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Preliminary Effluent Guidelines Program Plan 15

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1. EXECUTIVE SUMMARY

EPA prepares Preliminary Effluent Guidelines Program Plans pursuant to Clean Water Act (CWA) section 304(m). Preliminary plans provide a description of the EPA's annual review of effluent guidelines and pretreatment standards, consistent with CWA sections 301(d), 304(b), 304(g), 304(m), and 307(b). From these reviews, preliminary plans identify any new or existing industrial categories selected for effluent guidelines or pretreatment standards rulemakings and provide a schedule for such rulemakings. In addition, preliminary plans present any new or existing categories of industry selected for further review and analysis.

This Preliminary Effluent Guidelines Program Plan 15 (Preliminary Plan 15) discusses EPA's 2020 annual review of effluent guidelines and pretreatment standards, presents its preliminary review of specific categories identified through the review, and provides an update on the analyses and tools that EPA is continuing to develop to improve its annual review and biennial planning process.

Preliminary Plan 15 announces that EPA is initiating three new rulemakings. After several years of collecting and analyzing data, EPA has determined that revision of the following effluent guidelines or pretreatment standards are warranted:

- Meat and Poultry Products Category to address nutrient discharges (see Section 6.2 for additional details)
- Organic Chemicals, Plastics & Synthetic Fibers Category to address Per- and Polyfluoroalkyl Substances (PFAS) discharges (see Section 6.4 for additional details)
- Metal Finishing Category to address Per- and Polyfluoroalkyl Substances (PFAS) discharges (see Section 6.4 for additional details)

Preliminary Plan 15 also discusses ongoing efforts related to the Steam Electric Power Generating category rulemaking (see Section 7.1 for additional details) that the agency announced on July 26, 2021. At that time, EPA announced that the agency was initiating a rulemaking process to strengthen certain wastewater pollution discharge limitations for coal power plants that use steam to generate electricity.

Finally, Preliminary Plan 15 provides updates on ongoing point source category studies of the Electrical and Electronic Components Category and the Preliminary Multi-Industry PFAS study and announces no further action on oil and gas extraction wastewater management. Additionally, initial results from reviews of readily available data are discussed for the Metal Products and Machinery, Explosives Manufacturing, Canned and Preserved Seafood, Sugar Processing, Soap and Detergent Manufacturing, and Landfill Point Source Categories.

EPA solicits comments on the entirety of Preliminary Plan 15, particularly on its reviews of industrial wastewater discharges and treatment technologies that are described in Section 5 of this plan. This includes the 2020 annual review, which consisted of a cross-category concentration rankings analysis and preliminary review of specific, high-ranking point source categories. Along with any new comments, commenters who have previously provided relevant comments or rulemaking petitions must resubmit them for EPA to consider these comments in the context of Preliminary Plan 15.

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 effluent limitations guidelines and standards (ELGs) (i.e., the effluent guidelines planning process).

2.1 The Clean Water Act and the Effluent Guidelines Program

The CWA is focused on two types of controls for point source discharges of pollutants to waters of the United States: (1) technology-based controls, based on ELGs 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 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 guidelines or pretreatment standards representing the performance of the "best" pollution control technologies, regardless of their location or the nature of their 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, while technology-based ELGs in discharge permits may meet or exceed water quality standards, the CWA also requires EPA and authorized states to establish water quality-based effluent limitations as stringent as necessary to meet water quality standards.[2] 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[3] for more information. 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 technology-based limitations for conventional, toxic, and nonconventional pollutants in accordance with six statutorily prescribed levels of control (Table 2-1). The limitations are based on performance of specific technologies, but the regulations do not require use of a specific control

[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).

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 at issue (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] EPA has identified 65 pollutants and classes of pollutants as toxic, among which 126 specific substances have been designated by EPA 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)) The agency 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)). The agency 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 as well as direct and indirect dischargers.

For existing direct dischargers, i.e., those who discharge into navigable waters, 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, rather than conducting separate reviews, EPA consolidates its review of effluent limitations required under section 301(d) into its review of ELGs under section 304(b).[12]

For indirect dischargers, i.e., those who 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

[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). S*ee 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)).
[13] See CWA section 307(b); 33 U.S.C. 1317(b).
[14] See CWA section 304(g); 33 U.S.C. 1314(g).

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 guidelines,[18] it does not require EPA to make a "yes" or "no" determination every year on whether to revise the guidelines. See Effluent Guidelines Program Plan 14 (Plan 14, U.S. EPA, 2021a), Section 2.3 for further discussion of EPA's annual obligations.

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.

Preliminary Plan 15 describes ongoing planning activities, including projects EPA initiated as part of its 2020 annual review, and describes EPA's effluent guidelines planning efforts, including preliminary category reviews, category studies, and ELG rulemakings. For additional details, see EPA's *Review of Industrial Wastewater Discharge Monitoring Report (DMR) Data for Preliminary Plan 15* and *2020 Preliminary Review of Industrial Point Source Categories* (U.S. EPA, 2021b, 2021c).

[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. SOLICITATION OF PUBLIC COMMENTS

EPA seeks public input and comment on all aspects of its planning process including the entirety of Preliminary Plan 15. In particular, EPA requests comments on the following questions and related themes:

- EPA solicits feedback on the cross-category rankings analysis. To the extent that any comment advocates for a revision to existing ELGs the commenter should explain why EPA should prioritize these point source categories ahead of the ones that EPA is studying and revising (Section 5.1).
- EPA solicits public input on the capabilities, performance, and costs of membrane treatment technologies for industrial wastewater to support the membrane technology review (Section 5.8).
- EPA solicits public input on how best to incorporate environmental justice into the ELG planning process (Section 5.10).
- EPA solicits feedback on the findings of the Preliminary Multi-Industry PFAS study, specifically findings from the pulp and paper manufacturers and commercial airports (Section 6.4, U.S. EPA, 2021d).
- EPA solicits public input on the announcements made within Preliminary Plan 15 regarding ongoing studies and rulemaking activities (Sections 6 and 7).

4. SUMMARY OF ANNUAL REVIEW ACTIVITIES

Preliminary Plan 15 presents EPA's 2020 annual review activities, including its expanded cross-category review of discharge monitoring report (DMR) monthly average concentration data, initiated as part of the 2019 annual review and discussed in Plan 14 (U.S. EPA, 2021a). EPA updated the analysis using 2019 DMR data and analyzed the results using two different ranking approaches to identify categories that have discharges with relatively high pollutant concentrations compared to other point source categories (PSCs) (see Section 5.1). This analysis looked across all existing ELGs, including relevant data for industries with existing ELGs, and data for some industries that are not currently regulated by ELGs. Based on the results of the rankings analysis, EPA identified seven PSCs for preliminary review to assess which categories, if any, require further review and study (see Sections 5.2 through 5.6). EPA also conducted a preliminary review of the Landfills PSC (40 CFR Part 445) to assess the discharges of perfluorinated compounds, based on ongoing industrial wastewater reviews and stakeholder input (see Section 5.7, U.S. EPA, 2021a and 2021d). In addition, EPA continued to develop and update tools to facilitate the annual review and biennial planning processes, including a review of treatment technologies (see Section 5.8), and the Industrial Wastewater Treatment Technology (IWTT) and Effluent Limitations Guidelines (ELG) Databases (see Section 5.9).

The 2020 annual review and the information presented in this Preliminary Plan 15 build on EPA's previous annual reviews, including the 2019 annual review and ELG planning process described in Plan 14 (U.S. EPA, 2021a). Likewise, the analyses presented herein, as well as public comments received on Preliminary Plan 15, will inform EPA's 2021 annual review and ELG planning process. EPA welcomes comments on including the following analyses in the 2021 annual review:

- Evaluation of industrial category rankings based on annual pollutant loadings rather than concentration.
- Conduct of the cross-category concentration rankings analysis for a targeted pollutant group, such as toxic pollutants, rather than aggregating all pollutants.
- Updates to and expansion of the impaired waters analysis described in Plan 14, using new Assessment, Total Maximum Daily Load Tracking and Implementation System (ATTAINS) data.
- Reviews of emerging contaminants.

EPA plans to describe its 2021 annual review and consider any public comments received on Preliminary Plan 15 in developing Effluent Guidelines Program Plan 15.

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 data sources used to complete the reviews and the limitations of those data. This section also presents findings and next steps for the associated planning activities. Since Plan 14 (U.S. EPA, 2021a), EPA has undertaken the following efforts (discussed further below):

- Continued a cross-category review of monthly average concentration data from discharge monitoring reports (DMR) (see Section 5.1).
- Conducted preliminary category reviews of the top-ranking point source categories (PSCs) identified in the cross-category review of DMR concentration data and other categories identified through stakeholder input (see Sections 5.2 through 5.7).
- 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 5.8).
- Continued to compile wastewater treatment technology information in the Industrial Wastewater Treatment Technology (IWTT) Database and populate the information in the IWTT web application for public use (see Section 5.9.1).
- Published the ELG Database, which includes information across all regulated PSCs in a consolidated, searchable database (see Section 5.9.2).

