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Environmental Protection
Agency

Final 2016 Effluent Guidelines Program Plan

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1. EXECUTIVE SUMMARY

This *Final 2016 Effluent Guidelines Program Plan* (Final 2016 Plan), prepared pursuant to Clean Water Act (CWA) section 304(m), 33 U.S.C. § 1314(m), identifies new or existing industrial categories selected for effluent guidelines rulemakings and provides a schedule for such rulemakings. It also discusses the results of the EPA's annual review of effluent limitations guidelines and pretreatment standards (ELGs), consistent with CWA sections 301(d), 304(b), 304(g), 307(b), and 304(m), and it includes the EPA's evaluation of indirect discharge categories that do not have categorical pretreatment standards to identify potential new categories for which pretreatment standards under CWA section 307(b) might be warranted.

This Final 2016 Plan and its conclusions are primarily supported by the EPA's *Effluent Guidelines Planning Review Report Supporting the Final 2016 Effluent Guidelines Program Plan* (Review Report Supporting the Final 2016 Plan) (U.S. EPA, 2018). The Review Report Supporting the Final 2016 Plan, which builds on prior annual reviews, as appropriate, provides and explains the detailed data, analyses, and other information the EPA used in the 2016 Annual Review of industrial wastewater discharges, and is a part of the record for the Final 2016 Plan. Annual Review Reports for prior years are also part of the Annual Review record and can be found at EPA's Effluent Guidelines Plan webpage.

As the Final 2016 Plan explains, the EPA has completed all previously identified effluent limitations guidelines and standards rulemaking actions. In addition, the Final 2016 Plan identifies one new rulemaking (and the associated schedule) for the Steam Electric Power Generating Point Source Category. At this time, the EPA has concluded that no other industries warrant new or revised effluent limitations guidelines and standards at this time.

The Final 2016 Plan also announces that the EPA is initiating three new studies. The purpose of one study is to look holistically at the management of oil and gas extraction wastewater from onshore facilities. The focus of this study is not to look specifically at any one existing effluent guideline. Rather, the EPA intends to engage with stakeholders to evaluate approaches to manage both conventional and unconventional oil and gas extraction wastewater from onshore facilities, including but not limited to an assessment of technologies for facilities that treat and discharge oil and gas extraction wastewater. The EPA is also initiating two industry-wide studies of certain pollutants: nutrients and per- and polyfluoroalkyl substances (PFASs). The EPA's near term goal of these studies is to identify the extent to which these pollutants are discharged from industrial categories.

Lastly, the Final 2016 Plan announces that the EPA is continuing its study of the Electrical and Electronic Components (E&EC) Point Source Category and initiating a more detailed study of this category. The focus will be on changes within the industry since the 1983 rulemaking, particularly as these changes pertain to wastewater characteristics and wastewater treatment technologies.

2. BACKGROUND

This section explains how the Effluent Guidelines Program fits into the EPA's National Water Program, describes the general and legal background of the Effluent Guidelines Program, and summarizes the EPA's process for making effluent guidelines revision and development decisions (i.e., the effluent guidelines planning process).

2.1 The Clean Water Act and the Effluent Guidelines Program

The Clean Water Act (CWA) is based on the principle of cooperative federalism, with distinct roles for both the EPA and the states, in which the goal is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. To that end, the CWA is generally focused on two types of controls for point source discharges of pollutants to waters of the United States: (1) water quality-based controls, based on state water quality standards, and (2) technology-based controls, based on effluent limitations guidelines and standards (ELGs).

The CWA gives states the primary responsibility for establishing, reviewing, and revising water quality standards. Water quality standards consist of designated uses for each water body (e.g., fishing, swimming, supporting aquatic life), criteria that protect the designated uses (numeric pollutant concentration limits and narrative criteria such as "no objectionable sediment deposits"), and an antidegradation policy. The EPA develops recommended national criteria for many pollutants, pursuant to CWA section 304(a), 33 U.S.C. § 1314(a), which states may adopt or modify, as appropriate, to reflect local conditions, or establish another scientifically defensible method.

The EPA is responsible for developing technology-based ELGs, based on best available technologies, for controlling industrial wastewater discharges. ELGs apply to pollutant discharges from industrial facilities directly to surface water (direct discharges) and to publicly owned treatment works (POTWs) (indirect discharges). For sources discharging directly to surface waters, permitting authorities—states authorized to administer the National Pollutant Discharge Elimination System (NPDES) permit program, and the EPA in the few states that are not authorized[1]—must incorporate the EPA-promulgated limitations and standards into discharge permits, where applicable (U.S. EPA, 2010). For sources discharging indirectly to POTWs, the EPA, a state, or an approved municipal control authority will typically issue a permit or control mechanism containing the appropriate effluent limitations and/or local limits to obligate a facility to be in compliance with the applicable standards and reporting requirements.

While technology-based ELGs in discharge permits are sometimes as stringent as, or more stringent than necessary to meet 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, the CWA also requires the EPA and authorized states to establish water quality-based effluent limitations as stringent as necessary to meet water quality standards. Water quality-based limits may require industrial facilities to meet requirements that are more stringent than those in a national effluent guideline regulation. In the overall context of

[1] Idaho, Massachusetts, New Hampshire, New Mexico, and the District of Columbia as well as certain territories and Indian lands.

the CWA, ELGs are one tool in the broader set of tools and authorities Congress provided to the EPA and the states to restore and maintain the quality of the nation's waters.

The 1972 amendments to the Federal Water Pollution Control Act (which then became known as the CWA) marked a distinct change in Congress's efforts "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (see CWA section 101(a), 33 U.S. C. 1251(a)). Before 1972, the law focused principally on water quality standards. This approach was challenging, however, because of the difficulty in determining whether a specific discharger or combination of dischargers was responsible for decreasing the water quality in a receiving stream.

The CWA directed the EPA to promulgate ELGs that reflect pollutant reductions achievable by categories or subcategories of industrial point sources through the implementation of available treatment and pollution prevention technologies. The ELGs are based on specific technologies (including process changes) that the EPA identifies as meeting the statutorily prescribed level of control (see CWA sections 301(b)(2), 304(b), 306, 307(b), and 307(c)). Unlike other CWA tools, ELGs are national in scope and establish pollution control obligations for all facilities that discharge wastewater within an industrial category or subcategory. In establishing these controls under the direction of the statute, the EPA assesses, for example: (1) the performance and availability of the pollution control technologies or pollution prevention practices for an industrial category or subcategory; (2) the economic achievability of those technologies (including the effect that achieving the reductions may have on the applicable industrial category or subcategory), which can include consideration of the affordability of achieving the reduction in pollutant discharge; (3) the cost of achieving effluent; (4) non-water quality environmental impacts (including energy requirements); and (5) such other factors as the Administrator deems appropriate.

In passing the CWA, Congress viewed the creation of a single national pollution control requirement for each industrial category, based on the "best" technology the industry can afford, as a way to reduce the potential creation of "pollution havens" and to set the nation's sight on eliminating pollutant discharge to U.S. waters. Consequently, the EPA's goal in establishing national ELGs is to ensure that industrial facilities with similar characteristics, regardless of their location or the nature of their receiving water, or POTW into which they discharge, will, at a minimum, meet similar effluent guidelines or pretreatment standards representing the performance of the "best" pollution control technologies or pollution prevention practices.

The Effluent Guidelines Program has helped reverse the water quality degradation that accompanied industrialization in this country. Permits developed using the technology-based industrial regulations are a critical element of the nation's clean water program and reduce the discharge of pollutants that have serious environmental impacts, including pollutants that:

- Kill or impair fish and other aquatic organisms.
- Cause human health problems through the consumption of contaminated water, fish, or shellfish or recreation in or on the water.
- Degrade aquatic ecosystems.

The EPA has promulgated effluent guidelines for 59 industrial categories. Descriptions of all 59 industrial categories are available at EPA's Industrial Effluent Guidelines webpage. These regulations apply to between 35,000 and 45,000 facilities that discharge directly to the nation's waters, as well as another 129,000 facilities that discharge to POTWs. Based on estimates of pollutant reductions from each separate guideline, the EPA has estimated that the regulations, cumulatively, have prevented the discharge of over 700 billion pounds of toxic pollutants annually.

2.2 Effluent Guidelines Review and Planning Process

The EPA reviews all point source categories subject to existing ELGs to identify potential candidates for revision, consistent with CWA sections 304(b), 301(d), 304(m)(1)(A) and 304(g). The EPA also reviews industries consisting of direct-discharging facilities not currently subject to effluent guidelines to identify potential candidates for effluent guidelines rulemakings, pursuant to CWA section 304(m)(1)(B). Finally, the EPA reviews existing pretreatment standards and industries consisting of indirect-discharging facilities that are not currently subject to pretreatment standards, to identify potential candidates for pretreatment standards development under CWA section 307(b).

