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Environmental Protection
Agency

Effluent Guidelines Program Plan 15

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TABLE OF CONTENTS

Page

LIST OF APPENDICES

LIST OF TABLES

Page

LIST OF FIGURES

Page

1. EXECUTIVE SUMMARY

Under the Clean Water Act (CWA), EPA publishes Effluent Limitations Guidelines and Standards (ELGs), which are national industry-specific wastewater regulations based on the performance of demonstrated wastewater treatment technologies (i.e., "technology-based limitations"). The effluent limitations guidelines apply to discharges from industrial facilities to water bodies (referred to as "direct discharges"). Pretreatment standards apply to discharges from industrial facilities to publicly owned treatment works (POTWs) (referred to as "indirect discharges"). CWA Section 304(m) contains provisions requiring EPA to annually review the guidelines and standards and revise them if appropriate. The CWA also requires EPA to biennially publish a plan that establishes a schedule for annual reviews, revisions, and promulgation of any guidelines not previously established for industrial categories. This Effluent Guidelines Program Plan 15 (Plan 15) fulfills these CWA requirements and thus furthers the national work toward restoring and maintaining the chemical, physical, and biological integrity of the nation's waters.

Through its Effluent Guidelines Program Plans, EPA seeks to provide transparent decision-making with the benefit of stakeholder input throughout the planning process. EPA published and requested public comments on Preliminary Effluent Guidelines Program Plan 15 (Preliminary Plan 15) on September 14, 2021 (86 FR 51155). Plan 15 provides a summary of the comments received on Preliminary Plan 15 as well as updates on EPA's reviews of industrial wastewater discharges and treatment technologies. Plan 15 also presents EPA's 2021 annual review of effluent guidelines and pretreatment standards, including the initial results from its preliminary review of the Plastics Molding and Forming (40 CFR part 463), Leather Tanning (40 CFR part 425), and Paint Formulating (40 CFR part 446) Categories. With this Plan 15, EPA continues to focus on and evaluate the extent and nature of per- and polyfluoroalkyl substances (PFAS) discharges and assess opportunities for limiting those discharges from multiple industrial categories, as outlined in EPA's 2021 PFAS Strategic Roadmap.

Plan 15 announces that EPA, pending resource availability, intends to initiate one new rulemaking and several new studies. After collecting and analyzing data, as described throughout this Plan, EPA has determined that revisions to the effluent limitations guidelines and pretreatment standards for the Landfills Category (40 CFR part 445) are warranted, considering PFAS found in landfill leachate. EPA also intends to expand the detailed study of the Textile Mills Category (40 CFR part 410) to gather information on the use and treatment of PFAS in this industry and associated PFAS discharges. For this expanded study, EPA intends to use a mandatory questionnaire issued to a nationally representative sample of textile mills. Plan 15 also announces EPA's intent to initiate a POTW Influent Study of PFAS, which will focus on collecting nationwide data on industrial discharges of PFAS to POTWs, including categories recently reviewed. EPA intends to undertake this study to both verify sources of PFAS wastewater and to discover new PFAS wastewater sources. Finally, Plan 15 announces EPA's intent to undertake a detailed study of the Concentrated Animal Feeding Operations (CAFOs) Category (40 CFR part 412), which will focus on collecting further information to enable the Agency to make an informed, reasoned decision whether to undertake rulemaking to revise the ELG for CAFOs.

Plan 15 also announces that EPA is not pursuing further action for the Electrical and Electronic Components (E&EC) Category (40 CFR part 469) at this time but will continue monitoring this category for PFAS discharge data through the POTW Influent Study. EPA will also continue to monitor PFAS use and discharges from the Pulp, Paper, and Paperboard Category (40 CFR part 430) and airports.

Finally, Plan 15 provides updates of four ongoing rulemakings:

- Steam Electric Power Generating Category rulemaking (see Section 7.1 for additional details) to strengthen certain wastewater pollution discharge limitations for coal power plants that use steam to generate electricity.
- Meat and Poultry Products Category rulemaking to address nutrient discharges (see Section 7.2 for additional details).
- Organic Chemicals, Plastics & Synthetic Fibers Category rulemaking to address PFAS discharges (see Section 7.3 for additional details).
- Metal Finishing Category and Electroplating Category rulemakings to address PFAS discharges (see Section 7.4 for additional details).

The Agency intends to undertake the actions outlined in this Plan and summarized above. The commencement and pace of these activities will depend on the agency's Fiscal Year 2023 appropriations and operating plan.

2. BACKGROUND

This section explains how the Effluent Guidelines Program fits into EPA's National Water Program, provides an overview of the Effluent Guidelines Program, and summarizes EPA's procedures for revising and developing ELGs (i.e., the effluent guidelines planning process).

2.1 The Clean Water Act and the Effluent Guidelines Program

The CWA focuses on two types of controls for point source discharges of pollutants to waters of the United States: (1) technology-based controls, based on ELGs or, in the absence of applicable ELGs, best professional judgement (BPJ) of permit writers, and (2) water-quality-based controls, based on applicable water quality standards.

The CWA directs EPA to promulgate technology-based ELGs that reflect pollutant reductions achievable by facilities in categories or subcategories of industrial point sources through implementation of available treatment technologies.[1] ELGs apply to pollutants discharged from industrial facilities to surface water (direct discharges) and to publicly owned treatment works (POTWs) (indirect discharges). EPA's technology-based standards ensure that industrial facilities with similar characteristics will, at a minimum, meet similar effluent limitations or pretreatment standards that represent the performance of the "best" pollution control technologies, regardless of their location or the nature of the receiving water or POTW into which they discharge.

The CWA also gives states the primary responsibility for establishing, reviewing, and revising water quality standards. Effluent guidelines are not specifically designed to ensure that regulated discharges meet the water quality standards of the receiving water body. For this reason, although technology-based ELGs in discharge permits may be as stringent as or even more stringent than necessary to meet water quality standards, where this is not the case, the CWA requires EPA and authorized states to establish water-quality-based effluent limitations as stringent as necessary to meet water quality standards.[2] Thus, water-quality-based limitations may require industrial facilities to meet standards that are more stringent than those in the ELGs.

To date, EPA has promulgated ELGs for 59 industrial categories. See EPA's Industrial Effluent Guidelines webpage for more information.[3] These ELGs apply to between 35,000 and 45,000 U.S. direct dischargers, as well as to another 129,000 facilities that discharge to POTWs. Based on pollutant reduction estimates from each ELG, EPA estimates that the regulations altogether prevent the discharge of over 700 billion pounds of pollutants annually.[4]

2.2 Effluent Limitations Guidelines and Pretreatment Standards Overview

EPA promulgates ELGs that include technology-based limitations for conventional, toxic, and nonconventional pollutants in accordance with six statutorily prescribed levels of control (Table 2-1).

[1] See 33 U.S.C. 1311(b) and 1314(b).

[2] See 33 U.S.C. 1311(b)(1)(C).

[3] See https://www.epa.gov/eg/industrial-effluent-guidelines.

[4] Based on the difference between discharges from each point source category before ELG promulgation and the estimated (lower) volume of discharges from each point source category after promulgation (from review of ELG development documents).

The limitations are based on the performance of specific technologies, but the regulations do not require a specific control technology to achieve the limitations. For more information, see EPA's Learn about Effluent Guidelines webpage.[5]

The CWA specifies different levels of control based on the type of pollutant (i.e., conventional, toxic, or nonconventional). CWA Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demand (BOD_5), total suspended solids, fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979.[6] At the direction of Congress, EPA has identified 65 pollutants and classes of pollutants as toxic, among which EPA has designated 126 specific substances as priority toxic pollutants.[7] All other pollutants are considered nonconventional.

Table 2-1. Statutorily Prescribed Levels of Control

Level of Control	CWA Statutory Reference	Description
Best Practicable Control Technology (BPT)	CWA Sections 301(b)(1)(A) and 304(b)(1), 33 U.S.C. 1311(b)(1)(A) and 1314(b)(1)	EPA develops effluent limitations based on BPT for conventional, toxic, and nonconventional pollutants. EPA establishes BPT effluent limitations based on the average of the best performance of facilities within an industry of various ages, sizes, processes, or other common characteristics. Where existing performance is uniformly inadequate, BPT may reflect higher levels of control than currently in place in an industrial category if the agency determines that the technology can be practically applied.
Best Conventional Pollutant Control Technology (BCT)	CWA Sections 301(b)(2)(E) and 304(b)(4), 33 U.S.C. 1311(b)(2)(E) and 1314(b)(4)	BCT addresses conventional pollutants from existing industrial point sources. EPA establishes BCT limitations by considering the factors specified in Section 304(b)(4)(B), including a two-part "cost-reasonableness" test. This methodology was published in a Federal Register notice on July 9, 1986 (51 FR 24974).
Best Available Technology Economically Achievable (BAT)	CWA Sections 301(b)(2)(A) and 304(b)(2), 33 U.S.C. 1311(b)(2)(A) and 1314(b)(2)	EPA develops effluent limitations based on BAT for toxic and nonconventional pollutants. BAT represents the best available economically achievable performance of plants in an industrial subcategory or category. Factors considered in establishing BAT include the age of equipment and facilities involved, the process employed, the engineering aspects of control techniques or process changes, the cost of achieving such effluent reduction, non-water-quality environmental impacts (including energy requirements), and such other factors as the Administrator deems appropriate (33 U.S.C. 1314(b)(2)(B)). BAT limitations may be based on end-of-pipe wastewater treatment or effluent reductions attainable through changes in a facility's processes and operations.
Standards of Performance for New Sources (NSPS)	CWA Section 306, 33 U.S.C. 1316	EPA develops effluent limitations based on NSPS for conventional, toxic, and nonconventional pollutants. NSPS reflect effluent reductions based on the best available demonstrated control technology (33 U.S.C. 1316(a)(1)). In establishing or revising NSPS, EPA considers the cost of achieving such effluent reduction and any non-water-quality, environmental impact, and energy requirements (33 U.S.C. 1316(b)(1)(B)).

[5] See https://www.epa.gov/eg/learn-about-effluent-guidelines.

[6] 44 FR 44501.

[7] Appendix A to part 423, reprinted after 40 CFR part 423.17.

Table 2-1. Statutorily Prescribed Levels of Control

Level of Control	CWA Statutory Reference	Description
Pretreatment Standards for Existing Sources (PSES)	CWA Section 307(b), 33 U.S.C. 1317(b)	EPA develops PSES for nonconventional and toxic pollutants. PSES are national, uniform, technology-based standards that apply to indirect dischargers. They are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs (33 U.S.C. 1317(b)(1)). EPA considers the same factors for PSES as it does for BAT limitations (33 U.S.C. 1314(b)(2)(B)).
Pretreatment Standards for New Sources (PSNS)	CWA Section 307(c), 33 U.S.C. 1317(c)	EPA develops PSNS for nonconventional and toxic pollutants. PSNS are national, uniform, technology-based standards that apply to new indirect dischargers. Like PSES, they are designed to prevent the discharges of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. PSNS are issued at the same time as NSPS (33 U.S.C. 1317(c)). EPA considers the same factors in promulgating PSNS as it considers in promulgating NSPS (33 U.S.C. 1316(a)(1)).

EPA and states implement ELGs for point sources that discharge pollutants into surface waters through National Pollutant Discharge Elimination System (NPDES) permits.[8] POTWs, states, and EPA enforce pretreatment standards for point sources that discharge to POTWs.[9]

2.3 Effluent Guidelines Review and Planning Process

The CWA contains multiple provisions requiring EPA to review and revise the limitations, standards, and guidelines that apply to new and existing industrial facilities for both direct and indirect dischargers.

For existing direct dischargers, i.e., those that discharge into waters of the United States, the CWA requires EPA to review effluent limitations "at least every five years and, if appropriate, revise" those limitations.[10] The CWA also requires EPA to publish regulations providing guidelines for effluent limitations "and, at least annually thereafter, revise, if appropriate, such regulations."[11] Historically, EPA has combined rulemakings for effluent limitations and guidelines into a single rulemaking and referred to the resulting rule as an "ELG." Similarly, EPA consolidates its review of effluent limitations required under Section 301(d) and its review of effluent limitations guidelines under Section 304(b) into an annual review of the 59 promulgated ELGs.[12]

[8] See CWA Sections 301(a), 301(b), and 402; 33 U.S.C. 1311(a), 1311(b), and 1342.

[9] See CWA Sections 307(b) and 307(c); 33 U.S.C. 1317(b) and 1317(c).

[10] See CWA Section 301(d); 33 U.S.C. 1311(d).

[11] See CWA Section 304(b); 33 U.S.C. 1314(b). See also *Our Children's Earth v. EPA*, 527 F.3d 842, 848-49 (9th Cir. 2008) ("Sections 304(b) and (m) require an annual review of "guidelines for effluent limitations" applicable to direct dischargers and revision "if appropriate").

[12] See *Our Children's Earth v. EPA*, 527 F.3d 842, 849 (9th Cir. 2008) (discussing EPA's processes of combining the reviews required under Sections 301(d) and 304(b)).

For indirect dischargers, i.e., those that discharge to POTWs, the CWA requires EPA "from time to time" to publish proposed regulations establishing pretreatment standards.[13] The CWA also requires EPA to "review at least annually . . . and, if appropriate, revise guidelines for pretreatment."[14]

For new sources, both direct and indirect, the CWA requires EPA to "publish (and from time to time thereafter, revise) a list of categories of sources, which shall, at the minimum, include . . ." and "propose and publish regulations establishing Federal standards of performance for new sources within such category."[15] The CWA further provides that, "[t]he Administrator shall, from time to time, as technology and alternatives change, revise such standards following the procedure required by this subsection for promulgation of such standards."[16]

In the 1987 Amendments to the CWA, Congress added a provision that requires EPA to biennially publish in the Federal Register a "plan" that "establish[es] a schedule for the annual review and revision of promulgated effluent guidelines," identifies certain categories of sources for which ELGs have not previously been published, and establishes a schedule for promulgating ELGs for certain categories of sources for which such guidelines have not previously been published.[17] The biennial planning requirement was enacted after the CWA provisions regarding review and revision of effluent limitations and ELGs and informs EPA's obligations under those provisions. When read together, these provisions require EPA to annually review ELGs and revise those guidelines, if appropriate, and to biennially publish a plan as described above.

While the CWA requires EPA to annually "review" effluent limitations guidelines and pretreatment standards,[18] it does not require EPA to make a "yes" or "no" determination every year on whether to revise the guidelines and standards. See Effluent Guidelines Program Plan 14 (Plan 14, U.S. EPA, 2021a) Section 2.3 for further discussion of EPA's annual obligations. Further, where EPA initiates rulemaking revising ELGs, the CWA confers discretion on EPA as to the timing for that rulemaking (U.S. EPA, 2022o).

To increase transparency and stakeholder awareness, EPA's biennial plans include information on its review of existing ELGs and pretreatment standards, as well as industries reviewed for potential development of new ELGs or pretreatment standards.

Plan 15 describes ongoing planning activities, including projects EPA initiated as part of its 2021 annual review and details EPA's effluent guidelines planning efforts, including preliminary category reviews, category studies, and ELG rulemakings. For additional details, see *EPA's 2021 Annual Review of Industrial Wastewater Discharges* (U.S., EPA, 2022a) and *2021 Preliminary Review of Industrial Point Source Categories* (U.S. EPA, 2022b).

[13] See CWA Section 307(b); 33 U.S.C. 1317(b).
[14] See CWA Section 304(g); 33 U.S.C. 1314(g).
[15] See CWA Section 306(b)(1); 33 U.S.C. 1316(b)(1).
[16] See CWA Section 306(b)(1)(B); 33 U.S.C. 1316(b)(1)(B).
[17] See CWA Section 304(m); 33 U.S.C. 1314(m).
[18] See CWA Sections 304(b), 304(m)(1)(A), and 304(g); 33 U.S.C. 1314(b), 1314(m)(1)(A), 1314(g).

3. SUMMARY OF PUBLIC COMMENTS RECEIVED ON PRELIMINARY EFFLUENT GUIDELINES PROGRAM PLAN 15

On September 14, 2021, EPA published Preliminary Plan 15 for a 30-day public comment period (86 FR 51155). EPA received over 34,000 public comment letters on Preliminary Plan 15, the majority of which were submitted as part of four different mass-mail campaigns that supported the agency's review of and actions on PFAS and the meat and poultry industry. Apart from the mass-mail campaigns, EPA received 67 public comments.

EPA received comments on most of the topics presented in Preliminary Plan 15. Table 3-1 includes a summary of the major comments discussed in the public submissions and is generally organized by topic. See EPA's *Response to Comments for the Effluent Guidelines Program Plan 15* for all comment responses (U.S. EPA, 2022c).