In Plan 14, EPA discussed the possibility of initiating reviews of four industrial categories based on EPA's 2019 nutrient analyses. EPA's 2020 analysis of the overall amount of nutrient discharges indicated that further review of one category— Explosives Manufacturing (40 CFR Part 457)— is appropriate. EPA's analysis did not, however, support further review of Fertilizer Manufacturing (40 CFR Part 418), Plastics Molding and Forming (40 CFR Part 463), or Miscellaneous Food and Beverages (no current ELG) at this time. As discussed below, these latter three categories did not rank highly in EPA's 2020 analyses of pollutant discharges as compared to the other categories and other current EPA priorities for rulemaking. EPA uses its annual analyses and technical expertise to prioritize its reviews and to focus on point source categories that are best suited for revisions that further the objectives of the CWA. EPA solicits comments on using this 2020 analysis as a basis for prioritization. EPA may choose to continue its reviews of these categories in the future.

As required by the CWA, EPA reviewed all PSCs as part of its annual review. For categories not discussed in detail in this Preliminary Plan 15, EPA is currently not prioritizing further review. As described in detail below and in documents in the docket for this preliminary plan, EPA does not have data indicating that these categories discharge quantities of pollutants that would warrant revising the ELGs at this time. Additionally, given EPA's available resources, these categories are less important than the other PSC for which EPA is undertaking further study and or rulemaking. EPA solicits comment on this approach and will continue to review all categories while preparing the next plan.

EPA received petitions[19,20] for rulemaking that request changes to the ELGs for Concentrated Animal Feeding Operations and Plastic Manufacturers and EPA is carefully reviewing those petitions. At this time, based on EPA's general methodology and results from the 2020 annual review, and balancing this information with the agency's available resources for ELG revisions and this Administration's priorities, EPA is not planning to revise these ELGs at this time. EPA solicits comments on this approach and to the extent that any comment advocates for a revision to the ELGs, the commenter should explain why EPA should prioritize these point source categories ahead of the ones that EPA is studying and revising.

5.1 Cross-Category Review of Discharge Monitoring Report Concentration Data

As part of its 2020 annual review of the ELGs, EPA evaluated concentration data reported by industrial facilities on their 2019 DMRs. This analysis, referred to as the cross-category concentration rankings analysis, compared facility wastewater discharge pollutant concentrations across PSCs to identify categories that have relatively high pollutant concentration discharges compared to other PSCs. This comparison provides a mechanism for prioritizing specific PSCs for further review and adds to the analysis begun as part of EPA's 2019 annual review (U.S. EPA, 2021a). The following subsections discuss the data sources and methodology of the cross-category review, describe some factors that EPA considered in its review, summarize the results, and present potential refinements that EPA is considering to improve the analysis. For additional details on the cross-category concentration analysis, see *EPA's Review of Industrial Wastewater Discharge Monitoring Report (DMR) Data for Preliminary Plan 15* (2020 DMR Data Report, U.S. EPA, 2021b).

5.1.1 Data Used in the Analysis

For this analysis, EPA evaluated available industrial wastewater discharge data reported on facilities' 2019 DMRs. Facilities that directly discharge wastewater to surface 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 used the following three sets of 2019 DMR data from ICIS-NPDES to rank PSCs by the concentrations of pollutants in their discharges relative to other PSCs:

- *2019 DMR Industrial Monthly Average Concentration Data*
- *2019 DMR Industrial Monthly Average Quantity Data*
- *2019 DMR Flow Data*

[19] Food & Water Watch, et al. "Petition to Revise the Clean Water Act Regulations for Concentrated Animal Feeding Operations." Submitted 8 March, 2017.

[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 C.F.R. 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.

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

5.1.2 Methodology and Considerations for the Analyses

EPA limited the cross-category concentration analysis to toxic and nonconventional pollutants to focus the analysis on pollutants that have historically been part of the rationale to revise ELGs.

Facilities may monitor and report concentration and quantity data for different statistical bases (i.e., averages, maximums, or minimums) and frequencies (e.g., annually, monthly, or daily) depending on their NPDES permit requirements. To maintain comparability between data reported by facilities and to account for variability of the data throughout the year, EPA used concentration and quantity data reported as monthly averages in this analysis.

To prepare the data for analysis, when reported concentration data were not available, EPA calculated discharge concentrations of pollutants from quantity and flow data and then combined into a static database these calculated monthly average concentration data with the reported monthly average concentrations for all facilities and all monitoring periods into a static database (ERG, 2021). If a facility reported both a concentration and a quantity for the same monitoring period, parameter, and outfall, EPA prioritized the reported concentration over the calculated concentration derived from the quantity value to avoid double counting data. EPA then averaged all the monthly average concentrations from 2019 (either reported or calculated when a reported value was not available) to calculate a single 2019 average monthly concentration for each pollutant reported for each facility that could be compared with other facilities for use in the cross-category concentration analysis.

EPA used established crosswalks maintained in the Loading Tool documentation to relate individual facility and reported pollutants to the most appropriate PSC, commonly based on the facility's primary reported Standard Industrial Classification (SIC) or North American Industry Classification System (NAICS) code.[21]

Once the data were processed, as described above, EPA followed the steps described below to compare wastewater discharge pollutant concentrations across pollutants for facilities in each PSC to identify categories that have relatively high pollutant concentration discharges.

Step 1: Calculate Median Pollutant Concentrations by PSC

From the concentration data set, EPA calculated the median of the average monthly concentrations (hereafter referred to as the median concentration) for each pollutant discharged by facilities in each PSC. If a pollutant was only reported by one facility within a PSC, EPA excluded that pollutant from this analysis because it was considered unrepresentative of category discharges.

Step 2: Identify PSCs with Highest Median Concentrations by Pollutant

For each pollutant, EPA sorted the median pollutant concentrations for the PSCs from highest to lowest, assigning each PSC a rank. EPA only ranked PSCs with median concentrations greater than 0 mg/L in order to focus its review on top-ranking discharges. EPA removed pollutants

[21] EPA did not review facilities that did not report a SIC or NAICS code, facilities that reported a SIC code of 4952 (publicly and privately owned treatment works), and facilities that reported a SIC code but are not industrial facilities.

reported by only one PSC because the analysis is intended to be a comparison of discharge concentrations across PSCs.

Step 3: Calculate PSC Scores

EPA used two approaches[22] to count the number of top-ranking pollutants within a PSC and developed a PSC score for each approach:

- *Top Five PSC Approach*. Counts the number of pollutants where the median concentration for the PSC was among the five highest median concentrations for the pollutant across all PSCs.
- *Top 25 Percent PSC Approach*. Counts the number of pollutants where the median concentration for the PSC was among the top 25 percent of highest median concentrations for the pollutant across all PSCs.

To normalize for the varying number of pollutants reported by each PSC, EPA divided the count of top-ranking pollutants (under each approach) by the total number of pollutants reported by more than one facility in the PSC. This provided a directly comparable "score" for each PSC representing the percent of pollutants in the PSC with median concentrations ranked higher across PSCs. Using the Sugar Processing category as an example, the median pollutant concentrations ranked among the top five across PSCs for seven of the 12 pollutants (58 percent) reported by the facilities in the PSC and among the top 25 percent for eight of the 12 pollutants (67 percent), see Table 5-1. These percentages become the PSC's scores for the *Top Five PSC Approach* and *Top 25 Percent PSC Approach*, respectively.

Step 4: Rank and Prioritize PSCs for Further Review

EPA ranked the categories by the PSC score using both the *Top Five PSC Approach* and the *Top 25 Percent PSC Approach* (identified in Step 3). EPA selected the top-five ranking PSCs from each approach for further consideration for preliminary category review, excluding any PSCs currently being reviewed (as identified in Plan 14, U.S. EPA, 2021a). See Section 5.1.3 for the specific PSCs selected for the 2020 annual review.

EPA identified several limitations of the cross-category concentration analysis, which include but are not limited to the following:

- Analysis is relative to what other categories are reporting and does not consider the extent of discharge. A PSC that discharges larger concentrations relative to other categories may or may not indicate the potential for reducing or eliminating pollutant discharges within that PSC.
- Analysis uses median concentration and does not directly account for the range of concentration data within a PSC.
- Analysis does not compare the median pollutant concentrations for a PSC to any national effluent limitations, if there is one, or to specific permit limits.
- Analysis does not consider the magnitude (i.e., pollutant loading) or toxicity of the pollutants being discharged.

[22] EPA analyzed the rankings using two different approaches to account for top-ranking PSCs that are identified using the *Top Five PSC Approach* simply because few PSCs report a pollutant. This can result in PSCs being flagged as having a median concentration ranking in the top five, even if there are less than five PSCs reporting a pollutant.

- Analysis may rank higher those PSCs whose facilities monitor and report pollutants unique to the PSC simply because few other PSCs report those pollutants.

Even with these limitations, the cross-category concentration analysis provides an appropriate screening-level review of industrial discharges, as it allows comparison of the concentrations of pollutant discharges between PSCs.