In the effluent guidelines planning process, the EPA is guided by the following goals:

- Restore and maintain the chemical, physical, and biological integrity of the nation's waters.
- Provide transparent decision making and involve stakeholders early and often during the planning process.

The EPA uses four major factors to prioritize existing effluent guidelines and pretreatment standards for possible revision.

The first factor the EPA considers is a combination of the amount and type of pollutants in an industrial category's discharge and the relative hazard posed by that discharge. This factor enables the EPA to prioritize rulemakings that could produce the greatest environmental and health benefits.

The second factor the EPA considers is the performance and cost of applicable and demonstrated wastewater treatment technologies, process changes, and pollution prevention alternatives that could effectively reduce pollutant concentrations in the industrial category's wastewater.

The third factor the EPA considers is the affordability or economic achievability of the wastewater treatment technology, process change, or pollution prevention measures identified using the second factor. If the financial condition of the industry indicates that it would not be affordable to implement relatively expensive and stringent new requirements, the EPA might conclude that a less expensive or less stringent approach to reduce pollutants would better satisfy applicable statutory requirements. The EPA might also conclude that a wastewater treatment technology, process change, or pollution prevention measure was not economically achievable for a particular industry.

The fourth factor the EPA considers is the opportunity to eliminate inefficiencies or impediments to pollution prevention or technological innovation, or opportunities to promote innovative approaches. This factor might also prompt the EPA, during annual reviews, to decide against revising existing effluent guidelines or pretreatment standards if the pollutant source is already efficiently and effectively controlled by other regulatory or non-regulatory programs.

2.2.1 Annual Review Process

The EPA annually reviews industrial wastewater discharges through a variety of screening-level analyses to address cohesively and comprehensively the factors laid out in its draft National Strategy (U.S. EPA, 2002). Historically, this has included a toxicity rankings analysis (TRA), in which the EPA identifies and ranks those categories whose reported pollutant discharges pose a substantial hazard to human health and the environment (see Figure 2-1 and Figure 2-2). As part of the TRA, the EPA assesses the relative hazard of these discharges by applying toxic weighting factors (TWFs) to the annual pollutant discharges reported on discharge monitoring reports (DMRs) and to the Toxics Release Inventory (TRI) for a category to calculate the total discharge of toxic pollutants as toxic-weighted pound equivalents (TWPE) for a category. The EPA then ranks the industrial categories based on total TWPE discharged.

In recent Annual Reviews, the EPA has begun to implement additional screening-level approaches to enhance the identification of industrial categories for which new or revised ELGs may be warranted, beyond those that traditionally rank high in the TRA. For example, the EPA has reviewed data and information from other the EPA offices, including the Office of Pollution Prevention and Toxics (OPPT) to identify emerging pollutants of concern, evaluated analytical method updates, reviewed other regulations that may result in changes to (or new) industrial wastewater discharges (e.g., air pollution control regulations), and compiled information on advances in wastewater treatment. This is consistent with the Government Accountability Office (GAO) recommendation that the EPA's annual review approach include additional industrial hazard data sources to augment its screening-level review of discharges from industrial categories.[2] Figure 2-3 illustrates the additional review approaches. Specifically, the EPA targets other data sources that will provide information including, but not limited to, the following:

- Industrial process changes.
- Emerging contaminants of concern or new pollutant discharges (including nutrient discharges).
- Advances in treatment technologies and pollution prevention practices.
- Availability of new, more sensitive analytical methods.
- Other hazard data and information not captured in the TRA and/or suggested by stakeholders or by public comments.

See Section 3 of the Final 2016 Plan for details on the methodology the EPA followed for its 2016 Annual Review.

[2] GAO's recommendations for the review of additional hazard data sources were published in GAO's September 2012 report *Water Pollution: EPA Has Improved Its Review of Effluent Guidelines But Could Benefit from More Information on Treatment Technologies*.

The EPA conducts a more detailed preliminary category review of those industrial discharge categories that it identifies as warranting further review during its initial screening-level reviews. Where further review is appropriate for an industrial category, the EPA may complete a preliminary or detailed study of the point source category (see Section 2.2.1.1 and Section 2.2.1.2, respectively), which may eventually lead to a new or revised guideline.

2.2.1.1 Preliminary Category Reviews

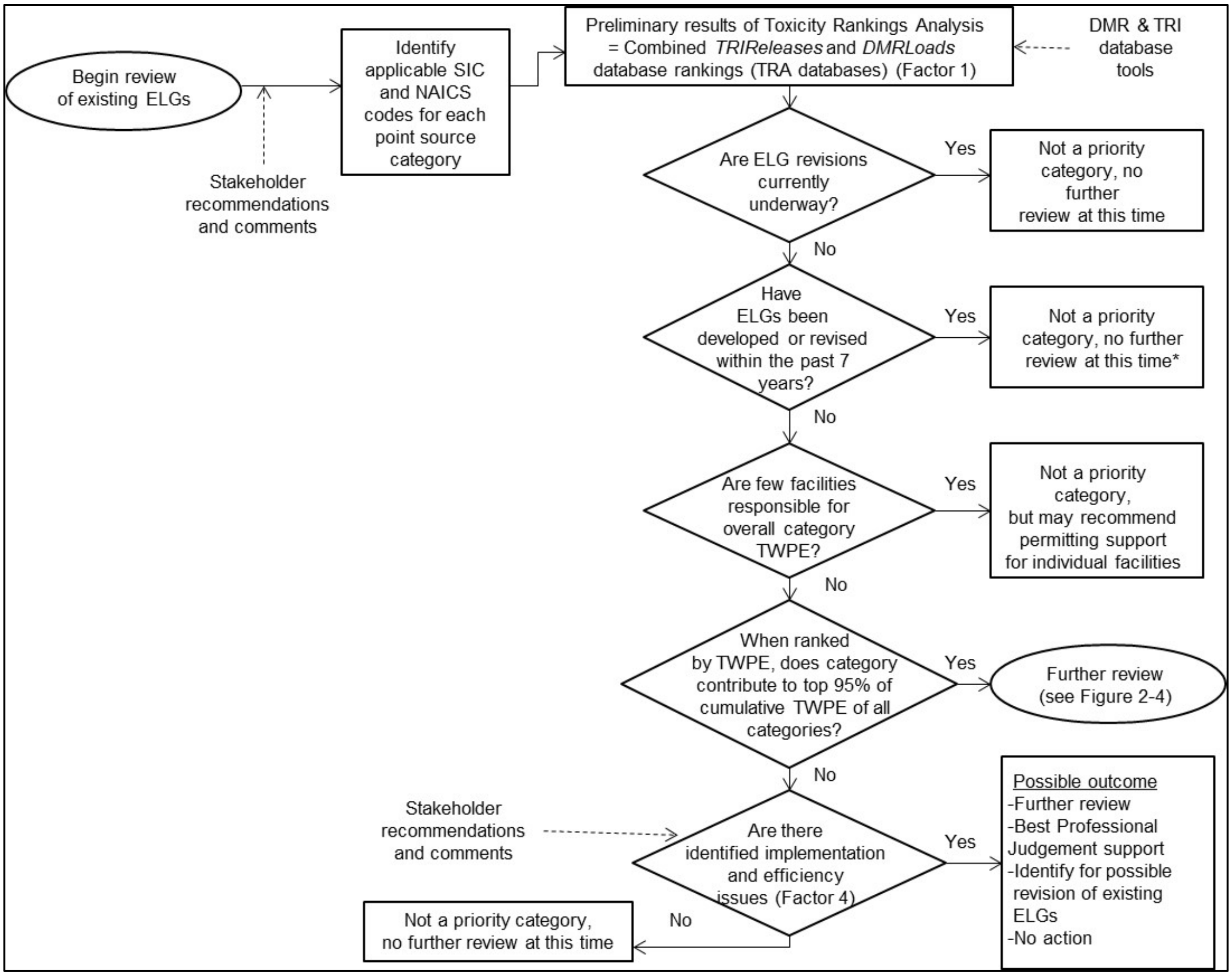
The EPA may conduct a more detailed preliminary category review for certain categories prioritized from the initial screening-level reviews described above. The EPA is particularly likely to conduct a preliminary category review if it lacks sufficient data to decide whether regulatory action would be appropriate (as illustrated in Figure 2-4). The EPA may also conduct preliminary category reviews based on information provided by public commenters on the Preliminary Plans or provided to the EPA through less formal mechanisms (as illustrated in Figure 2-2). The EPA may complete preliminary category reviews as part of the annual review cycle, depending on the industrial categories warranting review at that time or may extend the review into the next cycle. In its preliminary category reviews, the EPA may examine the following: (1) wastewater characteristics and pollutant sources, (2) the primary pollutants driving the discharges, (3) availability of pollution prevention and treatment, (4) the geographic distribution of facilities in the industry, (5) any pollutant discharge trends within the industry, and (6) any relevant economic factors. First, the EPA attempts to verify the pollutant discharges identified as a priority and fill in data gaps. Next, the EPA considers the factors that may be contributing to these discharges. These include, for example, whether the discharges are primarily driven by a few facilities or are more widespread within a category. The EPA may also review readily available technologies and approaches for reducing the discharges.

