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Effluent Guidelines Program Plan 14

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1. EXECUTIVE SUMMARY

Effluent Guidelines Program Plan 14 (Plan 14) fulfills the requirement in Clean Water Act (CWA) Section 304(m) to biennially publish a plan for new and revised effluent limitations guidelines, after public review and comment. EPA published Preliminary Effluent Guidelines Program Plan 14 (Preliminary Plan 14) on October 24, 2019.

Plan 14 provides updates on EPA's reviews of industrial wastewater discharges and treatment technologies discussed in Preliminary Plan 14 including analyses of industrial sources and discharges of nutrients, proposed treatment technology reviews, and the effluent limitations guidelines database, and presents preliminary results from some new analyses.

Plan 14 also provides updates on ongoing point source category (PSC) studies, including EPA's decision to conclude the Petroleum Refining Category study and planned next steps for the detailed study on the Electrical and Electronic Components (E&EC) Category. Plan 14 provides an update on the Per- and Polyfluoroalkyl Substances (PFAS) Multi-Industry study, the scope of which includes Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) manufacturers and formulators, airports, rug and textile manufacturers, pulp and paper manufacturers, and the metal finishing PSC (added to the scope of the study after the Preliminary Plan 14 was published). Plan 14 describes the types of information regarding PFAS that have been received to date, that EPA primarily received this information through outreach to stakeholders, and that EPA continues to evaluate this information to inform decisions about how best to address industrial PFAS discharges.

Finally, Plan 14 discusses several actions that are included in EPA's Fall Regulatory Agenda, including revisions to 40 CFR Part 437 to increase flexibility for centralized waste treaters who treat produced water from oil and gas extraction; initiating an effort to evaluate BAT limitations for two waste streams (landfill leachate and legacy wastewater) at steam electric power plants, that were addressed in the 2015 Steam Electric Rule, but vacated in an April 2019 decision in U.S. Court of Appeals for the Fifth Circuit; and an advance notice of proposed rulemaking for the OCPSF PSC to solicit additional information and data about PFAS manufacturers and formulators.

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 state 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. 33 U.S.C. 1311(b) and 1314(b). 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. 33 U.S.C. 1311(b)(1)(C). Water quality-based limits may require industrial facilities to meet requirements 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[1] for more information. These ELGs apply to between 35,000 and 45,000 U.S. direct dischargers, as well as 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.[2]

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 technology to achieve the limits. For more information, see EPA's Learn about Effluent Guidelines webpage.[3]

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

[2] Estimated from the difference between discharges in each point source category before ELG promulgation and expected decrease in discharge post promulgation, based on a review of ELG development documents.

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

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 (44 FR 44501). 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 (Appendix A to Part 423, reprinted after 40 CFR Part 423.17). 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).
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).

Table 2-1. Statutorily Prescribed Levels of Control

Level of Control	CWA Statutory Reference	Description
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.[4] POTWs, states, and EPA enforce pretreatment standards for point sources that discharge to POTWs.[5]

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. To provide transparency to the public, EPA has initiated the development of a document that will present the framework and the process that EPA uses to evaluate PSCs, gather information, and otherwise consider whether to promulgate or revise an ELG.

For existing direct dischargers, 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.[6] The CWA also requires EPA to publish regulations providing "guidelines for effluent limitations, and, at least annually thereafter, revise, if appropriate, such regulations."[7] 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).[8]

For indirect dischargers, those who discharge to POTWs, the CWA requires EPA "from time to time" to publish proposed regulations establishing pretreatment standards.[9] The CWA also requires EPA to "review at least annually . . . and, if appropriate, revise guidelines for pretreatment."[10]

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

[4] See CWA sections 301(a), 301(b), and 402; 33 U.S.C. 1311(a), 1311(b), and 1342.
[5] See CWA sections 307(b) and 307(c); 33 U.S.C. 1317(b) and 1317(c).
[6] See CWA section 301(d); 33 U.S.C. 1311(d).
[7] 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.").
[8] *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)).
[9] See CWA section 307(b); 33 U.S.C. 1317(b).
[10] See CWA section 304(g); 33 U.S.C. 1314(g).

such category . . ."[11] 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."[12]

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.[13] 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,[14] it does not require EPA to make a "yes" or "no" determination every year on whether to revise the guidelines. The CWA simply requires EPA to "review" the guidelines every year. "Review" means "to view or see again," "to examine or study again," "to look back on," or "to go over or examine critically or deliberately."[15] Unlike other sections of the CWA where Congress required EPA to "approve or disapprove"[16] or "determine"[17] something, Congress simply required EPA to "review" the guidelines and revise them if appropriate. If Congress intended to mandate EPA to make a "yes" or "no" determination on whether to revise the guidelines each year, Congress would have expressed that clearly in the statute.

Congress's 1987 amendments to the CWA support this understanding of EPA's annual obligation to "review" ELGs. When Congress amended the CWA in 1987 to add the biennial planning requirements, Congress used the word "review" rather than "approve or disapprove" or "determine" when describing EPA's annual obligation to evaluate ELGs.[18] Congress had an opportunity in these amendments to impose additional decision-making requirements on EPA's periodic evaluation of ELGs, for example by requiring EPA to annually "determine" whether to revise the guidelines, but chose not to.

Where Congress intended to impose a specific obligation on EPA, it knew how to specify that in the statute. For example, in 304(m), Congress was clear that EPA had to promulgate ELGs by a date certain for newly identified PSCs discharging toxic and nonconventional pollutants that had no ELGs.[19] Unlike the clarity it provided regarding newly identified PSCs, for existing sources, Congress required only

[11] See CWA section 306(b)(1); 33 U.S.C. 1316(b)(1).

[12] See CWA section 306(b)(1)(B); 33 U.S.C. 1316(b)(1)(B).

[13] See CWA section 304(m); 33 U.S.C. 1314(m).

[14] See CWA sections 304(b), 304(m)(1)(A), and 304(g); 33 U.S.C. 1314(b), 1314(m)(1)(A), 1314(g).

[15] See "Review," Merriam-Webster.com Dictionary, *available at* https://www.merriam-webster.com/dictionary/review (last visited Oct. 2, 2020).

[16] See CWA section 304(l)(2); 33 U.S.C. 1314(l)(2).

[17] See e.g., CWA section 301(g)(4)(B); 33 U.S.C. 1311(g)(4)(B).

[18] See CWA section 304(m)(1)(A); 33 U.S.C. 1314(m)(1)(A).

[19] *NRDC v. EPA*, 542 F.3d 1235 (9th Cir. 2008).

publication of a plan which establishes a schedule for the annual review and revision, if appropriate, of existing ELGs in accordance with section 304(b) and a process for public comment on the plan.

The review and revise provisions in the CWA are distinct from the review and revise provisions in the Clean Air Act (CAA). While courts have found that a provision in the CAA requiring EPA to periodically review and revise National Ambient Air Quality Standards (NAAQS) requires EPA to make a "yes" or "no" determination as part of the periodic review and revision, that CAA provision is distinguishable from the review and revise provisions in the CWA.[20] The CAA requires EPA to:

> Not later than December 31, 1980, and at five-year intervals thereafter, the Administrator shall complete a thorough review of the criteria published under section 7408 of this title and the national ambient air quality standards promulgated under this section and shall make such revisions in such criteria and standards and promulgate such new standards as may be appropriate in accordance with section 7408 of this title and subsection (b) of this section. The Administrator may review and revise criteria or promulgate new standards earlier or more frequently than required under this paragraph.[21]

Notably, this CAA provision requires EPA to "complete" a "thorough" review within the statutorily prescribed period. Conversely, the CWA only requires EPA to "review" the relevant limitations and guidelines within the statutorily prescribed period. The CAA's language requires a process with more finality and thoroughness than the process the CWA requires.

Similarly, this CAA provision requires EPA to revise the criteria and standards "as may be appropriate" while the CWA requires EPA to revise effluent limitations and guidelines and pretreatment guidelines "if appropriate." The CAA's use of "as … appropriate" implies that EPA will have determined whether a revision is appropriate by the end the prescribed review period while the CWA's use of "if appropriate" recognizes that EPA may not have determined whether a revision is appropriate by the end of the prescribed review period.

The CAA's review and revise language is distinguishable from the review and revise language in CWA section 304(b) in particular because the CAA does not have a subsequently enacted section like CWA section 304(m) that provides further direction to EPA on its periodic review obligations under CWA section 304(b). As noted above, CWA section 304(m) requires EPA to publish a plan for the annual review and revision, if appropriate, of promulgated ELGs and makes no mention of any requirement to approve or disapprove or to make any final determination regarding each of the fifty-nine promulgated ELGs each year. This statutory language does not meet the Supreme Court's admonition that a mandatory duty must be a "specific, unequivocal command." *See Norton v. S. Utah Wilderness Alliance*, 542 U.S. 55, 63 (2004).

The CAA's review and revise provisions are further distinguishable from the CWA's review and revise provisions due to the timeframes the statutes provide. While the CAA gives EPA five or eight years to "review and revise" pollutant standards,[22] the CWA gives EPA only one year to review the guidelines.

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[20] See e.g., *Environmental Defense Fund v. Thomas*, 870 F.2d 892, 899-900 (2nd Cir. 1989) ("we cannot agree with appellees that the Administrator may simply make no formal decision to revise or not to revise...").

[21] Clean Air Act section 109(d)(1); 42 U.S.C. 7409(d)(1) (emphasis added).

[22] See e.g., Clean Air Act section 109(d)(1); 42 U.S.C. 7409(d)(1) (requiring EPA to review and revise, as appropriate, air quality criteria and national ambient air quality standards every five years); Clean Air Act section 112(d)(6); 42 U.S.C. 7412(d)(6) (requiring EPA to review and revise, as necessary, hazardous air pollutant standards every eight years).