5.1.3 Results of the Cross-Category Concentration Analysis

Table 5-1 presents the results of this analysis, including the following information for each PSC:

- *Top Five Approach PSC Score*. Percent of pollutants reported by more than one facility where the PSC's median concentration ranked among the five highest median concentrations reported for the pollutant across all PSCs. Value is calculated from the number of pollutants that rank in the top five and the number of pollutants with data reported. The table is sorted from highest to lowest PSC score (and then alphabetically for PSCs with the same score).
- *Top Five Approach Number of Top-Ranking Pollutants*. Number of pollutants reported by more than one facility where the PSC's median concentration ranked among the five highest median concentrations reported for the pollutant across all PSCs.
- *Top 25 Percent Approach PSC Score*. Percent of pollutants reported by more than one facility where the PSC's median concentration ranked among the 25 percent highest median concentrations reported for the pollutant across all PSCs. Value is calculated from the number of pollutants that rank in the top 25 percent and the number of pollutants with data reported.
- *Top 25 Percent Approach Number of Top-Ranking Pollutants*. Number of pollutants reported by more than one facility where the PSC's median concentration ranked among the top 25 percent highest median concentrations reported for the pollutant across all PSCs.
- *Number of Pollutants with Data Reported*. Number of pollutants considered as part of the cross-category concentration analysis that were reported by more than one facility within a PSC. Pollutants excluded from this analysis (e.g., conventional pollutants or those reported by only one facility) are not captured in the counts for this analysis.
- *Number of Facilities Reporting Data*. Number of facilities corresponding to reported concentrations for pollutants considered part of the cross-category concentration analysis. Facilities reporting conventional pollutants, or other excluded pollutants, are not captured in the counts for this analysis.

EPA selected for further review the PSCs that were among the top five PSC scores from either of the two "top-five" approaches described above, after excluding any categories currently under review (U.S. EPA, 2021a). The following PSCs ranked in the top five in one or both of the two approaches (also highlighted in green and blue in Table 5-1):

- Metal Products and Machinery (40 CFR Part 438)
- Battery Manufacturing (40 CFR Part 461)
- Explosives Manufacturing (40 CFR Part 457)
- Canned and Preserved Seafood Processing (40 CFR Part 408)
- Paint Formulating (40 CFR Part 446)
- Sugar Processing (40 CFR Part 409)

- Soap and Detergent Manufacturing (40 CFR Part 417)

As a first step, for each of the seven categories listed above, EPA reviewed the underlying 2019 DMR concentration data for the top-ranking pollutants and the facilities reporting the top-ranking concentration data. Following this initial review, EPA decided to exclude the following two PSCs from further preliminary review:

- **Paint Formulating (40 CFR Part 446).** This PSC ranked high for total residual chlorine, chlorine product oxidants, and iron. The direct discharge requirements for existing and new plants state "there shall be no discharge of wastewater pollutants to navigable waters" (40 CFR Part 446). These pollutants were reported by five facilities and, through a review of the facility NPDES permits, EPA determined that these pollutants are associated with the discharges of noncontact cooling water and stormwater. The permit requirements are all based on state water quality criteria. Based on the available data, and the limited number of facilities reporting these discharges, revisions to the ELGs are unlikely to result in significant pollutant discharge reductions relative to the other point source categories discussed in this Plan.
- **Battery Manufacturing (40 CFR Part 461).** This PSC ranked high for lead, which were only reported by two out of 21 facilities. Based on EPA's review of the 2019 DMR concentration data, both facilities manufacture storage batteries and are captured under Subpart C of the Battery Manufacturing ELGs (Lead Subcategory). Permit requirements for both facilities are based on state water quality criteria and the ELGs. One facility is currently reporting concentrations that exceed permit limits. Based on the available data, and the number of facilities reporting these discharges, revisions to the ELGs 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 or best professional judgement on a case-by-case basis, as appropriate, to address any other potential issues with pollutants in discharges from this category.

Table 5-1. Cross-Category Concentration Analysis Results

PSC	PSC Name	Top Five Approach		Top 25 Percent Approach		Number of Pollutants with Data Reported	Number of Facilities Reporting Data
		PSC Score (Percent of Top- Ranking Pollutants)	Number of Top-Ranking Pollutants	PSC Score (Percent of Top-Ranking Pollutants)	Number of Top- Ranking Pollutants		
469	Electrical and Electronic Components[a]	100.0%	3	100.0%	3	3	5
461	Battery Manufacturing	100.0%	1	100.0%	1	1	2
438	Metal Products and Machinery	100.0%	11	0.0%	0	11	63
457	Explosives Manufacturing	80.0%	4	80.0%	4	5	6
408	Canned and Preserved Seafood Processing	66.7%	6	77.8%	7	9	27
417	Soap and Detergent Manufacturing	63.3%	19	20.0%	6	30	11
429	Timber Products Processing	60.5%	23	28.9%	11	38	54
409	Sugar Processing	58.3%	7	66.7%	8	12	15
455	Pesticide Chemicals	55.6%	5	55.6%	5	9	15
414	Organic Chemicals, Plastics and Synthetic Fibers[a]	51.6%	32	24.2%	15	62	296
446	Paint Formulating	50.0%	2	75.0%	3	4	6
443	Paving And Roofing Materials (Tars and Asphalt)	50.0%	8	50.0%	8	16	37
437	Centralized Waste Treatment[a]	50.0%	14	32.1%	9	28	7
420	Iron and Steel Manufacturing	44.7%	21	38.3%	18	47	100
432	Meat and Poultry Products[a]	43.3%	13	40.0%	12	30	185
415	Inorganic Chemicals Manufacturing	40.5%	17	38.1%	16	42	112
N/A	Food Service Establishments	40.0%	2	40.0%	2	5	107
467	Aluminum Forming	40.0%	4	40.0%	4	10	10
433	Metal Finishing	40.0%	18	26.7%	12	45	357
439	Pharmaceutical Manufacturing	37.5%	9	37.5%	9	24	32
430	Pulp, Paper and Paperboard	37.1%	13	40.0%	14	35	145
421	Nonferrous Metals Manufacturing	37.0%	10	40.7%	11	27	36
426	Glass Manufacturing	36.8%	7	42.1%	8	19	23
442	Transportation Equipment Cleaning	36.4%	8	18.2%	4	22	39

Table 5-1. Cross-Category Concentration Analysis Results

PSC	PSC Name	Top Five Approach		Top 25 Percent Approach		Number of Pollutants with Data Reported	Number of Facilities Reporting Data
		PSC Score (Percent of Top- Ranking Pollutants)	Number of Top-Ranking Pollutants	PSC Score (Percent of Top-Ranking Pollutants)	Number of Top- Ranking Pollutants		
423	Steam Electric Power Generating[a]	36.0%	18	10.0%	5	50	442
445	Landfills	34.1%	14	19.5%	8	41	143
N/A	Independent And Stand Alone Labs	33.3%	4	25.0%	3	12	14
435	Oil & Gas Extraction[a]	33.3%	9	29.6%	8	27	76
449	Airport Deicing	31.3%	5	37.5%	6	16	44
436	Mineral Mining and Processing	31.3%	10	18.8%	6	32	217
471	Nonferrous Metals Forming and Metal Powders	30.4%	7	56.5%	13	23	33
405	Dairy Products Processing	30.0%	6	30.0%	6	20	77
418	Fertilizer Manufacturing	27.8%	5	33.3%	6	18	35
N/A	Drinking Water Treatment	27.8%	10	22.2%	8	36	1425
N/A	Unassigned Waste Facility	27.5%	11	17.5%	7	40	115
460	Hospital	26.7%	4	33.3%	5	15	140
468	Copper Forming	25.0%	1	50.0%	2	4	5
424	Ferroalloy Manufacturing	23.8%	5	23.8%	5	21	9
440	Ore Mining and Dressing	23.3%	7	10.0%	3	30	72
419	Petroleum Refining	21.9%	7	15.6%	5	32	331
434	Coal Mining	20.5%	8	10.3%	4	39	1700
464	Metal Molding and Casting (Foundries)	20.0%	3	40.0%	6	15	29
450	Construction and Development	20.0%	4	25.0%	5	20	49
412	Concentrated Animal Feed Operations	20.0%	1	40.0%	2	5	16
407	Canned And Preserved Fruits and Vegetables Processing	18.8%	3	25.0%	4	16	56
444	Waste Combustors	13.3%	2	33.3%	5	15	11
463	Plastics Molding and Forming	12.5%	2	31.3%	5	16	31
451	Concentrated Aquatic Animal Production	12.5%	2	0.0%	0	16	193
428	Rubber Manufacturing	11.8%	2	11.8%	2	17	43

Table 5-1. Cross-Category Concentration Analysis Results

PSC	PSC Name	Top Five Approach		Top 25 Percent Approach		Number of Pollutants with Data Reported	Number of Facilities Reporting Data
		PSC Score (Percent of Top- Ranking Pollutants)	Number of Top-Ranking Pollutants	PSC Score (Percent of Top-Ranking Pollutants)	Number of Top- Ranking Pollutants		
N/A	Miscellaneous Foods and Beverages	10.7%	3	0.0%	0	28	82
406	Grain Mills	9.1%	1	63.6%	7	11	26
410	Textile Mills[a]	8.3%	1	50.0%	6	12	31
411	Cement Manufacturing	4.3%	1	4.3%	1	23	48
N/A	Printing & Publishing	0.0%	0	0.0%	0	1	2
422	Phosphate Manufacturing	0.0%	0	12.5%	1	8	14

Source: U.S. EPA, 2021b.
N/A: Not Applicable
[a] EPA is conducting other efforts on these categories and they were not further reviewed in this context.
Note: Top PSCs identified through the Top Five Approach are highlighted in blue, and top PSCs identified through the Top 25 Percent Approach are highlighted in green. PSCs not included in this review due to only one facility reporting a pollutant: Coil Coating, Gum and Wood Chemicals Manufacturing, Industrial Laundries, Leather Tanning and Finishing, Tobacco Products, Carbon Black Manufacturing, Ink Formulating, Asbestos Manufacturing

EPA's preliminary reviews of the remaining five PSCs are summarized in Sections 5.2 through 5.6. EPA's preliminary review of the Landfills Category, identified for review through stakeholder input, is summarized in Section 5.7.