During a preliminary category review, the EPA may consult data sources including, but not limited to the following: (1) the U.S. Economic Census, (2) TRI and DMR data, (3) trade associations and reporting facilities that can verify reported releases and facility categorizations, (4) regulatory authorities (states and EPA regions) that can clarify how category facilities are permitted, (5) NPDES permits and their supporting fact sheets, (6) EPA effluent guidelines technical development documents, (7) relevant EPA preliminary data summaries or study reports, and (8) technical literature on pollutant sources and control technologies. If a preliminary category review reveals that the reported discharges are correct and are likely to be the result of the production practices widely used throughout the category, or technology approaches may exist for further controlling the pollutants, the EPA may decide to conduct a preliminary or detailed study prior to initiating a rulemaking.

2.2.1.2 Preliminary and Detailed Studies

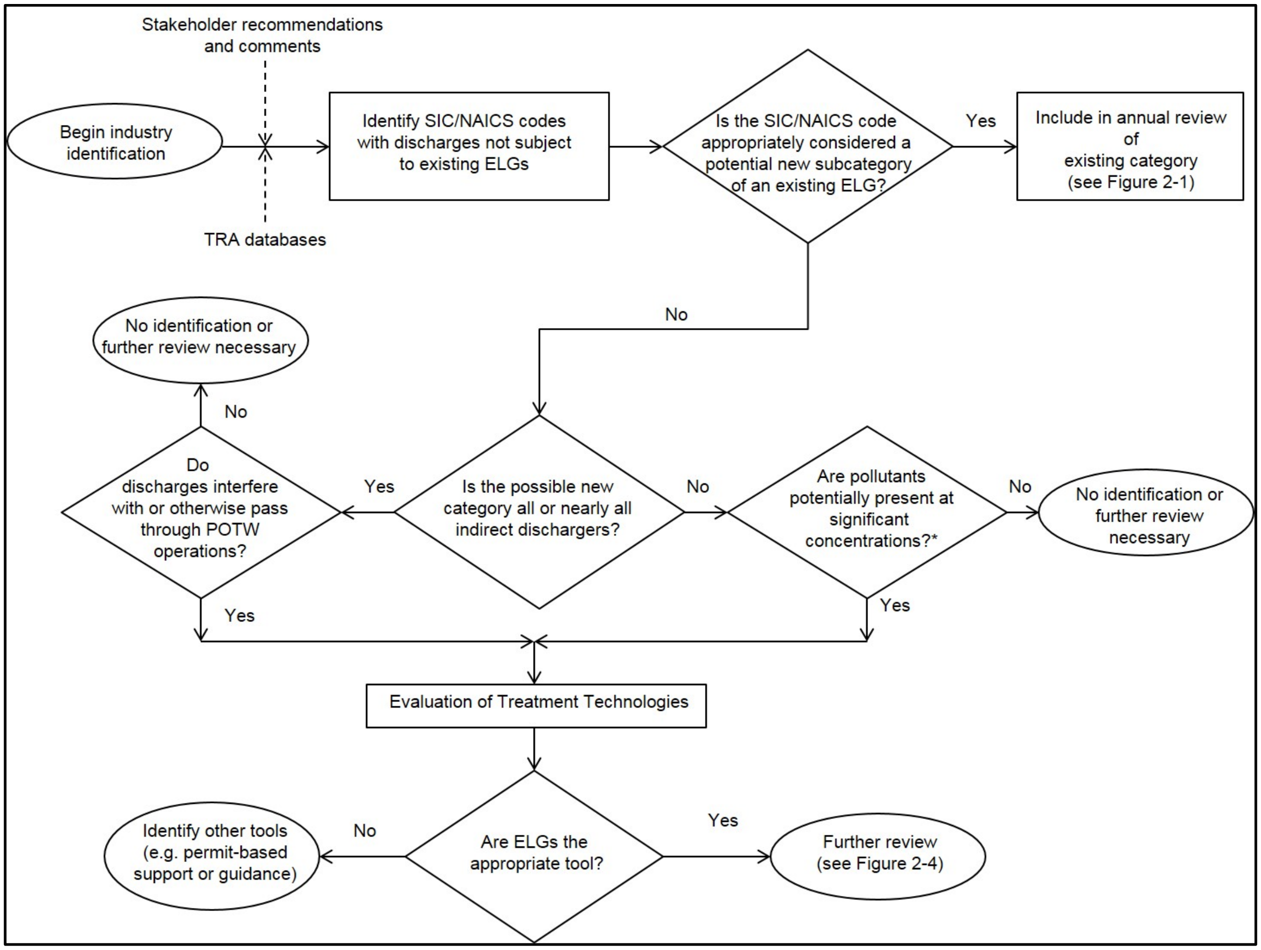
After conducting the preliminary category reviews (depicted in Figure 2-4), the EPA may then conduct a study of an industrial category. Typically, the EPA has conducted two types of studies; preliminary studies and detailed studies. A preliminary study is usually more introductory in its level of information collection and evaluation than a detailed study. Both types of studies typically profile an industry category, gather information about its wastewater discharges, collect information about availability and cost of treatment and pollution prevention technologies, assess the financial status of the facilities in the category, and investigate other factors to decide if it would be appropriate to identify the category for possible effluent guidelines revision. If the EPA needs to collect information as part of either a preliminary or detailed study, it may rely upon existing collection mechanisms or undertake a new collection of information, as appropriate. During preliminary or detailed studies, the EPA also typically examines the factors and data sources listed above for preliminary category reviews. However, during a detailed study, the EPA's examination of a point source category and available pollution prevention and treatment options is generally more rigorous than the analyses conducted during a preliminary category review or preliminary study, and may include primary data collection activities, such as industry questionnaires and wastewater sampling and analysis. The EPA uses this information to determine if a new or revised guideline may be warranted or not. When the EPA determines that a new or revised guideline may be warranted, the information and data gathered for the study inform the rulemaking effort. In such cases, the data does not form the sole basis of any further regulation and are instead supported by various other data. However, in some instances, the additional data and information gathered in a study may indicate that a new or revised guideline is not warranted. Regardless of the outcome, the EPA describes its decisions to conduct studies, or to develop rulemakings, in the Effluent Guidelines Program Plan.[3] When a rulemaking is appropriate, the Plan also describes projected schedules.

[3] While the EPA describes such decisions in its plans, the EPA may elect to describe them first on its website or through a public venue other than the plan.