A mandatory duty for EPA to complete the analyses necessary to make a "yes" or "no" determination on whether to revise the guidelines for each of the categories of sources every year should not be ascribed to EPA in the absence of explicit evidence of such Congressional intent.

To increase transparency and stakeholder awareness, EPA includes in its biennial plans information on its review of existing effluent limitations guidelines and pretreatment standards and any industries reviewed for potential development of new effluent guidelines or pretreatment standards.

Plan 14 summarizes public comments received on the Preliminary Plan 14, describes ongoing planning activities, including projects EPA initiated as part of its 2019 annual review, and presents findings of EPA's effluent guidelines planning efforts, including PSC studies and ELG rulemakings (U.S. EPA, 2019a).

3. SUMMARY OF PUBLIC COMMENTS RECEIVED ON THE PRELIMINARY EFFLUENT GUIDELINES PROGRAM PLAN 14

EPA published its Preliminary Plan 14 and provided a 30-day public comment period starting on October 24, 2019 (see 84 FR 57019). EPA received 18 public comment letters[23] on the Preliminary Plan 14 representing seven private citizens, six trade associations, and four environmental organizations.

EPA received comments on most of the topics presented in Preliminary Plan 14. See *Response to Comments for the Effluent Guidelines Program Plan 14* for all comment responses (U.S. EPA, 2020a). The following summarizes the comments and is organized by topic.

Nutrient Review

Some commenters recommended that when considering the need for further actions to address nutrients, EPA consider the relatively small percentage of total nutrient loadings attributable to any one specific industrial category when compared to the total of nutrient loadings in the United States, including non-point sources of nutrients.

One commenter requested that EPA acknowledge the efforts POTWs have taken in attempting to reduce their associated nutrient discharges.

There were also specific comments on revising the methodology used in analyzing nutrient data and EPA is in the process of evaluating those comments and revising the methodology as appropriate. See Section 5.3 for updates on EPA's review of nutrients in industrial discharges.

Several commenters suggested that EPA should revise the existing Meat and Poultry Products ELGs, because they contend, the existing regulations do not adequately address discharges from this PSC. See Section 6.5 for updates on EPA's study of this category.

Per- and Polyfluoroalkyl Substance Review

Several commenters supported EPA's efforts to address PFAS in industrial point source wastewater discharges, including the multi-industry PFAS Study announced in Preliminary Plan 14 and EPA's PFAS Action Plan.

One commenter requested that EPA include landfills in its detailed study, as they are known indirect dischargers of PFAS.

A commenter stated that "existing authorities could be better utilized to protect against PFAS contamination" and that "EPA should utilize these authorities to track PFAS use in commercial and industrial facilities in order to identify PFAS discharges in the absence of a CWA-approved analytical method." The commenter suggested that EPA can and should prioritize addressing PFAS at the source rather than through drinking water regulations that will impact rate payers.

A commenter requested that EPA clarify its review of PFAS in the Organic Chemicals Plastics and Synthetic Fibers category as the industry is broad and complex. The commenter also indicated that EPA should consider addressing PFAS chemicals in a substance-specific manner rather than as a class, to more precisely describe the historical and current PFOA and long-chain PFAS use and manufacturing,

[23] One organization submitted a second comment as a replacement to a previous comment submitted during the comment period. EPA reviewed and responded to the updated version of the comment instead of the initial comment submitted. As such, the original version of the comment is not included in this count.

and to develop validated, reproducible analytical methods to monitor for PFAS in industrial wastewater discharges before limits can be set.

Another commenter urged "EPA to take steps to develop ELGs for industries discharging or likely to discharge PFAS in our waters, and to take steps so it can better gather and publicize critical information regarding PFAS discharges" (e.g., adding PFAS to the list of TRI chemicals).

See Section 6.4 for updates on the PFAS Multi-Industry Study.

Detailed Study of the Petroleum Refining Category

One commenter stated that they "support EPA's conclusion that no further action regarding the Refinery ELGs is necessary or appropriate."

Another commenter commented that EPA should continue to study refineries in order to consider PFAS discharges from refineries.

See Section 6.1 for updates on the Petroleum Refining Detailed Study.

Detailed Study of the E&EC Category

EPA received comments encouraging an update to the pretreatment standards for the E&EC PSC because of changes in the industry since the ELGs for this PSC were issued in 1983.

See Section 6.2 for updates on the detailed study of the E&EC Category.

Oil and Gas Extraction Wastewater Management

One commenter stated that they "support EPA's decision to complete the Study of Oil and Gas Extraction Wastewater Management Under the Clean Water Act."

Another commenter disagreed with EPA's categorization of this activity as a study, stating that it is "…a survey of stakeholders to better characterize current management practices as they relate to discharges of oil and gas extraction wastewater, and potential challenges, benefits, and barriers to altering EPA's regulations to allow for discharges in a wider array of circumstances."

This commenter also expressed support for site-specific assessments and treatment plans to ensure that the discharge of produced water does not impact the environment or downstream drinking water facilities, rather than national rulemaking.

See Section 6.3 for updates on the Oil and Gas Extraction Wastewater Management study.

4. SUMMARY OF ANNUAL REVIEW ACTIVITIES

The Preliminary Plan 14 discussed two annual reviews, both the 2017 and the 2018 reviews. Plan 14 presents a summary of the 2019 annual review and identifies additional analyses expected to be part of the 2020 annual review. This section does not discuss detailed studies or rulemakings for specific industrial categories that are described in subsequent sections.

For the 2017 annual review, Preliminary Plan 14 discussed EPA's cross-industry review of nutrients in industrial discharges, (Section 3.3), based on the most recent data available at the time of the review, specifically 2015 discharge monitoring reports (DMR) and Toxics Release Inventory (TRI) data; EPA's review of PFAS in industrial discharges (Section 3.4) based on 2016 DMR data; EPA's review of discharges to impaired waters (Section 3.8); and EPA's consideration of economic indicators as a component to the ELGs review process (Section 3.7). These reviews 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.

Preliminary Plan 14 also discussed EPA's intention to continue using peer-reviewed information on industrial wastewater treatment technologies compiled in the Industrial Wastewater Treatment Technology (IWTT) Database since 2012 (Section 3.5), along with other information sources to review technologies that could prompt revisions for certain ELGs (Section 3.6). Preliminary Plan 14 also discussed EPA's activities to construct and populate the ELG Database (Section 3.1). EPA plans to continue this effort with the goal of including all 59 ELGs in the final database, which should be made available on EPA's website in Spring 2020.

For the 2018 annual review, EPA expanded the dataset used to review PFAS in industrial discharges to include 2017 DMR data. At the time that the 2018 review of PFAS discharges was conducted, 2017 was the most current year of DMRs available.

For the 2019 annual review, Plan 14 describes how EPA expanded the dataset for the cross-industry review of nutrient discharges to include 2018 DMR data and incorporated the results of its nutrient estimation tool to rank and prioritize categories for further review (see Section 5.3). EPA also initiated a cross-category review of 2017 DMR monthly average concentration data for all reported pollutants (see Section 5.7). As described generally in Section 5 of this Plan 14, EPA also continued development of the other analyses and tools. At the time the 2019 review of nutrient discharges was conducted, 2018 was the most current year of DMRs available. Subsequent annual review activities will look at updated DMRs.

EPA will present its 2020 annual review as part of Preliminary Effluent Guidelines Plan 15 and expects to expand the dataset for the cross-category review of DMR data to include 2018 data. Results of these and any additional reviews will be discussed in Preliminary 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, listed below, to identify industrial categories for potential development of new or revised ELGs and summarizes the data sources and limitations used to complete the reviews. It also presents the findings and next steps for the associated planning activities. In Preliminary Plan 14, EPA discussed an economic screening analysis that it may use in the future to prioritize industrial categories for further review. EPA did not receive comments on this analysis and has not revised the analysis, however it is a tool the Agency may use in future to when conducting annual reviews. Plan 14 discusses the following actions that EPA has taken.

- Continued developing an ELG Database that will ultimately include information across all regulated PSCs in a consolidated, searchable database (see Section 5.1).
- Continued a cross-industry review of nutrient discharges in industrial wastewater and incorporated results from a tool to estimate nutrient discharges from industrial sources that are underrepresented in readily available datasets (see Section 5.3).
- Continued to compile wastewater treatment technology information in the IWTT Database and populate the information in the IWTT web application for public use (see Section 5.4).
- Continued to screen, prioritize, and further review specific industrial wastewater treatment technologies that may be more broadly evaluated as technology options for future studies and rulemakings (see Section 5.4).
- Continued review of impaired waters, specifically related to nutrients, to determine if specific industrial sources were contributing to impairments. (see Section 5.6).
- Initiated a cross-category review of monthly average DMR concentration data (see Section 5.7).

5.1 ELG Program Framework

As mentioned in Section 2.3, 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. To provide transparency and clarity to the public and to better explain the discretion that EPA maintains regarding review of ELGs and its rulemaking schedule, EPA has initiated the development of a document that will present the framework and the process that EPA uses to evaluate PSCs, gather information, and otherwise consider whether to promulgate or revise an ELG.

5.2 Effluent Limitations Guidelines Database

EPA has compiled information on its ELGs for the 59 different PSCs[24] into a consolidated ELG Database and is in the process of developing a web-based application to allow the public to query the information. The database, once publicly available, and ultimately the web application, will facilitate searching for information within and across ELGs. The database captures information from the Code of Federal Regulations (CFR) (40 CFR Parts 405 through 471),[25] as well as from the technical development documents supporting promulgated rules. The ELG Database includes the following information.

[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.
[25] See https://www.ecfr.gov/cgi-bin/text-idx?SID=1e3d7a295bbc0feaae8ea6b4b85da954&mc=true&tpl=/ecfrbrowse/Title40/40tab_02.tpl.