To conduct the preliminary category reviews, EPA reviewed available rulemaking documentation, publicly available NPDES discharge permits and fact sheets, other publicly available facility discharge information in the Loading Tool (e.g., Toxics Release Inventory (TRI) data), contacted relevant EPA Regions and state permitting authorities, and compared available discharge concentrations to ELGs, long-term averages, and available effluent data from EPA's IWTT database (see Section 5.9.1), ELG database (see Section 5.9.2), or other benchmarks. EPA analyzed these concentration data to compare current performance to the potential for improvements based on upgraded treatment technologies. See EPA's *2020 Preliminary Review of Industrial Point Source Categories* (2020 Preliminary Category Review Report) for more details on EPA's preliminary category reviews (U.S. EPA, 2021c).

5.1.4 Potential Refinements to the Analysis

EPA considers the cross-category concentration analysis to be a dynamic screening level analysis that can be adapted in future annual reviews and ELG planning cycles to further refine EPA's prioritization of PSCs for review. EPA plans to make the following refinements in future reviews to expand the scope of the current analysis:

- *Update DMR data*. Industrial facilities submit new DMRs continuously, based on permit and reporting requirements. EPA may refresh the cross-category concentration analysis with updated DMR data to review the current state of discharges within and across PSCs. This will capture changes based on updated permitting requirements such as the incorporation of emerging pollutants that are added to permits to address water quality criteria and standards. Additionally, refreshing the analysis with updated DMR data would enable reviews more closely reflecting the current state of industrial practice, including recent changes in market conditions or manufacturing processes that may have led to fluctuations in discharges.
- *Evaluate pollutant loads.* The current cross-category concentration analysis uses concentration data submitted through DMRs. EPA may perform the cross-category analysis using pollutant loads (pounds of pollutants discharged per year) instead of, or in addition to, concentrations to capture the magnitude of the discharge and account for the impacts of facility and industry flow.
- *Include TRI data.* If conducting an analysis of pollutant loads, EPA may also consider incorporating TRI data to assess discharges of additional toxic pollutants not reported on DMRs, as well as indirect discharges. The TRI program only requires reporting of pollutant loads; it does not provide data on pollutant concentrations or facility flows.
- *Focus analysis on specific group(s) of pollutants*. EPA may perform the cross-category concentration analysis for a specific group of pollutants (e.g., metals, organics, toxics), depending on agency priorities or the availability of a viable technology to treat specific pollutants or pollutant groups.

5.2 Metal Products and Machinery (40 CFR Part 438)

EPA reviewed the Metal Products and Machinery (MP&M) Category because it ranked high in the 2020 cross-category concentration analysis for 11 pollutants, all of which were defined as toxic organics in the 2003 MP&M Technical Development Document (U.S. EPA, 2021c). The 11 top-ranking pollutants were:

- 1,4-Dioxane
- Acenaphthene
- Anthracene
- Chloroform
- Fluoranthene
- Fluorene
- Methylene chloride
- Naphthalene
- Phenanthrene
- Pyrene
- Trichloroethylene

EPA promulgated BPT, BCT, and NSPS limitations for the MP&M Category in 2003, specifically for the Oily Wastes Subcategory. The limitations included total suspended solids (TSS), oil and grease (O&G), and pH and were based on the following technologies: chemical emulsion followed by gravity separation using an oil/water separator, two-stage countercurrent cascade rinsing for all flowing rinses, centrifugation and recycling of painting water curtains, and centrifugation, pasteurization, and recycling of water-soluble machining coolants. There are no pretreatment standards for the MP&M Category.

EPA reviewed the 2019 DMR concentration data for both regulated pollutants and top-ranking pollutants. EPA compared the TSS and O&G 2019 DMR concentration data for the MP&M Category to available effluent data in IWTT for different treatment technologies. EPA found that current discharge concentrations of both TSS and O&G from MP&M facilities are within the range of the effluent concentrations in IWTT and the long-term averages (LTAs) documented during the MP&M rulemaking.

EPA compared the top-ranking pollutants to available effluent concentration data in IWTT and to other benchmarks, including EPA and state water quality criteria (both human health and aquatic). The rulemaking documents indicate that O&G was identified as a surrogate pollutant for the 11 top-ranking pollutants identified in EPA's rankings analysis and that they would be controlled through the regulation of O&G. Based on these data, the current toxic organic pollutant and O&G discharge concentrations are consistent with discharges from treatment technologies evaluated in IWTT. EPA is not considering revision of the ELGs for this category at this time because, based on the available data, such a revision is unlikely to yield significant pollutant discharge reductions.

5.3 Explosives Manufacturing (40 CFR Part 457)

EPA identified the Explosives Manufacturing (Explosives) Category for preliminary review because it ranked high in the 2020 cross-category concentration analysis for nitrogen, ammonia, and phosphorus (U.S. EPA, 2021c).

EPA promulgated BPT limitations for two subcategories, Subpart A (Manufacture of Explosives) and Subpart C (Explosives Load, Assemble, and Pack Plants) in 1976. Subpart A limitations include biological oxygen demand (BOD_5), chemical oxygen demand (COD), and TSS. The technology basis for these limitations includes equalization, neutralization, primary sedimentation (or pre-clarification), activated sludge (aeration basin, final clarification), and sludge handling system. For Subpart C, the limitations include TSS and O&G and are based on the Subpart A technology followed by extended aeration, which includes screening, biotreatment, and clarification with skimming and chlorination.

EPA compared the 2019 DMR concentration data for the regulated pollutants to available effluent data in IWTT for different treatment technologies and effluent data collected during the 1976 rulemaking. EPA found that current discharge concentrations of regulated pollutants from these facilities are within the range of the effluent concentrations in IWTT and the rulemaking data.

For the top-ranking pollutants, EPA evaluated each of the six facilities reporting the nutrient parameters. EPA found that the some of these facilities were making updates to their facility operations, treatment systems, and outfalls to comply with the revised limits and legal agreements with corresponding permitting authorities, some were out of compliance with permit limits, and the remainder were within

the ranges of concentrations evaluated from IWTT and the rulemaking data. For this reason, EPA did not select this category for further review.

5.4 Canned and Preserved Seafood (40 CFR Part 408)

EPA identified the Canned & Preserved Seafood Processing (Seafood Processing) Category for preliminary review because it ranked high in the 2020 cross-category concentration analysis for nutrients, zinc, and mercury (U.S. EPA, 2021c).

The Seafood Processing Category, promulgated in 1974 and 1975, is organized into 33 subcategories, generally characterized by the processing type and the species processed. EPA established production-based BAT limitations for BOD_5, TSS, O&G, and pH for 30 subcategories based on a technology option include screening systems, dissolved air flotation units, grease traps, and process modifications to reduce wastewater loads. The remaining three subcategories are considered to be remote Alaskan seafood processors, and are required to grind solids down to 0.5 inches or less in any direction.

In 1980, EPA received a petition requesting a suspension of the applicability requirements for onshore seafood processors in the Alaskan cities of Anchorage, Cordova, Juneau, Ketchikan, and Petersburg, which would made them subject to the same limitations as remote facilities (i.e., required to be grinding solids). Following proposed revisions in 1981 and a Notice of Data Availability in 2013, EPA decided not to finalize proposed amendments to the ELGs in 2017, leaving the remote classification in effect per the 1980 petition. EPA concluded that, because all affected facilities are in Alaska, the state of Alaska may set stricter controls on wastewater through NPDES permits wherever the state determined it necessary (U.S. EPA, 2017).

For the purpose of this review, and due to the number of subcategories in the ELGs, EPA divided its review of seafood processors based on location and species processed. Seafood processors with 2019 DMR data fall into five distinct geographic areas: the Pacific Northwest, the Gulf Coast, American Samoa, New England, and Southeast Atlantic. As part of this review, EPA reviewed the 2019 DMR concentration data for regulated pollutants and for top-ranking pollutants.

EPA compared the 2019 DMR concentration data for seafood processors for each regulated pollutant to available effluent data in IWTT for different treatment technologies. EPA found that BOD_5 and TSS concentrations are currently higher than effluent concentrations associated with biological, membrane, and chemical treatment technologies, as documented in IWTT, and are generally located in Alaska and the Gulf Coast. To learn more about these discharges, EPA contacted Alaska Department of Conservation (DEC) and Mississippi Department of Environmental Quality (MDEQ). Alaska DEC confirmed that BOD_5 limits, along with TSS and O&G, are included in permits for processors classified as remote due to water quality standards. Alaska DEC also confirmed that the processors are able to meet permit limits. The majority of facilities on the Gulf Coast, specifically Mississippi and Louisiana, are shrimp processors. According to MDEQ, BOD_5 limits were added to these permits to comply with NSPS limitations following damage from Hurricane Katrina and reclassification of the processors as new sources. MDEQ reports some noncompliance among shrimp processors after implementation of the NSPS limitations.