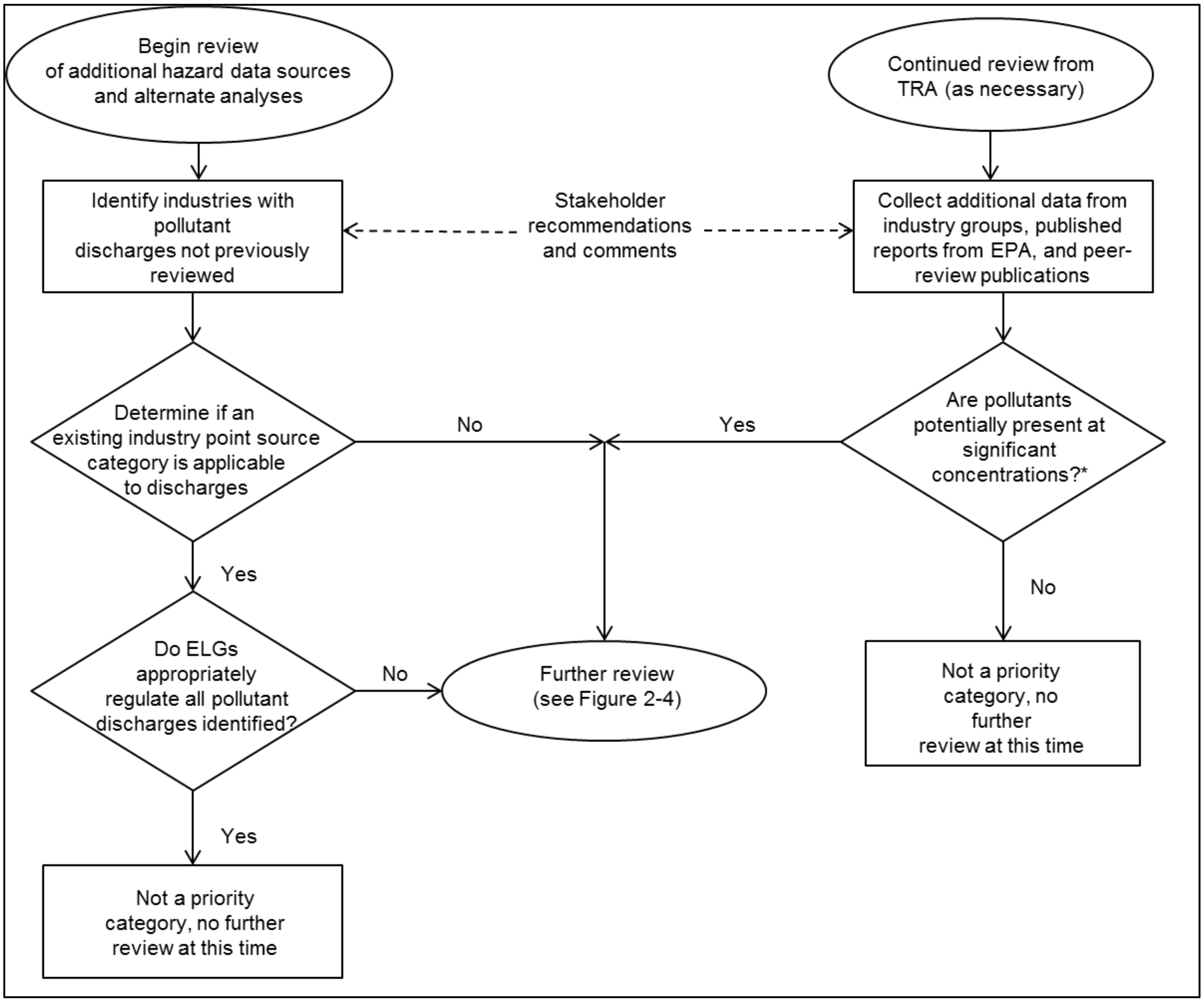
* If the EPA is aware of new segment growth within such a category or new concerns are identified, the EPA may do further review.

Figure 2-1. Annual Review of Existing ELGs Through the TRA



* Significant concentrations may include levels above minimum levels from 40 CFR Part 136 or other the EPA-approved methods, levels above treatable levels, or levels of concern to human health and toxicity.

Figure 2-2. Identification of Possible New ELGs Through the TRA



* Significant concentrations may include levels above minimum levels from 40 CFR Part 136 or other the EPA-approved methods, levels above treatable levels, or levels of concern to human health and toxicity.

Figure 2-3. Annual Review of Existing ELGs and Identification of Possible New ELGs Through Other Review Approaches

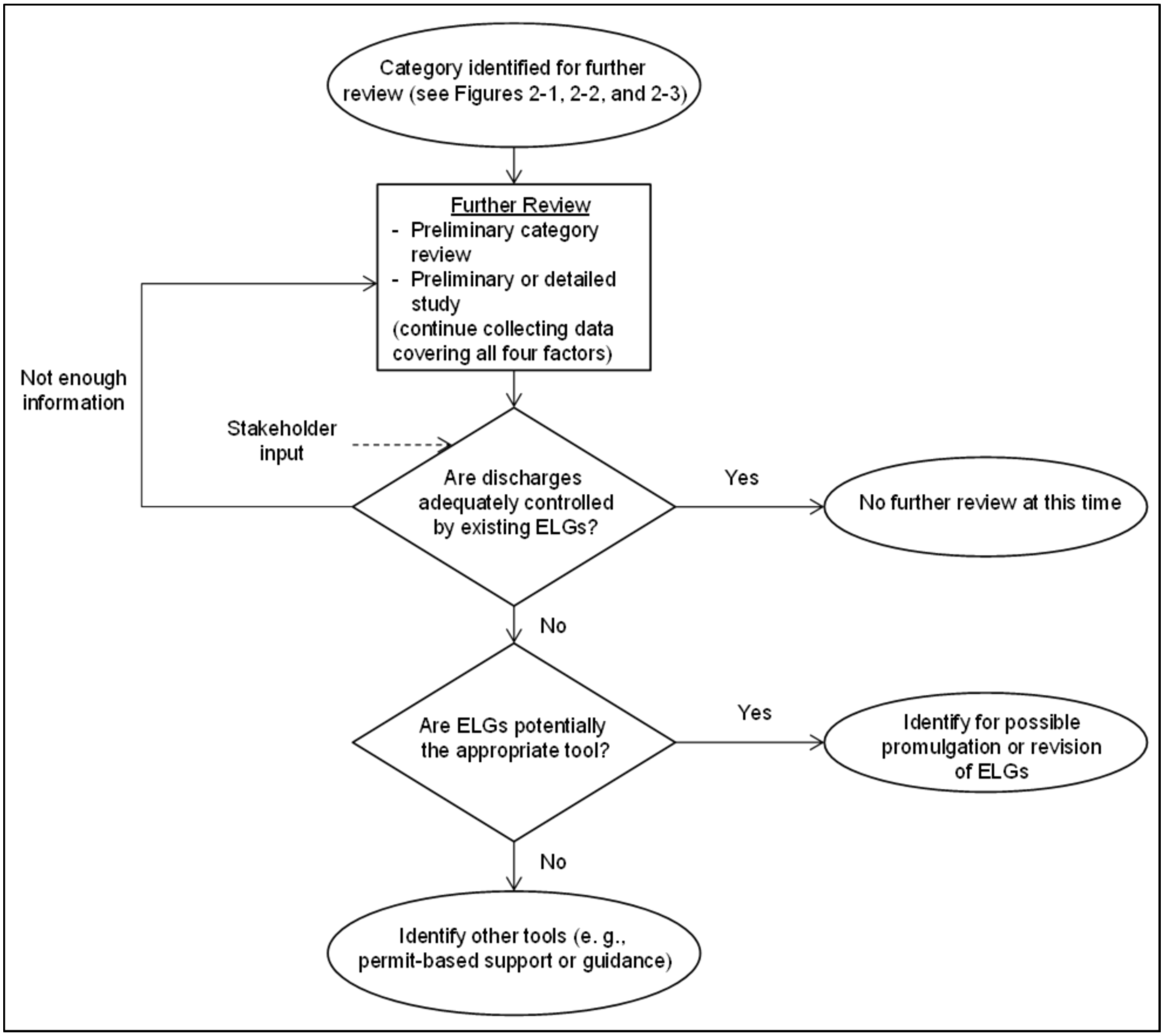


Figure 2-4. Further Review of Industrial Categories Identified During Annual Reviews

2.2.2 Effluent Guidelines Program Plans

CWA sections 304(m)(1)(A) and (B) require the EPA to publish a plan (the Effluent Guidelines Program Plan (Plan)) every two years that identifies any existing industries for effluent guideline revisions and any new industries for effluent guideline regulations. The plan must also provide a rulemaking schedule for any such activities. The EPA also provides information on its review of existing effluent guidelines and pretreatment standards and industries identified for pretreatment standard regulations to increase transparency and stakeholder awareness of its planning process.

The EPA's Review Report Supporting the Final 2016 Plan presents the results of its ELG reviews (U.S. EPA, 2018). The Review Report Supporting the Final 2016 Plan provides and explains the detailed data, analyses, and other information the EPA used in the 2016 annual review of industrial wastewater discharges and is a part of the record for this Final Plan.

The EPA coordinates its reviews under the CWA, with publication of Plans under section 304(m) for several reasons. First, the reviews are linked to the planning effort because each review year's results can inform the content of the Preliminary and Final Plans (e.g., by identifying candidates for ELG revision, or by identifying point source categories for which the EPA has never promulgated ELGs). Second, even though it is not required to do so under the CWA, the EPA serves the public interest by periodically describing the annual review results (including the review process). Doing so while simultaneously publishing the Preliminary and Final Plans makes both processes more transparent. Third, by requiring the EPA to review existing effluent guidelines each year, the EPA understands Congress to have intended for each successive review to build on the results of earlier reviews.