- 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 the regulations.

The database web application provides EPA and the public with consolidated information about the requirements and development of current existing ELGs. EPA and the public will be able to search the regulations for a specific PSC or compare regulations across multiple PSCs more quickly, systematically, and comprehensively.

EPA plans to use this information to more easily compare specific pollutant limitations, and the associated technology bases, across industries to identify limitations that may be based on outdated technologies, or limitations developed using less sensitive analytical methods than are now available.

5.3 Nutrient Discharges in Industrial Wastewater

Nutrient pollution is one of the most widespread, costly, and challenging environmental problems impacting water quality in the United States. Excessive nitrogen and phosphorus in surface water can lead to a variety of problems, including eutrophication and harmful algal blooms, with impacts on drinking water, recreation, and aquatic life. A wide range of human activities contribute to nutrient pollution from both point and nonpoint sources, including stormwater discharges, runoff, leaking septic systems, fertilizer, atmospheric deposition, and wastewater discharges.

As part of the 2017 and 2018 annual review of ELGs and to more comprehensively screen industrial wastewater as a source of nutrients, EPA initiated a cross-industry review of publicly available data on nutrient discharges from industrial PSCs, as described in Preliminary Plan 14 (U.S. EPA, 2019a). For that review, EPA ranked and prioritized PSCs for further review based on their annual reported discharges of nutrients in wastewater and developed a method to estimate potential nutrient discharges from industrial facilities that are likely to discharge nutrients but are not reported in the publicly available discharge data. EPA then ranked industrial categories by the nutrient loads in their wastewater discharges. See *The EPA's Review of Nutrient in Industrial Wastewater Discharge* ("Previous Nutrients Report") (U.S. EPA, 2019b) for the methodology and results of the nutrients review.

EPA further reviewed sources of nutrients, nutrient wastewater discharges, and typical wastewater treatment technologies or best management practices used to control nutrient discharges from the top two ranking categories: Pulp, Paper, and Paperboard (40 CFR Part 430) and Meat and Poultry Products (40 CFR Part 432). For the review of the Pulp, Paper, and Paperboard PSC, EPA concluded that the Agency would review this category when additional information becomes available. See Section 4 of the Previous Nutrients Report for a summary of the Pulp, Paper, and Paperboard category review. For the Meat and Poultry Products industry, EPA is continuing to study and collect data to fill large data gaps on the indirect dischargers associated with this industry (U.S. EPA, 2019b). See Section 6.5 for additional details on this study.

In support of its 2019 annual review of ELGs, EPA updated and refined the cross-industry review of nutrient discharges. Specifically, EPA refreshed the nutrient discharge rankings and nutrient estimations using 2018 DMR data and combined the reported and estimated data to assess the total potential nutrient discharges from each PSC. Section 5.3.1 briefly summarizes the methods and findings of EPA's current review of nutrient discharges. To provide additional context for the discharges, EPA also began analyzing industrial discharges to nutrient impaired waters as described in Section 5.3.1.2. For additional details on the methodology and analyses completed for the current nutrients review, see *EPA's Review of Nutrients in Industrial Wastewater Discharge* ("Current Nutrients Report") (U.S. EPA, 2020b). Section 5.3.2 presents the prioritization of PSCs for further review of nutrients in industrial wastewater discharges.

5.3.1 Nutrient Discharge Rankings

For the 2019 cross-industry review of nutrients, EPA used 2018 publicly available data to screen industrial categories based on reported and estimated total nitrogen and total phosphorus loads discharged to receiving waters. The goal of this review was to identify additional industries with potentially greater nutrient loads relative to other PSCs and prioritize for further review those PSCs that may be candidates for controlling nutrient discharges through ELGs development or revision.

Consistent with its previous cross-industry review of nutrients, EPA downloaded and analyzed 2018 DMR data from EPA's Water Pollutant Loading Tool (Loading Tool).[26,27] Data from the Loading Tool were used since it provides facility-level total nitrogen and phosphorus data from the raw ICIS-NPDES DMR data. The ICIS-NPDES flow and concentration data, which is certified to be accurate from the facility, is reported at the outfall level in a variety of forms according to individual permit conditions. For example, the nutrient parameters reported in DMRs vary by industry and NPDES permit and may include total nitrogen, ammonia, nitrate, phosphate, total phosphorus and/or other nitrogen or phosphorus species. See Section 2.1.3.1 in the Previous Nutrients Report for a detailed discussion of the DMR nutrient aggregation methodology (U.S. EPA, 2019b). These annual total nitrogen and total phosphorus loads were grouped by PSC as described next.

Individual facility data are commonly reported by Standard Industrial Classification (SIC) or North American Industry Classification System (NAICS) code rather than PSC, so EPA used established crosswalks within the Loading Tool to match individual facility data to the most appropriate PSC or potential PSC based on the facility's reported SIC or NAICS code. EPA then grouped the discharge data by PSC. See Section 3 of the Loading Tool Technical Users Document for more information on these crosswalks (U.S. EPA, 2012). EPA summed the reported facility aggregated total nitrogen and total phosphorous loads in each PSC to calculate a reported total nitrogen and total phosphorous load by category. This is the same methodology used in Preliminary Plan 14. To provide additional context for the reported discharges, EPA used the load and flow reported by each facility to calculate the range of total nitrogen and total phosphorus concentrations discharged by facilities in each PSC.

So far, we have described the processing of reported data (reported in DMRs). Next, EPA estimated nutrient loadings for facilities that did not report nutrient data. Reported DMR data are only available for

[26] See https://echo.epa.gov/trends/loading-tool/water-pollution-search.

[27] Because the nutrient discharge rankings methodology specifically includes an analysis of concentration data, EPA did not use TRI data, which only includes reported annual loadings, for this review. Additionally, Emergency Planning and Community Right-to-Know Act (EPCRA) Section 313 Chemical List only includes the following nutrient parameters: ammonia, nitrate compounds, and yellow or white phosphorus compounds.

pollutants specified in the facilities' NPDES permits. Currently, only 14 of the 59 ELGs contain technology-based limitations for nitrogen and/or phosphorus (11 for nitrogen parameter only, one for phosphorus parameter only, and two for both nitrogen and phosphorus) (U.S. EPA, 2019b).[28] Facilities may also have permit limits for nutrients to meet specific water quality standards or requirements. Overall, the limits included in facility permits for nutrients vary widely. As presented in Preliminary Plan 14, EPA developed the Nutrient Estimation Tool (Nutrient Tool) to fill gaps in the available industrial nutrient wastewater discharge data. The Nutrient Tool identifies and estimates nutrient discharges for industries whose nutrient discharges may be underrepresented in the DMR dataset. See Section 5.1 of EPA's previous Nutrients Report for a discussion of the data sources and methodology of the Nutrient Tool (U.S. EPA, 2019b).[29]

The Nutrient Tool uses known nutrient discharge data within defined industrial sectors or subsectors (based on SIC codes), as reported on DMRs, to estimate nutrient discharges for facilities within that sector or subsector that do not have reported nutrient discharges but based on their industrial classification are presumed likely to discharge nutrients. The estimation considers, within each SIC code, elements such as the median nutrient concentration and flow, as well as the percent of facilities within the SIC code that have reported discharges. The actual discharges may be somewhat higher or lower than estimated because this estimate is based on a median concentration.

EPA added the estimated and reported total nitrogen and total phosphorous loads for each PSC and ranked the categories based on the total reported plus estimated load (calculated using the Nutrient Tool). EPA also calculated the range of concentrations across the combined reported and estimated data sets.

5.3.1.1 Nutrient Discharge Rankings Results

The nutrient discharge rankings results based on the 2018 DMR data show that industrial facilities reported discharges of more than 205,000,000 pounds of total nitrogen and 25,500,000 pounds of total phosphorous to surface waters. With the Nutrient Tool EPA estimated that industrial facilities may have discharged an additional 215,000,000 pounds of total nitrogen and 128,000,000 pounds of total phosphorus directly to surface waters in 2018 (ERG, 2020a and 2020b).

Figure 5-1 and Figure 5-2 below present the percent allocation of total discharged load (reported and estimated) of total nitrogen and total phosphorus, respectively, by the top ten PSCs. Section 5.3.2 discusses EPA's prioritization of PSCs for further review based on the nutrient discharge rankings. See the Nutrients Report for a detailed breakout of reported and estimated discharge load (ERG, 2020a and 2020b).

[28] EPA did not include PSCs with requirements that include zero discharge of pollutants.

[29] The Nutrient Tool includes discharges of total nitrogen, ammonia (as N), nitrate (as N), total phosphorus, and phosphate (as P). The Tool does not use data from the TRI because TRI data do not include underlying pollutant concentrations or wastewater flows.