Table 3-1. Summary of Public Comments Received on Preliminary Plan 15

Topic	Summary	Commenter Types (Count by Type)
ELG Planning	• EPA should prioritize the ELG program and reconsider its approach for reviewing and revising ELGs. • EPA needs to annually review industrial discharges and revise ELGs to meet the goals of the CWA. Despite progress made by the agency, less than half of waterways assessed for impairments have been determined to be safe and clean. • Over two thirds of the industrial regulations are 30 years old. EPA has not applied upgrades in treatment technologies to lower limits for the categories after many were originally established in the 1970s and 1980s. EPA should streamline its approaches by applying data and knowledge collected about current technologies when considering wastewater treatment upgrades (or issues) common among multiple industries (e.g., nutrients). • EPA should manage pollutants at the source, reducing burdens on POTWs that receive industrial discharges. • EPA ELG planning tools should be more transparent. In its analyses, EPA should consider toxicity of contaminants in its rankings analyses in addition to reviewing EPA's Contaminant Candidate List (CCL). • ELG planning should consider innovative approaches for complying with NPDES requirements and further advancing the goals of the CWA. • EPA should establish the strongest possible standards to protect waters, which are essential to communities (e.g., drinking water and business development). • Commenters generally agree with the limitations outlined by EPA on the 2020 cross-category concentration analysis, though one commenter noted that evaluating loads is also flawed because it does not consider permit limits or water quality at the industry level. • EPA should annually review and publish summaries of industry technology updates, characterization data, and clarifications on applicability to help with implementation of ELGs, specifically older regulations. • Commenters support the use of membrane technologies, both economical and versatile, in combination with chemical/physical treatment and/or biological treatment.	Env. Organization (6) Federal Agency (1) Industry Trade Assoc. (5) State Govt. (1)
Environmental Justice	• EPA should consider multiple environmental justice indicators in its annual reviews and look beyond EJScreen, as that tool does not provide a risk analysis and does not consider multiple environmental indicators at one time. EPA should consider the following in its proposed analyses: expanding the geographic proximity from wastewater discharge point, considering cumulative impacts (both environmental and from multiple dischargers in an area), measuring impaired water bodies, evaluating compliance within a geographic location, evaluating water bodies for downstream impacts, assessing impacts of fish consumption advisories on tribal and low-income communities, and considering impacts on Indigenous communities and sacred lands and waters. • EPA's proposed environmental justice methodology may not capture all environmental justice and inequity considerations. • EPA should consider environmental justice in the planning process and in regulation development. • Commenters stated specific environmental justice concerns with refineries, facilities discharging PFAS, fertilizer manufacturing facilities, slaughterhouses, and CAFOs. • EPA should consider prioritizing industries that are not currently regulated and are located in communities with environmental justice concerns.	Env. Organization (8) Federal Agency (1) Industry Trade Assoc. (2) Private Citizen (2) State Govt. (1)

Table 3-1. Summary of Public Comments Received on Preliminary Plan 15

Topic	Summary	Commenter Types (Count by Type)
PFAS – General	• Commenters stated PFAS are extremely persistent in the environment and the human body, and many have been linked at very low doses to serious health harms. • Recent action by EPA falls short of what is needed to sufficiently address industrial discharges of PFAS both in terms of scope and urgency. Commenters urged EPA to curb industrial releases of the toxic "forever chemicals" known as PFAS. • EPA should promulgate PFAS ELGs and pretreatment standards for multiple industry sectors at once and include all those that contribute to PFAS discharges. • EPA should set deadlines for the development of new standards to address industrial discharges of PFAS. • Commenters support the U.S. House of Representative's bipartisan legislation that requires EPA to set PFAS standards for nine industry categories within four years. • EPA should finalize a PFAS Road Map that shifts responsibility for PFAS discharges to polluters. EPA is encouraged to: require the disclosure of PFAS and use of technology to control discharges, set a PFAS drinking water standard, quickly set nationwide standards to restrict industrial releases of PFAS, designate PFAS as hazardous substances, end needless uses of PFAS, and ensure that PFAS wastes are properly disposed. • Commenters support EPA actions in issuing a regulatory determination under the Safe Drinking Water Act for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), proposing to expand monitoring of PFAS in drinking water, developing new analytical methods, providing more funding for local communities, restoring scientific integrity to EPA's review of PFAS, taking steps to close PFAS loopholes, and demanding more data from polluters. • Commenters varied in their opinion on the classification of PFAS. Some stated that PFAS are too broad of a class to promulgate regulations collectively, while others stated that PFAS must be addressed as a class, not as one chemical at a time. Some commenters encouraged EPA to delineate exact which chemical is being regulated and transition to using CAS Registry numbers when referring to compounds in the PFAS family. • Some commenters noted that PFAS burdens environmental justice communities. • EPA should conduct PFAS-specific screening across all industrial categories and incorporate Toxics Release Inventory (TRI) data into the analysis to reduce data gaps due to the lack of a part 136 PFAS surface water analytical method. • EPA should develop PFAS discharge prioritization guidance for states. • EPA must push state agencies to incorporate technology-based limits into state issued permits through case-by-case analyses, as required by the CWA, and provide guidance to states for conducting these analyses. • Some commenters stated that legacy and current use of PFAS should be addressed in analyses and in the development of regulations. • EPA should clarify whether stormwater practices and PFAS concentrations in stormwater were limiting factors in the agency's analysis. • EPA should include reverse osmosis and granulated activated carbon in technology-based regulations for PFAS.	Env. Organization (7) Federal Agency (3) Industry (4) Industry Trade Assoc. (4) Private Citizen (6) State Govt. (1)

Table 3-1. Summary of Public Comments Received on Preliminary Plan 15

Topic	Summary	Commenter Types (Count by Type)
PFAS – Analytical Methods	• EPA should validate and finalize Draft Method 1633 and develop methods to detect total organic precursors (TOP) and total organic fluorine (TOF). • In addition to Draft Method 1633, EPA should develop recommended sampling techniques/guidance. • PFAS data analyzed by EPA for Preliminary Plan 15 predates a draft method; one commenter was unaware of any other ELG that has been developed based on sampling data absent a single reference analytical method. • Once an analytical method is developed, it will take time to build laboratory capacity. Commenters are unaware of other ELGs that have faced this capacity issue. • Commenters noted that EPA should consider whether or not analytical methods are available for the specific chemical being regulated, as EPA's Draft Method 1633 is only applicable to 40 PFAS.	Env. Organization (2) Industry (1) Industry Trade Assoc. (2) Private Citizen (1)
PFAS – Organic Chemicals, Plastics and Synthetic Fibers (OCPSF)	• Some commenters support the revision of the OCPSF ELG and agree that it is warranted. • EPA's announced rulemaking should consider the wide variety of facilities and operations captured in the category and specifically define impacted facilities. • Some commenters stated that PFAS formulators, including those not currently regulated, should be considered when developing ELG. • One state commented that their sampling program has not identified OCPSF facilities as sources of discharges to POTWs or surface waters. However, there are data that suggest that some facilities may have PFAS discharges associated with the storage of aqueous film-forming foam (AFFF). This state also stated that there are 29 chemical manufacturers in the state that are not categorically covered under OCSPF; some are sources of PFAS, and these manufacturers should be considered as part of the rulemaking. • One commenter stated that EPA should review the wastewater characterization data and identify any pretreatment in order to effectively characterize treatment. EPA should also consider collecting paired influent-effluent data across treatment technologies. • One commenter stated that EPA should further study PFAS formulators and agreed that these facilities should not be regulated at this time.	Env. Organization (2) Industry (1) Industry Trade Assoc. (2) State Govt. (1)
PFAS – Metal Finishing and Electroplating	• Commenters supported the proposed rulemaking for the Metal Finishing Category and stated that EPA should consider specific regulatory language (e.g., a subcategory or paragraph) for chromium electroplating and chromium anodizing. • EPA should also consider expanding the scope to identify the presence of PFAS at all metal finishers, including electroplaters. • One commenter stated that the EPA PFAS report should be updated to include perfluorononanoic acid (PFNA) data from the Region 5 PFAS Electroplater Study for chromium electroplating and chromium anodizing operations.	Env. Organization (3) Industry (1) State Govt. (1)

Table 3-1. Summary of Public Comments Received on Preliminary Plan 15

Topic	Summary	Commenter Types (Count by Type)
PFAS – Textile Mills	• One commenter stated that textile mills are known dischargers of PFAS. • EPA should issue Section 308 letters to require data collection for PFAS in discharges. • EPA should make data collected in the study publicly available on EPA's website and publish a separate detailed study report on its findings.	Env. Organization (1) Industry (1) Industry Trade Assoc. (1)
PFAS – Landfills	• The Landfill ELG should include pretreatment standards, as leachate is a significant source of PFAS and other compounds released to POTWs. • EPA's study should cover active and closed landfills. • The current methods EPA is evaluating for the treatment of PFAS from leachate have not been proven to be viable for full-scale implementation (or economically feasible). • Landfills are not the users of PFAS; they are the receivers. As such, industry believes that there are opportunities for them to minimize discharges of PFAS. However, industry maintains that the most effective approach to controlling PFAS would be to eliminate it at the source. Minimization techniques should be evaluated as part of the detailed study. • EPA's review of landfills should account for different landfill profiles and, therefore, different wastewater characterization. • Two commenters stated that they welcome the opportunity to share information on the data requested as part of Preliminary Plan 15. • One commenter expressed interest in collaborating with EPA to conduct further research and study leaching characteristics and evaluate applicable treatment technologies.	Env. Organization (2) Industry (3) Industry Trade Assoc. (1) State Govt. (1)
PFAS – Other Industries	*Pulp, Paper, and Paperboard* • A commenter stated that EPA should continue its study on the use and discharge of PFAS at pulp and paper mills. • States expressed concern about indirect discharges of PFAS from legacy PFAS (e.g., in recycled fibers) even though the industry will phase out direct application of PFAS in new products in 2024. • Pulp and paper sites have contaminated ground water and soils that contribute to impacted ground and surface water (via old paper sludge land application sites). • EPA should consider working with the U.S. Food and Drug Administration to evaluate PFAS in the food packaging industry. • EPA should consider monitoring PFAS in paper mill intake water to determine if it is a relevant source of PFAS. • One commenter stated that the pulp and paper industry phased out the use of long-chain PFOA and PFOS approximately 10 years ago and has almost completed its transition of intentional short-chain PFAS in its manufacturing process.	Env. Organization (2) Industry (2) Industry Trade Assoc. (2) State Govt. (2)

Table 3-1. Summary of Public Comments Received on Preliminary Plan 15

Topic	Summary	Commenter Types (Count by Type)
	Leather Tanning and Finishing • EPA should consider PFAS limitations for this category due to data indicating contaminated ground water and stormwater associated with these sites. *Plastics Molding and Forming* • EPA should prioritize this industry sector in its ongoing PFAS research, collect data from the industry, and determine if updated ELG are necessary to address PFAS. *Paint Formulating* • EPA should collect data from the industry to determine if updated ELG are necessary to address PFAS. • A commenter also noted that because paints are flammable, sites may be outfitted with AFFF. *E&EC* • The use of PFAS in electronics is well documented. EPA should complete its detailed study and should update the public in Plan 15. *Airports/AFFF* • EPA should continue studying the use of AFFF at airports and consider expanding the scope of facilities identified as having a stockpile of AFFF. • EPA should include more firefighting solutions other than PFAS-free firefighting foam. • One state commented that no new ELG for airports were required at this time because it found no current impairments resulting from PFAS storage, loading, or use at airports in Wyoming.	
Petroleum Refining	• A commenter stated that EPA should complete a thorough review of the petroleum refining ELG, including an assessment of BAT and limits for other pollutants discharged by the industry. • Over the course of a multi-year review, EPA failed to consider or answer the questions needed to determine if revision to the existing ELG is warranted. • Current ammonia discharge monitoring report (DMR) data suggest that the ammonia limits (established in 1974) no longer represent BAT. • EPA should promulgate concentration- or mass-based limitations so that larger refineries are held to similar standards as smaller refineries. • EPA should consider nitrates, selenium, mercury, nickel, and PFAS (including legacy contamination from the use of AFFF).	Env. Organization (1)
Oil and Gas/ Centralized	• EPA should continue to study Oil and Gas Extraction/Centralized Waste Treatment ELG, specifically for PFAS as there is evidence that PFAS are used in oil and gas production and potentially oil recovery operations and that centralized waste treatment facilities are a source of PFAS to POTWs.	Env. Organization (2) State Govt. (1)

Table 3-1. Summary of Public Comments Received on Preliminary Plan 15

Topic	Summary	Commenter Types (Count by Type)
Waste Treatment	• EPA should set national standards for produced water in order to help states set appropriate standards and ensure water quality. • One commenter expressed support for EPA's decision not to make changes to Section 437 (to allow for more flexibility for increased discharge of produced water to centralized waste treatment facilities). • EPA should engage with stakeholders on a more robust study of produced water discharges to determine if revised ELGs are needed.	
Fertilizer Mfg.	• EPA should review the Fertilizer Manufacturing ELG. EPA has overlooked details about discharges that impact communities with environmental justice concerns and pollute climate, air, and surface water in its decision not to continue review of the category as announced in the Preliminary Plan 15. • EPA should develop ELGs for three categories of fertilizer manufacturing plants: manufacture of nitrogen fertilizer ingredients, manufacture of phosphorus fertilizer ingredients, and plants that mix nitrogen and phosphorus ingredients with others for finished fertilizer products. • One commenter stated that EPA's most recent review was insufficient to determine whether the existing ELG and pretreatment standards are appropriate. • EPA's cross-category concentration analysis was not grounded in CWA requirements; EPA should have compared fertilizer manufacturing concentrations to actual permit limits required by the ELG. • One commenter stated that pollutants from fertilizer manufacturing and the application of fertilizer products impact human health and the environment.	Env. Organization (1)
Steam Electric	• EPA should consider limitations, or mitigation strategies, for bromides to help protect sources of drinking water. • EPA must set zero discharge requirements for bottom ash transport water and flue gas desulfurization wastewater. • EPA should target the discharges associated with legacy wastewater. • One commenter stated that EPA should propose revised standards sooner than the announced Fall 2022 timeline. • One commenter agreed with EPA's 2020 rulemaking decision not to establish membrane technology as BAT and supports the 2020 Rule. • One state commented that it does not show any impairments from steam electric power plants; therefore, they do not support a revised rulemaking and welcome the opportunity to meet with EPA to discuss.	Env. Organization (3) Industry Trade Assoc. (2) State Govt. (2)

Table 3-1. Summary of Public Comments Received on Preliminary Plan 15

Topic	Summary	Commenter Types (Count by Type)
Meat and Poultry Products (MPP)	• One commenter stated that it is collaborating with EPA to update and clearly define the list of facilities that are captured under the applicability of the ELG as part of the detailed study effort referenced in Plan 14 (86 FR 1960). • EPA should strengthen the ELG for MPP as soon as possible, as available technology for these wastewaters has improved. • One commenter indicated that the MPP industry has caused interference and pass through at POTWs. • EPA can use existing DMR data, information on BAT nutrient removal technologies from industry (or best performers), and information on nutrient removal technologies from POTWs to revise MPP ELG.	Env. Organization (3) Industry Trade Assoc. (3) Private Citizen (1) State Govt. (2)
Concentrated Animal Feeding Operations (CAFOs)	• One commenter urged EPA to review the ELG for the CAFOs industry based on assertions that: EPA has factual evidence that demonstrates the inadequacy of the current ELG, current wastewater management practices are no longer BAT, and EPA's current rankings methodology (based solely on DMR data) does not accurately characterize pollutant impacts.	Env. Organization (1)

4. SUMMARY OF ANNUAL REVIEW ACTIVITIES

This section presents EPA's 2021 annual review activities. These review activities include review of discharge monitoring report (DMR) data and ranking of pollutant load discharged across all existing ELGs, comprised of industries with existing ELGs and some industries that are not currently regulated by ELGs. EPA has taken the following actions as part of its 2021 annual review:

- Conducted a rankings analysis (as a follow-on of the cross-category concentration analysis conducted for the 2020 annual review and described in Preliminary Plan 15) of point source categories based on pollutant load data reported on 2019 DMRs (see Section 5.1). EPA used 2019 DMR data for the 2021 annual review because they were the most recent and complete set of industrial wastewater discharge data available when the rankings analysis began.
- Conducted preliminary category reviews of three point source categories to assess discharges of PFAS and other regulated and unregulated pollutants to determine whether the categories warrant further review and study: Leather Tanning and Finishing (40 CFR part 425), Paint Formulating (40 CFR part 446), and Plastics Molding and Forming (40 CFR part 463) (see Sections 5.2 through 5.4). EPA used 2020 DMR and Toxics Release Inventory (TRI) data for these preliminary category reviews because they were the most recent and complete set of industrial wastewater discharge data available when the category reviews began.
- Continued to screen, prioritize, and further review specific industrial wastewater treatment technologies that may be more broadly evaluated as technology options in future studies and rulemakings (see Section 5.5).
- Continued to compile wastewater treatment technology information in the Industrial Wastewater Treatment Technology (IWTT) Database and populate the information into the IWTT web application for public use (see Section 5.6.1).

In Preliminary Plan 15, EPA announced that it was initiating a detailed study for one point source category: Landfills (40 CFR part 445). See Section 6.3.3 for information on EPA's next steps regarding this category.