2.3 Effluent Limitations Guidelines and Pretreatment Standards Overview

The effluent guidelines program is one component of the Nation's clean water program, established by the 1972 CWA and subsequent amendments. The effluent guidelines program is authorized under CWA sections 301, 304, 306, and 307, 33 U.S.C. §§ 1311, 1314, 1316, 1317. In summary, the CWA directs the EPA to promulgate categorical regulations through the following six levels of control:

1. Best practicable control technology currently available (BPT).
2. Best conventional control technology (BCT).
3. Best available technology economically achievable (BAT).
4. New source performance standards (NSPS).
5. Pretreatment standards for existing sources (PSES).
6. Pretreatment standards for new sources (PSNS).

For point sources that discharge pollutants directly into surface waters (direct dischargers), the effluent limitations and standards promulgated by the EPA are implemented through NPDES permits (see CWA sections 301(a), 301(b), 402; 33 U.S.C. §§ 1311(a), 1311(b), 1342). For point sources that discharge to POTWs (indirect dischargers), the EPA promulgates pretreatment standards that apply directly to those sources and are enforced by POTWs and by state and federal authorities. See CWA sections 307(b), 307(c); 33 U.S.C. § 1317(b), 1317(c). Figure 2-5 illustrates the relationship between the regulation of direct and indirect dischargers.

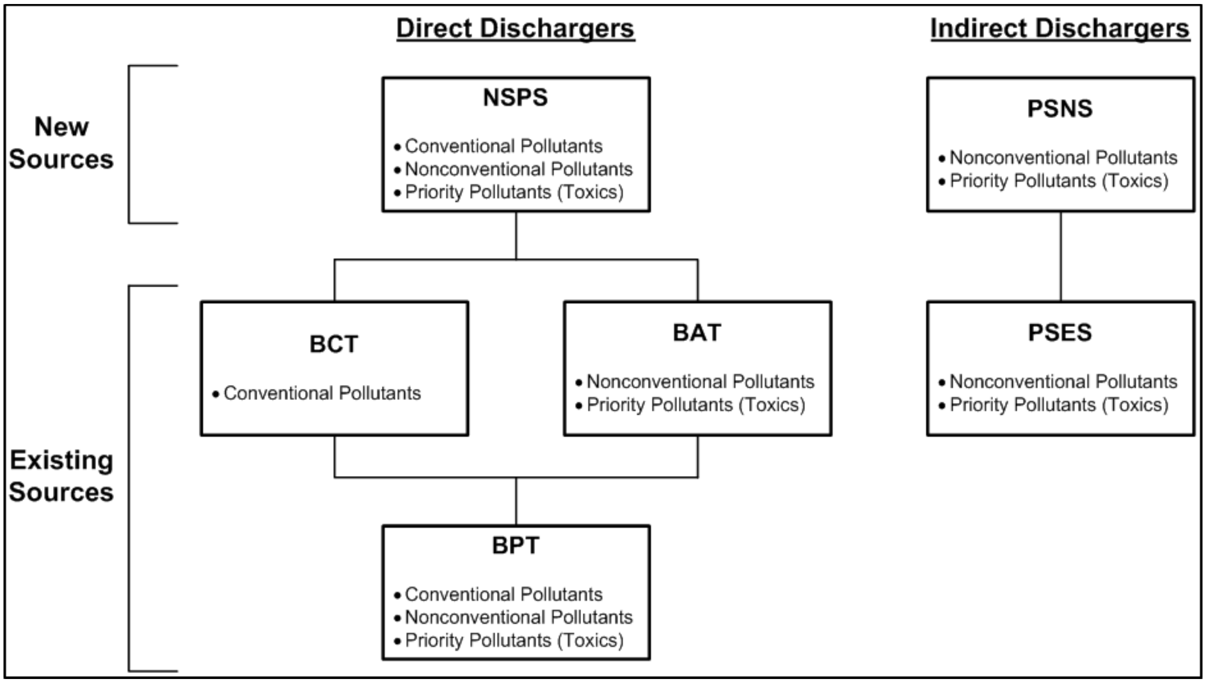


Figure 2-5. Regulations of Direct and Indirect Wastewater Discharges

2.3.1 Best Practicable Control Technology Currently Available (BPT) — CWA Sections 301(b)(1)(A) and 304(b)(1)

The EPA develops effluent limitations based on BPT for conventional, toxic, and nonconventional pollutants. 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 (see 44 FR 44501). The EPA has identified 65 pollutants and classes of pollutants as toxic, among which 126 specific substances have been designated priority toxic pollutants (see Appendix A to Part 423, reprinted after 40 CFR Part 423.17). All other pollutants are considered to be nonconventional.

In specifying BPT, the EPA looks at numerous factors. The EPA first considers the total cost of applying the control technology in relation to the effluent reduction benefits. It also considers the age of the equipment and facilities, the processes employed and any required process changes, engineering aspects of the control technologies, non-water-quality environmental impacts (including energy requirements), and such other factors the Administrator deems appropriate (see CWA section 304(b)(1)(B)). Traditionally, the EPA establishes BPT effluent limitations by averaging the best performances of facilities of various ages, sizes, processes, or other common characteristics within the industry. Where existing performance is uniformly inadequate, BPT may reflect higher levels of control than currently in place in an industrial category, if the EPA determines that the technology can be applied practically.

2.3.2 Best Conventional Pollution Control Technology (BCT) — CWA Sections 301(b)(2)(E) and 304(b)(4)

The 1977 amendments to the CWA required the EPA to identify effluent reduction levels for conventional pollutants associated with BCT for discharges from existing industrial point sources. In addition to the other factors specified in section 304(b)(4)(B), the CWA requires that the EPA establish BCT limitations after considering a two-part, “cost-reasonableness” test. The EPA explained its methodology for the development of BCT limitations in 1986 (see 51 FR 24974; July 9, 1986).

2.3.3 Best Available Technology Economically Achievable (BAT) — CWA Sections 301(b)(2)(A) and 304(b)(2)

For toxic pollutants and nonconventional pollutants, the EPA promulgates effluent limitations guidelines which require application of BAT (see CWA sections 301(b)(2)(A) and 304(b)(2)(B)).

The CWA factors relating to the assessment of BAT shall take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate (see CWA section 304(b)(2)(B)).

In addition to end-of-pipe wastewater treatment, BAT limitations may be based on effluent reductions attainable through changes in a facility’s processes and operations. Where existing performance is uniformly inadequate, BAT may reflect a higher level of performance than is currently being achieved within a particular subcategory, based on technology transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

2.3.4 New Source Performance Standards (NSPS) reflecting Best Available Demonstrated Control Technology — CWA Section 306

NSPS reflect effluent reductions based on the best available demonstrated control technology. New sources have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the best available demonstrated control technology for all pollutants (i.e., conventional, nonconventional, and priority pollutants). In establishing NSPS, the EPA considers the cost of achieving the effluent reduction and any non-water quality environmental impacts including energy requirements (see CWA section 306(b)(1)(B)).

2.3.5 Pretreatment Standards for Existing Sources (PSES) — CWA Section 307(b)

PSES apply to indirect dischargers and are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs, including wastewater conveyance and sludge disposal. Pretreatment standards are technology-based and are analogous to BAT effluent limitations guidelines (see CWA section 301(b)(1)(A)).

The General Pretreatment Regulations, which set forth the framework for implementing national pretreatment standards, are found at 40 CFR Part 403.

2.3.6 Pretreatment Standards for New Sources (PSNS) — CWA Section 307(c)

Like PSES, PSNS apply to indirect dischargers and are designed to prevent the discharges of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. PSNS are to be issued at the same time as NSPS (see CWA section 307(c)). New indirect dischargers have the opportunity to incorporate the best available demonstrated technologies in their plants. The EPA considers the same factors in promulgating PSNS as it does in promulgating NSPS.

3. CURRENT EFFLUENT GUIDELINES PLANNING PROCESS AND METHODOLOGY

This section summarizes the process the EPA used in its 2016 Annual Review to identify industrial categories for potential development of new or revised effluent limitations guidelines and standards (ELGs), as well as the data sources and limitations used to complete this review. This process generally consisted of the following:

- Considering public comments on the *Preliminary 2016 Effluent Guidelines Program Plan* (Preliminary 2016 Plan) and other stakeholder input.
- Continuing the review of select industrial categories or pollutants which the EPA identified for further review in the Preliminary 2016 Plan.
- Continuing investigation of several proposed actions (e.g., engineered nanomaterials) identified in the *Final 2014 Effluent Guidelines Program Plan* (Final 2014 Plan) (U.S. EPA, 2015a).