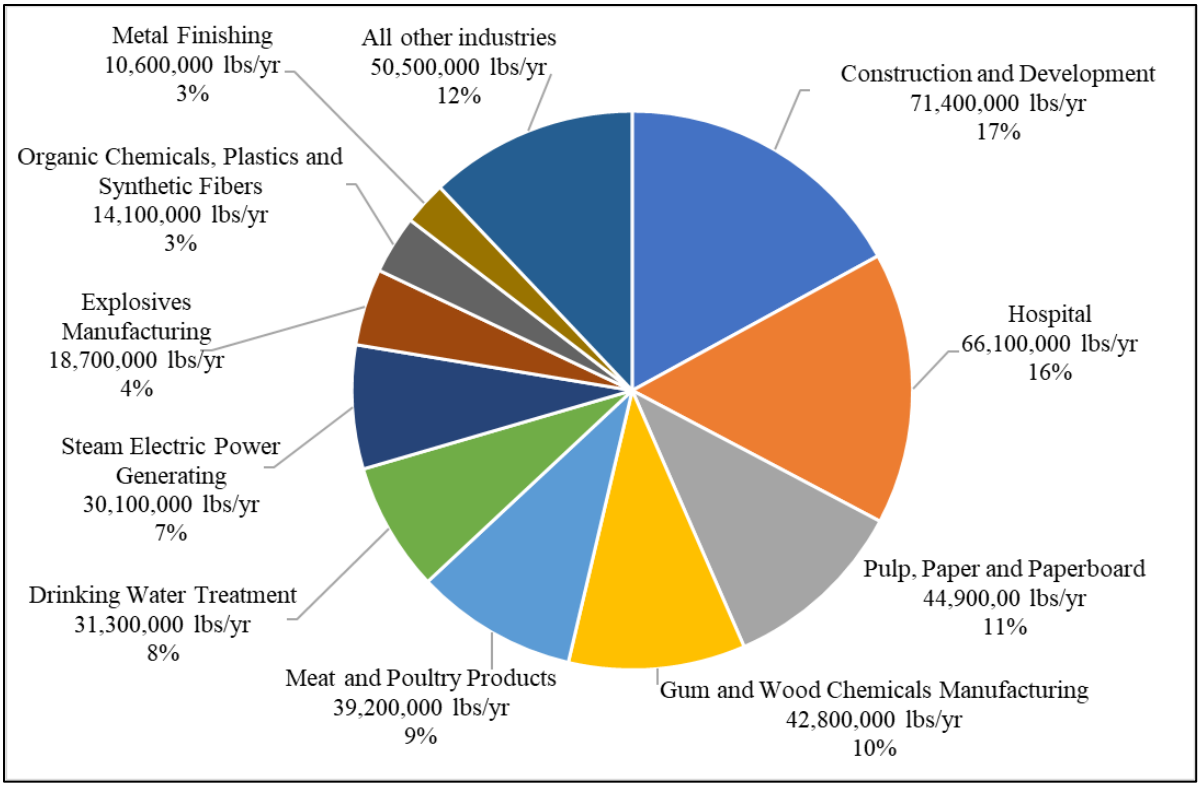

Figure 5-1. Top Ten PSCs Discharging Total Nitrogen in 2018

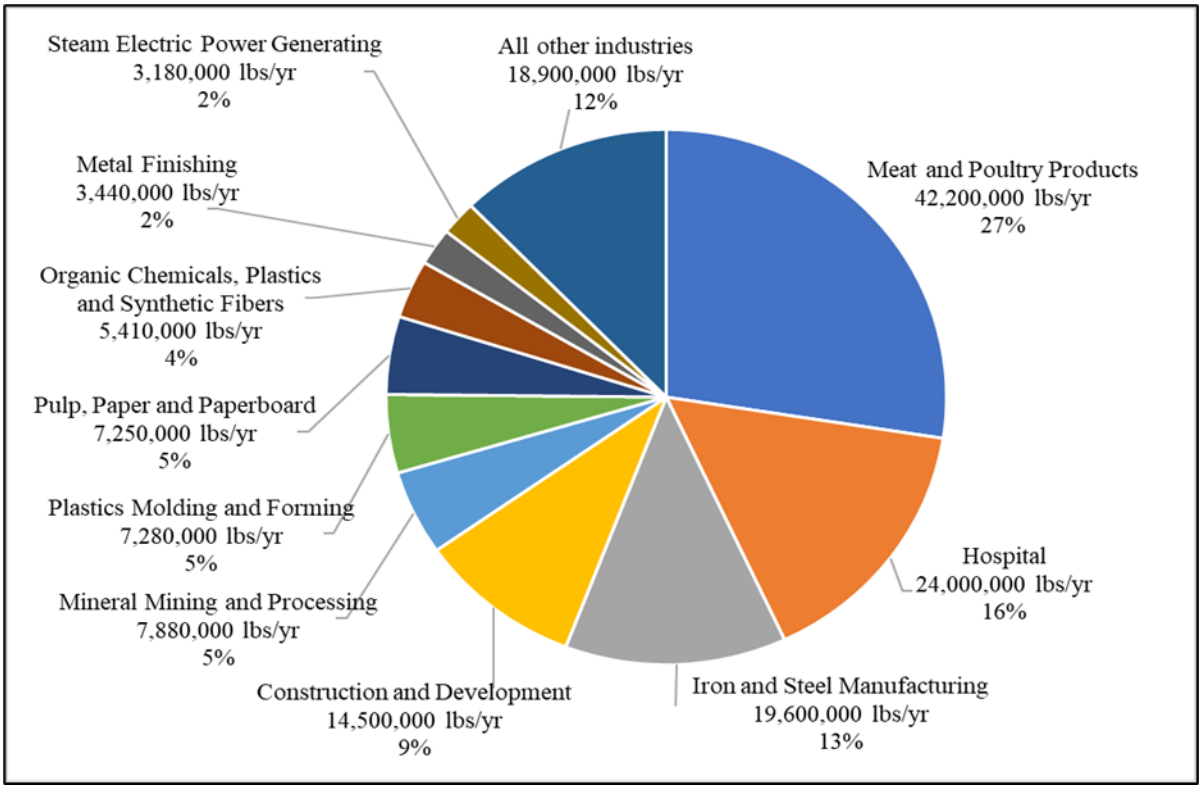

Figure 5-2. Top Ten PSCs Discharging Total Phosphorus in 2018

5.3.1.2 Assessing Industrial Discharges to Waters Impaired for Nutrients

As part of this cross-industry nutrients review, EPA began evaluating impaired waters data to identify PSCs potentially discharging nutrients to nutrient impaired waters. This analysis aims to provide additional context on the potential impact of nutrient discharges from prioritized PSCs. Table 5-1 summarizes the datasets used for this analysis.

Table 5-1. Data Sources Used for Nutrients Impaired Waters Analysis

Data Sources	Brief Description	Use in Impaired Waters Analysis
ICIS-NPDES	ICIS-NPDES is an information management system maintained by EPA's Office of Compliance to track permit compliance and enforcement status of facilities regulated by NPDES under the CWA. ICIS-NPDES contains permit and discharge monitoring information, including the location of facilities and outfalls.	EPA compiled a list of facility and outfall locations reported by all NPDES permitted facilities in 2017 and DMR discharge data reported in 2018.
National Hydrography Dataset Plus (NHD Plus) (Version 2.1)	NHD Plus is a national geospatial surface water framework. It is a geospatial dataset that, among other things, contains shapefiles and attribute data for all hydrologic features in a given area. In the NHD Plus data, each body of water in the U.S is split into smaller subsections and assigned an identifying code called the Reach code.	EPA used the NHD dataset in order to associate the facility outfall (or facility location in the absence of specific outfall locations) to the nearest water body segment using the Reach code.
Assessment and Total Maximum Daily Load Tracking and Implementation System (ATTAINS)	ATTAINS is an online system for accessing information about the conditions in the nation's surface waters. The CWA requires states, territories, and authorized tribes (states for brevity) to monitor water pollution and report to EPA every two years on the waters they have evaluated. This process is called assessment. This information reported to EPA by states is available in ATTAINS. The public information is made available via ATTAINS web services, geospatial services, as well as through other EPA tools including "How's My Waterway", and "Envirofacts."	EPA used ATTAINS data to identify the impairment status and causes, if applicable, associated with Reach codes. For this analysis, EPA considered a water to be nutrient impaired if the impairment cause was one or more of the following: algal growth, ammonia, nutrients, or oxygen depletion.

EPA counted the number of facilities discharging nutrients where at least one outfall is discharging to waters impaired for algal growth, ammonia, nutrients, or oxygen depletion. The location of facilities and outfalls were based on the permit data in the ICIS-NPDES database, and the surface water impairment was based on the ATTAINS dataset. EPA then calculated the percent of facilities in each industry that may be discharging to waters impaired for nutrient-related causes using the following approach:

1. From the 2018 DMR data, EPA summed all reported total nitrogen and total phosphorus loads for each PSC.
2. EPA calculated the reported total nitrogen and total phosphorus loads for facilities in each PSC that may be discharging to nutrient impaired waters.
3. EPA divided the load from facilities that may be discharging to nutrient impaired waters from step 2 by the total load discharged from each PSC from step 1 to calculate the percent

of the PSC's total nitrogen and total phosphorus load that is likely discharged to nutrient impaired waters.

EPA has identified the following considerations regarding the analysis.

- For this analysis, if a facility's outfall location information was not available in ICIS-NPDES, EPA used the facility's location to determine the National Hydrography Dataset Plus (NHD Plus) reach that is closest to the facility. Thus, some discharge locations and receiving waters may be incorrectly identified, affecting the accuracy of estimated discharge loads into impaired waters.
- Although required to report impaired waters in ATTAINS every two years, the most recent reporting year varies by state. Some of the data are from as far back as 2002. Furthermore, many states do not monitor or assess all waters within their boundaries for impairments, resulting in incomplete data concerning waters impaired by nitrogen and phosphorus pollution in these states.
- ATTAINS data also do not include coastal regions and Great Lakes waterbodies.[30]

EPA used the results of this analysis to provide additional context when prioritizing PSCs for further review (see Section 5.3.2).

5.3.2 Prioritization of PSCs for Further Review from the Nutrient Discharge Rankings

In order to prioritize PSCs for further review, EPA reviewed PSCs whose summed total load (reported and estimated) makes up 95 percent of the total nitrogen and total phosphorous load, respectively, in 2018 across all PSCs, see the Current Nutrients Report (U.S. EPA, 2020b). EPA did not review facilities from categories where the ELGs were promulgated or revised in the past seven years: Construction and Development (Revised March 6, 2014), Steam Electric Power Generating (Revised 2020), Oil and Gas Extraction (Revised June 2016), and Dental Office (Promulgated June 14, 2017).