The top-ranking pollutants from EPA's cross-category concentration analysis include phosphorus, nitrogen, total kjeldahl nitrogen (TKN), and ammonia as N. When broken down by region, the top discharging facilities were in American Samoa and the Gulf Coast. EPA reviewed facility permits and fact sheets, then contacted EPA Region 9 and MDEQ to gather additional information about these discharges. EPA Region 9 is reviewing the two tuna canneries in American Samoa associated with the

top-ranking nutrient concentrations and is requiring the canneries to monitor for any potential pollutants that are being discharged in order to appropriately characterize the wastewater and apply permit limitations where needed. Per MDEQ, nutrient discharges are monitored due to TMDLs in the Mississippi delta and surrounding waters. MDEQ recently began requiring nutrient monitoring for all seafood processors, regardless of receiving water characteristics. In Louisiana, only four of the 55 seafood processors in the 2019 DMR report nutrients data. Given the similar seafood processing and receiving waters, nutrient discharges from Louisiana seafood processors may be similar to those in Mississippi.

Mercury and zinc are being discharged by the same two canneries in American Samoa that EPA reviewed for nutrient discharges. Based on conversations with Region 9, they are monitoring both the mercury and zinc discharges and will apply permit limitations if they are determined to be necessary to meet applicable water quality standards.

EPA is discontinuing review of this category at this time because the issues identified are being addressed at the regional and state levels, which is more appropriate than proposing revisions to the ELGs. EPA recommends that state and local permitting authorities consider applying water-quality based effluent limits or best professional judgement on a case-by-case basis, as appropriate, to address any other potential issues with pollutants in discharges from this category

5.5 Sugar Processing (40 CFR Part 409)

EPA reviewed the Sugar Processing Category because it ranked high in the 2020 cross-category concentration analysis for nutrients, bicarbonate, chlorine, copper, lead, mercury, and sodium (U.S. EPA, 2021c). The Sugar Processing ELGs were published in three parts: beet sugar processing (1974), cane sugar refining (1974), and raw cane sugar processing (1975):

- Subcategory A applies to beet sugar processors. The BPT and BCT regulations include limits for BOD_5, TSS, fecal coliform, temperature, and pH. BAT requirements include a limit for temperature and NSPS requirements are zero discharge. There are no limitations for PSES or PSNS. The limits are based on technology options including extensive recycle and reuse of wastewater during beet processing operations.
- Subcategories B and C apply to cane sugar processors. The BPT, BCT, and NSPS regulations include limits for BOD_5, TSS, and pH. There are no limitations for BAT, PSES, or PSNS. Technology at the time of the ELGs for the control and treatment of cane sugar wastewaters consisted primarily of process control (recycling of water, prevention of sucrose entrainment in barometric refinery and reuse condenser cooling water, recovery of sweet waters), impoundage (land retention), and disposal of process water to municipal sewer systems.
- Subcategories D through H apply to raw cane processors. The BPT and BCT regulations include limits for BOD_5, TSS, and pH or are set to zero discharge. There are no limitations for BAT, PSES, NSPS, or PSNS. EPA identified in-process practices, biological treatment, and surface impoundment as the technology bases for BPT and BCT.

EPA reviewed the 2019 DMR concentration data for both regulated pollutants and top-ranking pollutants. EPA compared the 2019 DMR TSS and BOD_5 concentration data for the Sugar Processing Category to effluent data for different treatment technologies available in IWTT. EPA found that current discharge concentrations of both TSS and BOD_5 from Sugar Processing facilities are within the range of the effluent concentrations in IWTT.

For the top-ranking pollutants, EPA found that the facility with the highest reported concentrations for multiple pollutants had reached a settlement agreement with the Colorado Department of Public Health and Environment (CDPHE). Per that agreement, the facility is currently expanding its wastewater treatment facility (expected to be completed by the end of 2021) to include biological treatment.

The remaining facilities reporting concentrations of the top-ranking pollutants are, for the most part, beet sugar processors. Ammonia concentrations are expected in the barometric condenser wastewater from these facilities due to the higher nitrogen content of beets relative to sugar cane. EPA compared the 2019 DMR discharge concentrations to the underlying concentration data collected during the time of the rulemaking and effluent concentration data in IWTT. Aside from the concentrations associated with the facility in Colorado, EPA's comparison suggested that 2019 DMR Sugar Processing ammonia concentrations are similar to those cited during the rulemaking and are comparable to effluent ammonia concentrations reported in IWTT.

Bicarbonate, sodium, mercury, lead, and copper concentrations may be associated with the manufacturing processes and equipment maintenance. These requirements are included in permits based on water quality criteria and these facilities are not exceeding the permit limitations. Chlorine discharges are associated with disinfection processes at these facilities.

EPA is not prioritizing sugar processing for further review or ELG revision at this time. Based on the available data, revisions to the ELGs 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 or best professional judgment on a case-by-case basis, as appropriate, to address any potential issues with bicarbonate, ammonia, mercury, or other pollutants in discharges from this category.

5.6 Soap and Detergent Manufacturing (40 CFR Part 417)

EPA reviewed the Soap and Detergent Manufacturing (Soap and Detergent) Category because it ranked high in the 2020 cross-category concentration analysis for 19 pollutants (U.S. EPA, 2021c). The top-ranking pollutants include:

- 1,1-Dichloroethylene
- 1,2-Dichloroethane
- Acenaphthylene
- Anthracene
- Benz[a]anthracene
- Benzo(b)fluoranthene
- Benzo[a]pyrene
- Benzo[k]fluoranthene
- Carbon tetrachloride
- Chromium
- Chrysene
- Fluoranthene
- Fluorene
- Foaming agents
- Methylene chloride
- Phenanthrene
- Pyrene
- Toluene
- Vinyl chloride

The Soap & Detergent ELGs, promulgated in 1974 and 1975, apply to facilities that manufacture soap, synthetic organic detergents, and inorganic alkaline detergents. Soap & Detergent subcategories are broadly divided into soap manufacturing (eight subcategories) and detergent manufacturing (11 subcategories). EPA defines soap manufacturing as the production of alkaline metal salts of fatty acids derived from natural fats and oils. EPA defines detergent manufacturing as the production of sulfated and sulfonated cleaning agents from manufactured raw materials, primarily petroleum derivatives. Shampoo, shaving products, and synthetic glycerin manufacturers, as well as specialty cleaners, polishing, and sanitation preparations, are not included in this category.

The BAT limitations for BOD_5, COD, TSS, and O&G are based on best management practices and process improvements that reduce total effluent discharge volume. Foaming agents, or methylene blue activated surfactants (MBAS), are anionic surfactants that EPA identified as a pollutant of concern during the 1975 rulemaking due to their potential contribution to foaming in streams and biological effects from surface effects or toxicity. Anionic surfactants are tested separately from other non-ionic surfactants, which are captured by proxy through BOD_5 and COD monitoring. Limitations for anionic surfactants are only applicable to the detergent manufacturing subcategories. EPA based these limitations on recycling process water, intermittent release of accumulated wash water, and secondary biological treatment for larger operations.

EPA compared the BOD_5, COD, TSS, and O&G 2019 DMR concentration data to available effluent data in IWTT for different treatment technologies. EPA found that current discharge concentrations of these pollutants are within the range of the effluent concentrations available in IWTT.

Based on further review of the top-ranking pollutants, EPA found that the two facilities reporting 16 of the top 19 pollutants are misclassified as Soap & Detergent facilities in EPA's rankings analyses and should be categorized under 40 CFR Part 414 (Organic Chemicals, Plastics, and Synthetic Fibers). Based on permit reviews, the facility operations both fall under the applicability of 40 CFR Part 414 and the permit bases for these discharges are cited as 40 CFR Part 414.

For the remaining top-ranking pollutants, foaming agents, toluene, and methylene chloride, EPA compared 2019 DMR concentration data to effluent concentrations in IWTT and water quality standards. EPA found that the 2019 DMR concentrations are within the range of the IWTT and benchmark data evaluated.

EPA did not prioritize soap and detergent manufacturing for further review or ELG revision. Based on the available data discussed above, revisions to the ELGs 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 or best professional judgement on a case-by-case basis, as appropriate, to address any potential issues with pollutants in discharges from this category.

5.7 Landfills (40 CFR Part 445)

EPA initiated a preliminary review of the Landfills Category based on comments received on Plan 14. Public comments identified landfill leachate as a source of per- and polyfluoroalkyl substances (PFAS) to surface water, groundwater, and POTWs. PFAS are a family of thousands of synthetic organic chemicals that resist natural breakdown, accumulate in the environment and in organisms, and are associated with negative human health impacts. EPA conducted the Landfills Category preliminary review in coordination with the PFAS industrial sources and discharges study (Section 6.4), which investigated PFAS discharges from five additional industrial categories (U.S. EPA, 2021d).

EPA promulgated BPT, BAT, BCT, and NSPS limitations for two subcategories, Subpart A (Hazardous Waste Landfills) and Subpart B (Non-Hazardous Waste Landfills) in a rulemaking in 2000. Subpart A covers Resource Conservation and Recovery Act (RCRA) Subtitle C Hazardous Waste Landfills which are used specifically for the disposal of hazardous waste. Subpart B covers RCRA Subtitle D Non-Hazardous Waste Landfills, which include municipal solid waste (MSW), industrial waste, construction and demolition (C&D) debris, and coal combustion residual (CCR) landfills. EPA identified equalization, chemical precipitation, biological treatment, and multimedia filtration and equalization, biological treatment, and multimedia filtration as the treatment basis for the Subpart A and Subpart B

limitations, respectively. EPA did not establish pretreatment standards for indirect discharges from landfills.

