(Passed the Senate September 25, 2019)*	A resolution instructing the managers on the part of the Senate on the bill S. 1790 (116th Congress) to insist upon the provisions contained in Section 316 of the Senate bill (relating to a prohibition on the use of perfluoroalkyl substances and polyfluoroalkyl substances for land-based applications of firefighting foam)	Would instruct the Senate conferees on the FY2020 NDAA to "insist upon" Section 316 of S. 1790 that would prohibit DOD from procuring firefighting foam containing PFAS in excess of one part per billion after October 1, 2022 for use at U.S. military installations, and from using existing stocks of such firefighting foam after October 1, 2023 at U.S. military installations. (See S. 1790, Sec. 316)

Source: CRS identified the legislation listed above based on a search of selected terms relevant to PFAS in Congress.gov, as of October 23, 2019. This list therefore may not necessarily be comprehensive of all relevant legislation that may have contained differing terms.

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