EPA also explained in Preliminary Plan 15 that it was considering how best to incorporate equity and environmental justice considerations into the ELG planning process. As a component of the preliminary reviews for the Leather Tanning and Finishing, Paint Formulating, and Plastics Molding and Forming Categories, EPA compiled publicly available socioeconomic data for census block groups where facilities discharging to surface water or POTWs are located to evaluate the impact of potential discharges and help further prioritize the categories for review and study. Specifically, EPA evaluated the following indicators: the percentile of people of color, low income, life expectancy at birth, unemployment rate, less than high school education, and linguistically isolated relative to the U.S. median value (50th percentile). For an entire category, EPA calculated the percentage of facilities located in census block groups that had one or more socioeconomic indicators greater than the national 80th percentile, consistent with the EJScreen methodology for highlighting communities that may require closer attention. See EPA's *2021 Preliminary Review of Industrial Point Source Categories* for more details on the specific analyses performed as part of the preliminary category reviews (U.S. EPA, 2022b). Section 5.7 describes this methodology in more detail.

As required by the CWA, EPA reviewed all point source categories as part of its annual review. Given EPA's current priorities and available resources, the agency will continue to focus on the categories identified in EPA's PFAS Strategic Roadmap that are likely discharging PFAS, in addition to the other point source categories discussed in this Plan. Categories not discussed in detail in Plan 15 are not priorities for further study or rulemaking at this time. EPA will continue to review all point source categories while preparing the next plan.

The 2021 annual review and the information presented here in Plan 15 build on EPA's previous annual reviews, including the 2020 annual review and ELG planning process described in Preliminary Plan 15 (U.S. EPA, 2021b). EPA will present its 2022 annual review as part of Preliminary Plan 16 and expects to expand its rankings analyses to include additional metrics such as size of the industry, average volume of wastewater discharged, age of regulations, current ELG requirements and technology basis, presence of PFAS in industrial wastewater discharges, discharges to impaired waters, and demographics data associated with the location of industrial dischargers.

EPA also received petitions for rulemaking that in part request changes to the ELG for CAFOs and Plastic Manufacturers and is carefully reviewing those petitions.[19,20]

[19] Food & Water Watch, et al. "Petition to Revise the Clean Water Act Regulations for Concentrated Animal Feeding Operations." Submitted 8 March 2017. Food & Water Watch filed a mandamus action in the U.S. Court of Appeals for the Ninth Circuit asking the court to order EPA to respond to the petition. As of the time of signature of Plan 15, EPA and Food & Water Watch have entered into the Court's mediation program to address the mandamus action.

[20] Center for Biological Diversity, et al. "Petition to Revise the Clean Water Act Effluent Limitations Guidelines and Standards for the Petro-Plastics Industry Under the 40 CFR part 419 Petroleum Refining Industrial Category (Cracking and Petrochemicals Subparts) and part 414 Organic Chemicals, Plastics, and Synthetic Fibers Industrial Category." Submitted 23 July 2019.

5. REVIEWS OF INDUSTRIAL WASTEWATER DISCHARGES AND TREATMENT TECHNOLOGIES

This section describes EPA's ongoing ELG program planning activities and analyses to identify industrial categories for potential new or revised ELGs and summarizes the sources and limitations of the data used to complete the reviews. This section also presents findings and next steps for the associated planning activities.

5.1 DMR Pollutant Load Rankings Analysis

As part of its 2021 annual review of the ELGs, EPA used DMR data to rank categories by total annual pollutant load discharged. This rankings analysis provides a mechanism for prioritizing specific point source categories for further review. The following subsections discuss the data sources and methodology of the DMR pollutant load rankings analysis, describe factors that EPA considered in its review, and summarize the results of the review. For additional details on the DMR pollutant load rankings analysis, see *EPA's 2021 Annual Review of Industrial Wastewater Discharges* (U.S. EPA, 2022a).

5.1.1 Data, Methodology, and Analysis Considerations

For this analysis, EPA evaluated available industrial wastewater discharge data reported on facilities' 2019 DMRs, which was the most current DMR data set available at the time the rankings analysis was conducted. Facilities that discharge wastewater to "waters of the United States" pursuant to a National Pollutant Discharge Elimination System (NPDES) permit are required to report monitoring data via DMRs for pollutants listed in their NPDES permits. Facilities send DMRs electronically to their respective NPDES permitting authorities (state or EPA). The DMR data are stored in EPA's centralized program database, Integrated Compliance Information System National Pollutant Discharge Elimination System (ICIS-NPDES). ICIS-NPDES captures pollutant-specific permit limits, monitoring requirements, and DMR data, including, but not limited to, facility, outfall, and monitoring-period-specific pollutant discharge concentrations, quantities, and wastewater flows. EPA's Water Pollutant Loading Tool compiles the ICIS-NPDES data into a web-based platform that calculates and presents facility pollutant discharges in pounds per year or by monitoring period, as described in Section 3 of the *Technical Users Background Document for the Discharge Monitoring Report (DMR) Pollutant Loading Tool* (U.S. EPA, 2012) and summarized in *EPA's 2021 Annual Review of Industrial Wastewater Discharges* (U.S. EPA, 2022a).

As a first step, EPA downloaded data from the Water Pollutant Loading Tool[21] and established a crosswalk to relate individual facility and subsequent parameter-level data to the most appropriate point source category or potential point source category, primarily based on the facility's reported Standard Industrial Classification (SIC) or North American Industry Classification System (NAICS) code and the reported parameter. These links enabled EPA to analyze discharges within and across point source categories.

[21] Water Pollutant Loading Tool Resources: https://echo.epa.gov/trends/loading-tool/resources (see "Effluent Guidelines (ELG) Crosswalks (used only for Top Industrial Dischargers of Toxic Pollutants)"). EPA uses the "NPDES ID and Parameter Code to Point Source Category" crosswalk for its annual review analyses.

EPA then downloaded the following 2019 DMR data for each facility from the Water Pollutant Loading Tool into a static database to preserve the integrity of the data and facilitate subsequent analyses (ERG, 2021a):

- NPDES permit number.
- Parameter name and code.
- Pollutant name and code.
- Average concentration in milligrams per liter (mg/L).
- Maximum concentration (mg/L).
- Total load discharged for 2019 in pounds per year (lb/year).
- Wastewater flow for 2019 (million gallons per day).

EPA used 2019 data for this review because they comprised the most recent and complete set of industrial wastewater discharge data available when EPA began the review.

Using the point source category crosswalk, EPA linked all records to a point source category using the NPDES permit number and the parameter and then summed the annual load across pollutants to the facility level and, subsequently, to the point source category level. EPA then ranked point source categories from highest to lowest pounds of discharge in 2019. Section 5.1.3 of this report presents the results of the 2021 rankings analysis (based on the 2019 DMR data).

5.1.2 Data Quality Review and Corrections

For this analysis, EPA evaluated completeness, accuracy, and reasonableness of the downloaded 2019 data as follows.

Completeness. EPA assessed completeness of the data sets by comparing the volume of the 2019 downloaded ICIS-NPDES data to data from a similar analysis conducted in 2017 to ensure that there was no discrepancy that would indicate an incomplete download of the data. EPA identified a 1 percent increase in the total count of facilities reporting data, as new facilities or pollutants are typically added each year as permits are developed or revised.

Accuracy and reasonableness. For the top ten point source categories in the pollutant load rankings,[22] EPA identified outliers (where a few facilities form most of the point source category load) and determined if any of the data were a result of data entry errors (e.g., unit errors, such as data entered as "2.7 grams" instead of "2.7 milligrams").

For identified facility outliers, EPA used the Enforcement and Compliance History Online (ECHO) effluent charts[23] to investigate and determine if the outlier data resulted from reporting errors. These effluent charts graph facilities' submitted monitoring data from all years, allowing EPA to identify whether the data are consistent over time. EPA identified potential data errors where the facility effluent

[22] Note that EPA did not review data from facilities in categories where ELGs were promulgated or revised in the past seven years.

[23] ECHO: https://echo.epa.gov.

data were unexpectedly different from year to year and/or month to month (higher or lower) by an order of magnitude or more and reported these potential errors through its Integrated Error Correction Process (IECP), via the error report feature built into ECHO's website. In instances where the IECP confirmed the error, EPA recalculated the annual pollutant loads and reran the rankings. For additional details on the identified outliers and data corrections, see EPA's *2021 Annual Review of Industrial Point Source Categories* (U.S. EPA, 2022a).

5.1.3 Results of the DMR Pollutant Load Rankings Analysis

Table 5-1 presents the 2021 annual review discharge rankings using 2019 DMR data. The rankings include the 2019 aggregated annual loads for each point source category (ranked from highest to lowest), the percentage of the total load the point source category comprises, and the number of facilities in each point source category that reported data greater than zero in 2019.

The rankings analysis provides a mechanism for EPA to review discharges from industrial categories and potentially prioritize specific point source categories for further review. EPA's recommendation to further prioritize categories also considers other aspects such as stakeholder input and Administration priorities. As described in this Plan, EPA continues to focus on and evaluate the extent and nature of PFAS discharges and assess opportunities for limiting those discharges from multiple industrial categories, as outlined in EPA's PFAS Strategic Roadmap. Specifically, as identified in the agency's PFAS Strategic Roadmap, EPA conducted a preliminary review of three point source categories to assess discharges of PFAS and other regulated and unregulated pollutants to determine whether the categories warrant further review and study: Leather Tanning and Finishing (40 CFR part 425), Paint Formulating (40 CFR part 446), and Plastics Molding and Forming (40 CFR part 463) (see Sections 5.2 through 5.4). For the three preliminary category reviews, EPA used 2020 DMR and TRI data, as these data were publicly available during the agency's review (see Section 1 of EPA's *2021 Preliminary Review of Industrial Point Source Categories* for a description of the data sources, uses, and limitations (U.S. EPA, 2022b)).

The results of the pollutant load rankings analysis, presented in Table 5-1, did not present any findings that altered EPA's decision on prioritization for industrial category reviews targeting PFAS at this time. EPA may choose to prioritize reviews of these categories differently in the future.

Table 5-1. 2021 Annual Review Discharge Ranking Results

40 CFR Part	Point Source Category Name	2019 DMR Annual Loads (lb/year)	Percentage of Total Load	Cumulative Percentage of Total Load	Facilities Reporting Discharges Greater than Zero
414	Organic Chemicals, Plastics, and Synthetic Fibers[a]	120,000,000,000[b]	72%	72%	609
423	Steam Electric Power Generating[a]	14,600,000,000	9%	81%	808
N/A	Drinking Water Treatment	5,830,000,000	3%	84%	2,022
435	Oil and Gas Extraction	3,130,000,000[b]	2%	86%	489
419	Petroleum Refining	3,040,000,000	2%	88%	642
433	Metal Finishing[a]	2,510,000,000[b]	2%	90%	638

Table 5-1. 2021 Annual Review Discharge Ranking Results

40 CFR Part	Point Source Category Name	2019 DMR Annual Loads (lb/year)	Percentage of Total Load	Cumulative Percentage of Total Load	Facilities Reporting Discharges Greater than Zero
434	Coal Mining	2,380,000,000	1%	91%	1,674
415	Inorganic Chemicals Manufacturing	2,310,000,000	1%	92%	229
436	Mineral Mining and Processing	2,020,000,000	1%	94%	1,324
430	Pulp, Paper, and Paperboard[a]	1,640,000,000	1%	95%	233
420	Iron and Steel Manufacturing	1,320,000,000	1%	95%	145
432	Meat and Poultry Products[a]	1,030,000,000[b]	1%	96%	296
445	Landfills[a]	690,000,000	<1%	96%	247
438	Metal Products and Machinery	674,000,000	<1%	97%	836
405	Dairy Products Processing	590,000,000	<1%	97%	118
440	Ore Mining and Dressing	537,000,000	<1%	97%	91
449	Airport Deicing	496,000,000	<1%	98%	79
N/A	Miscellaneous Foods and Beverages	463,000,000	<1%	98%	159
444	Waste Combustors	379,000,000	<1%	98%	25
460	Hospital	360,000,000	<1%	98%	237
463	Plastics Molding and Forming[a]	345,000,000	<1%	99%	120
451	Concentrated Aquatic Animal Production	278,000,000	<1%	99%	306
454	Gum and Wood Chemicals Manufacturing	247,000,000	<1%	99%	12
408	Canned and Preserved Seafood Processing	225,000,000	<1%	99%	99
407	Canned and Preserved Fruits and Vegetables Processing	145,000,000	<1%	99%	81
N/A	Unassigned Waste Facility	131,000,000	<1%	99%	178
N/A	Food Service Establishments	121,000,000	<1%	99%	172
429	Timber Products Processing	117,000,000	<1%	99%	271
455	Pesticide Chemicals	109,000,000	<1%	99%	31
437	Centralized Waste Treatment	103,000,000	<1%	100%	15
421	Nonferrous Metals Manufacturing	101,000,000	<1%	100%	56
418	Fertilizer Manufacturing	89,400,000	<1%	100%	59
422	Phosphate Manufacturing	85,900,000	<1%	100%	18
409	Sugar Processing	84,600,000	<1%	100%	34
411	Cement Manufacturing	80,000,000	<1%	100%	507
442	Transportation Equipment Cleaning	75,900,000	<1%	100%	127
N/A	Independent and Stand-alone Labs	51,600,000	<1%	100%	37
439	Pharmaceutical Manufacturing	43,400,000	<1%	100%	56
464	Metal Molding and Casting (Foundries)	35,200,000	<1%	100%	48
406	Grain Mills	33,000,000	<1%	100%	32
410	Textile Mills[a]	27,600,000	<1%	100%	58

Table 5-1. 2021 Annual Review Discharge Ranking Results

40 CFR Part	Point Source Category Name	2019 DMR Annual Loads (lb/year)	Percentage of Total Load	Cumulative Percentage of Total Load	Facilities Reporting Discharges Greater than Zero
443	Paving and Roofing Materials (Tars and Asphalt)	20,800,000	<1%	100%	91
457	Explosives Manufacturing	14,600,000	<1%	100%	15
428	Rubber Manufacturing	14,100,000	<1%	100%	82
N/A	Printing & Publishing	8,640,000	<1%	100%	12
426	Glass Manufacturing	7,050,000	<1%	100%	42
469	Electrical and Electronic Components	6,020,000	<1%	100%	9
471	Nonferrous Metals Forming and Metal Powders	5,970,000	<1%	100%	56
450	Construction and Development	5,170,000	<1%	100%	182
424	Ferroalloy Manufacturing	4,380,000	<1%	100%	11
467	Aluminum Forming	3,350,000	<1%	100%	21
425	Leather Tanning and Finishing[a]	2,520,000	<1%	100%	3
417	Soap and Detergent Manufacturing	1,710,000	<1%	100%	14
468	Copper Forming	759,000	<1%	100%	18
458	Carbon Black Manufacturing	639,000	<1%	100%	8
412	Concentrated Animal Feeding Operations[a]	325,000	<1%	100%	18
N/A	Industrial Laundries	177,000	<1%	100%	3
446	Paint Formulating[a]	131,000	<1%	100%	20
427	Asbestos Manufacturing	53,300	<1%	100%	1
461	Battery Manufacturing	47,100	<1%	100%	7
447	Ink Formulating	33,900	<1%	100%	5
N/A	Tobacco Products	19,200	<1%	100%	2
465	Coil Coating	1,250	<1%	100%	3
459	Photographic	6.90	<1%	100%	1
Total		**167,000,000,000**	-	-	-

a – EPA is currently monitoring, reviewing, or studying this category or conducting a rulemaking for this category.

b – 2019 DMR Annual Load may be overestimated due to outliers in the underlying data. EPA submitted the outliers via the error report feature built into ECHO's website but has not identified a correction at this time.

5.2 Leather Tanning and Finishing Point Source Category (40 CFR part 425)

EPA announced the Leather Tanning and Finishing Category (40 CFR part 425) for preliminary review in EPA's PFAS Strategic Roadmap. EPA initiated a preliminary review of this category to gather additional information on discharges associated with PFAS, among other pollutants.

Leather tanning and finishing refers to processes that convert animal hides or skins into leather. In 1982, EPA promulgated ELG for this industry, which cover wastewater generated from beamhouse, tanyard, and retan and wet-finish process steps. EPA established production-based limitations for direct dischargers and concentration-based limitations for indirect discharges for nine subcategories (U.S. EPA, 1982). The ELG include limitations for BOD_5, oil and grease, total suspended solids (TSS), total chromium, pH, and sulfide. As part of this preliminary category review, EPA evaluated U.S. census data and 2020 DMR and TRI data to assess the size of the industry and corresponding pollutant loads. The census data showed that the number of leather tanning and finishing facilities has been decreasing steadily since 2000 and that most tanneries are small operations with fewer than 20 employees.

PFAS are used in leather manufacturing to improve the efficiency of the tanning process. PFAS can also be applied to leather to provide water and oil repellence, stain resistance, and oil release (Glüge et al., 2020). PFAS discharges were not reported from this industry in either 2020 DMR or TRI data because the category is not currently required to report discharges in NPDES permits or based on current TRI reporting criteria. Therefore, EPA evaluated the available PFAS data from the Michigan Department of Environment, Great Lakes, and Energy (MI EGLE),[24] which collected PFAS data as part of a state sampling effort separate from NPDES permit (i.e., DMR) and TRI reporting requirements. The MI EGLE data set captured four leather tanning facilities in the sampling effort. Three out of four leather tanning facilities in Michigan had detectable quantities of PFAS in their effluent. The highest concentration detected was 83 ppt of PFOS. MI EGLE did not identify leather tanneries as a high priority source of PFAS or PFOA compared to other industries identified during their ongoing study; however, they did identify some inactive tanneries that used PFAS in the past as contaminated sites (MI EGLE, 2020a; U.S. EPA, 2022d).