For the top PSCs, EPA reviewed the total load across the PSC to determine if the majority of the load is associated with multiple facilities (hereafter referred to as widespread). EPA did not prioritize PSCs that have high annual loads due to discharges from less than three facilities, which may not be representative of discharges across the category. For a breakdown of estimated and reported loads, see the Current Nutrients Report (U.S. EPA, 2019b).

To provide context for the magnitude of the discharges and facilitate EPA's further prioritization of PSCs, EPA then compared the range of reported concentrations for each PSC to wastewater treatment levels associated with varying degrees of nutrient removal obtainable with current technology. The levels include no nutrient removal with effluent TN greater than 15 mg/L at Level 1 up to Level 5 with TN less than 2 mg/L (WERF, 2011, U.S. EPA, 2015). For this review, EPA compared 2018 DMR median and third quartile concentration value (i.e., 50 percent and 75 percent of facilities, respectively) to Level 2 (the least stringent treatment objective targeting nutrients) and Level 5 (the most stringent treatment objective targeting nutrients). Table 5-2 describes these treatment levels. Additionally, EPA compares PSC concentrations to nutrient levels achieved in POTWs using biological nutrient removal

[30] See EPA's Waters Assessed as Impaired due to Nutrient-Related Causes for a more detailed discussion of this.

(BNR) processes. BNR levels of technology are the same as level 4, at 3 mg N/L and 0.1 mg P/L (Jeyanayagam, 2005).

Table 5-2. WERF Nutrient Removal Methods and Treatment Objectives

Treatment Level	Nutrient Removal Mechanism	Treatment Objectives	
		Total Nitrogen	Total Phosphorous
Level 2	Nitrification/Denitrification and Biological Phosphorus Removal	8 mg/L	1 mg/L
Level 4	BNR, Nitrification/Denitrification and Biological Phosphorus Removal, High Rate Clarification and Denitrification Filtration	3 mg/L	0.1 mg/L
Level 5	Nitrification/Denitrification and Biological Phosphorus Removal, High Rate Clarification Denitrification Filtration, Microfiltration/Reverse Osmosis on about Half the Flow	< 2 mg/L	< 0.02 mg/L

Source: WERF, 2011

The following sections present the results of EPA's review based on the total nitrogen rankings (discussed in Section 5.3.2.1) and the total phosphorus rankings (discussed in Section 5.3.2.2). For the PSCs prioritized for each of the nutrient discharge rankings, EPA also reviewed the results of the nutrient impaired waters analysis (see Section 2.5 of the Current Nutrient Report for the methodology of the nutrient impaired waters analysis and how it was applied).

5.3.2.1 Prioritizing Industries Based on Total Nitrogen Discharge Rankings

From the total nitrogen discharge rankings, 16 PSCs cumulatively make up 95 percent of the total load in 2018. For most of the PSCs with widespread discharges, at least 75 percent of facilities are reporting total nitrogen concentrations at or below 2 mg/L. However, some of the PSCs are discharging above 8 mg/L. Therefore, EPA prioritized PSCs with widespread discharges (i.e., not resulting from a few facilities with high loads), and concentrations above 8 mg/L. This level of nitrogen is commonly achieved by POTWs with biological nutrient removal (BNR) processes, and by any of EPA case study facilities (U.S. EPA, 2015). In these PSCs, at least 25 percent of facilities are discharging concentrations greater than what POTWs with BNR can achieve. See Section 3.1 of the Current Nutrient Report for a discussion of EPA's review of the total nitrogen discharge rankings for each top PSC.

From this review, EPA is prioritizing the following PSCs for further review: Fertilizer Manufacturing (40 CFR Part 418) and Explosives Manufacturing (40 CFR Part 457).

5.3.2.2 Prioritizing Industries Based on Total Phosphorus Discharge Rankings

From the total phosphorus discharge rankings, 15 PSCs cumulatively make up 95 percent of the total load in 2018. EPA first evaluated whether the 2018 total load for each PSC was being driven by a few facilities, which would not be representative of the industry. If the 2018 total load appeared widespread, EPA compared the median and third percentile concentrations across the top PSCs. All top PSCs had the third quartile concentrations above Level 5 for total phosphorus (<0.02 mg/L), indicating that very few facilities in the top PSCs may be implementing advanced phosphorus removal. Therefore, EPA prioritized PSCs where the total phosphorus discharges appear widespread among the PSC's facilities and the 75th percentile concentration value is greater than Level 2 for total phosphorus (1 mg/L).

From this review, EPA is currently prioritizing the following PSCs for further review: Plastics Molding and Forming (40 CFR Part 463) and Miscellaneous Foods and Beverages (no current ELGs). See the Current Nutrients Report (U.S. EPA, 2020b) for more details on this prioritization.

5.4 Industrial Wastewater Treatment Technology Information in the 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.[31] EPA identified and screened additional references across a broad range of industries from key technical conferences on wastewater treatment, including the 2018 Water Environment Federation's Technical Exhibit and Conference. 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 for 34 industrial PSCs and removal performance for 195 individual pollutant parameters.

5.5 Industrial Wastewater Treatment Technologies Reviews

EPA received no comment on the industrial wastewater treatment technology review methodology that it described in Preliminary Plan 14 (see Section 3.6 of Preliminary Plan 14). 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.
- 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.

EPA's methodology 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.

EPA first focused its technology screening review on nutrient removal in industrial wastewaters. As a starting point, EPA evaluated the data available in IWTT to identify technologies that have been used to treat ammonia, nitrogen, and phosphorus, gathering the following details to prioritize technologies for further review.[32]

- Number of treatment systems and their scale (full or pilot).
- Average percent removal.
- Number of industries studied.

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

[32] EPA notes that the number of studies in IWTT is a function of how much information EPA has identified through literature reviews conducted to date and has been entered into the IWTT database and that it is not an exhaustive collection of the available literature. However, IWTT's structure facilitates this type of information search in a way that is much more readily available to the Agency than through other research methods available.

Based on the results of data evaluated in IWTT and the understanding that biological treatment methods are often used for nutrient removal, and EPA's evaluation of recent research and development trends, EPA prioritized and developed preliminary treatment technology reviews for suspended growth systems (activated sludge), membrane bioreactors (MBR), and moving bed biofilm reactors (MBBR) because these categories cover the main types of biological treatment for which EPA had data. In addition, EPA also developed a preliminary technology review for membrane systems generally because MBRs include membranes as the solids separation mechanism and membranes can also be used to remove nutrients directly in some cases. EPA also considered available information for membrane systems including microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

For the four selected technologies, EPA further reviewed data from IWTT and conducted a targeted literature search to understand the treatment removal mechanisms and identify treatable industrial wastewater and pollutants targeted for removal. The reviews focused on pilot or full-scale implementation of the wastewater treatment systems from data sources from 2010 or later to focus on new applications of these technologies. With these reviews, EPA aims to prioritize at least one wastewater treatment technology for a detailed technology study that has potential applications across PSCs.

Table 5-3 summarizes key findings and pollutants removed for each technology identified by EPA from its review of available data. All four technologies are applicable across a range of industries. See the *Status Update of EPA's Industrial Wastewater Treatment Technology Reviews* memorandum (ERG, 2021) for further discussion and citations.

Table 5-3. Preliminary Technology Review Findings

Technology Description	Target Pollutants	Findings
Activated Sludge		
Widely used biological treatment method using suspended biomass to degrade organic pollutants.	Organics Nutrients	• Much of the current activated sludge research involves modifying or reconfiguring activated sludge units to provide nutrient removal. • Innovations in activated sludge for nutrient removal include: o Deammonification – Sidestream process to remove ammonia. o Nitrition and denitrition - Sidestream technology for ammonia removal that is effective for treating concentrate and filtrate recycle streams from dewatering anaerobically digested biosolids o OpenCell – Waste activated sludge pretreatment technology to generate carbon for denitrification operations. o Integrated fixed-film activated sludge – Hybrid treatment that retrofits existing activated sludge environments with fixed or mobile attached biomass structures to increase reactor capacity without adding basins.
Moving Bed Bioreactor		
Biological treatment technology using buoyant free-moving plastic biofilm carriers in a reactor tank. The biomass is retained in the reactor	Organics Nutrients	• MBBR has advantages over conventional activated sludge: o Provides higher biomass concentration resulting in smaller reactor volumes. o Produces less sludge since the biomass is retained within the reactor on carriers.

Table 5-3. Preliminary Technology Review Findings

Technology Description	Target Pollutants	Findings
		○ More resistant to load fluctuations. • MBBR innovations focus on modifying configurations to optimize treatment for different wastewater characteristics (e.g., high organic content, high ammonia content). • MBBRs can be used anywhere conventional activated sludge may be used. Industrial applications include petroleum refining, oil and gas extraction, mining, food and beverage manufacturing, meat and poultry processing, and organic chemicals manufacturing,
Membrane Bioreactor		
Uses a combination of suspended growth biological treatment with membrane filtration for solids removal.	Organics Nutrients	• Because membranes are more effective at removing solids, MBR can produce effluent with lower solids and nutrients concentrations than conventional activated sludge. • MBRs can be used as the primary biological component of an activated sludge wastewater treatment system, as part of a nutrient removal treatment system, or as a polishing step following traditional biological treatment • Membrane costs and cleaning usually make MBR more expensive than conventional activated sludge. Although MBR has historically been more expensive than conventional activated sludge, recent advances in membrane technology have resulted in cost decreases. • Recent developments in MBR technology focus on water/wastewater reuse, fouling control, high strength wastewater treatment (e.g., food processing), and nutrient control.
Membranes		
Physical barrier that allows certain substances to pass through while blocking others. Pollutants removed depend on the membrane pore size.	Metals, suspended and dissolved solids, oils and greases, viruses, bacteria.	• Membranes can produce effluent with lower concentrations than conventional wastewater separation mechanisms such as gravity settling or multimedia filtration. • Although membranes have historically been more expensive than conventional wastewater treatment, recent advances in membrane technology have resulted in cost decreases. • Membranes can be used across industries for both pretreatment of process water and wastewater treatment across a variety of industries. In wastewater treatment, membranes may be used to treat the entire waste stream or for pretreating individual waste streams prior to an end-of-pipe wastewater treatment system. • Recent developments in membrane technology focus on water/wastewater reuse, fouling control, high strength wastewater treatment (e.g., oil and gas industry, metals processing), and nutrient control.