As part of the preliminary category review, EPA evaluated the 2019 DMR concentration data for conventional pollutants and the 14 top-ranking pollutants identified in the 2020 cross-category concentration analysis (Section 5.1). The top-ranking pollutants include:

- Acetone
- Ammonia, as NH3
- Carbon tetrachloride
- Chlorine, total residual
- Chromium, trivalent
- Magnesium
- Manganese
- Naphthalene
- Potassium
- Residue, total filterable
- Sodium
- Sulfide
- Thallium
- Total Kjeldahl Nitrogen

For the 2000 rulemaking, EPA investigated and conducted sampling for 11 of the 14 top-ranking pollutants. EPA did not evaluate Total Kjeldahl Nitrogen; residue, total filterable; or total residual chlorine in this effort. Acetone, carbon tetrachloride, and thallium were not detected in EPA's sampling effort and were not further investigated during the rulemaking. EPA established BPT, BAT, and NSPS limitations for ammonia discharges in Subparts A and B. EPA established BPT, BAT, and NSPS limitations for chromium and naphthalene in limitations in Subpart A only.

EPA compared the BOD_5 and TSS 2019 DMR concentration data to available effluent data in IWTT for different treatment technologies. EPA found that current discharge concentrations of these pollutants are within the range of the effluent concentrations available in IWTT.

As part of its study of PFAS industrial sources and discharges, EPA gathered analytical data published in peer-reviewed literature and state sampling efforts to define PFAS sources at landfills and quantify PFAS concentrations observed in landfill leachate. EPA identified several sources of PFAS in landfills, including PFAS-treated textiles, paper, and packaging materials, C&D waste, and industrial waste from PFAS-related manufacturing processes. PFAS are detected in landfill leachate regardless of waste type or landfill age and have been quantified in concentrations ranging from less than 1 nanogram per liter (ng/L) to over 8,000 ng/L (U.S. EPA, 2021c).

EPA began gathering data to develop a profile of the landfills industry using facility data from EPA's Enforcement and Compliance History Online (ECHO) database and industry breakdowns defined in the 2000 *Development Document for Final Effluent Limitations Guidelines and Standards for the Landfills Point Source Category* (U.S. EPA, 2000). Based on the 2000 rulemaking data, a majority of hazardous waste landfills subject to Subpart A of the ELGs are direct dischargers and a majority of non-hazardous waste landfills subject to Subpart B of the ELGs are indirect dischargers that collect and send wastewater to POTWs. Further research will continue gathering information to estimate the current scope of the industry and their generation and collection of landfill wastewater. See the "Preliminary Category Review Report" (U.S. EPA, 2021c) for further details.

In addition, EPA began investigating treatment technologies at landfills. For the 2000 rulemaking, the technology basis includes equalization, chemical precipitation, biological treatment, and multimedia filtration for Subpart A and equalization, biological treatment, and multimedia filtration for Subpart B. Survey data from the 2000 rulemaking indicate that indirect dischargers typically send wastewater directly to POTWs without pretreatment as it is not required. Indirect dischargers are not subject to pretreatment standards under Part 445 but may have pretreatment in place to meet state or local

requirements. Some landfills may achieve zero discharge through deep well injection, incineration, evaporation, land application, and recirculation (U.S. EPA, 2000). EPA is collecting data (e.g., literature articles, studies) on new pollutant control practices and wastewater treatment technologies being implemented at landfills to address PFAS contamination in leachate. Moreover, EPA is reviewing literature sources gathering data to characterize the impact of landfill leachate on PFAS influent and effluent concentrations in POTW.

The preliminary review results show that further research is needed to address limited data availability including the following:

- Current size and scope of the landfills industry that generates and collects landfill wastewater.
- Analytical data for PFAS discharges from landfills nationwide, particularly direct discharge data on PFAS concentrations other than perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS).
- Profile of indirect discharging landfills including the amount of wastewater they discharge and their impact on POTW influent and effluent PFAS concentrations.
- Current wastewater control practices and treatment technologies in place at landfills and whether there are landfills currently implementing PFAS treatment for leachate.

For this industry category, EPA will continue gathering information addressing areas with limited data by proceeding with a detailed study.

5.8 Industrial Wastewater Treatment Technologies Reviews

EPA continued its industrial wastewater treatment technology review, initially described in Preliminary Plan 14 (see Section 3.6 of Preliminary Plan 14, U.S. EPA, 2021a). EPA has the following goals for the technology reviews:

- Enhance EPA's ability to identify and prioritize industries for further study based on wastewater treatment technology availability, capabilities, and performance in order to understand the range of wastewater characteristics that are treatable and to what level with a given technology. For example, which point source categories might be able to use a technology successfully and which might not.
- Inform industry studies and rulemakings based on advances/changes in wastewater treatment technologies.
- Consolidate wastewater treatment technology background information for future reference and use.
- Collect preliminary information and data on treatment technology costs, where available.
- Investigate the potential for technology transfer from one point source category to others.

EPA's methodology for treatment technology reviews consists of a three-phase approach to identify and prioritize for further review technologies that can inform its ELG planning process. The three phases are: (1) technology screening; (2) preliminary technology review; and (3) technology study.

As identified in Plan 14, EPA selected suspended growth systems (activated sludge), membrane bioreactors (MBR), moving bed biofilm reactors (MBBR), and treatment based on membranes alone for preliminary technology reviews. EPA continued its preliminary review of these four technologies, collecting additional data from IWTT, targeted literature searches, and treatment technology

conferences, where applicable. EPA reviewed these data sources to update information on the treatment removal mechanisms, potential for industrial wastewater applicable, and pollutants targeted for removal.

EPA will gather additional information on the use of membranes for industrial wastewater treatment as a technology review. For example, EPA contacted several membrane treatment vendors to understand the potential application for membranes in wastewater treatment across industrial sectors. To support this effort, EPA solicits comment on the capabilities, performance, and costs of membrane treatment technologies for industrial wastewater.

EPA summarized its current key findings to date for the four treatment technologies mentioned in this section in the *Key Findings for EPA's Industrial Wastewater Treatment Technology Reviews* memorandum (ERG, 2021a) and the preliminary review for suspended growth systems (activated sludge) and membranes (ERG, 2021b and 2021c).

5.9 ELG Planning Tools

EPA continued to populate the IWTT Database and the ELG Database. These databases, described in more detail below, were used to supplement EPA's preliminary category reviews for the 2020 annual review by:

- Estimating the percent of pollutants with ELGs for a specific point source category included in the cross-category concentration analyses (see Section 5.1).
- 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 2020 Preliminary Category Review Report for a description of the specific analyses performed as part of the preliminary category reviews (U.S. EPA, 2021c).

5.9.1 Industrial Wastewater Treatment Technology Database

EPA continued to collect industrial wastewater treatment performance information to populate the IWTT Database and made the information available to the public through the IWTT web application.[23] 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. EPA also screened references identified through the Study of Per- and Polyfluoroalkyl Industrial Sources and Discharges (U.S. EPA, 2021d). The IWTT database currently contains performance data for 58 different treatment technologies, some of which may be components of a larger treatment system. The IWTT database contains wastewater treatment technology performance data from 34 industrial PSCs and removal performance data for 205 individual pollutant parameters.

5.9.2 Effluent Limitations Guidelines and Standards Database

As discussed in Plan 14, EPA has compiled information on its ELGs for the 59 different PSCs[24] into a consolidated ELG Database. 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

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

[24] See EPA's Industrial Effluent Guidelines webpage (https://www.epa.gov/eg/industrial-effluent-guidelines) for a list of the 59 point source categories.

database captures information from the Code of Federal Regulations (CFR),[25] 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 and PSNS).
- Applicability of the ELGs, including definitions of any regulated subcategories.
- Waste streams 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.

5.10 Environmental Justice

EPA is considering how best to incorporate equity and environmental justice considerations into the ELG planning process. Specifically, EPA is evaluating the use of 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. EJSCREEN includes 11 EJ indexes[26] which geographically relate (by Census block group) demographic data, including percent low-income, percent people of color, less than high school education, linguistic isolation, and different age groups, and environmental indicator data for air, lead paint, noise, and waste/wastewater. The index is calculated for each Census block group based on how much the local demographics are above the national average.

In this preliminary stage, EPA plans to evaluate the wastewater discharge indicator index, which provides an indication of stream proximity and toxic concentrations that may be associated with industrial wastewater discharges and related demographics data[27]; however, EPA may consider additional air and waste indicators (e.g., particulate matter). EPA may use the EJ wastewater indexes to supplement its screening-level analysis across or within specific point source categories. As this effort is preliminary and still under development, EPA solicits comments from the public on the specific analyses and data sources it might use in its screening-level reviews to account for environmental justice.

[25] See https://www.ecfr.gov/cgi-bin/text-idx?SID=1e3d7a295bbc0feaae8ea6b4b85da954&mc=true&tpl=/ecfrbrowse/Title40/40tab_02.tpl.
[26] See https://www.epa.gov/ejscreen/environmental-justice-indexes-ejscreen.
[27] The Wastewater discharge indicator is calculated from EPA's Risk-Screening Environmental Indicators (RSEI) model, https://www.epa.gov/ejscreen/overview-environmental-indicators-ejscreen.