Three leather tanning facilities reported DMR data in 2020; one facility accounted for over 90 percent of the DMR discharges. Because EPA determined that one facility contributed to the majority of the loads, EPA did not prioritize DMR data for further pollutant-specific reviews. Over 99 percent of the total 2020 TRI loads were reported as indirect releases to POTWs. The top pollutant contributing to over 90 percent of the indirect load was ammonia.

Ammonia accounts for 93 percent of the 2020 TRI indirect loads. Research indicates that ammonia is generated during two steps in the leather tanning process: (1) the soaking and unhairing step (during which the proteins removed can convert to ammonia) and (2) the deliming step (where ammonia comes from the addition of ammonia salts, ammonium chloride, and ammonium sulfate). Because facilities report total estimated releases to TRI (i.e., total pounds per year) and there are no corresponding concentration data available in TRI, EPA reviewed the ammonia concentrations collected as part of the

[24] See the MI EGLE Industrial Pretreatment Program (IPP) PFAS Initiative website for more information.

1982 rulemaking. In 1982, EPA collected effluent samples from 31 tanneries across all nine subparts; ammonia concentrations ranged from 1 mg/L to 680 mg/L.

The regulation of ammonia was considered during the 1982 rulemaking, specifically the potential substitution of Epsom salts for ammonia during the deliming process. EPA did not promulgate pretreatment standards in 1982 because this substitution was determined to be cost prohibitive. As part of this review, EPA compared the 1982 ammonia concentrations to inhibition thresholds for ammonia at POTWs. An inhibition threshold is a concentration range at which a pollutant in a POTW's wastewater or sludge causes operational problems for biological treatment processes. Based on the available documentation, ammonia concentrations observed during the 1982 rulemaking were generally lower than 2004 inhibition thresholds for ammonia based on activated sludge (480 mg/L) and anaerobic digestion (1,500 mg/L to 8,000 mg/L), suggesting that ammonia discharges are not causing impacts to POTW operations (U.S. EPA, 2022b).

EPA evaluated facilities for environmental justice concerns including whether they are located in census block groups (i.e., communities) that have higher demographic metrics than the national average (50th percentile). The 2-factor demographic index considers the average of people of color and low-income populations, and the 5-factor index considers low income, education less than a high school degree, linguistic isolation, unemployment, and life expectancy. The communities surrounding leather tanning and finishing facilities are on average at the 53rd percentile for the 2-factor demographic index and at the 70th percentile for the 5-factor index. Four facilities are in census block groups in the 80th percentile or higher for one or both indices, and overall, these facilities are in communities with higher-than-average demographic indicators.

EPA is not prioritizing the Leather Tanning and Finishing Category for further review or ELG revision at this time. EPA recommends that state and local permitting authorities consider applying water-quality-based effluent limitations, as appropriate, to address any potential issues with direct discharging facilities within this category. During this review, EPA has not identified any data that suggest discharges from leather tanning facilities to POTWs are impacting POTW operations at this time. The PFAS data EPA reviewed are limited; however, EPA expects to review additional data in the coming years as a result of the POTW Influent Study (Section 6.3.5), updated TRI reporting requirements for PFAS, and NPDES permit monitoring requirements for federally-issued permits.[25] These data will help EPA identify any significant sources of these chemicals in future reviews.

5.3 Paint Formulating Point Source Category (40 CFR part 446)

EPA announced the Paint Formulating Category (40 CFR part 446) for preliminary review in EPA's PFAS Strategic Roadmap. The PFAS Strategic Roadmap identifies the ELG program as a potential method for restricting PFAS discharges from industrial wastewater sources as a key action (U.S. EPA, 2021d). EPA initiated a preliminary review of the Paint Formulating Point Source Category to gather additional information on discharges associated with PFAS, among other pollutants.

[25] See EPA's April 2022 memorandum and December 2022 memorandum, detailing the agency's intention to address PFAS discharges in NPDES permits and through the pretreatment program and monitoring programs. In addition to reducing PFAS discharges, this will also provide data to inform ELG planning and actions.

In 1975, EPA promulgated ELG for this industry, which captured the discharges resulting from the production of paint and coatings. EPA organized the ELG into three subcategories based on the base and the technique used for equipment washing (U.S. EPA, 1975):

- Subcategory A. Oil-Base Solvent Wash Paint Manufacture.
- Subcategory B. Oil-Base Caustic Wash Paint Manufacture.
- Subcategory C. Water-Base Paint Manufacture.

EPA established zero discharge regulations for BPT, BAT, NSPS, and PSNS for Subcategory A and reserved[26] PSES for Subcategory A. EPA reserved the Subcategory B regulation and planned to reevaluate Subcategory C for promulgation at a later date. Resin manufacture is covered under 40 CFR part 414: Organic Chemicals, Plastics, and Synthetic Fibers.

As part of this preliminary category review, EPA evaluated 2019 U.S. Census data and 2020 DMR and TRI data to learn more about the size of the industry, discharge practices, and corresponding pollutant loads. The count of facilities from the 2019 U.S. Census and 2020 DMR and TRI data suggests that the proportion of direct and indirect discharges within the industry remains similar to 1975 and that most discharges of process wastewater are indirect discharges (U.S. EPA, 2022b). Census data suggest that much of the industry is comprised of small establishments (i.e., less than 20 employees).

EPA's limited literature search identified that PFAS are used in paint, coating, and varnish manufacturing. A 2022 Organization for Economic Cooperation and Development (OECD) report, *Per- and Polyfluoroalkyl Substances and Alternatives in Coatings, Paints and Varnishes (CPVs), Report on the Commercial Availability and Current Uses*, identified that the majority of PFAS in coatings, paints, and varnishes are fluoropolymers and, to a lesser degree, short-chain PFAS used in household paints. The PFAS function as levelling, wetting, and anti-blocking agents and provide protective properties for increased durability and weatherability, as well as repellency for anti-stick and anticorrosive applications (OECD, 2022; Glüge et al., 2020). These properties allow paints to apply smoothly and evenly and prevent damage to the surfaces they cover and the paints themselves. Several resources indicated that there are viable PFAS alternatives for paint including polyurethane, polyethylene, and polyvinylchloride (OECD, 2022). EPA did not identify any PFAS discharge data from this industry in either 2020 DMR or TRI because these facilities are not currently required to report discharges in NPDES permits or based on current TRI reporting criteria. Therefore, EPA evaluated the available PFAS data from MI EGLE,[27] which collected PFAS data as part of a state sampling effort separate from NPDES permit (i.e., DMR) and TRI reporting requirements (U.S. EPA, 2022d). Based on state-provided data, EPA found six facilities with available PFAS discharge data, four of which had detectable quantities of PFAS in their effluent. PFOS and PFOA had the highest average concentrations at 6.05 ppt and 0.15 ppt, respectively. EPA expects that the POTW Influent Study (Section 6.3.5) which EPA intends to initiate will provide further information on any PFAS discharges from indirect dischargers in this industry.

[26] "Reserved" refers to a placeholder within the Code of Federal Regulations. The agency may "reserve" certain ELGs to indicate that it may develop ELGs at a later date.

[27] See the MI EGLE Industrial Pretreatment Program (IPP) PFAS Initiative website for more information.

To understand current discharges of non-PFAS pollutants, EPA reviewed 2020 DMR and TRI data for the Paint Formulating Category. From the 2020 DMR data, EPA identified 18 facilities with NPDES permits. EPA found that all effluent limits in the 18 discharge permits were associated with stormwater or other noncontact process wastewater outfalls, which is to be expected as the regulations for Subcategory A (Oil-Base Solvent Wash Paint Manufacture) require zero discharge of pollutants from process wastewater. EPA reviewed pollutants reported to 2020 TRI, which provides available data on indirect discharges. EPA focused the review on solvents and metals, which make up the majority of the indirect discharges reported to TRI. Solvents are used as a volatile vehicle that film-forming binders and pigments are dissolved into, and they provide different properties to paints. Metals in the paint industry are used as biological inhibitors, driers, and pigments. From the review of TRI data, EPA found:

- Solvents such as glycols, and others, have been used historically and are currently used in the paint formulating industry.
- Zinc is a prominent metal discharged from the paint industry, as it was during the 1975 review.
- Lead have been phased out of the industry since the 1975 review (U.S. EPA, 1975).

EPA evaluated facilities for environmental justice concerns including whether they are located in census block groups (i.e., communities) that have higher demographic metrics than the national average (50th percentile). The 2-factor demographic index considers the average of people of color and low-income populations, and the 5-factor index considers low income, education less than a high school degree, linguistic isolation, unemployment, and life expectancy. Paint formulating facilities are located in communities that are on average at the 51st percentile for the 2-factor demographic index and at the 59th percentile for the 5-factor demographic index. These facilities have similar demographic indicators to the national average.

EPA is not prioritizing the Paint Formulating Category for further review or ELG revision at this time. Based on the available data, revisions to the ELG are unlikely to result in significant pollutant discharge reductions relative to the other point source categories discussed in this Plan. EPA recommends that state and local permitting authorities consider applying water-quality-based effluent limits, as appropriate, to address any potential issues with solvents, or other pollutants in discharges from this category. EPA intends to continue to monitor the use, discharge, and treatment of PFAS from paint formulating facilities as part of the POTW Influent PFAS Study (Section 6.3.5), updated TRI reporting requirements for PFAS, and NPDES permit monitoring requirements for federally-issued permits and state-issued permits as more states include monitoring for PFAS in permits.[28] These data will help EPA identify any significant sources of these chemicals in future reviews and understand the subcategorization of current facility discharges, in particular indirect discharges.

[28] See EPA's April 2022 memorandum and December 2022 memorandum, detailing EPA's intention to address PFAS discharges in NPDES permits and through the pretreatment program and monitoring programs. In addition to reducing PFAS discharges, this will also provide data to inform ELG planning and actions.

5.4 Plastics Molding and Forming Point Source Category (40 CFR part 463)

EPA announced the Plastics Molding and Forming Category (40 CFR part 463) for preliminary review in EPA's PFAS Strategic Roadmap. EPA initiated a preliminary review of the Plastics Molding and Forming Category to gather additional information on discharges associated with PFAS, among other pollutants.

In 1984, EPA promulgated ELG for this industry, which capture processes that blend, mold, form, or otherwise process plastic materials into intermediate or final plastic products. Specifically, the ELG cover process water that contacts plastic material, product, or the surfaces of shaping equipment used to mold or form plastic materials. EPA organized the ELG into three subcategories based on the pollutant characteristics of the process water (U.S. EPA, 1984):

- Subcategory A. Contact Cooling and Heating Water. This includes process water that comes into contact with plastic materials or plastic products during heat transferring processes.
- Subcategory B. Cleaning Water. This includes process water used to clean the surface of an intermediate or final plastic product, including water used in the detergent wash cycle or rinse cycles. It also includes water that comes into contact with shaping equipment surfaces (i.e., molds and mandrels) that have been in contact with plastic material for the purpose of cleaning equipment surfaces.
- Subcategory C. Finishing Water. This includes process water used to finish plastic products such as carry-away waste plastic materials or product lubrication. It includes water used to machine or assemble intermediate or final plastic products.

EPA established BPT, BAT, and NSPS for BOD_5, oil and grease, TSS, and pH and reserved[29] PSES and PSNS regulations for phthalates (U.S. EPA, 1984). The applicability of the Plastics Molding and Forming Point Source Category (40 CFR part 463.1) overlaps with others, including the Metal Finishing (40 CFR part 433), Electroplating (40 CFR part 413), and Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR part 414).

As part of this preliminary category review, EPA evaluated U.S. census data and 2020 DMR and TRI data to learn more about the size of the industry and corresponding pollutant loads. EPA did not identify any PFAS discharge data in DMR or TRI because the category is not currently required to report discharges in NPDES permits or based on current TRI reporting criteria. Therefore, EPA evaluated available PFAS data from MI EGLE[30] and Wisconsin Department of Natural Resources[31], which collected PFAS data as part of a state sampling effort separate from NPDES permit (i.e., DMR) and TRI reporting requirements (U.S. EPA, 2022d; U.S. EPA, 2022e). EPA also met with one manufacturer to further understand PFAS discharges associated with the industry (U.S. EPA, 2022f).

PFAS are used in the plastics molding and forming industry for their hydrophobic and oleophobic properties and low surface tension, which are desirable in plastics (Glüge et al., 2020). These properties

[29] "Reserved" refers to a placeholder within the Code of Federal Regulations. The agency may "reserve" certain ELGs to indicate that it may develop ELGs at a later date.

[30] See the MI EGLE Industrial Pretreatment Program (IPP) PFAS Initiative website for more information.

[31] See the Wisconsin DNR PFAS initiatives website for more information.

may help with improving polymer extrusion and reducing imperfections on the mold. Based on the state-provided data, EPA found five facilities with available PFAS discharge data, three of which had detectable quantities of PFAS in their effluent. PFOS, PFOA, and perfluorohexanoic acid (PFHxA) had the highest average concentrations at 13 ppt, 4 ppt, and 1 ppt, respectively.

EPA reviewed the top-ranking DMR and TRI pollutants in the 2020 data. Based on an initial review of the 2020 DMR data, EPA found that 98 percent of the annual loads were associated with stormwater (which is covered under general permits for stormwater associated with industrial activity) and not captured in the applicability of this ELG. Excluding stormwater discharges, EPA identified the following pollutants for review:

- Regulated pollutants: TSS, oil and grease, BOD_5, bis(2-ethylhexyl) phthalate, di-n-butyl phthalate, and dimethyl phthalate.
- Unregulated pollutants: chemical oxygen demand (COD), total organic carbon (TOC), nitrogen compounds, and N,N-Dimethylformamide.

As part of its review, EPA found:

- Reported average concentrations of TSS, oil and grease, and BOD_5 were an order of magnitude below the current ELG.
- Bis(2-ethylhexyl) phthalate, di-n-butyl phthalate, and dimethyl phthalate regulations are reserved under the current ELG; bis(2-ethylhexyl) phthalate discharges are similar to those reported in 1984, and phthalate discharges reported on 2020 DMRs are lower than the existing regulations for other categories.
- COD, TOC, and ammonia concentrations were found to be generally lower than 1984 observations.
- The extent of the use of N,N-Dimethylformamide is not currently known, but the data suggest that only a small subset of facilities release this pollutant. For these reasons, EPA did not review discharges of this pollutants further.

EPA evaluated facilities for environmental justice concerns including whether they are located in census block groups (i.e., communities) that have higher demographic metrics than the national average (50^{th} percentile). The 2-factor demographic index considers the average of people of color and low-income populations, and the 5-factor index considers low income, education less than a high school degree, linguistic isolation, unemployment, and life expectancy. Communities surrounding plastics molding and forming facilities are on average at the 43^{rd} percentile for the 2-factor demographic index and at the 55^{th} percentile for the 5-factor demographic index. Plastics molding and forming facilities overall have demographic indicators similar to the national average.

EPA is not prioritizing the Plastics Molding and Forming Category for further review or ELG revision at this time. Based on the available data, revisions to the ELG are unlikely to result in significant pollutant discharge reductions relative to the other point source categories discussed in this Plan. EPA recommends that state and local permitting authorities consider applying water-quality-based effluent limits, as appropriate, to address any potential issues with phthalates or other pollutants in discharges

from this category. EPA intends to continue to monitor discharges from this category, specifically for PFAS. The PFAS data EPA reviewed are limited; however, EPA expects to review additional data in the coming years as a result of the POTW Influent Study (Section 6.3.5), updated TRI reporting requirements for PFAS, and NPDES permit monitoring requirements for federally-issued permits and state permits as more states include monitoring for PFAS in permits.[32] These data will help EPA identify any significant sources of these chemicals in future reviews.

5.5 Industrial Wastewater Treatment Technologies Reviews

EPA continued its industrial wastewater treatment technology review, initially described in *Preliminary Effluent Guidelines Program Plan 14* (Preliminary Plan 14) (see Section 3.6 of Preliminary Plan 14, U.S. EPA, 2019a). As described in Preliminary Plan 15, EPA summarized its key findings to date for four treatment technologies in the memorandum "Key Findings for EPA's Industrial Wastewater Treatment Technology Reviews" (ERG, 2021b) and in the preliminary review for suspended growth systems (activated sludge) and membranes (ERG, 2021c; ERG, 2021d). As part of ongoing treatment technology reviews, EPA is currently reviewing ion exchange and granular activated carbon and the corresponding applications for industrial wastewater discharges.

5.6 ELG Planning Tools

EPA continued to maintain the IWTT Database and the ELG Database. These databases, described in more detail below, are used to supplement EPA's ongoing category reviews by:

- Identifying pollutants with ELGs for specific point source categories.
- Comparing current discharge concentrations to effluent data in IWTT and long-term average data, limitation data, and technology bases in the ELG Database.

See EPA's *2021 Preliminary Review of Industrial Point Source Categories* for a description of the specific analyses performed as part of the preliminary category reviews (U.S. EPA, 2022b).