Source: ERG, 2021

5.6 Industrial Discharges to Impaired Waters

As described in Preliminary Plan 14, EPA reviewed available information that CWA section 303(d) requires states to submit biennially to EPA concerning waters that do not meet state water quality

standards. The 303(d) database includes information about the location of impaired waterbodies and categories of probable sources and probable causes of their impairment. At that time, the available data were not robust enough to be used for ELG planning because few states had relevant data entered into the system housing that information.

As indicated in Preliminary Plan 14, EPA anticipates future improvements in state data submissions about impaired waterbodies as implementation of the 303(d) electronic reporting system known as ATTAINS 2.0 continues. The 303(d) database in the ATTAINS 2.0 framework is expected to yield a more substantial and usable dataset when states identify an industrial or municipal point source as the probable cause of an impairment. This improvement over the previous reporting framework could prove to be useful in future effluent guidelines program planning efforts.

5.7 Review of Industrial Wastewater Discharge Monitoring Report Concentration Data

As part of EPA's 2019 review of ELGs, EPA evaluated concentration data reported by industrial facilities on DMRs. This analysis, referred to as the cross-category concentration analysis, compares facility wastewater discharge pollutant concentrations across industrial PSCs to identify categories that have relatively high pollutant concentration discharges compared to other PSCs and provides a means of prioritizing specific PSCs for further review and study. Section 5.7.1 provides a discussion of the data sources, Section 5.7.2 presents the analysis methodology and considerations, Section 5.7.3 provides a summary of the results, and Section 5.7.4 discusses future potential refinements EPA is considering making to the analysis. For additional details on the methodology, data quality review, considerations, and findings from the cross-category concentration analysis, see *EPA's Review of Industrial Wastewater Discharge Monitoring Report (DMR) Data* (U.S. EPA, 2020c).

5.7.1 Data Used in the Analysis

For this analysis, EPA evaluated available industrial wastewater discharge data reported on DMRs. Facilities that directly discharge wastewater to surface waters of the United States pursuant to a 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 authority (state or EPA). The DMR data are stored in EPA's centralized program database, 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 downloaded DMR data from ICIS-NPDES to rank PSCs by the concentrations of pollutants in their discharges relative to other PSCs.

EPA downloaded the following three sets of DMR data for calendar year 2017:

- *2017 DMR Industrial Monthly Average Concentration Data (ERG, 2020c)*
- *2017 DMR Industrial Monthly Average Quantity Data (ERG, 2020d)*
- *2017 DMR Flow Data (ERG, 2020e)*

EPA used 2017 data for this review because they were the most recent and complete set of industrial wastewater discharge data available when this review began.

5.7.2 Methodology and Considerations for the Analysis

EPA focused the cross-category concentration analysis on toxic and nonconventional pollutants. EPA excluded conventional pollutants,[33] pollutants in drilling fluid, pollutants measured in units that are not comparable with units for concentration or quantity data (e.g., percent), and whole effluent toxicity (WET) parameters.

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 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 the analysis, EPA calculated discharged concentrations of pollutants from reported quantity and flow data (when reported concentration data were not available) and then combined these calculated monthly average concentration data with reported monthly average concentration data for all facilities and all monitoring periods into a static database (ERG, 2020f). EPA then averaged all the monthly average concentrations from 2017 (both reported and calculated) to calculate a single 2017 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 SIC or North American Industry Classification System (NAICS) code.[34]

Once the data set was processed, as described above, EPA followed the steps outlined below to compare wastewater discharge pollutant concentrations across pollutants for facilities in each PSC to identify categories that have relatively high pollutant concentration discharges compared to other categories. See *EPA's Review of Industrial Wastewater Discharge Monitoring Report (DMR) Data* (U.S. EPA, 2020c) for further details on the methodology.

Step 1: Calculate Median Pollutant Concentrations by PSC

From the concentration dataset, 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 is unlikely to be representative of discharges within the PSC.

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 and assigned the PSC a rank.

[33] 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 (44 FR 44501).

[34] EPA did not review facilities that do not have an industrial classification (did not report a SIC code), facilities that report a SIC code of 4952 (publicly and privately owned treatment works), and facilities that report a SIC code but are not industrial facilities.

Steps 3: Identify the Number of Top Ranked Pollutants by PSCs and Develop an Overall PSC Score

For each PSC, EPA counted the number of pollutants where the median concentration for the PSC was among the five 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 in the PSC 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 in the top five across PSCs.

Step 4: Rank and Prioritize PSCs for Further Review

EPA ranked each PSC by the PSC score (percent of pollutants with median concentrations ranked in the top five across PSCs) developed in Step 3 to prioritize categories for further review.

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

- 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 are any, or to specific permit limits.
- Analysis does not consider the magnitude (i.e., pollutant loading) or toxicity of the pollutants being discharged.
- 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, EPA considers the cross-category concentration analysis an appropriate method to provide a screening-level review of industrial discharges, as it provides an indication of the extent to which a PSC has larger concentrations of pollutant discharges relative to other PSCs. This analysis considers all DMR data reported as concentration and quantity simultaneously, including facilities with only monitoring requirements. To the extent possible, EPA will address the limitations associated with the analysis as part of the prioritized PSCs review, which will include a review of the range and magnitude of concentrations.

5.7.3 Results of the Analysis

Table 5-4 presents the results of the cross-category concentration analysis, including the following information for each PSC:

- *PSC score*. Percent of pollutants reported by more than one facility where the PSC's median concentration ranked among the top 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.

- *Number of pollutants that rank in the top five*. Number of pollutants reported by more than one facility where the PSC's median concentration ranked among the top five highest median concentrations reported for the pollutant across all PSCs.
- *Number of pollutants with data reported.* Number of pollutants that were reported by more than one facility within a PSC and, therefore, considered in the cross-category concentration analysis for the PSC.
- *Total number of pollutants with data.* Total number of pollutants with monitoring data within the PSC in the considered dataset. This includes pollutants that were only reported by one facility within the PSC. Provides an indication of the number of pollutants that were excluded from the analysis because they were only reported by a single facility within a PSC and thus may not be representative of discharges within the category as a whole.
- *Total number of facilities.* Total number of facilities reporting data within the PSC.

Table 5-4. Results of the Cross-Category Concentration Analysis

40 CFR Part	PSC Name	PSC Score (Percent of Pollutants that Rank in the Top Five)	Number of Pollutants that Rank in the Top Five	Number of Pollutants with Data Reported by More than One Facility	Total Number of Pollutants with Data	Total Number of Facilities
469	Electrical and electronic components	100%	2	2	15	5
446	Paint formulating	100%	1	1	13	5
438	Metal products and machinery	92%	11	12	35	89
417	Soap and detergent manufacturing	79%	41	52	82	11
454	Gum and wood chemicals manufacturing	75%	3	4	15	4
414	Organic chemicals, plastics and synthetic fibers	64%	52	81	223	259
425	Leather tanning and finishing	60%	3	5	20	2
437	Centralized waste treatment	59%	13	22	139	9
455	Pesticide chemicals	57%	4	7	54	57
408	Canned and preserved seafood processing	56%	5	9	13	25
409	Sugar processing	55%	6	11	33	12
429	Timber products processing	52%	17	33	58	65
461	Battery manufacturing	50%	1	2	6	2
457	Explosives manufacturing	50%	3	6	16	7
435	Oil & gas extraction	49%	21	43	166	78
433	Metal finishing	47%	26	55	110	402
439	Pharmaceutical manufacturing	47%	14	30	122	27
420	Iron and steel manufacturing	46%	24	52	91	104
419	Petroleum refining	46%	18	39	170	316

Table 5-4. Results of the Cross-Category Concentration Analysis

40 CFR Part	PSC Name	PSC Score (Percent of Pollutants that Rank in the Top Five)	Number of Pollutants that Rank in the Top Five	Number of Pollutants with Data Reported by More than One Facility	Total Number of Pollutants with Data	Total Number of Facilities
415	Inorganic chemicals manufacturing	45%	19	42	99	97
445	Landfills	44%	16	36	125	154
443	Paving and roofing materials (tars and asphalt)	44%	7	16	32	38
432	Meat and poultry products	42%	11	26	41	163
450	Construction and development	42%	13	31	63	45
423	Steam electric power generating	40%	22	55	189	458
471	Nonferrous metals forming and metal powders	39%	9	23	58	32
444	Waste combustors	38%	3	8	19	4
418	Fertilizer manufacturing	37%	7	19	33	32
436	Mineral mining and processing	36%	14	39	70	213
430	Pulp, paper and paperboard	35%	11	31	69	137
421	Nonferrous metals manufacturing	35%	11	31	62	40
449	Airport deicing	35%	6	17	43	64
442	Transportation equipment cleaning	35%	8	23	68	39
464	Metal molding and casting (foundries)	33%	5	15	48	34
406	Grain mills	33%	3	9	17	23
405	Dairy products processing	29%	6	21	33	56
NA	Drinking water treatment	28%	11	39	121	1276
410	Textile mills	27%	4	15	86	42
NA	Food service establishments	25%	2	8	15	117
468	Copper forming	25%	1	4	15	6
NA	Independent and standalone labs	22%	2	9	80	18
422	Phosphate manufacturing	22%	2	9	14	15
NA	Unassigned waste facility	22%	9	41	115	134
NA	Miscellaneous foods and beverages	22%	5	23	40	70
434	Coal mining	21%	7	33	47	1713
412	Concentrated animal feeding operation (CAFO)	20%	1	5	10	18
424	Ferroalloy manufacturing	19%	3	16	40	8
407	Canned and preserved fruits and vegetables processing	19%	3	16	26	47
426	Glass manufacturing	18%	4	22	57	25
460	Hospital	18%	3	17	24	145