3.1 Current Annual Review Methodology Summary

This section briefly summarizes the EPA's review methodology. For more information, see the EPA's Review Report Supporting the Final 2016 Plan (U.S. EPA, 2018). In addition, as discussed in Section 5, the EPA also continued detailed studies of existing ELGs for Centralized Waste Treatment (40 CFR Part 437) and Petroleum Refining (40 CFR Part 419).

3.1.1 Public Comments on the Preliminary 2016 Plan and Stakeholder Input

The EPA considered public comments and stakeholder input received on the Preliminary 2016 Plan. See Section 4.1 for a summary of the public comments and stakeholder input received. For a detailed listing of the organizations that provided public comment and stakeholder input as well as the EPA's responses to the comments, see DCN 08521.

3.1.2 Preliminary Category Review

The EPA continued to evaluate three industrial categories that ranked high in the 2015 TRA, and which it identified as warranting further review in the Preliminary 2016 Plan (U.S. EPA, 2016a): Iron and Steel Manufacturing (40 CFR Part 420); Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) (40 CFR Part 414); and Pulp, Paper, and Paperboard (Pulp and Paper) (40 CFR Part 430). For each category, the EPA focused on a subset of pollutants identified for further review in the Preliminary 2016 Plan, shown in Table 3-1.

Table 3-1. Pollutants Reviewed as Part of the EPA's Continued Preliminary Category Reviews

Point Source Category	Pollutants Reviewed	
Iron and Steel Manufacturing (40 CFR Part 420)	• Lead • Nitrate • Manganese	• Copper • Total Phosphorus
OCPSF (40 CFR Part 414)	• Total Residual Chlorine • Nitrate	• Total Phosphorus

Table 3-1. Pollutants Reviewed as Part of the EPA's Continued Preliminary Category Reviews

Point Source Category	Pollutants Reviewed	
Pulp and Paper (40 CFR Part 430)	• Lead • Mercury • Manganese • Hydrogen Sulfide	• Selenium • Cadmium • Total Phosphorus • Total Reduced Sulfur

The EPA also continued the review of four additional point source categories brought to the EPA's attention through public and stakeholder comments and input: Battery Manufacturing (40 CFR Part 461), Electrical and Electronic Components (40 CFR Part 469), Metal Finishing (40 CFR Part 433) and Oil and Gas Extraction in the Cook Inlet (40 CFR Part 435). In addition, the EPA reviewed food and beverage manufacturing based on results of a 2015 TRI National Analysis performed by the EPA's Office of Pollution Prevention and Toxics (OPPT).

Sections 4.2 and 4.3 of this Plan present the evaluations from the EPA's review of these additional industrial categories.

3.1.3 Continued Investigations of Pollutants and Treatment Technologies

The EPA continued its investigation of several proposed actions identified in the Final 2014 Plan, including (1) an investigation of the manufacture and processing of engineered nanomaterials (ENMs) as a potential new source of industrial wastewater discharge; (2) a review of relevant literature documenting new and improved industrial wastewater treatment technology performance for inclusion in its Industrial Wastewater Treatment Technology Database (IWTT); and (3) a targeted review of pesticide active ingredients (PAIs) without PAI-specific effluent limitations for pesticide chemicals manufacturing under the Pesticide Chemicals ELGs. Section 4.4 of this Plan presents the evaluations from the EPA's investigations.

3.1.4 Categories for Which EPA Has Recently Promulgated or Revised ELGs

The EPA did not consider industrial categories for which ELGs were recently established or revised but are not yet fully implemented. In general, the EPA removes an industrial point source category from further consideration during a review cycle if the EPA established or revised the category's ELGs within seven years of the annual reviews. This seven-year period allows time for the ELGs to be incorporated into NPDES permits. Table 3-2 lists the categories the EPA excluded from the 2016 Annual Review due to this seven-year period.

Table 3-2. Point Source Categories That Have Undergone Recent Rulemaking

40 CFR Part	Point Source Category	Date of Rulemaking
449	Airport Deicing	May 16, 2012
450	Construction and Development	March 6, 2014

Table 3-2. Point Source Categories That Have Undergone Recent Rulemaking

40 CFR Part	Point Source Category	Date of Rulemaking
423	Steam Electric Power Generating[4]	September 30, 2015
435	Oil and Gas Extraction[a]	June 28, 2016
441	Dental Offices	June 14, 2017

[a] The EPA established pretreatment standards under Subpart C which prohibit discharges of wastewater pollutants from onshore unconventional oil and gas extraction facilities to POTWs.

In addition, the EPA did not consider industrial categories or subcategories that were subject to an ongoing rulemaking process. These include the Canned and Preserved Seafood Category (covering the Alaskan seafood processing subcategories). See Section 6 for details on the rulemaking status of this category.

Lastly, the EPA did not consider industrial categories or subcategories for which it has recently considered developing or revising ELGs. This is because the EPA thoroughly reviewed these categories separately from the annual review process. Specifically, the EPA excluded facilities that produce chlorine and chlorinated hydrocarbons (CCH) that fall within either the OCPSF (40 CFR Part 414) or the Inorganic Chemicals Manufacturing (40 CFR Part 415) point source categories, as the EPA's review was limited to only those facilities producing CCH and did not include the remainder of the OCPSF or Inorganic Chemicals categories. See Section 5 of the EPA's *Final 2012 and Preliminary 2014 Effluent Guidelines Program Plans* (U.S. EPA, 2014) for details on the EPA's evaluation of this category.

3.1.5 DMR and TRI Data

The EPA uses Discharge Monitoring Report (DMR) and Toxics Release Inventory (TRI) data to support its annual reviews. These data, available in the DMR Loading Tool, are processed to calculate annual DMR and TRI loadings used to supplement the EPA's annual reviews according to the methodologies laid out in the EPA's *Technical Support Document for the Annual Review of Existing Effluent Guidelines and Identification of Potential New Point Source Categories* (2009 Screening-Level Analysis (SLA) Report) (U.S. EPA, 2009).[5]

The EPA uses DMR data to evaluate direct discharges of pollutants to waters of the U.S. that are regulated by a permit in which monitoring is required. More than 250,000 industrial facilities and 17,000 POTWs have NPDES individual permits or general permits[6] for wastewater discharges to U.S. waters. Facilities must report compliance with NPDES permit requirements via DMRs. DMR data can include pollutant concentrations and/or quantities, flow, and permit limits. Thus, DMR data provide readily available and relevant information on industrial pollutant

[4] Under a separate action, in 2017, the EPA announced that it was reconsidering the 2015 steam electric ELGs and is planning to conduct a rulemaking to potentially revise particular aspects of those regulations. See https://www.epa.gov/eg/steam-electric-power-generating-effluent-guidelines-2015-final-rule.
[5] The 2009 SLA Report also describes the annual review methodology conducted as part of the TRA and the EPA's use of DMR and TRI data (U.S. EPA, 2009).
[6] An NPDES individual permit is written to reflect site-specific conditions of a single discharger based on information submitted by that discharger in a permit application. An individual permit is unique to that discharger. NPDES general permits are written to cover multiple dischargers with similar operations and types of discharges, based on the permit writer's professional knowledge of those types of activities and discharges (U.S. EPA, 2010).

discharges to surface waters (i.e., direct discharges). State permitting authorities and NPDES permittees submit DMR data to the EPA's Integrated Compliance Information System (ICIS)-NPDES database. The EPA downloads these data from the DMR Loading Tool to further support the annual reviews of industrial wastewater discharges.

The EPA uses TRI data to evaluate indirect discharges of pollutants to POTWs, as well as the direct discharge of pollutants to waters of the U.S. that are not regulated via NPDES permits. TRI requires facilities that meet operating thresholds to report onsite releases of certain listed toxic chemicals to receiving streams and POTWs, as well as other media (e.g., air, land, underground wells). The list of chemicals reported to TRI can be broader than the chemicals for which facilities have NPDES permit limits or monitoring requirements that are reported on DMRs. Thus, TRI data provide supplementary information to DMR data regarding potential additional pollutants that may be discharged by an industrial category. However, as discussed below, TRI data are somewhat limited in utility due to TRI reporting requirements, including requirements that allow facilities to report releases that are based on estimates and not actual monitoring data. As with DMR data, the EPA downloads the TRI data for the 2016 Annual Review from the DMR Loading Tool. Table 3-3 describes the utility and limitations of the DMR and TRI data. See Section 2.1 of the 2015 Annual Review Report for further information on DMR and TRI data sources and limitations (U.S. EPA, 2016b).