5.6.1 Industrial Wastewater Treatment Technology Database

IWTT is an online database that contains wastewater treatment technology performance data from 34 industrial point source categories and removal performance data for 205 individual pollutant parameters. As part of maintaining the IWTT database, EPA continually collects industrial wastewater treatment performance information to populate the database and makes the information available to the public through the IWTT web application.[33] As described in Preliminary Plan 15, EPA identified and screened additional references across a broad range of industries from key technical conferences on wastewater treatment, including the 2019 and 2020 Water Environment Federation's Technical Exhibit and Conference (WEFTEC). EPA also screened references identified through the *Multi-Industry Per- and Polyfluoroalkyl (PFAS) Study – 2021 Preliminary Report* (U.S. EPA, 2021c). During the 2022 annual reviews, EPA intends to populate IWTT with these references. EPA also intends to continue to review

[32] See EPA's April 2022 memorandum and December 2022 memorandum, detailing EPA's intention to address PFAS discharges in NPDES permits and through the pretreatment program and monitoring programs. In addition to reducing PFAS discharges, this will also provide data to inform ELG planning and actions.

[33] See https://www.epa.gov/eg/industrial-wastewater-treatment-technology-database-iwtt.

and identify references from conferences, including 2021 and 2022 WEFTEC and the 2022 International Water Conference. IWTT currently contains performance data for 58 different treatment technologies, some of which may be components of a larger treatment system.

5.6.2 Effluent Limitations Guidelines and Standards Database

As discussed in Plan 14, EPA has compiled information on its ELGs for the 59 different point source categories[34] into a consolidated ELG Database in order to reference and query ELGs, long-term average data, and technology bases as part of ongoing category reviews. EPA has now made the information publicly available through the ELG Database web application. Users of this tool can search for information within and across ELGs. The database captures information from the CFR[35] as well as from the technical development documents supporting promulgated rules. The ELG Database includes the following information:

- Regulations promulgated (e.g., BPT, BAT, BCT, NSPS, PSES, PSNS).
- Applicability of the ELGs, including definitions of any regulated subcategories.
- Wastestreams or process operations associated with each regulation.
- Pollutant limitations.
- CFR references to best management practices, monitoring requirements, and narrative limitations.
- Rule history, including promulgation and revision dates.
- Technology bases for the underlying regulations.

5.7 Environmental Justice

As part of Preliminary Plan 15, EPA solicited public comment on how best to incorporate equity and environmental justice considerations into the ELG planning process. Specifically, EPA proposed using EJScreen, the agency's mapping and screening tool that combines demographic and environmental indicator information, to assess the proximity and potential impact of industrial discharges on underserved and underrepresented populations.

As part of the preliminary category reviews completed and discussed in this Plan (see Sections 5.2 through 5.4), EPA developed a methodology that evaluates demographic data within census block groups, corresponding to the geographic locations of facilities within point source categories. The methodology maps facilities within a category and indicates which categories are at the 80th percentile or greater for a selected demographic metric:

- Standard two-metric (people of color and low income).
- Five-metric (low income, education, linguistic isolation, unemployment, and life expectancy).

[34] See EPA's Industrial Effluent Guidelines webpage for a list of the 59 point source categories.
[35] See the eCFR.

EPA may explore using additional metrics to evaluate environmental justice concerns in future category reviews, including impairment status (and impairment cause(s)) under Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS); facility contacts, Resource Conservation and Recovery Act (RCRA) permit status, greenhouse gas releases, and demographic percentiles. EPA may also consider whether a facility is located in a disadvantaged community based on the Climate and Economic Justice Screening Tool (CEJST) methodology and the count of disadvantaged categories for each facility (e.g., climate change, clean energy/energy efficiency, clean transit). The results for each preliminary category review are presented in EPA's *2021 Preliminary Review of Industrial Point Source Categories* (U.S. EPA, 2022b).

6. ONGOING ELG STUDIES

This section summarizes the status of EPA's ongoing ELG studies.

6.1 Electrical and Electronic Components Point Source Category (40 CFR part 469)

The purpose of this detailed study was to determine if the Electrical and Electronic Components (E&EC) ELG (40 CFR part 469) warrant further review or possible revision. As part of the 2015 annual review, EPA initiated a preliminary review of the E&EC Category in response to stakeholder comments received during a 2014 National Association of Clean Water Agencies (NACWA) conference regarding the applicability of the ELG to the manufacture of sapphire crystals. Additional information collected during the 2016 annual review focused on 40 CFR 469 Subpart A (Semiconductors). Following this review, EPA determined that further review of the category was appropriate and began a detailed study related to Subparts A, B (Electronic Crystals), C (Cathode Ray Tubes), and D (Luminescent Materials) to further characterize the industry profile.

As part of this study, 34 different permitting authorities (EPA regions, state, and local) from 19 states provided information. The study identified 104 facilities permitted according to requirements in CFR part 469. As when the rule was originally issued, the general distribution of facilities subject to each subpart remained the same, with most being permitted under Subpart A, followed by Subpart B, and only a few for Subparts C and D. While manufacturing activities have remained similar, manufacturing technologies have evolved to produce ever smaller and more complex devices that are faster and more energy efficient. This has required a corresponding evolution in the equipment, chemicals, and components used in the manufacturing process.

Over 95 percent of the permitted facilities are indirect dischargers sending their wastewater to a local or regional wastewater treatment facility. For the most part, the discharges from these indirect facilities are a small fraction of the total received by the wastewater treatment facility, although for a few of the larger facilities the discharge can account for 10 to 20 percent of the incoming flow. While most facilities are indirect dischargers, many also have a solvent management plan to collect and ship their organic solvents off site for processing to keep them from being discharged in their wastewater.

The composition of the wastestream has changed through the years as technologies have changed. In 1983, when the current ELG rule was written, chlorinated solvents and strong acids for the etching process were used in this industry. Over the years the chlorinated solvents have been replaced, and the industry is no longer using the original regulated solvents. At present, over 70 different elements (some added an atom at a time) from the periodic table are used by the industry as a whole, but the specific number and composition varies from facility to facility. Strong acids remain, but etching is achieved through the use of cold plasmas generated from a variety of gases. PFAS have been used for some time, with PFOA and PFOS being recently phased out and other PFAS replacing them. PFAS as a class of chemicals is difficult to eliminate from the production process as their chemical and physical properties are difficult to replicate with non-PFAS compounds.

The wastewater treatment systems being utilized are similar to those available in 1983—pH adjustment, chemical precipitation, filtration, and activated carbon finishing. Each facility also employs ultrapurification processes to produce high-quality water to meet their exacting requirements. A growing

number of E&EC facilities also utilize this equipment to conserve water, reclaiming water used in their production process that originally would have been discharged after a single use. This wastewater is considerably cleaner than that supplied by the local drinking water provider and easier to purify.

The ELG regulation (40 CFR part 469), in conjunction with locally employed discharge limits, has for the most part been effective in limiting the discharge of pollutants from these facilities. While the regulation could be modified to remove subsections that are no longer relevant and clarify certain sections that can be confusing for permit writers, the review of monitoring data from these facilities (U.S. EPA, 2022p) does not demonstrate a need to revise the existing regulation at this time. EPA intends to continue to monitor discharges of PFAS from this category. The PFAS data EPA reviewed are limited; however, EPA expects to review additional data in the coming years as a result of the POTW Influent Study (Section 6.3.5), updated TRI reporting requirements for PFAS, and NPDES permit monitoring requirements for federally-issued permits and state permits as more states include monitoring for PFAS in permits.[36] These data will help EPA identify any significant sources of these chemicals in future reviews.

6.2 Concentrated Animal Feeding Operations Point Source Category (40 CFR part 412)

CAFOs are facilities that confine and maintain large numbers of animals for specified periods of time (40 CFR 122.23 defines CAFOs in precise terms). The CAFOs ELG regulate two parts of CAFOs: the "production area" and the "land application area." The production area is the area that includes the animal confinement area, manure storage areas, raw materials storage area, and waste containment areas (40 CFR 122.23(b)(8)). The land application area is the land under the control of a CAFO owner or operator to which manure, litter, and process wastewater from the production area is or may be applied (40 CFR 122.23(b)(3)).

The existing CAFOs ELG impose substantial and detailed requirements on both the production area and land application area. The ELG requirements for the production area prohibit the discharge of manure, litter, and process wastewater from the production area to waters of the United States, with only one exception (40 CFR 412.31(a)). Under this exception, the ELG allow discharges from the production area where those discharges are caused by precipitation and where the production area is designed to contain all manure, litter, and process wastewater from a 25-year, 24-hour rainfall event (40 CFR 412.31(a)(1) defines this exemption in precise terms).[37]

The ELG requirements for the land application area prohibit discharges unless those discharges qualify as "agricultural stormwater," which the CWA expressly excludes from regulation (33 USC 502(14)). EPA interprets "agricultural stormwater" to include any precipitation-related discharges of manure, litter, and process wastewater from the land application areas if the manure, litter, and process wastewater has been applied to the land application area in accordance with a site-specific "nutrient management plan" that ensures appropriate agricultural utilization of the nutrients in the manure, litter,

[36] See EPA's April 2022 memorandum and December 2022 memorandum, detailing EPA's intention to address PFAS discharges in NPDES permits and through the pretreatment program and monitoring programs. In addition to reducing PFAS discharges, this will also provide data to inform ELG planning and actions.

[37] The ELG allow CAFOs to request site-specific alternatives to the containment requirements if those alternatives result in discharge amounts that are equal to or less than the containment requirements (40 CFR 412.31(a)(2) defines these alternative requirements in precise terms).

or process wastewater (40 CFR 122.23(e)). A nutrient management plan addresses the form, source, amount, timing, and method of application of nutrients on each field to achieve crop production goals while minimizing the transport of nutrients to surface waters (40 CFR 412.4(c)(1)). The application rates for manure, litter, and process wastewater must be established in accordance with technical standards established by each state (see 40 CFR 123.36; 412.4(c)(2)). The ELG also require CAFOs to comply with certain recordkeeping and reporting requirements related to both the production area and the land application area (40 CFR 412.4(b), (c)).

EPA has concluded that it needs to gather additional information to inform a decision as to whether rulemaking to revise the ELG is warranted. See Appendix A for discussion of the agency's rationale for this decision and the information EPA plans to gather as part of its detailed study.

6.3 PFAS Industrial Sources and Discharge Studies

As part of the statutorily required ELG planning process, EPA's Office of Water examined readily available public information about PFAS discharges. The Preliminary Plan 14 and a supporting report, *The EPA's Review of Per- and Polyfluoroalkyl Substances (PFAS) in Industrial Wastewater Discharge*, both published in October 2019, describe the review activities and findings of the initial examination and identify several industries with facilities that are likely to be discharging PFAS in their wastewater (U.S. EPA, 2019a; U.S. EPA, 2019b). In 2019, EPA determined that further data collection and study were necessary to inform decisions about how best to address industrial PFAS discharges and initiated the Multi-Industry PFAS Study. The Multi-Industry PFAS Study focused on data collection and review of PFAS manufacture, use, control, and discharge by specific point source categories that EPA determined were likely to be discharging PFAS in their wastewater. The objectives of the Multi-Industry PFAS Study were to: 1) examine specific industrial categories and facilities manufacturing, using, or discharging PFAS; 2) collect, compile, and review information and data on PFAS in industrial discharges; 3) use compiled data to characterize PFAS types and concentrations discharged in industrial wastewater; and 4) assess availability and feasibility of control practices and treatment technologies capable of reducing or eliminating PFAS in wastewater discharges.

In September 2021, EPA published the *Multi-Industry PFAS Study – Preliminary 2021 Report* which discussed information and data EPA collected on PFAS manufacture, use, control, and discharge by five point source categories: OCPSF; Metal Finishing; Pulp, Paper, and Paperboard; Textile Mills; and airports (U.S. EPA, 2021c). In Preliminary Plan 15, also published in September 2021, EPA announced the following actions based on the information and data collected during the Multi-Industry PFAS Study (U.S. EPA, 2021b):

- Initiate rulemaking to revise limitations for the OCPSF Point Source Category to address PFAS discharges from PFAS manufacturers.
- Initiate rulemaking to revise limitations for the Metal Finishing and Electroplating Point Source Categories to address PFAS discharges from chromium finishing operations.
- Initiate detailed studies of PFAS discharges from the Textile Mills and Landfills Point Source Categories.

- Continue to monitor the anticipated reduction of PFAS use and discharge by pulp and paper mills and airports through the ELGs annual review process.

Sections 6.3.1 to 6.3.4 discuss information and data EPA has collected and reviewed since September 2021 on PFAS use, control, and discharge from textile mills, landfills, pulp and paper mills, and airports, respectively. Section 6.3.5 discusses a new study EPA intends to initiate to continue studying PFAS discharges to POTWs. See Section 7 for additional information on ongoing rulemakings to address PFAS discharges from the OCPSF and Metal Finishing and Electroplating Categories.

6.3.1 Airports

Based on information and data EPA collected as part of the Multi-Industry PFAS Study, EPA documented that aqueous film forming foam (AFFF) has been, and continues to be, used by airports in the United States to prevent, extinguish, and control flammable liquid-based fires. There are different types of firefighting foams, not all of which contain PFAS, but all historically and currently manufactured AFFF products contain PFAS as an active ingredient. EPA determined that 14 CFR part 139 airports[38] are currently required by the Federal Aviation Administration (FAA) to use only firefighting foams that conform to military specification (MILSPEC) MIL-PRF-24385: "Fire Extinguishing Agent, Aqueous Film-Forming Foam" and that no fluorine-free foams currently meet this standard. Therefore, the 500+ FAA-certified airports in the United States will continue to use PFAS-containing firefighting foam formulations until a fluorine-free foam is approved for use. EPA determined these airports may have historically generated and discharged PFAS-containing wastewater (i.e., water contaminated with AFFF) from live-fire firefighting training, firefighting equipment testing, and emergency response activities. EPA announced in Preliminary Plan 15 that it would continue to review airports to further understand the potential for discharge of PFAS-containing wastewater from facilities that use AFFF and to monitor the industry's anticipated phase out of AFFF.

While developing ELG Plan 15, EPA collected additional data on AFFF use and wastewater management from 14 CFR part 139 airports from the FAA. EPA met with the FAA in March 2022 to discuss updates related to the FAA's efforts to reduce, and eventually eliminate, use and release of PFAS-containing AFFF (U.S. EPA, 2022g). In recent years, both the FAA and the United States Department of Defense (DOD) have taken voluntary actions to curb the release of AFFF during nonemergency exercises (i.e., training and testing), replace legacy AFFF firefighting foams which contain long-chain PFAS, and fund development of fluorine-free foams.

As part of the FAA's guidance on minimizing potential environmental impact from AFFF during testing and firefighting training, the FAA recommends 14 CFR part 139 airports install testing devices for firefighting equipment that eliminate release of AFFF during mandatory periodic testing of firefighting foam system performance, and the FAA is no longer requiring these airports to use AFFF during live firefighting testing. As of March 2022, the FAA has approved and is funding four different types of testing devices for firefighting equipment that do not require dispensing AFFF when airports conduct periodic equipment testing and training: Eco-Logic System from E-One, NoFoam System, Oshkosh Eco

[38] Regulation at 14 CFR part 139 requires the FAA to issue airport operating certifications to airports that: 1) serve scheduled and unscheduled air carrier aircraft with more than 30 seats; 2) serve scheduled air carrier operations in aircraft with more than nine seats but less than 31 seats; or 3) the FAA Administrator requires to have a certificate. Most commercial service airports are 14 CFR part 139 certified.

EFP (Electronic Foam Proportioning) System, and Rosenbauer FIXMIX 2.0E Input-Based Proportioning Test System (FAA, 2021a). The FAA extended the program funding the testing devices for firefighting equipment at 14 CFR part 139 airports until November 2023, an additional two years beyond the original program end date (FAA, 2021b). As of March 2022, the FAA has stated that more than half of the 518 certified airports have adopted these procedures and equipment, eliminating the release of AFFF except for during actual emergency response (U.S. EPA, 2022g). See Table 6-1 for a breakdown of system type and airport count.

Table 6-1. System Type and Airport Count

System Type	14 CFR part 139 Airport Count
Eco-Logic System from E-One	156
NoFoam System	92
Oshkosh ECO EFP System & Oshkosh ECO EFP vehicles retrofitted	91
Rosenbauer FIXMIX 2.0E Input-Based Proportioning Test System	33
Total 14 CFR part 139 Airports (as of May 2022)	**518**

In April 2020, the DOD amended MILSPEC MIL-PRF-24385 to specify that AFFF with the lowest demonstratable concentrations of PFOS and PFOA should be used in the interim before a suitable PFAS-free foam is available for use. As of June 2022, all firefighting foam formulations that meet MILSPEC MIL-PRF-24385 contain less than 800 parts-per-billion of PFAS. The DOD has issued guidance and best management practices to control and capture AFFF releases in the event of an actual emergency response. The DOD is developing guidance to address cleanup and disposal of existing AFFF stockpiles and residuals in firefighting equipment (U.S. EPA, 2022g).