6. ONGOING ELG STUDIES

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

6.1 Detailed Study of Electrical and Electronic Components Category (40 CFR Part 469)

As the result of the 2015 Annual Review (U.S. EPA, 2016), EPA decided to conduct a detailed study of the Electrical & Electronic Components Category (40 CFR Part 469). The E&EC ELG was issued in 1983 and has not been revised. The intent of the study is to determine whether, in light of changes implemented and innovations achieved by this industry, revisions to the existing ELGs are warranted.

As part of the detailed study of the E&EC industry, EPA has identified a population of facilities that are subject to the current regulation. EPA obtained discharge permits and monitoring data from over 100 such facilities, which, taken together, provide information on treatment technologies being used and the concentrations of contaminants in the facilities' wastestreams. EPA has used these data to develop a profile of the regulated community. EPA has conducted five site visits, all of which yielded valuable information regarding manufacturing techniques, chemicals used, and changes to the industry since the 1983 rule was issued. EPA has held discussions with regulatory authorities in at least 11 states to discuss regulatory concerns related to this ELG.

EPA is in the process of finalizing a study report to document this review. EPA will evaluate next steps after the report is complete and will provide an update on this study in the upcoming Effluent Guidelines Program Plan 15.

6.2 Study of Meat and Poultry Products Point Source Category (40 CFR Part 432)

As described in ELG Program Plan 14, EPA initiated a detailed study of wastewater discharges from the Meat and Poultry Products Category (40 CFR Part 432). This was a result of the cross-industry review of nutrients in industrial wastewater and of the Meat and Poultry Products (MPP) Preliminary Category Review. The MPP industry includes facilities that slaughter and/or further process meat and poultry and/or perform rendering operations. A goal of this study was to gain a more complete understanding of the total number of facilities, the locations of the facilities across the United States, the sizes of the facilities, the characteristics of their processes and their wastewater, and current wastewater treatment technologies used to evaluate whether the ELG should be revised.

To date, EPA has collected publicly available information from various sources to construct a picture of the industry's facilities, discharge practices, control technologies currently in place, and the effectiveness of nutrient removal. This information was also used to identify candidates for site visits, to identify other treatment technologies that may be available to the industry to treat their wastewater beyond the current ELG requirements, to identify documented environmental or human health impacts associated with MPP facilities, and to determine the proximity of MPP wastewater discharges to impaired waters, and communities with environmental and demographic characteristics of concern.

EPA evaluated industry directories from the U.S. Department of Agriculture (USDA) Food Safety Inspection Service (FSIS), the U.S. Food and Drug Administration (FDA), and the National Renderers Association to obtain a list of facilities potentially included in the MPP industry. To further develop this list, EPA has also evaluated information from POTW Annual Reports, EPA's ICIS-NPDES database, and EPA's TRI database.

EPA recognizes that it is important to engage with the water sector and agricultural and meat processing stakeholders early in the process. Therefore, EPA conducted outreach and engagement with EPA

Offices, Regions and States, clean water organizations, and other Federal Agencies, such as the USDA and the FDA.

EPA reached out to the clean water organizations that represent the POTWs, the National Rural Water Association (NRWA) and National Association of Clean Water Agencies (NACWA) to get a better understanding of POTW impacts by MPP facilities. EPA also engaged with Industry Stakeholders such as US Poultry and Egg Association, National Cattlemen's Beef Association, North American Meat Institute and National Pork Producers Council to understand their perspectives and gain insights into the industry. EPA also met with community and environmental groups to understand their perspectives and those of the communities living near MPP facilities and using the waters downstream from MPP discharges.

The following summarizes the findings to date:

- The MPP industry discharges the highest phosphorus levels and second highest nitrogen levels of all industrial categories, these pollutants are at concentrations that can be reduced with current wastewater treatment technology, the discharges are from numerous facilities across the industry, and some facilities are already removing nutrients, achieving effluent concentrations well below the limitations in the existing MPP ELGs.
- The existing ELGs apply only to about 300 of the estimated 7,000 MPP facilities nationwide. The ELGs only apply to facilities that directly discharge wastewater to surface waters; they do not include pretreatment standards for facilities that indirectly discharge via publicly owned treatment works (POTWs).
- In addition to concern about the discharge of effluents directly into the Nation's waters, EPA is also concerned about pollutants in wastewater discharged through sewers flowing to POTWs. Data indicate that MPP facilities are causing problems for POTWs that receive MPP wastewater via indirect discharges. For example, a review of 200 indirect MPP facilities shows that 73% of the POTWs receiving MPP wastewater have violation(s) of permit limits for pollutants found in MPP wastewater. Pollutants include nitrogen, phosphorus, TSS, BOD, oil and grease, chloride, total residual chlorine, coliform bacteria (e.g., *E. coli)*, and metals. Of the more than one hundred corresponding POTW discharge permits reviewed, only 45% have nitrogen limits and only 15% have phosphorus limits, which indicates that many POTWs may not be removing much of the nutrient load discharged to POTWs from MPP industrial users.
- National ELGs and pretreatment standards can help ensure make sure people in all areas in the vicinity of industrial direct and indirect discharges receive the same degree of protection from environmental and health hazards, and equal access to the decision-making process to have a healthy environment in which to live, learn, and work. To address Environmental Justice considerations, EPA conducted screening analyses of areas with MPP facilities and found 74% of MPP facilities that directly discharge wastewater to surface waters are within one mile of census block groups with demographic or environmental characteristics of concern.[28] This indicates that such facilities may be disproportionately impacting communities of concern.

[28] Characteristics of concern in this analysis are defined as demographic or environmental indexes above the 80th percentile in a state based on data available in the 2020 release of EJSCREEN. Census block groups with one or more indexes above this threshold were considered communities of concern.

- Data also show that 120 of approximately 300 direct discharge facilities discharge to waters listed as impaired under section 303(d) of the CWA, and over 40 percent of TN and TP load is discharged to waters impaired for algal growth, ammonia, nutrients and/or oxygen depletion.
- In addition to nutrients, the DMR data indicate that MPP facilities discharge 63 unique pollutants and 17 metals.

The data reviewed to date indicates that a revision of the ELG may be appropriate. As such, EPA is concluding its study and is initiating a rulemaking to revise the Meat and Poultry Products Category ELGs, as appropriate. EPA solicits public input on this announcement.

6.3 Study of Oil and Gas Extraction Wastewater Management

In Final ELG Program Plan 14, EPA announced that it was initiating rulemaking to revise definitions in the Centralized Waste Treatment (CWT) ELGs (40 CFR Part 437) to increase flexibility for CWT facilities that treat and discharge produced water from oil and gas extraction. EPA indicated plans to propose revising 40 CFR Part 437 to expand the beneficial use of treated produced waters by allowing, under certain circumstances, the discharge of produced waters from CWT facilities and from POTWs. EPA indicated that these revisions would allow more flexibility in the discharge and management of treated produced waters for use in agricultural, reuse for oil recovery, and other uses to alleviate water scarcity.

After further consideration, EPA intends to take no further action on oil and gas extraction wastewater management and will not move forward with revisions to the CWT ELGs at this time. The agency has determined that the current regulations provide sufficient flexibility for managing produced waters at the national level at this time. EPA is aware that several states are conducting technical evaluations of the management, treatment, and regulation of produced water discharges in their states. EPA will continue to monitor and evaluate state-level activities and may re-visit regulatory changes to address produced water discharges if industry practices change.

6.4 Study of Per- and Polyfluoroalkyl Industrial Sources and Discharges

Along with Preliminary Plan 15, EPA is publishing the *Multi-Industry Per- and Polyfluoroalkyl Substances (PFAS) Study - 2021 Preliminary Report* (U.S. EPA, 2021d). The report presents the results to date of EPA's study of industrial PFAS manufacturing, use, treatment, and discharge to surface water and POTWs. The report focuses on five PSCs: organic chemicals, plastics and synthetic fibers (OCPSF); metal finishing; pulp, paper, and paperboard; textile mills; and commercial airports. As part of the detailed study, EPA collected facility-specific information such as the types of PFAS compounds discharged, discharge concentrations, treatment methods, and facility flow rates. This information was primarily collected through outreach to stakeholders, including company representatives and trade associations, state, regional, and local wastewater regulatory authorities, treatment technology vendors, and non-governmental organizations.

While there has been significant study in recent years of the presence of PFAS in the environment, and the presence of PFAS in drinking water, there has been relatively little study of the discharges of PFAS to surface water and POTWs. As a result, there is limited information about PFAS discharges, including the types of PFAS compounds discharged, concentrations of PFAS discharged, and the significant sources of PFAS discharges. EPA solicits comment on the information and data regarding these five point source categories that EPA has collected to date. EPA has evaluated the following information to inform decisions about how best to address industrial PFAS discharges:

6.4.1 PFAS Manufacturers and Formulators

Based on information and data collected, EPA determined that PFAS have been and continue to be manufactured and used by PFAS manufacturer facilities, a subset of facilities regulated under the OCPSF ELG (40 CFR Part 414), in the U.S. The types and quantities of PFAS manufactured and used varies by facility and have changed over time. Through outreach to industry and data collection, EPA identified six OCPSF facilities that currently manufacture PFAS in the U.S. through electrochemical fluorination, fluorotelomerization, or other processes. The PFAS feedstocks may be further processed on site or transferred to other facilities where they are blended, converted, or integrated with other materials to produce new commercial or intermediate products, such as plastic, rubber, resins, coatings, and cleaning products. EPA identified eight additional OCPSF facilities that use PFAS feedstocks to formulate other products. EPA has not developed a comprehensive list of all PFAS manufacturers and formulators in the U.S. and considers it probable that there are many more OCPSF facilities using PFAS that EPA has not yet identified.