Table 5-4. Results of the Cross-Category Concentration Analysis

40 CFR Part	PSC Name	PSC Score (Percent of Pollutants that Rank in the Top Five)	Number of Pollutants that Rank in the Top Five	Number of Pollutants with Data Reported by More than One Facility	Total Number of Pollutants with Data	Total Number of Facilities
411	Cement manufacturing	17%	4	23	42	48
451	Concentrated aquatic animal production	13%	2	15	27	179
467	Aluminum forming	13%	1	8	24	9
440	Ore mining and dressing	10%	3	29	50	82
428	Rubber manufacturing	6%	1	18	94	46
463	Plastics molding and forming	0%	0	10	28	34
NA	Printing & publishing	-	0	0	7	2
NA	Industrial laundries	-	0	0	2	2
NA	Tobacco products	-	0	0	2	1
465	Coil coating	-	0	0	1	1
458	Carbon black manufacturing	-	0	0	4	2
447	Ink formulating	-	0	0	1	1

Source: ERG, 2020f
NA: Not Applicable

5.7.4 Potential Analysis Refinements

EPA envisions 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. As such, EPA has identified the following steps and plans to take them 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 and the incorporation of emerging pollutants that are added to permits to address water quality criteria and standards.
- *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 impact of facility and industry flow.
- *Include TRI data.* If conducting a pollutant loads analysis, 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.

6. ONGOING ELG STUDIES

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

6.1 Detailed Study of the Petroleum Refining Category (40 CFR Part 419)

EPA is concluding its detailed study of wastewater discharges from the petroleum refining industry (40 CFR 419) and is not taking further action on this source category at this time. EPA initiated this study to investigate concerns about increased discharges of metals from petroleum refineries due to implementation of wet air-pollution controls and changes in crude oil feedstock. As part of the study, EPA also investigated discharges of dioxin and dioxin-like compounds from petroleum refineries to discern whether these pollutants were being discharged at detectible concentrations. EPA conducted extensive data collection activities as part of this study, including visiting 10 refineries, collecting detailed questionnaire responses from 21 refineries, reviewing 80 NPDES permits, and attending annual meetings with representatives from the refining industry and petroleum refining trade associations since 2014.

The data EPA gathered on the impact of wet air-pollution controls and changes in crude oil feedstock during the detailed study was inconclusive. The data did not demonstrate whether implementation of wet air-pollution controls or changes in crude oil feedstocks have had an impact on the characteristics of the wastewater generated by the industry. The Agency found some limited published information about the potential presence of naphthenic acids and alkylated polynuclear aromatic hydrocarbons (alkylated PAHs) in wastewaters from processing heavier crudes; however, there was no actual data on discharges of these pollutants for EPA to evaluate.

The information EPA gathered on discharges of dioxin and dioxin-like compound from petroleum refineries indicated that dioxin discharges found during an initial review of the petroleum refining industry were primarily due to discharges from a single refinery that was in upset at the time they reported their effluent data. Additional details about the study, information EPA collected as part of the study, and limitations on available data are provided in the *Final 2019 Petroleum Refining Detailed Study Report* (U.S. EPA, 2019c).

EPA discussed its proposed decision to conclude this study in Preliminary Plan 14 and did not receive any comments that warrant EPA changing its proposed decision. More detailed responses to the comments EPA received on its proposed decision are included in the *Comment Response Document for Preliminary Plan 14* (U.S. EPA, 2020a).

Though EPA is concluding this particular study of the petroleum refining industry, EPA will continue to review the petroleum refining category, consistent with the CWA. EPA will continue to collaborate with the industry and other stakeholders regarding future data assessments and methodologies.

6.2 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 E&EC PSC (40 CFR Part 469). The E&EC ELGs were issued in 1983 and have not been revised. EPA intends to study if considerable changes and innovations achieved by this industry warrant considering revisions to the existing ELGs.

As part of the detailed study of the E&EC industry, EPA is working to identify the population of facilities subject to the regulation to study further. EPA has been in contact with industry trade groups

likely to be associated with regulated facilities and has started building a profile of the regulated community. EPA has searched permitting databases for facilities that have a discharge permit that contains conditions from the E&EC ELGs. This type of search will only yield partial lists as most E&EC facilities discharge their wastewater to a POTW and will not be present in those databases. EPA has also been contacting permitting authorities to build a database of those facilities that discharge to a POTW. To date, EPA has acquired information on over 100 facilities permitted as an E&EC facility discharging to POTWs. EPA has also acquired permits and monitoring reports from many of these facilities which discuss treatment technologies being used and the concentration of contaminants in their waste stream.

At this time, EPA has conducted five site visits, all of which yielded valuable information regarding manufacturing techniques, chemicals used, and changes to the industry since the rule was issued.

6.3 Study of Oil and Gas Extraction Wastewater Management

In May of 2018, EPA initiated a study of the management of produced water from the onshore oil and gas extraction industry. During the study EPA held more than 80 meetings and conference calls with states, tribes and stakeholders and held a public meeting in October 2018 to provide an overview of the input received from these various groups. On May 15, 2019, EPA released a draft study report for public input. The draft study report describes the outreach activities and what EPA learned during the study period. After considering public input received on the draft report, EPA published a final report in May of 2020. The Agency is still determining what, if any, next steps should be taken regarding produced water management under the CWA. See EPA's Oil and Gas Management webpage[35] for more information.

In the 2020 Fall Regulatory Agenda, EPA announced it is initiating rulemaking to revise definitions in the Centralized Waste Treaters Effluent Guideline (40 CFR Part 437) to increase flexibility for centralized waste treaters who treat and discharge produced water from oil and gas extraction (40 CFR Part 437). EPA plans to propose revising sections 40 CFR Part 437 to expand the beneficial use of treated produced waters by allowing, under certain circumstances, the discharge of produced waters from Centralized Waste Treatment facilities and from POTWs. These revisions would allow more flexibility in the discharge, and ultimately the management of treated produced waters for agricultural uses, reuse for oil recovery, and other uses to alleviate water scarcity.

6.4 Study of Per- and Polyfluoroalkyl Industrial Sources and Discharges

As described in the October 2019 Preliminary Plan 14, EPA is conducting a Multi-industry Detailed Study of industrial PFAS use, treatment and discharges to surface water and POTWs focusing on four PSCs: PFAS manufacturers, pulp and paper manufacturers, textile and carpet manufacturers, and airports. After publication of the Preliminary Plan 14, an additional PSC, Metal Finishers, was added to the Study. The addition of this new category was based on information and data received by EPA from the metal finishers industry and a review of PFAS source inventories conducted by states (ERG, 2019a, 2019b, 2019c, 2020g, 2020h). As part of the detailed study, EPA is collecting facility-specific information such as the types of PFAS compounds discharged, discharge concentrations, treatment methods, and facility flow rates. This information has primarily been collected through outreach to stakeholders, including company representatives, trade associations, state, regional, and local wastewater regulatory authorities, treatment technology vendors, and non-governmental organizations. EPA is evaluating this information to inform decisions about how best to address industrial PFAS

[35] See EPA's Oil and Gas Management webpage for more information: https://www.epa.gov/eg/study-oil-and-gas-extraction-wastewater-management

discharges. The Agency is continuing to collect information and intends to provide for public review and comment the information and data regarding PFAS manufacturers and formulators that EPA has collected to date. EPA will request public comment on this information and data and solicit additional information and data regarding discharges of PFAS from these facilities to inform potential future revisions to the wastewater discharge requirements that apply to the OCPSF PSC. EPA intends to publish an advanced notice of proposed rulemaking (ANPRM) to solicit data and information regarding manufacturers of PFAS and the presence and treatment of PFAS in discharges from this industrial category. EPA also intends to request information regarding PFAS formulators, which are facilities that produce a variety of PFAS products and materials from PFAS feedstocks. EPA will provide data and information on the other PSCs once data collection and analysis is completed.

While EPA takes additional steps regarding PFAS manufacturers and formulators, EPA will continue its Multi-industry Detailed Study described above to collect additional information about PFAS discharges from the four remaining PSCs included in the study. While there has been significant study in recent years on the *presence* of PFAS in the environment, and the *presence* of PFAS in drinking water in particular, there has been relatively little study of the *discharges* of PFAS into water. 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 has collected more of this type of information for PFAS manufacturers and formulators than it has for the other four categories included in the study but expects that the detailed study will help fill some of these data gaps and help EPA identify appropriate future actions to address PFAS discharges for the four remaining categories included in the study. Further study of the remaining four categories is needed before initiating rulemaking to address PFAS discharges from these categories.

Embarking on an effluent guidelines rulemaking is a significant deployment of limited Agency time and resources, generally entailing many years and significant resources. Before EPA embarks on such an endeavor, EPA would want some idea that there are promising candidate technologies that might reflect BAT. More specifically, developing effluent guidelines requires EPA to gather information on industry practices, characteristics of discharges (e.g., pollutants, flow variability, stormwater), technologies or practices used to prevent or treat the discharge, and economic characteristics. EPA identifies the best available technology that is economically achievable for that industry and sets regulatory requirements based on the performance of that technology. Before EPA were to initiate such a significant undertaking, EPA would want to have this type of information. Given the data EPA currently has, taking the additional steps described above regarding PFAS manufacturers and formulators and continuing the detailed study on the four other PSCs included in the study is warranted.