The FAA, the DOD, and firefighting foam manufacturers are collaboratively researching PFAS-free foam alternatives to identify formulations that are more environmentally friendly and that provide an equivalent level of performance as the current MILSPEC MIL-PRF-24385. As of July 2022, the FAA has studied 36 fluorine-free foams (11 commercially available, 25 manufacturer prototypes) and conducted more than 500 fire suppression tests at the FAA Technical Center as part of their MILSPEC development and firefighting foam research program (U.S. EPA, 2022g). On July 2022, the FAA released its report on evaluating commercially available fluorine-free foams, which do not contain PFAS, to determine if any fluorine-free foam can be considered a suitable replacement for AFFF for use on aviation fuel fires. The FAA's full findings can be found in the *Fluorine-free Foam Testing* report which concludes that none of the fluorine-free foam candidates consistently had an equivalent extinguishing performance to AFFF (FAA, 2022).

Only the DOD is authorized to update MILSPECs. On June 2, 2022, the DOD published draft MILSPEC MIL-PRF-XX727 ("Fire Extinguishing Agent, Fluorine-Free Foam (F3) Liquid Concentrate, For Land-Based, Fresh Water Applications") for PFAS-free firefighting foam, a significant step in the process for meeting the deadline of publishing a new fluorine-free foam MILSPEC by January 31, 2023,

as required by the 2020 National Defense Authorization Act (NDAA).[39] The FAA plans to adopt and require use of PFAS-free firefighting foams compliant with the new MILSPEC once it is published. The FAA expects that it will take 14 CFR part 139 airports approximately two to five years to transition from procurement and use of AFFF to the new PFAS-free firefighting foams. The FAA is targeting completion of this transition by January 2025, or as soon as possible thereafter. The FAA notes that there will be a lot of competition between military sites, airports, and industrial facilities for the limited initial supply of PFAS-free firefighting foam product. Figure 6-1, provided to EPA by the FAA, illustrates the DOD and FAA schedule to replace AFFF with PFAS-free foams along with relevant NDAA deadlines.

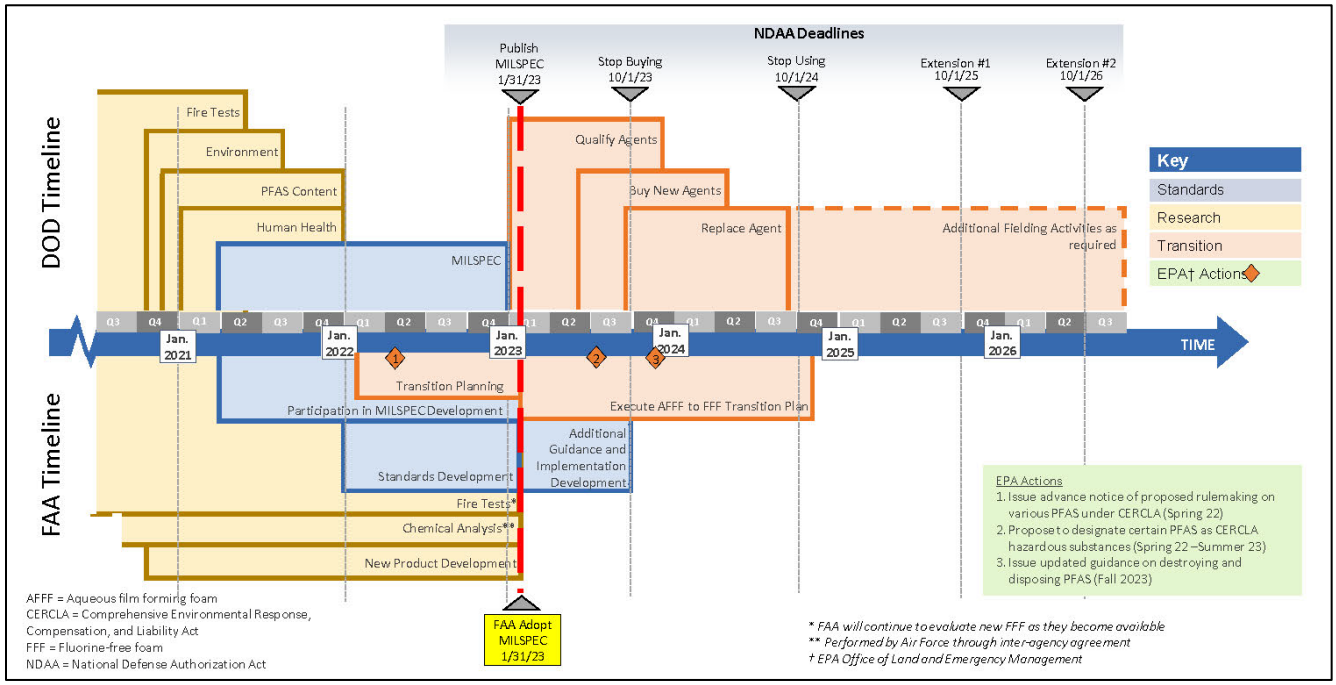

Figure 6-1. DOD and FAA Schedule for Replacing AFFF

At this time, the FAA has not determined whether to require exclusive use of fluorine-free firefighting foams or to permit 14 CFR part 139 airports to use existing AFFF stockpiles once a final fluorine-free firefighting foam MILSPEC is published and adopted. The FAA states that this will be heavily dependent on how many foams meet the new MILSPEC, and there could be supply issues if there is only one qualifying foam. Similarly, the FAA does not plan on issuing guidance to address cleanup and disposal of existing AFFF stockpiles and residuals in firefighting equipment (U.S. EPA, 2022g).

Based on this information, EPA is not prioritizing a rulemaking on this category at this time. EPA will continue to review airports to further understand the potential for discharge of PFAS-containing wastewater from facilities that use AFFF and to monitor the industry's transition to fluorine-free foam. EPA intends to provide updates on these activities in subsequent ELG program plans.

[39] The 2020 NDAA requires the Secretary of the Navy to publish new specifications for PFAS-free firefighting foams by January 2023, the DOD to cease procurement of PFAS-containing products by October 2023, and the DOD to cease use of AFFF at all military installations by October 2024, with limited exceptions.

6.3.2 Textile Mills Point Source Category (40 CFR part 410)

Based on information and data EPA collected as part of the Multi-Industry PFAS Study, EPA-documented PFAS have been, and continue to be, used by textile mills in the United States to impart outdoor gear, clothing, household fabrics, carpets, and other textile products with water, oil, soil, and heat resistance; to improve cleanability of oil- and water-based stains; as a wetting or antifoaming agent when dyeing and bleaching; and as a breathable moisture barrier to wind and rain. EPA determined that most textile mills are not monitoring PFAS; however, limited discharge sampling data available indicated that PFAS may be present (U.S. EPA, 2021c). EPA announced in Preliminary Plan 15 that it would initiate a detailed study of wastewater discharges from the Textile Mills Point Source Category to continue collecting and reviewing information and data on wastewater discharges of PFAS from textile mills that historically or currently use PFAS.

Since September 2021, EPA has collected additional data on PFAS use and discharge from textile mills from technical literature, textile manufacturing companies, EPA regions, and state and local wastewater regulatory authorities. New information and data collected and reviewed by EPA since publication of Preliminary Plan 15 is summarized below.

EPA conducted outreach to six state agencies or local wastewater treatment coordinators to discuss available data on use, control, discharge of PFAS from textile mills to state waters and POTWs, and to obtain state-level lists of permitted textile mills (U.S. EPA, 2022d; U.S. EPA, 2022e; U.S. EPA, 2022h; U.S. EPA, 2022i; U.S. EPA, 2022j; U.S. EPA, 2022k). EPA met with W.L. Gore & Associates in December 2021 to discuss PFAS use and discharges associated with performance textile manufacturing. EPA determined that the company's textile mills use PFAS chemistry in the manufacture of textile products, but all wastewater generated from these processes is captured and transferred offsite for incineration (i.e., zero discharge of these process wastewaters) (U.S. EPA, 2022f). EPA attempted to meet with representatives of two industry trade associations – the National Council of Textile Organization (NCTO) and the Carpet and Rug Institute (CRI) – and their member companies to collect, on a voluntary basis, information on the use and discharge of PFAS by textile mills; however, EPA has been unsuccessful in arranging such a meeting.

EPA assessed the number and location of textile mills, characterized their manufacturing and discharge practices, and identified pollutant control practices and technologies currently in place using national EPA data sets (e.g., ECHO, DMR, TRI), state-submitted lists of permitted textile mills, and Davison's 2022 Textile Blue Book (an industry directory for textile mills, dyers, finishers, and suppliers) (Davison's Publishing, 2022). Based on these data sources, EPA estimates the national population of textile mills, dyers, and finishers in the United States is over 2,100 facilities.

To supplement limited available data, in November 2021 EPA used the authority granted in CWA Section 308 to require nine textile manufacturing companies complete a survey to obtain information related to PFAS use and import, PFAS in industrial wastewater discharges, wastewater treatment of PFAS-containing industrial wastewater, and other information necessary for EPA's study of the category. EPA sent the request to Brookwood Companies, Elevate Textiles, Milliken & Co., Mohawk Industries, Mount Vernon Mills, Sage Automotive Interiors, Shaw Industries Group, Tex Tech Industries, and W.L. Gore & Associates on November 30, 2021. EPA received timely responses from

these nine companies by February 2022, providing information on 92 of their facilities. An anonymized summary of the responses is below:[40]

- 19 of 92 textile mills (21 percent) reported that they used PFAS in textile manufacturing in 2020, and responses led EPA to conclude that two additional facilities likely used PFAS in their textile manufacturing. Responses indicated that side-chain fluorinated polymers and/or fluoropolymer coatings are used for oil, water, and stain resistance.
- 18 of the 19 textile mills (95 percent) that reported PFAS use also reported either permanent closure by 2026 or the intention to reduce or eliminate PFAS use by the end of 2026, through product replacement or using alternative surface treatment technologies.
- Most textile mills that reported using PFAS generate and discharge wastewater from the associated operations. Only two of these textile mills treat their effluent wastewater and operate wastewater treatment systems demonstrated to be effective at removing or eliminating PFAS in wastewater (e.g., granulated activated carbon).
- More than half of the textile mills that responded to the data request discharge their process wastewater to a POTW. The existing ELG for the Textile Mills Point Source Category do not establish pretreatment standards for any pollutant.

EPA continued to evaluate the available data on types and concentrations of PFAS in wastewater discharged from textile mills. As described in Preliminary Plan 15, EPA previously identified a state permitting authority data source containing PFAS monitoring data for textile mill effluent (MI EGLE, 2020b). EPA has since collected analytical data from four additional data sources that meet EPA's acceptance criteria for inclusion in analyses for characterizing PFAS discharges in industrial wastewater discharges:[41]

- Michigan EGLE 2022 PFAS monitoring results for direct and indirect discharging facilities (U.S. EPA, 2022d).
- North Carolina Department of Environmental Quality 2019 PFAS monitoring order for one textile mill (NC DEQ, 2022).
- Merrimack, New Hampshire, Wastewater Treatment Facility PFAS monitoring results for one textile mill (U.S. EPA, 2022k).
- PFAS monitoring results submitted by five textile mills as part of the response to EPA's November 2021 PFAS data request.

EPA included 358 PFAS sample results representing 10 facilities from the combined five data sources in its analysis characterizing PFAS in textile mill effluent. Table 6-2 presents the average, minimum, and maximum concentrations for each PFAS observed in effluent from the 10 textile mills. As illustrated in the table, EPA estimated the average concentrations for short-chain perfluoroalkyl carboxylic acids

[40] The sampled population is not statistically representative of the industry. EPA selected companies likely to be using PFAS and discharging process wastewater to complete the PFAS data request.

[41] EPA's acceptance criteria are presented in the memorandum "Development of the PFAS Wastewater Characterization Analytical Database" (ERG, 2022a).

(PFCAs) and short-chain fluorotelomers were generally higher relative to perfluoroalkane sulfonic acids (PFSAs) and long-chain PFCAs. Average PFAS concentrations in textile mill wastewater are lower than average PFAS concentrations observed in effluent from PFAS manufacturers, chromium finishing facilities, and landfills.

Table 6-2. Textile Mills Effluent PFAS Concentrations

PFAS Subgroup	Analyte[a,b]	Facilities with Data	Quantified Detections/Total Sample Results	Concentration Range (ppt)[c]	Average Concentration (ppt)[c]
Perfluoroalkyl carboxylic acids (PFCAs)	Perfluorobutanoic acid (PFBA)	7	8/14	ND – 343	32.7
	Perfluoropentanoic acid (PFPeA)	7	9/14	ND – 1360	176
	Perfluorohexanoic acid (PFHxA)	7	10/14	ND – 2340	227
	Perfluoroheptanoic acid (PFHpA)	7	10/14	ND – 383	66.1
	Perfluorooctanoic acid (PFOA)	10	17/29	ND – 1400	80.5
	Perfluorononanoic acid (PFNA)	7	10/14	ND – 65.9	6.27
	Perfluorodecanoic acid (PFDA)	7	10/14	ND – 96.1	6.10
	Perfluoroundecanoic acid (PFUnA)	7	5/14	ND – 22.6	1.36
	Perfluorododecanoic acid (PFDoA)	7	4/14	ND – 19.4	0.757
	Perfluorotridecanoic acid (PFTrA)	7	1/14	ND – 0.307	0.0439
	Perfluorotetradecanoic acid (PFTeA)	7	0/14	ND	ND
	Perfluorohexadecanoic acid (PFHxDA)	4	0/4	ND	ND
	Perfluorooctadecanoic acid (PFODA)	4	0/4	ND	ND
Perfluoroalkane sulfonic acids (PFSAs)	Perfluorobutane sulfonic acid (PFBS)	7	3/14	ND – 3	0.362
	Perfluoropentane sulfonic acid (PFPeS)	7	1/14	ND – 1.2	0.171
	Perfluorohexane sulfonic acid (PFHxS)	7	5/14	ND – 386	11.5
	Perfluoroheptane sulfonic acid (PFHpS)	7	3/14	ND – 7.32	0.383
	Perfluorooctane sulfonic acid (PFOS)	10	17/29	ND – 600	39.4
	Perfluorononane sulfonic acid (PFNS)	7	0/14	ND	ND
	Perfluorodecane sulfonic acid (PFDS)	7	0/14	ND	ND
Perfluoroalkane sulfonamides (FASAs)	Perfluorooctane sulfonamide (PFOSA)	3	5/10	ND – 10.3	1.21
Fluorotelomer sulfonic acids (FTSAs)	4:2 fluorotelomer sulfonic acid (4:2 FTSA)	2	0/7	ND	ND
	6:2 fluorotelomer sulfonic acid (6:2 FTSA)	2	7/7	84 – 264	188
	8:2 fluorotelomer sulfonic acid (8:2 FTSA)	2	3/7	ND – 5.48	0.643
N-Alkyl perfluoroalkane sulfonamido acetic acids (FASAAs)	N-methyl perfluorooctane sulfonamido acetic acid (NMeFOSAA)	3	3/10	ND – 20.7	7.61
	N-ethyl perfluorooctane sulfonamido acetic acid (NEtFOSAA)	3	8/10	ND – 98.8	19.0

Table 6-2. Textile Mills Effluent PFAS Concentrations

PFAS Subgroup	Analyte[a,b]	Facilities with Data	Quantified Detections/Total Sample Results	Concentration Range (ppt)[c]	Average Concentration (ppt)[c]
Per- and polyfluoroalkyl ether carboxylic acids (PFECAs)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	1	0/1	ND	ND

Sources: ERG, 2022b.

Abbreviations: ND – nondetection; ppt – parts-per-trillion (equivalent to nanograms per liter).

a – This table presents data for all PFAS listed in the draft EPA Method 1633 analyte list for which sample results are available and meet EPA's acceptance criteria. EPA also collected data for perfluorododecane sulfonic acid (PFDoS).

b –The table identifies short-chain PFCAs (≤7 carbons) and short-chain PFSAs (≤5 carbons) in blue text, while long-chain PFCAs (≥8 carbons) and long-chain PFSAs (≥6 carbons) are designated in red text.

c – In this analysis, EPA treated all nondetection results as zero for the purpose of estimating concentrations. All concentration values were rounded to three significant figures.

EPA intends to expand this detailed study, pending resource availability, to allow for additional data collection and outreach for this industry through the use of a mandatory, nationally representative questionnaire.

6.3.3 Landfills Point Source Category (40 CFR part 445)

As described in Preliminary Plan 15, EPA initiated a detailed study of wastewater discharges from the Landfills Point Source Category (40 CFR part 445), focusing on PFAS discharges in landfill leachates. This was a result of the Landfills preliminary category review based on public comments received on Preliminary ELG Plan 14 identifying landfill leachate effluent as a source of PFAS discharges to surface waters and POTWs. The goals of this study were to understand the total number and location of landfills discharging leachate across the United States, characterize PFAS in leachate effluent from regulated landfills, and identify current wastewater treatment technologies and management practices at regulated landfills. EPA used information collected from the study to evaluate whether the ELG for the Landfills Point Source Category should be revised.

Since September 2021, EPA has collected publicly available information to construct a picture of the industry's facilities, discharge practices, and control practices/technologies currently in place, including their effectiveness for PFAS removal. EPA also collected information to begin determining whether pollutants in landfill leachate pass through, interfere with, or are otherwise incompatible with POTW operations; to identify documented environmental or human health impacts associated with landfill discharges and exposure to PFAS, and to determine the proximity of landfill leachate discharges to CWA Section 303(d) impaired waters and communities with environmental and demographic characteristics of concern. EPA evaluated information from the following EPA data sources:

- ECHO database.
- RCRAInfo database.
- ICIS-NPDES Permit database.
- DMR data available via EPA's Water Pollutant Loading Tool.
- Landfill Methane Outreach Program (LMOP).
- TRI database.