Table 3-3. TRI and DMR Data Utility and Limitations

TRI	DMR
Utility	
National scope.	National scope.
Includes indirect releases to POTWs, in addition to direct discharges to surface waters.	Includes direct discharges to surface waters from facilities with a NPDES permit.
Includes estimated releases of several hundred toxic chemicals, some of which are not reported on DMRs.	Includes discharge data for parameters included in NDPES permits; data are based on effluent chemical analysis (concentrations or quantities) and metered flows.
Includes discharge data from facilities classified by manufacturing NAICS code.	Includes discharge data from facilities classified by SIC code.
Limitations	
TRI requires facilities to report releases for a specific list of chemicals; therefore, not all pollutants discharged from a facility may be captured.	The types of pollutants and discharge data reported are determined by the specific monitoring requirements in the facility's permit.
Some reported releases are based on estimates (based on TRI reporting guidance); some facilities may overestimate or underestimate releases.	Facilities do not always report average concentrations or quantities, which results in overestimates of annual loads if only maximum values are reported.
Small establishments and those that do not meet TRI industry reporting criteria are not included.	Data characterizing indirect discharges from industrial facilities to POTWs are not included.
Certain chemicals are reported as a class, not as individual compounds.[a]	Facilities do not always report the duration of discharges, which may result in overestimates of toxic releases based on the assumption that discharges are continuous.
Facilities are identified by NAICS codes, not point source category.	Facilities are identified by SIC codes, not point source category.
Facilities report annual pollutant loads; not pollutant concentration or flow data.	Some permits do not clearly identify the type of wastewater discharged, which may solely include stormwater, non-contact cooling water or other non-process wastewater; pipe identification is not always clear to enable the EPA to identify the relevant facility wastestreams that should be considered in the analyses.
	Limited discharge data for minor[b] permittees.
	Data may contain errors from routine manual data entry.
	Since 2012, DMR data reported to ICIS-NPDES do not include data from New Jersey.[c]

[a] Chemicals reported as a class include polycyclic aromatic compounds, dioxin and dioxin-like compounds, and some metal compounds.

[b] The EPA developed a major/minor classification system for NPDES permits. The distinction was initially made to help the EPA and states set priorities for permit issuance and reissuance. Facilities with minor discharges must report compliance with NPDES permit limits via monthly DMRs submitted to the permitting authority; however, the EPA does not require the permitting authority to enter data in the Integrated Compliance Information System (ICIS)-NPDES databases (U.S. EPA, 2010). Effective December 2016, the NPDES Electronic Reporting Rule requires facilities to electronically submit their DMR data and requires states and other regulatory authorities to share data electronically with the EPA (U.S. EPA, 2015b).

c In 2006 states began transitioning their DMR reporting from the Permit Compliance System (PCS) to ICIS-NPDES. The transition was completed in 2012. By 2012, all states and U.S. territories/tribes had completely migrated to ICIS-NPDES, except New Jersey; thus, New Jersey has not supplied the EPA with required discharge data, including 2015 DMR data (U.S. EPA, 2016b).

The EPA performed a quality review of the DMR and TRI data downloaded from the DMR Loading Tool to assess the data's completeness, accuracy, and reasonableness, in accordance with the *Environmental Engineering Support for Clean Water Regulations Programmatic Quality Assurance Project Plan (PQAPP)* (ERG, 2013). See Section 2.1 of the Review Report Supporting the Final 2016 Plan for a detailed discussion of the quality review of the DMR and TRI data.

3.1.6 Canada's NPRI Data

The EPA compared available pollutant release data and reporting requirements from the U.S. TRI to the Canadian NPRI. The goal of this analysis was to identify potential additional pollutants that may be present in industrial wastewater discharges from iron and steel manufacturing, OCPSF, and pulp and paper facilities in the U.S., not currently captured in the EPA's traditional data sources for industrial wastewater discharge information (i.e., TRI and DMR).

NPRI is Canada's legislated, publicly accessible inventory of pollutant releases to air, water, and land, disposals, and transfers for recycling. The Canadian Environmental Protection Act 1999 requires facilities that manufacture, process, or otherwise use or release certain substances, and that meet reporting thresholds and other requirements to report their pollutant releases, disposals, and transfers annually to NPRI. In recent years, approximately 8,000 facilities report to NPRI (Environment Canada, 2013). Table 3-4 summarizes and compares the NPRI and TRI program reporting requirements and chemical universes.

Table 3-4. Reporting Requirements of TRI and NPRI

Inventory	Summary of Reporting Requirements	Chemical Universe
TRI	Facilities must meet three criteria to report to TRI[a]: • Be covered under a specific set of NAICS codes (related to mining, utilities, manufacturing, merchant wholesalers, wholesale electronic markets, publishing, hazardous waste, federal facilities). • Have 10 or more full-time employee equivalents. • Manufacture, process, or otherwise use any of the listed chemicals above an activity threshold (e.g., 25,000 pounds for non-persistent, bioaccumulative, and toxic (PBT) chemicals).	• The TRI chemical list contains 688 reportable chemicals or chemical groups [b] • TRI requires reporting based on mass thresholds. • The 2013 TRI data include direct and indirect water releases associated with 256 of the 688 chemicals.[c]
NPRI	Facilities must meet one of the following criteria and the mass or concentration thresholds for one or more of the listed NPRI substances to report to NPRI[d]: • Have 10 or more employees, or • Perform certain activities, including incineration, wood preservation/pressure treatment, terminal operations, wastewater collection, pits and quarries operation, or pipeline installation.	• The NPRI Substance List contains 366 reportable chemicals.[e] • NPRI requires reporting based on the mass or concentration thresholds. • The 2013 NPRI data include direct and indirect water releases

		associated with 111 of the 366 reportable chemicals.[f]

Note: The EPA used TRI and NPRI data for reporting year 2013 because those were the most recent data available when the review began.
[a] Source: (U.S. EPA, 2016b)
[b] Sources: (U.S. EPA, 2015c, 2015d)
[c] Source: *TRILTOutput2013_v1*
[d] Source: (Environment Canada, 2015)
[e] Sources: (Environment Canada, 2014a)
[f] Source: (Environment Canada, 2014b)

The EPA performed a quality review of the NPRI data to assess the data's completeness, accuracy, and reasonableness, in accordance with the *Environmental Engineering Support for Clean Water Regulations Programmatic Quality Assurance Project Plan (PQAPP)* (ERG, 2013). Table 3-5 summarizes the NPRI data utility and limitations. Section 2.2 of the Review Report Supporting the Final 2016 Plan describes in detail the EPA's quality evaluation of the NPRI data (U.S. EPA, 2018). The EPA determined that the data are of sufficient quality and that the utility and limitations of the NPRI data are similar to TRI; therefore, the datasets can be readily compared.

Table 3-5. Utility and Limitations on NPRI Data

Utility	Limitations
• National in scope, including data from facilities across Canada. • Includes industrial releases to municipal sewage treatment plants (indirect releases), not just direct releases to surface water. • Identifies facilities by NAICS code, which can be used to match the data in TRI and facilitate the analysis of reporting differences and potential gaps in the TRI data associated with specific industrial categories. • Includes release data from many industrial categories. • For the Iron and Steel Manufacturing, OCPSF, and Pulp and Paper point source categories, includes releases of some toxic chemicals that do not overlap with pollutants reported for these industries in TRI.	• Many small establishments (fewer than 10 full-time equivalent employees) are not required to report (unless they meet another reporting criterion), nor are facilities that do not meet the reporting thresholds. Additionally, reporting is not required for any particular NAICS codes. Thus, facilities reporting to NPRI comprise a subset of an industry. • Release reports are, in part, based on estimates, not measurements. Facilities may use a number of methods to report releases, including estimating and direct measurement. • NPRI only requires facilities to report certain chemicals; therefore, all chemicals discharged from a facility may not be captured.

3.1.7 Other Data Sources Supporting the EPA's Current Annual Review

The EPA also used data from government and other peer reviewed publications or databases, publicly available data, correspondence with industry and state and local governments, industry conferences, and online sources to support its analyses of industrial wastewater discharges. The EPA considered the accuracy, reliability, and representativeness of data sources to assess their usability for the 2016 Annual Review, as described below and in Section 4.3.1 of the PQAPP (ERG, 2013). The EPA also referenced Table 4-2 in the PQAPP to determine that the sources provided information that is sufficiently accurate and reliable for use in the 2016 Annual Review (ERG, 2013).