EPA determined that the manufacture or formulation of PFAS may generate wastewaters containing PFAS. EPA verified that PFAS, including legacy long-chain PFAS and short-chain replacement PFAS, are present in wastewater discharges from OCPSF facilities to surface waters and POTWs. EPA estimated the types and quantity of PFAS present in wastewater discharges from these facilities using available sampling data. For both PFAS manufacturers and formulators, average concentrations of short-chain perfluoroalkyl carboxylic acids (PFCAs) and perfluoroalkane sulfonic acids (PFSAs) were generally higher relative to long-chain PFCAs and PFSAs. EPA identified two OCPSF facilities that have reduced effluent concentrations of PFAS using granulated activated carbon (GAC) treatment.

On March 17, 2021, after publishing the January 2021 Final Plan 14, EPA published an advance notice of proposed rulemaking (ANPRM): "Clean Water Act Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category," which provided for public review of and comment on the information and data regarding PFAS manufacturers and formulators that EPA has collected to date. EPA requested public comment on the collected information and data and solicited additional information and data regarding manufacturers and formulators of PFAS and the presence and treatment of PFAS in discharges from these facilities. Comments on the ANPRM were due to EPA on or before May 17, 2021. These comments, along with data and information received in response to the ANPRM, will inform the development of wastewater discharge requirements for these facilities.

Based on the information collected through the Preliminary Multi-Industry PFAS Study, EPA has determined that the development of effluent guidelines and standards for PFAS manufacturers is warranted. EPA therefore plans to revise the existing OCPSF ELGs (40 CFR Part 414) to address PFAS discharges from facilities manufacturing PFAS. Additionally, EPA will continue to evaluate the need to develop regulations to address PFAS discharges from PFAS formulators. EPA solicits public input on this announcement.

6.4.2 Metal Finishing

Based on information and data EPA has collected since it began studying PFAS in industrial wastewater, EPA determined that PFAS have, and continue to be, used by metal finishing facilities in the United States. EPA identified chromium electroplating and chromium anodizing operations (collectively referred to as "chromium electroplating facilities") as the most significant source of PFAS in the metal finishing point source category due to their use of PFAS-based mist/fume suppressants to control toxic hexavalent chromium emissions. EPA determined that the use of PFAS-based mist/fume suppressants

may generate PFAS-containing wastewaters. EPA verified that PFAS, including legacy long-chain PFAS and short-chain replacement PFAS, are present in wastewater discharges from chromium electroplating facilities to surface waters and POTWs. EPA did not identify any chromium electroplating facilities with PFAS effluent limitations or pretreatment standards in their wastewater discharge permits. Most chromium electroplating facilities are not monitoring for PFAS and may continue to discharge PFAS to POTWs or surface waters. EPA identified several Michigan chromium electroplating facilities that have reduced effluent concentrations of PFAS using GAC treatment.

Based on the information collected through the Preliminary Multi-Industry PFAS Study, EPA has determined that the development of effluent guidelines and standards for chromium electroplating facilities is warranted. EPA therefore plans to revise the existing Metal Finishing ELGs (40 CFR Part 433) to address PFAS discharges from chromium electroplating facilities. EPA solicits public input on this announcement.

6.4.3 Pulp, Paper, and Paperboard

Based on information and data EPA collected for the Preliminary Multi-Industry PFAS Study, EPA determined that PFAS have been and continue to be used by U.S. pulp, paper, and paperboard facilities. However, only a small subset of facilities are actively applying PFAS to paper products. Information EPA has collected indicates that the industry phased out the use of PFOA and PFOS approximately a decade ago but continues to use FDA-approved short-chain PFAS in limited quantities for the manufacture of food contact packaging and specialty paper products. The industry is expected to transition to PFAS-free technologies and eliminate all application of PFAS in their U.S. pulp and papermaking operations by 2024. This schedule coincides with an FDA agreement with chemical manufacturers to voluntarily phase out use of PFAS that contain or may degrade to 6:2 fluorotelomer alcohol (6:2 FTOH) in food contact applications by 2024.

EPA did not identify any pulp, paper, and paperboard facilities with PFAS effluent limitations or pretreatment standards in their wastewater discharge permit and determined that only a small fraction of facilities monitor for PFAS. Although industry reports the application of PFAS to pulp, paper, and paperboard products is typically a dry or closed-loop process and may not generate a wastewater stream, EPA determined that PFAS, including legacy long-chain PFAS and short-chain replacement PFAS, are present in wastewater discharges from pulp, paper, and paperboard facilities to surface waters and POTWs. The presence of PFOA, PFOS, and other long-chain perfluoroalkyl acids (PFAAs) may be due to legacy issues or degradation of other more complex PFAS.

EPA will continue to study this point-source category with particular attention to understanding the potential for legacy discharges from these facilities after the industry's transition to PFAS-free additives. EPA solicits public input on additional data and information regarding PFAS use and discharge from the pulp and paper manufacturing industry that should be reviewed as part of this study. EPA intends to provide updates on these activities in subsequent ELG program plans.

6.4.4 Textile and Carpet Manufacturers

Based on information and data EPA collected for the Preliminary Multi-Industry PFAS Study, EPA determined that PFAS have been and continue to be used by textile and carpet manufacturers, a subset a subset of facilities regulated under the Textile Mills ELGs (40 CFR Part 410), in the U.S. EPA's review of PFAS use and discharge by the textile mills point source category is largely based on publicly available information and literature. EPA attempted to meet with industry trade associations and companies to collect, on a voluntary basis, information on the use and discharge of PFAS for textile and

carpet mills. The industry trade associations and companies that EPA contacted, however, declined to meet with EPA or provide information. Based on a small number of sample results, EPA determined that PFAS, including legacy long-chain PFAS, are present in wastewater discharges from textile mills to POTWs. Most textile mills are not monitoring for PFAS and may be discharging PFAS to POTWs or surface waters.

EPA plans to continue to study textile and carpet manufacturers in a separate detailed study. EPA will continue to collect and review information and data on the use, treatment, and discharge of PFAS from these industries. EPA intends to provide updates on these activities in subsequent ELG program plans.

6.4.5 Commercial Airports

The Federal Aviation Administration (FAA) Reauthorization Act of 2018 (enacted October 5, 2018) mandates that the FAA can no longer require the use of PFAS-based aqueous film-forming foam (AFFF) by Part 139 airports no later than three years from the date of enactment (October 4, 2021). As a result, the FAA has approved, encourages use of, and in some cases funds four different types of AFFF testing equipment that do not require dispensing AFFF when airports conduct periodic equipment testing and training (FAA, 2021). The FAA has also built a research testing facility and has conducted over 400 tests in an effort to find a new fluorine-free alternative firefighting extinguishing agent. (FAA, 2019)

Historically, the FAA required that commercial airports certified under 14 CFR Part 139 purchase only firefighting foams that conform to military specification (Mil-Spec) MIL-PRF-24385 for performance and procurement (FAA, 2006). In May 2019, the DOD amended Mil-Spec MIL-PRF-24385 to remove the requirement that AFFF must contain PFAS. As of July 2021, all firefighting foam formulations that meet MIL-PRF-24385 contain less than 800ppb of PFAS. The FAA and the DOD are continuing to collaborate on research and to test fluorine-free alternatives that provide the same level of safety currently offered by Mil-Spec MIL-PRF-24385.

Based on this information, EPA determined that commercial airports may generate PFAS-containing wastewater from live-fire firefighting training, emergency response activities, and accidental leaks from stockpiles of AFFF. The volume of PFAS released to the environment can vary depending on the activity, types of controls employed by the airport, and type and volume of AFFF released.

EPA is not prioritizing a rulemaking on this category at this time, however EPA will continue to study commercial airport use of AFFF that contains PFAS. EPA solicits public input on additional data and information regarding AFFF use and discharge that should be reviewed as part of this study. EPA intends to provide updates on these activities in subsequent ELG program plans.

7. ONGOING ELG RULEMAKING

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's for the Steam Electric Power Generating PSC 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, respectively. The legal challenges to the 2015 ELGs for flue gas desulfurization (FGD) wastewater and bottom ash (BA) transport water have been held in abeyance since EPA commenced the 2020 rulemaking. EPA completed its reconsideration rulemaking for FGD wastewater and BA transport water in August 2020, establishing 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 ELGs 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.

On July 26, 2021, EPA announced that it is initiating a rulemaking process 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 Steam Electric Reconsideration 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 Clean Water Act) as part of the new rulemaking. While the agency pursues this new rulemaking process for coal power plants, the current regulations will be 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 will secure progress made by the 2015 and 2020 rules while the agency undertakes a new rulemaking to consider more stringent requirements.

EPA intends to publish a proposed rule in the fall of 2022.

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