EPA Office of Water conducted outreach and engagement with other EPA offices, EPA regional offices, states, trade associations representing public and privately held landfills, and the Environmental Research and Education Foundation (EREF). EPA conducted outreach to six state agencies to discuss impacts of landfill leachate discharges on PFAS management in state waters and POTWs, and to obtain state level lists of permitted landfills (U.S. EPA, 2022d; U.S. EPA, 2022e; U.S. EPA, 2022h; U.S. EPA, 2022i; U.S. EPA, 2022j; U.S. EPA, 2022l).

EPA also engaged with industry stakeholders including the National Waste and Recycling Association (NWRA), the Solid Waste Association of North America (SWANA), and the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) to understand their perspectives and provide them with an opportunity to share insights on the industry. EPA additionally met with two privately-owned landfill operating companies in the United States, Waste Management and Republic Services, to further understand their operations and PFAS management practices.

EPA also collected analytical data from over 200 RCRA Subtitle D Non-Hazardous Waste Landfills to characterize PFAS concentrations and species distributions in landfill leachate and gathered information from published literature, including journal articles and federal and state reports.

The following summarizes the study findings to date:

- In the 2000 Landfills ELG technical development document, EPA estimated there were 1,662 landfills that collect landfill-generated wastewater, comprising approximately 16 percent of landfills nationwide. A majority of the landfills subject to ELG (81 percent) are RCRA Subtitle D Non-Hazardous Waste Landfills (EPA, 2000).
- In 2000, EPA established BPT, BAT, BCT, and NSPS limitations for landfills that directly discharge wastewater to surface waters; EPA did not establish pretreatment standards (PSES and PSNS) for landfills that indirectly discharge via POTWs (see 65 FR 3048, January 19, 2000).
- Landfills are essential utilities and the ultimate destination of many discarded consumer and industrial products containing PFAS. PFAS presence in landfill leachate is caused by the use and disposal of products manufactured with PFAS.
- EPA evaluated discharge data from over 200 landfills from across the country and found PFAS present in the leachate at over 95 percent of the landfills. PFAS detections included 63 different PFAS with average concentrations for an individual compound as high as 14,000 parts-per-trillion (ppt) (ERG, 2022c).
- Landfill leachate, while a challenging matrix, is likely able to be treated by typical PFAS treatment technologies such as granular activated carbon, ion exchange, and reverse osmosis.
- EPA estimates that approximately 13,200,000 individuals live within one mile of a landfill. In these communities, the average median income is $48,100 and on average 31 percent of the population belongs to a minority group. EPA calculated the state percentiles of all landfill-proximal census block groups for demographic and environmental indicators available through EJScreen. The median percentile for all indicators exceeded the state average except for the percentage of the population under five years old and for ozone levels. At least two environmental indicators exceed the 80th percentile in 45 percent of these communities.

Based on information and data collected through the Landfill Leachate Detailed Study, the development of effluent guidelines and pretreatment standards for landfills that discharge their leachate is warranted. Therefore, EPA intends to revise the existing Landfills Point Source Category (40 CFR part 445) ELG to address PFAS discharge from these landfills pending resource availability. Once EPA develops the schedule for this rulemaking, it will be published in EPA's Regulatory Agenda.

6.3.4 Pulp, Paper and Paperboard Point Source Category (40 CFR part 430)

As described in EPA's Multi-Industry PFAS Study, PFAS have been, and continue to be, used by pulp, paper, and paperboard facilities in the United States as a coating or additive to provide water, oil, and grease resistance to food contact papers and other specialty paper products. EPA collected data from one trade association and eight major companies from this category. Based on these data, EPA determined

that only a small subset of facilities were actively applying PFAS, the production of paper products containing PFAS at these facilities was less than 0.1 percent of the industry's overall production, and the industry is planning to eliminate use of PFAS by end of 2023.

EPA announced in Preliminary Plan 15 that it would continue to review the Pulp, Paper, and Paperboard Point Source Category to further understand the potential for wastewater discharges of PFAS from facilities that historically or currently use PFAS and to monitor the industry's anticipated phase-out of PFAS. While developing ELG Plan 15, EPA has collected additional data on PFAS use and discharge from pulp, paper, and paperboard facilities from the United States Food and Drug Administration (FDA), a trade association, paper manufacturing companies, and state regulatory authorities. New information and data collected by EPA since publication of Preliminary Plan 15 are summarized below.

In April 2022, EPA met with the FDA to discuss use of PFAS as food contact substances. All food contact substances must be authorized by the FDA prior to marketing and typically come through the Food Contact Substance Notification Program, under which the FDA reviews available migration, exposure, and human health risk data to ensure a food contact substance is safe for its intended use prior to approving it for use on the market. Manufacturers of chemicals authorized as a food contact substances are permitted to market and sell these chemicals to food contact paper and packaging producers, who use them in products with food contact applications. Since the 1960s, the FDA has authorized several PFAS for use as food contact substances including certain long-chain PFAS (PFOA and PFOS have never been authorized) and more recently short-chain fluorotelomer PFAS and polyfluorinated polymers. FDA provided EPA with a list of all effective Food Contact Notifications containing PFAS that the FDA had authorized, as of July 2022, as grease-proofing agents used in food contact paper and paperboard. EPA determined that, as of July 2022, FDA had authorized 35 effective Food Contact Notifications containing PFAS submitted by ten manufacturing companies; however, the manufacturers had voluntarily ceased nearly half of these Food Contact Notifications for introduction into interstate commerce and delivery (FDA, 2022). FDA states that three manufacturers have agreed to a complete market phase-out of PFAS containing or degrading to 6:2 FTOH by December 31, 2023. The market phase-out is a response to FDA research that raised questions about human health risks for 6:2 FTOH.[42] While companies are permitted to use other authorized PFAS-based food contact substances, the FDA expects that most manufacturers will seek to replace PFAS with authorized nonfluorinated replacements in response to public pressure and consumer demand for PFAS-free chemistries in food contact paper and packaging (U.S. EPA, 2022m). These expectations are consistent with EPA's findings that pulp, paper, and paperboard companies plan to eliminate PFAS use by end of 2023 and transition to non-PFAS chemistries for oil and grease resistance in food contact paper and packaging.

EPA continued to conduct outreach and collect data on PFAS use and phase-out from this industry. In March 2022, the American Forest and Paper Association (AF&PA), a national trade association for the forest, pulp, and paper industry whose 39 member companies represent about 87 percent of pulp, paper, and paper-based packaging and tissue production capacity in the United States, inquired to its member companies regarding ongoing PFAS use in pulp, paper, and paperboard manufacture and transition to PFAS-free chemicals. These data indicated that most AF&PA member companies that previously

[42] Additional information on authorized uses of PFAS in food contact applications and this voluntary phase-out is available on the FDA's website at https://www.fda.gov/food/chemical-contaminants-food/authorized-uses-pfas-food-contact-applications

reported PFAS use in calendar year 2020 have since ceased all PFAS use at their pulp, paper, and paperboard facilities. As of July 2022, EPA is aware of five pulp and paper mills in the United States, all operated by Ahlstrom-Munksjö, that continue to use PFAS. All five of these facilities are expected to complete phase-out of all PFAS-based production by the end of 2023. PFAS use by AF&PA member companies remains limited to food contact substances authorized by the FDA. EPA determined that all companies that have joined AF&PA since September 2021 do not intentionally add PFOA, PFOS, or any other PFAS in pulp, paper, or paperboard products (U.S. EPA, 2022n).

To respond to public comments on Preliminary Plan 15, EPA gathered information regarding whether the recycle of PFAS-treated paper products may result in the transfer, and ultimately discharge, of PFAS in wastewater. Based on AF&PA data, EPA estimates that 78 percent of the approximately 340 pulp and paper mills operating in the United States use recovered fiber in the manufacture of pulp, paper, and paperboard products. However, the service life of PFAS-treated food contact paper and packaging is brief and the recycle rates for these products is low. EPA determined less than 15 percent of the United States population had access to recycling for direct contact foodservice paper and packaging in 2021 and, therefore, most food contact paper and packaging is thrown in the trash at the point of use (U.S. EPA, 2022n). Further, most member companies are targeting paper products that are as close as possible to virgin material for recycle (i.e., not products previously treated with PFAS). Some recovered fiber mills have zero tolerance for food contamination and will not accept any food contact papers and packaging for recycle. Because the production of PFAS-treated paper products is low (and continues to decrease) and most recovered fiber is not generated from PFAS-treated paper products, it is unlikely that recovered fiber facilities would be a significant source of PFAS discharges. Based on pulp and paper mill effluent data collected by the National Council for Air and Stream Improvement (NCASI), EPA determined that PFAS concentrations in effluent from mills using virgin pulp and mills using recovered fiber are low and that these data also show no significant difference in type or quantity of PFAS between the two types of facilities (U.S. EPA, 2022n; ERG, 2022b).

EPA continued to evaluate the available data on types and concentrations of PFAS in wastewater discharged from pulp, paper, and paperboard facilities. As described in Preliminary Plan 15, EPA previously identified three state permitting authority data sources containing PFAS monitoring data for pulp and paper mill effluent (MI EGLE, 2020b; MI EGLE, 2020c; VT DEC, 2020; U.S. EPA, 2021e). EPA has since collected analytical data from four additional data sources that meet EPA's acceptance criteria for inclusion in analyses for characterizing PFAS in industrial wastewater discharges:[43]

- Michigan EGLE 2022 PFAS monitoring results for direct and indirect discharging facilities (U.S. EPA, 2022d).
- Wisconsin Department of Natural Resources 2020 investigative order PFAS monitoring data for 40 industrial facilities and 78 POTWs (U.S. EPA, 2022e).
- New Hampshire Department of Environmental Services submission of PFAS sample results from the state's Environmental Monitoring Database (U.S. EPA, 2022l).

[43] EPA's acceptance criteria are presented in the memorandum "Development of the PFAS Wastewater Characterization Analytical Database" (ERG, 2022a).

- AF&PA data submission of NCASI-collected effluent samples for six unidentified pulp and paper mills (U.S. EPA, 2022n).

EPA included 4,664 PFAS sample results representing 52 facilities from the combined seven data sources in its analysis characterizing PFAS in pulp, paper, and paperboard facility effluent. Table 6-3 presents the average, minimum, and maximum concentrations for each PFAS observed in effluent from the 52 pulp, paper, and paperboard facilities. As illustrated in the table, EPA estimated the average concentrations for short-chain PFCAs were generally higher relative to PFSAs and long-chain PFCAs. Despite the phase-out of long-chain PFAAs, some pulp, paper, and paperboard facilities still report detectable levels of PFOA and PFOS in their wastewater.

Table 6-3. Pulp, Paper, and Paperboard Effluent PFAS Concentrations

PFAS Subgroup	Analyte[a,b]	Facilities with Data	Quantified Detections/ Total Sample Results	Concentration Range (ppt)[c]	Average Concentration (ppt)[c]
Perfluoroalkyl carboxylic acids (PFCAs)	Perfluorobutanoic acid (PFBA)	26	32/43	ND – 638	38.5
	Perfluoropentanoic acid (PFPeA)	26	33/43	ND – 246	22.7
	Perfluorohexanoic acid (PFHxA)	26	41/43	ND – 640	33.1
	Perfluoroheptanoic acid (PFHpA)	26	39/43	ND – 206	15.2
	Perfluorooctanoic acid (PFOA)	52	168/229	ND – 680	22.2
	Perfluorononanoic acid (PFNA)	38	34/57	ND – 52.6	4.08
	Perfluorodecanoic acid (PFDA)	26	15/43	ND – 19.7	0.969
	Perfluoroundecanoic acid (PFUnA)	26	9/43	ND – 15.3	0.423
	Perfluorododecanoic acid (PFDoA)	26	6/43	ND – 20.3	0.469
	Perfluorotridecanoic acid (PFTrA)	26	5/43	ND – 24.9	0.503
	Perfluorotetradecanoic acid (PFTeA)	26	6/43	ND – 23	0.465
	Perfluorohexadecanoic acid (PFHxDA)	3	0/7	ND	ND
	Perfluorooctadecanoic acid (PFODA)	3	2/7	ND – 14.6	2.91
Perfluoroalkane sulfonic acids (PFSAs)	Perfluorobutane sulfonic acid (PFBS)	38	36/57	ND – 254	4.84
	Perfluoropentane sulfonic acid (PFPeS)	25	4/42	ND – 1.43	0.122
	Perfluorohexane sulfonic acid (PFHxS)	38	32/57	ND – 59	1.98
	Perfluoroheptane sulfonic acid (PFHpS)	23	4/40	ND – 0.28	0.03
	Perfluorooctane sulfonic acid (PFOS)	52	161/231	ND – 810	16.1
	Perfluorononane sulfonic acid (PFNS)	25	1/42	ND – 2.17	0.022
	Perfluorodecane sulfonic acid (PFDS)	26	3/43	ND – 5.17	0.117
Perfluoroalkane sulfonamides (FASAs)	Perfluorooctane sulfonamide (PFOSA)	25	1/42	ND – 17.5	0.7
Fluorotelomer sulfonic acids (FTSAs)	4:2 fluorotelomer sulfonic acid (4:2 FTSA)	23	0/33	ND	ND
	6:2 fluorotelomer sulfonic acid (6:2 FTSA)	24	19/36	ND – 284	8.7
	8:2 fluorotelomer sulfonic acid (8:2 FTSA)	24	6/36	ND – 0.821	0.119
Perfluoroalkane sulfonamido ethanols (FASEs), perfluoroalkane	N-methyl perfluorooctane sulfonamide (NMePFOSA)	18	0/22	ND	ND
	N-ethyl perfluorooctane sulfonamide (NEtPFOSA)	18	0/22	ND	ND

Table 6-3. Pulp, Paper, and Paperboard Effluent PFAS Concentrations

PFAS Subgroup	Analyte[a,b]	Facilities with Data	Quantified Detections/ Total Sample Results	Concentration Range (ppt)[c]	Average Concentration (ppt)[c]
sulfonamido acetic acids (FASAAs), and N-Alkyl FASAAs	N-methyl perfluorooctane sulfonamido ethanol (NMeFOSE)	18	2/22	ND – 6.62	0.459
	N-ethyl perfluorooctane sulfonamido ethanol (NEtFOSE)	18	0/22	ND	ND
	N-methyl perfluorooctane sulfonamido acetic acid (NMeFOSAA)	26	12/43	ND – 12	1.56
	N-ethyl perfluorooctane sulfonamido acetic acid (NEtFOSAA)	26	20/44	ND – 46	4.31
Per- and polyfluoroalkyl ether carboxylic acids (PFECAs)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	20	10/25	ND – 3.14	0.392
	4,8-dioxa-3H-perfluorononanoic acid (DONA)	17	0/17	ND	ND
	Sodium dodecafluoro-3H-4, 8-dioxanonanoate (NaDONA)	2	0/6	ND	ND
Per- and polyfluoroalkyl ether sulfonic acids (PFESAs)	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS/F-53B Major)	16	0/16	ND	ND
	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OudS/F-53B Minor)	16	0/16	ND	ND

Sources: ERG, 2022b.

Abbreviations: ND – nondetection; ppt – parts-per-trillion (equivalent to nanograms per liter).

A – This table presents data for all PFAS listed in draft EPA Method 1633 analyte list for which sample results are available and meet EPA's acceptance criteria. EPA also collected data for 10:2 fluorotelomer sulfonic acid (10:2 FTSA) and perfluorododecane sulfonic acid (PFDoS).

B –The table identifies short-chain PFCAs (≤7 carbons) and short-chain PFSAs (≤5 carbons) in blue text, while long-chain PFCAs (≥8 carbons) and long-chain PFSAs (≥6 carbons) are designated in red text.

C – In this analysis, EPA treated all nondetection results as zero for the purpose of estimating concentrations. All concentration values are rounded to three significant figures.

Based on this information, EPA is not prioritizing a rulemaking on the Pulp, Paper and Paperboard Point Source Category at this time. EPA will continue to review this category with particular attention to understanding the potential for legacy discharges from these facilities after the industry's transition to PFAS-free additives. EPA intends to provide updates on these activities in subsequent ELG program plans.

6.3.5 POTW Influent PFAS Study

EPA's PFAS Strategic Roadmap identifies the unique challenges posed by PFAS contamination and states its approach includes a "deeper focus to preventing PFAS from entering the environment in the first place—a foundational step to reducing the exposure and potential risks of future PFAS contamination." EPA's PFAS Strategic Roadmap and Preliminary Plan 15 further discuss the ubiquitous nature of PFAS and the paucity of PFAS monitoring data from industrial sources. EPA has reviewed the readily available PFAS monitoring data to date and continues to look for additional sources of PFAS. For many industries, PFAS monitoring of effluent discharges has not yet been conducted. These characterization data would fill a crucial data gap in the agency's efforts to establish technology-based limits for PFAS. Pending resource availability, EPA intends to initiate a POTW Influent PFAS Study, which will focus on collecting nationwide data on industrial discharges of PFAS to POTWs. This includes indirect discharges from categories recently reviewed and categories identified but for which insufficient PFAS monitoring data exists.