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

As a result of the cross-industry review of nutrients in industrial wastewater and the results of the Meat and Poultry Products preliminary category review, EPA initiated a detailed study of wastewater discharges from the Meat and Poultry Products PSC (40 CFR Part 432). In February 2020, EPA met with trade associations and provided an overview of the data available and the data needed to determine if a rule revision might be appropriate.

EPA is in the process of building an industry profile of Meat and Poultry Products facilities based on publicly available sources. To develop a list of facilities potentially included in this PSC, EPA evaluated Meat and Poultry Products 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 further develop this list, EPA is also evaluating information from POTW

Annual Reports, EPA's ICIS-NPDES database, and EPA's TRI database. Based on EPA's preliminary review, the Meat and Poultry Products industry includes roughly 7,000 facilities of which about 1,200 have NPDES permits, for stormwater discharges or process wastewater discharges. Approximately 500 facilities have DMR data in ICIS-NPDES. EPA is currently reviewing the contents of these permits and associated DMRs to better understand the industry. EPA's review is currently limited to facilities with effluent limits (based on ELGs, WQBELs or TMDLs) and NPDES permits, which tend to include only large, direct discharge facilities. EPA does not have as much information on smaller direct discharge facilities and indirect discharge facilities because those facilities do not submit information about nitrogen discharges in EPA's ICIS NPDES database. EPA is working to collect this information through other means to inform its evaluation of this PSC.

EPA is also evaluating data to determine which wastewater treatment technologies are currently in use and the effectiveness of nutrient removal. Specifically, EPA is reviewing NPDES permits, POTW annual reports, and available indirect discharge inspection reports from significant industrial users. EPA is also reviewing information to identify candidates for site visits to learn more about the industry operations and wastewater treatment. Furthermore, EPA is evaluating available data to identify other treatment technologies that may be available to the industry (but not necessarily currently in use by the Meat and Poultry Products facilities) to treat their wastewater beyond the existing ELG requirements.

Additionally, to better document the impacts of the Meat and Poultry Products industry on the environment, EPA is conducting literature searches for any documented environmental or human health impacts associated with Meat and Poultry Products facilities. EPA is studying the proximity of Meat and Poultry Products wastewater discharges to impaired waters. Since nutrients are the primary concern, EPA is estimating the nutrient loadings associated with Meat and Poultry Products wastewater discharges and developing watershed and water quality eutrophication models. Modeling locations will be determined by factors that include the availability of data and the magnitude of discharge loadings. Widely used and peer reviewed water quality models will be used. These models would be used to evaluate environmental improvement due to pollutant loading removals resulting from potential Meat and Poultry Products wastewater treatment improvements.

Developing effluent guidelines is a resource intensive endeavor that requires EPA to gather information on industry practices, characteristics of discharges (e.g., pollutants, flow variability, stormwater), technologies or practices used to prevent or treat the discharge, and economic characteristics. EPA identifies the appropriate level of technology as prescribed by the CWA and sets effluent limitations based on the performance of that technology. Given the data gaps, EPA has identified in the Meat and Poultry Products category, conducting a detailed study is needed to gather more information prior to deciding if a revision to the ELG is appropriate. As such, EPA is announcing that the Agency will conduct a detailed study of the Meat and Poultry Products category.

EPA typically performs ELG revisions on both direct and indirect dischargers concurrently, as the economic impacts to the industry are not cleanly severable between those classes of dischargers. EPA considers a detailed study the best way to account for the complexity of the industry, address the data gaps described above, and inform a decision as to whether or not engaging in a rulemaking is appropriate. This study will facilitate a more complete understanding the total number of facilities, the locations of the facilities across the US, the size of the facilities, and the characteristics of the processes and wastewater generated.

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. That rule was subject to legal challenge and in addition the agency received two petitions for administrative reconsideration. In response to the two administrative petitions, EPA agreed to reconsider the Effluent Guidelines for two waste streams: flue gas desulfurization (FGD) wastewater and bottom ash (BA) transport water. The legal challenges to the 2015 ELGs for these two waste streams were held in abeyance while EPA reconsidered the ELG's.

EPA completed its reconsideration of the ELG's for FGD wastewater and BA transport water in August 2020, establishing effluent limits for FGD wastewater and for BA transport water to better protect public health and the environment by limiting wastewater discharges into surface waters and wastewater treatment plants, while also reducing costs. See the Effluent Guidelines website[36] for further details. EPA conducted a webinar on November 5, 2020 to inform the public, industry, and state and local officials about the contents of the new rule.

Meanwhile, on April 12, 2019, the U.S. Court of Appeals for the Fifth Circuit rendered a decision on the legal challenges to portions of the 2015 rule that had not been held in abeyance.

The Fifth Circuit struck down as unlawful aspects of the 2015 ELG's pertaining to effluent limitations for "legacy" wastewater and combustion residual leachate. These provisions had been challenged by environmental group petitioners. The Fifth Circuit held that EPA's legacy wastewater limitations were arbitrary and capricious under the Administrative Procedure Act (APA) and that EPA's leachate limitations were unlawful under the CWA, pursuant to the familiar *Chevron* test for reviewing an agency's interpretation of a statute that it administers. The Court vacated those portions of the 2015 ELG rule and remanded them to the Agency "for reconsideration consistent with this opinion." In the 2020 Fall Regulatory Agenda, EPA announced its plan to initiate a rulemaking to revise the Steam Electric ELG's to establish Best Available Technology Economically Achievable limitations for these two waste streams (landfill leachate and legacy wastewater) that were vacated by the Fifth Circuit in its April 2019 decision. The schedule for this rulemaking has yet to be determined.

[36] See the following website for further details: https://www.epa.gov/eg/2020-steam-electric-reconsideration-rule-documents

8. SUMMARY TABLE OF PLANS FOR EXISTING POINT SOURCE CATEGORIES

Table 8-1 summarizes the plans for future activity based on EPA's review of the effluent guidelines and pretreatment standards of the existing PSCs. As explained in Section 2.3, above, EPA does not interpret the CWA as requiring it to decide every year whether to revise the effluent guidelines and pretreatment standards. The table below summarizes the status of EPA's ongoing review process. EPA uses the following codes to describe its findings and potential next steps for each industrial category.

A. EPA recently promulgated or revised effluent guidelines or pretreatment standards for this category.

B. EPA is undergoing rulemaking for this category.

C. No further action is appropriate for the effluent guidelines and pretreatment standards for this category at this time.

D. EPA intends to continue the review or study of this category.

E. EPA intends to initiate a review or study of this category.

F. EPA plans to or is in the process of issuing an ANPRM for this category.

Table 8-1. Summary of Plans from EPA's Review of Existing Industrial Categories

No.	Industry Category (listed alphabetically)	40 CFR Part	Finding(s)
1	Airport Deicing	449	C
2	Aluminum Forming	467	C
3	Asbestos Manufacturing	427	C
4	Battery Manufacturing	461	C
5	Canned and Preserved Fruits and Vegetable Processing	407	C
6	Canned and Preserved Seafood Processing	408	C
7	Carbon Black Manufacturing	458	C
8	Cement Manufacturing	411	C
9	Centralized Waste Treatment	437	B
10	Coal Mining	434	C
11	Coil Coating	465	C
12	Concentrated Animal Feeding Operations (CAFO)	412	C
13	Concentrated Aquatic Animal Production	451	C
14	Construction and Development	450	C
15	Copper Forming	468	C
16	Dairy Products Processing	405	C
17	Dental Offices	441	A
18	Electrical and Electronic Components	469	D
19	Electroplating	413	C
20	Explosives Manufacturing	457	E
21	Ferroalloy Manufacturing	424	C
22	Fertilizer Manufacturing	418	E
23	Glass Manufacturing	426	C

Table 8-1. Summary of Plans from EPA's Review of Existing Industrial Categories

No.	Industry Category (listed alphabetically)	40 CFR Part	Finding(s)
24	Grain Mills	406	C
25	Gum and Wood Chemicals	454	C
26	Hospitals	460	C
27	Ink Formulating	447	C
28	Inorganic Chemicals	415	C
29	Iron and Steel Manufacturing	420	C
30	Landfills	445	C
31	Leather Tanning and Finishing	425	C
32	Meat and Poultry Products	432	D
33	Metal Finishing	433	E
34	Metal Molding and Casting	464	C
35	Metal Products and Machinery	438	C
36	Mineral Mining and Processing	436	C
37	Nonferrous Metals Forming and Metal Powders	471	C
38	Nonferrous Metals Manufacturing	421	C
39	Oil and Gas Extraction	435	B
40	Ore Mining and Dressing	440	C
41	Organic Chemicals, Plastics, and Synthetic Fibers	414	F
42	Paint Formulating	446	C
43	Paving and Roofing Materials (Tars and Asphalt)	443	C
44	Pesticide Chemicals	455	C
45	Petroleum Refining	419	C
46	Pharmaceutical Manufacturing	439	C
47	Phosphate Manufacturing	422	C
48	Photographic	459	C
49	Plastics Molding and Forming	463	E
50	Porcelain Enameling	466	C
51	Pulp, Paper and Paperboard	430	D
52	Rubber Manufacturing	428	C
53	Soap and Detergent Manufacturing	417	C
54	Steam Electric Power Generating	423	B
55	Sugar Processing	409	C
56	Textile Mills	410	D
57	Timber Products Processing	429	C
58	Transportation Equipment Cleaning	442	C
59	Waste Combustors	444	C

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