EPA's intent is to partner with wastewater treatment facilities to conduct this national sampling effort. Recent improvements to analytical methods; including Draft EPA Method 1633, which measures 40 PFAS in a number of environmental matrices, and Draft EPA Method 1621, which measures Adsorbable Organic Fluorine (AOF) (a surrogate for the presence of PFAS), in wastewater. EPA plans to collect samples of PFAS and AOF from industrial sources upstream of POTWs, before mixing and dilution from other wastestreams make it difficult to identify the source of the PFAS. As part of initiating this effort, EPA intends to develop an Information Collection Request (ICR) and a sampling strategy providing more details about the POTW Influent PFAS Study.

7. ONGOING ELG RULEMAKINGS

This section summarizes the status of EPA's ongoing ELG rulemaking efforts.

7.1 Steam Electric Power Generating Point Source Category (40 CFR part 423)

EPA promulgated new ELG for the Steam Electric Power Generating Point Source Category in 2015 and revised them in 2020. The rules are subject to legal challenge in the U.S. Court of Appeals for the Fifth and Fourth Circuits. The legal challenges to the 2015 ELG for flue gas desulfurization (FGD) wastewater and bottom ash (BA) transport water have been held in abeyance since EPA commenced its reconsideration rulemaking, which EPA completed in August 2020. The 2020 Rule established revised effluent limitations for FGD wastewater and BA transport water. Meanwhile, the Court proceeded to hear claims on aspects of the 2015 rule that were not the subject of EPA's reconsideration rulemaking. On April 12, 2019, the U.S. Court of Appeals for the Fifth Circuit struck down as unlawful aspects of the 2015 ELG pertaining to effluent limitations for "legacy" wastewater and combustion residual leachate. The Court vacated those portions of the 2015 ELG rule and remanded them to the agency.

Subsequent to the 2020 Rule, on July 26, 2021, EPA announced it was initiating a new supplementary rulemaking to strengthen certain wastewater pollution discharge limitations for coal power plants that use steam to generate electricity. EPA undertook a science-based review of the 2020 Rule under Executive Order 13990, finding that there are opportunities to strengthen certain wastewater pollution discharge limitations. For example, treatment systems using membranes have advanced since the 2020 Rule's issuance and continue to rapidly advance as an effective option for treating a wide variety of industrial pollution, including from steam electric power plants. EPA expects this technology to continue advancing and the agency will evaluate its availability (as defined in the CWA) as part of the new rulemaking. While the agency pursues this new supplementary rulemaking, the current regulations are being implemented and enforced. These requirements provide significant environmental protections relative to a 1982 rule that was previously in effect. The 2015 and 2020 rules are leading to better control of water pollution from power plants while reducing the cost of controls such as biological treatment systems and membrane treatment systems. The agency's approach is securing progress made by the 2015 and 2020 rules while the agency considers more stringent requirements.

EPA continues to work on the new supplementary rulemaking announced in July 2021, including continuing to analyze information and data, such as performance data and costs related to various pollution control technologies for treating and controlling steam electric wastewaters. EPA anticipates signing a notice of proposed rulemaking by early 2023.

7.2 Meat and Poultry Products Point Source Category (40 CFR part 432)

EPA initially promulgated the MPP ELG in 1974 and amended the regulations in 2004. The current regulation covers wastewater directly discharged by meat and poultry slaughterhouses and further processors as well as independent renderers. The technology basis for existing non-small direct dischargers includes biological treatment with partial denitrification. The current MPP ELG does not include pretreatment standards for any facilities indirectly discharging process wastewater. In the Effluent Guidelines Program Plan 14 (January 2021), EPA announced a detailed study of the MPP Category. The MPP Category ranked among the top two industrial categories in EPA's cross-industry review of nutrients in industrial wastewater. During the study, EPA evaluated publicly available data for

direct discharging facilities, which make up a small portion of the industry, and data from POTWs. The record indicated that in addition to having high nutrient discharges, indirect discharging MPP facilities may be causing problems for POTWs. In addition, the data showed that some MPP facilities are already removing nutrients and achieving effluent concentrations below the current ELG requirements. In Preliminary Program Plan 15, EPA summarized the detailed study, indicated that a revision to the ELG may be appropriate, and stated that EPA would be initiating a rulemaking to revise the MPP ELG.

A survey of the current MPP industry is critical for the rulemaking process and necessary for EPA to determine what revisions may be appropriate. Data collection activities will provide a robust data set that characterizes wastewater generation, treatment, and discharge from MPP facilities. As part of the rulemaking process, EPA processed and received Office of Management and Budget approval in June 2022 for an ICR to collect financial and engineering data from MPP facilities. With input from stakeholders, EPA's Office of Water has developed a short, census questionnaire and a more detailed questionnaire that was sent to facilities in fall 2022. EPA is currently administering both of these questionnaires to facilities engaging in meat and poultry processing, including those currently regulated under 40 CFR part 432 and facilities that discharge wastewater directly to waters of the United States, indirectly discharge wastewater, or do not discharge wastewater. EPA is administering both questionnaires via a web-based platform, Qualtrics Survey Software (Qualtrics). Based on data primarily from the U.S. Department of Agriculture Food Safety and Inspection Service and ICIS-NPDES, EPA estimates the MPP industry has between 7,000 and 8,000 facilities. Because no one data source collects information from all MPP facilities, the exact number is unknown, and the survey questionnaires will help determine the number of facilities. In addition, EPA has conducted site visits of facilities that represent meat and poultry processors across current effluent guidelines subcategories, including those that treat process wastewater with high-level treatment technologies.

EPA intends to select up to 10 facilities for multiday sampling to fill any data gaps remaining from the questionnaire data collection. The purpose of the multiday sampling is to characterize pollutants in raw wastewaters prior to treatment, as well as to document wastewater treatment plant performance. Selection of facilities for multiday sampling will be based on an analysis of information collected during the site visits, as well as the following criteria:

- The facility performs meat and/or poultry slaughtering and/or further processing operations representative of MPP facilities.
- The facility uses in-process treatment and/or end-of-pipe treatment technologies that EPA may consider for technology option selection.
- Compliance monitoring data for the facility indicates that it is among the better performing treatment systems or that it employs a wastewater treatment process for which EPA sought data for option selection.

EPA intends to propose this regulation in December 2023.

7.3 Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category: PFAS Manufacturers and Formulators (40 CFR part 414)

EPA announced in Preliminary Plan 15 and in the PFAS Strategic Roadmap that it will revise the ELG for the OCPSF Point Source Category (40 CFR part 414) to address wastewater discharges of PFAS from PFAS manufacturing facilities. Based on information and data collected, EPA determined that PFAS have been, and continue to be, manufactured and used by PFAS manufacturing facilities in the United States.

In December 2021, EPA delivered a data request under Section 308 of the CWA to obtain information and data from the industry that will provide a robust data set that characterizes wastewater generation, treatment, and discharge from PFAS manufacturing facilities. In addition, EPA has conducted virtual site visits of facilities that manufacture PFAS and treat the process wastewater with advanced wastewater treatment technologies.

Based on data collected from outreach and the Section 308 questionnaire, EPA sampled wastewater at a number of facilities in 2022. The purpose of the sampling was to characterize pollutants in raw wastewaters prior to treatment, as well as to document wastewater treatment performance. Selection of facilities for sampling is based on an analysis of information collected during the site visits and the responses to the data request. Pending resource availability, EPA intends to publish a proposed rule in the spring of 2024 and intends to continue to evaluate the need to develop regulations to address PFAS discharges from PFAS formulators/processors.

7.4 Metal Finishing (40 CFR part 433) and Electroplating (40 CFR part 413) Point Source Categories

EPA announced in Preliminary Plan 15 and in the PFAS Strategic Roadmap that it will revise the ELG for the Metal Finishing and Electroplating Point Source Categories (40 CFR part 433 and part 413, respectively) to address wastewater discharges of PFAS. Based on data collected to date, EPA has identified facilities conducting operations that use or may have used hexavalent chromium, including chromium electroplating, chromium anodizing, chromate conversion coating, and chromic acid etching (referred to as chrome finishing facilities), as the most significant source of PFAS in the Metal Finishing and Electroplating Point Source Categories. Existing data demonstrate that these facilities have concentrations of PFOS in their effluent that is, on average, several orders of magnitude higher than metal finishing and electroplating facilities that do not conduct chrome finishing.

PFAS are present in wastewater from chrome finishing facilities primarily due to the use of PFAS containing chemical fume suppressants to mitigate emissions and inhalation exposure of hexavalent chromium. A revision to the National Emission Standards for Hazardous Air Pollutants (NESHAP) phased out the use of PFOS in 2015; however, PFOS is still detected in wastewater from facilities that have used PFOS-based chemical fume suppressants in the past. As a result of the phase-out, many facilities switched to a chemical fume suppressant containing a different PFAS: 6:2 fluorotelomer sulfonic acid (6:2-FTSA). This has been detected at high levels in the wastewater from chrome finishing facilities that use it.

EPA has learned that: (1) it is possible to successfully mitigate hexavalent chromium emissions using commercially available chemical fume suppressants that do not contain any PFAS; (2) many facilities

could switch their operations to using trivalent chromium, which does not require the use of chemical fume suppressants; (3) a number of facilities are successfully using granular activated carbon to treat PFOS in wastewater to meet water quality limitations and granular activated carbon may be effective for other PFAS in metal finishing and electroplating wastewater; and (4) other technologies exist or are in development that may be able to treat PFAS in wastewater from chrome finishing facilities, including membranes, ion exchange, and PFAS destruction techniques.

Pending available resources, EPA intends to collect the data necessary to revise these ELGs, which will include conducting a survey of the industry and analysis of wastewater samples in the coming year. EPA intends to publish a proposed rule by the end of 2024.

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Appendix A—Response to Remand of ELG Plan 14 in Food and Water Watch V. EPA (No. 21-71084 9th Cir.)

A.1 Background

CAFOs are facilities that confine and maintain large numbers of animals for a specified period of time. 40 CFR 122.23 (defining CAFOs in precise terms). The CAFOs ELG regulates two parts of CAFOs: the "production area" and the "land application area." The production area is the area that includes the animal confinement area, manure storage areas, raw materials storage area, and waste containment areas. 40 CFR 122.23(b)(8). The land application area is the land under the control of a CAFO owner or operator to which manure, litter, and process wastewater from the production area is or may be applied. 40 CFR 122.23(b)(3).

In Effluent Guidelines Program Plan 14, EPA stated that it was not appropriate at that time to revise the effluent guidelines for the CAFOs industrial point source category. This determination with respect to CAFOs was challenged in the U.S. Court of Appeals for the Ninth Circuit. *Food and Water Watch v. U.S. EPA*, (9th Cir. No. 21-71084). On February 25, 2022, the court granted EPA's motion for remand of that decision. This Plan responds to that remand.

A.2 Existing CAFOs ELG

The existing CAFOs ELG imposes substantial and detailed requirements on both the production area and land application area. The ELG requirements for the production area prohibit the discharge of manure, litter, and process wastewater from the production area to waters of the United States, with only one exception. 40 CFR 412.31(a). Under this exception, the ELG allows discharges from the production area where those discharges are caused by precipitation and where the production area is designed to contain all manure, litter, and process wastewater from a 25-year, 24-hour rainfall event. 40 CFR 412.31(a)(1) (defining this exemption in precise terms).

The ELG requirements for the land application area prohibit discharges unless those discharges qualify as "agricultural stormwater," which the Clean Water Act expressly excludes from regulation. 33 USC 502(14). EPA interprets "agricultural stormwater" to include any precipitation-related discharges of manure, litter, and process wastewater from the land application areas if the manure, litter, and process wastewater has been applied to the land application area in accordance with a site-specific "nutrient management plan" that ensures appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater. 40 CFR 122.23(e). A nutrient management plan addresses the form, source, amount, timing, and method of application of nutrients on each field to achieve crop production goals while minimizing the transport of nutrients to surface waters. 40 CFR 412.4(c)(1). The application rates for manure, litter, and process wastewater must be established in accordance with technical standards established by each state. See 40 CFR 123.36; 412.4(c)(2).

The ELG also requires CAFOs to comply with certain recordkeeping and reporting requirements related to both the production area and the land application area. 40 CFR 412.4(b), (c).

A.3 Information to Determine Whether to Undertake Rulemaking to Revise the CAFOs ELG

A decision whether to undertake rulemaking to revise the CAFOs ELG is informed by understanding the extent to which the current ELG is controlling pollutant discharges from CAFOs, and, if not, the extent to which revisions to the ELG could result in improved water quality protection. Understanding the potential effectiveness of ELG revisions requires up-to-date information about the extent to which

CAFOs are discharging to "waters of the United States," technologies that are available and economically achievable for controlling CAFOs discharges, and implementation issues associated with currently applicable standards. EPA has decided to gather additional information and conduct a detailed study on these issues in order to be able to make an informed decision as to whether to undertake rulemaking.

A.4 Information Gathering and Study

EPA intends to gather information about many aspects of implementation of the existing CAFOs ELG and discharges from the production area and land application area. This information will help shed light on the appropriateness of ELG revision in light of the statutory standards for effluent guidelines, including that they reflect the best available technology economically achievable, after consideration of factors specified in the Act.

First, EPA intends to identify the extent to which CAFOs discharge into "waters of the United States." As commenters on Preliminary Plan 15 noted, EPA's data about discharges of pollutants from CAFOs is sparse; indeed, its preliminary analysis was only able to analyze monitoring data from sixteen reporting CAFOs. EPA intends to gather information about discharges from the production area to appropriate characterize whether manure, litter, and process wastewater flows off land application areas. EPA has reviewed many studies addressing impacts of CAFOs on surrounding communities and the environment, but little data is available demonstrating the impacts of CAFOs specifically on "waters of the United States," particularly considering the agricultural stormwater exemption. EPA also intends to assess whether any discharges from CAFOs are concentrated in particular regions or states, or whether they are widespread nationally. Understanding the nature and frequency of discharges is critical to understanding the extent to which potential revision of the ELG could yield significant pollutant reductions.

In addition, EPA plans to gather information about new technologies and practices for reducing discharges from the production area and land application area. EPA will consider whether these technologies may be technologically available and economically achievable for the CAFOs point source category. See 33 U.S.C. § 1311(b)(2). EPA lacks a sufficient understanding of technologies and practices that may have developed since its 2003 and 2008 rules, including their effectiveness at reducing discharges of pollutants beyond what is already required in the CAFOs ELG, the applicability of these technologies in a variety of situations, any secondary impacts they may have on farm production, and their cost to CAFOs owners and operators. EPA also intends to study the financial health of the agriculture industry as a whole and by sector, to the extent possible. Given the statute's requirement that any ELG revision be technologically available and economically achievable, EPA believes it should have a greater understanding of the availability, effectiveness, and economic achievability of new technologies.

This information is important for EPA to be able to make an informed, reasoned decision regarding the effectiveness of the existing ELG and whether emerging alternatives to existing requirements may be technologically available and economically achievable and may better protect water quality. EPA will evaluate other issues related to the CAFOs ELG in addition to the issues highlighted above, and the focus of the detailed study will evolve as EPA gathers information.

A.5 Conclusion

For the reasons provided above, EPA has determined that gathering additional information and conducting a detailed study of the CAFOs ELG is a necessary next step for evaluating whether revisions to the ELG are warranted. Completing this study before determining whether to revise the ELG also reflects EPA's careful evaluation of the Agency resources that would need to be committed to a rulemaking, due to the large number of environmental priorities that EPA has concluded need to be addressed through rulemaking. Typical ELG rulemakings take several years, 3 full-time employees, and a million dollars per year in contractor support. As noted above, EPA promulgated the CAFOs ELG in 2003 and revisions in 2008 – these rulemakings and associated litigation spanned approximately 11 years. Thus, a decision to undertake rulemaking has significant implications for the Agency's allocation of its resources. EPA has concluded that the information that will be collected is the appropriate course of action to make an informed, reasoned determination whether the potential environmental benefits of undertaking rulemaking justify devoting the significant resources that are required for such a rulemaking.

In deciding to gather information and conducting a detailed study prior to making a decision whether to undertake such a rulemaking, the Agency has also considered the substantial resources that it has committed to revising ELG for other industrial sectors and that undertaking rulemaking for CAFOs at this time could divert resources from these efforts. For example, EPA has undertaken rulemaking to control, for the first time, discharges of per-and polyfluoroalkyl substances (PFAS) from certain manufacturers and processors. See Section 7.3 and the Multi-Industry PFAS Study – 2021 Preliminary Report. EPA has also recently determined that it will undertake rulemaking to improve control of discharges from meat and poultry slaughterhouses. See Section 7.2. EPA is also now engaged in rulemaking for part of the power industry sector. See Section 7.1. EPA is undertaking those rulemakings because it had sufficient information to determine that revising those ELG would advance protection of quality of the nation's waters and, in the absence of such information with regard to CAFOs, has determined not to divert resources from those efforts.

For the reasons described above, EPA has determined that collecting further information and conducting a detailed study will enable the Agency to make an informed, reasoned decision whether to undertake rulemaking to revise the ELG for CAFOs.