Accuracy. The EPA assumed that the data and information contained in supporting government publications or databases, selected conference proceedings, peer-reviewed journal articles, and other academic literature are sufficiently accurate to support the general and facility-specific characterization of industries, process operations, and wastestreams. The EPA considered the data and information obtained from direct correspondence with state and local government representatives and regulators, and data from federal government agencies as sufficiently accurate to characterize and quantify specific wastewater discharges or process operations from individual facilities. The EPA considered data from industry, including discussions with trade association and correspondence with individual facilities, sufficiently accurate to provide a qualitative characterization and understanding of industries, process operations, and wastestreams. The EPA considered government and other economic data sources (e.g., U.S. economic census data, IBISWorld Reports) to be sufficiently accurate and used them in profiling industries and analyzing market statistics.

Reliability. The EPA used the following criteria to evaluate the reliability of available data and other information collected and used in its analyses:

- The scientific work is clearly written, so that all assumptions and methodologies can be identified.
- The variability and uncertainty (quantitative and qualitative) of the information or in the procedures, measures, methods, or models are evaluated and characterized.
- The assumptions and methods are consistently applied throughout the analysis, as reported in the source.
- Wastestreams, parameters, units, and detection limits (when appropriate) are clearly characterized.
- The governmental or facility contact is reputable and has knowledge of the industry, facility, process operation, or wastestreams of interest.

The EPA considered data sources that met these criteria sufficiently reliable to characterize and understand industries, process operations, and wastestreams.

Representativeness. The EPA used the following criteria to evaluate whether the data and information provide a national perspective and are relevant to and representative of the industry to which the data are applied:

- *Relevance*: The data source is relevant to the industry or pollutant group of interest (e.g., the industry description or Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes provided in the data source, when available, match the industry; the Chemical Abstract Service (CAS) number matches the CAS number for the pollutant or interest).
- *National applicability*: The data can be applied broadly to provide a national perspective relative to the industry or pollutant group of interest (e.g., the data are characteristic of the industry or pollutant group as a whole).

The EPA considered data sources that met these criteria sufficiently representative to characterize industries, process operations, and wastestreams. For more information on the quality assurance activities supporting the 2016 Annual Review, including a summary of the EPA's data quality and utility evaluation for these additional data sources, see Appendix A of the Review Report Supporting the Final 2016 Plan (U.S. EPA, 2018).

4. SUMMARY OF THE CURRENT ELG REVIEW

This section summarizes the results of the current ELG Review.

4.1 Summary of Public Comments and Stakeholder Input

The EPA published its Preliminary 2016 Plan and provided a 30-day public comment period starting on June 27, 2016 (see 81 FR 41535). The EPA received 11 public comment letters on the Preliminary 2016 Plan, representing 20 organizations: one non-profit trade association, one organization representing POTWs, two municipal entities, seven organizations representing industry[7], and nine environmental organizations.[8] A more detailed summary of the comments can be found in the Review Report Supporting the Final 2016 Plan (U.S. EPA, 2018).

Treatment of oil and gas extraction wastewaters received the most comments from a wide range of stakeholders. Industry commenters assert the need for wastewater management approaches that allow for discharge of treated oil and gas wastewaters, particularly in areas of water scarcity. Others assert the need for regulations such that all pollutants in these wastewaters are treated at facilities equipped to do so. Most of these comments were general; however, some were specific to requirements for oil and gas extraction facilities in 40 CFR Part 435 while others were specific to Centralized Waste Treatment facilities subject to 40 CFR Part 437. For additional information, see Sections 5.2, 7.1, and 7.4. The EPA received one set of comments from eight environmental organizations indicating that the EPA's decision to delist Coalbed Methane Extraction from the ELG Plan was premature and suggesting that the EPA reconsider in light of shifting gas prices, demand, and costs of wastewater treatment. The EPA also received public comments regarding the Hospitals (40 CFR Part 460), Concentrated Animal Feeding Operations (CAFOs) (40 CFR Part 412), Concentrated Aquatic Animal Production/Aquaculture (40 CFR Part 451), Landfills (40 CFR Part 445), and Soap and Detergent Manufacturing (40 CFR Part 417) point source categories which were not specifically mentioned in the Preliminary 2016 Plan. For additional information, see the Docket supporting the Final 2016 Plan (docket number EPA-HQ-OW-2015-0665) which includes a complete set of the comments submitted, as well as the Agency's responses (see DCN 08521).

4.2 Evaluations from the EPA's Continued Preliminary Review of Categories Identified from the 2015 Toxicity Ranking Analysis (TRA)

The EPA continued to evaluate three regulated industrial categories it had identified in the Preliminary 2016 Plan as warranting further review: Iron and Steel Manufacturing, Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF), and Pulp, Paper, and Paperboard (Pulp and Paper). The EPA summarized the evaluations from these continued preliminary category reviews below. Section 4 of the Review Report Supporting the Final 2016 Plan provides further details of the evaluations (U.S. EPA, 2018).

[7] Three organizations representing industry submitted public comments on the Preliminary 2016 Plan collectively in one comment letter. Four organizations representing industry submitted separate public comments.
[8] Eight environmental organizations submitted public comments on the Preliminary 2016 Plan collectively in one comment letter. One environmental organization submitted a separate public comment.

- **Iron and Steel Manufacturing (40 CFR Part 420).** The EPA reviewed lead, nitrate, copper, manganese, and total phosphorus discharges from the Iron and Steel Manufacturing Category. From its continued preliminary review of the Iron and Steel Manufacturing Category, concluded that no additional review is warranted for any of the identified pollutants at this time other than possibly nutrients.

  — ***Lead.***

    - The EPA identified a large number of iron and steel manufacturing facilities with reported lead discharges in the 2013 and 2014 DMR and TRI data. The Iron and Steel Manufacturing ELGs regulate lead in eight of 13 subcategories. The EPA compared facility concentration data in DMR and provided by facilities reporting to TRI to concentrations achieved by the technologies evaluated in the 2002 Iron and Steel Manufacturing rulemaking. The data show that the direct discharge concentrations of lead from this category are below the concentrations achieved by the technologies evaluated for the 2002 rulemaking. Facility-specific concentration data for indirect dischargers are above most of the long-term averages (LTAs) for lead evaluated in the 2002 rulemaking; however, they represent concentrations from facilities reporting the highest indirect releases of lead to TRI.

      Discussions with one state permitting authority indicated that the technologies for removing metals at iron and steel manufacturing facilities are well established and that they are generally removed through solids removal. The EPA's review of performance data in the IWTT database identified several technologies that effectively remove lead (not specific to iron and steel manufacturing), achieving effluent concentrations lower than the median 2014 DMR and TRI lead concentrations and generally less than, but on the same order of magnitude as the concentrations achieved by the technologies considered during the 2002 Iron and Steel Manufacturing rulemaking.

  — ***Nitrate.***

    - The Iron and Steel Manufacturing ELGs do not regulate nitrate; however, the EPA identified a large number of facilities with reported nitrate releases in the 2013 and 2014 TRI data. From the review of facility concentration data in DMR and data provided by facilities reporting to TRI, the EPA found that, in general, the nitrate direct discharge concentration values are above, but on the same order of magnitude as the concentrations achieved by most of the technologies considered in the EPA's 2002 rulemaking for all but the cokemaking subcategory, BAT option, which is two orders of magnitude higher than the other subcategory LTAs. Only a few facilities report indirect releases of nitrate to TRI, and the EPA was unable to obtain nitrate concentration data from these dischargers.

The EPA's review of performance data in the IWTT database identified several technologies achieving concentrations generally of the same order of magnitude as the range of LTA nitrate concentrations identified for the 2002 rulemaking for all but the cokemaking subcategory, BAT option. In addition, several of the studies show concentrations generally of the same order of magnitude but lower than the median nitrate concentrations identified from the 2014 DMR and TRI direct discharge data.

— ***Copper.***

- The Iron and Steel Manufacturing ELGs do not regulate copper; however, the EPA identified a large number of facilities with reported copper releases in the 2013 and 2014 TRI data. From the review of available facility concentration data in DMR, and data provided by facilities reporting to TRI, the EPA found that the direct discharges of copper are below, but on the same order of magnitude as the concentrations achieved by the technologies considered during the 2002 rulemaking. The EPA also found that the indirect discharge median concentration is above, but on the same order of magnitude as the concentrations achieved by the technologies considered during the 2002 rulemaking. However, the indirect data represent concentrations from facilities reporting the highest indirect releases of copper to TRI.

  Effluent concentrations of copper from studies in IWTT are generally of the same order of magnitude as the range of the LTA copper concentrations identified for the 2002 rulemaking. Two studies achieved copper concentrations below the copper LTA range. In addition, several of the studies show concentrations below the median copper concentrations identified from the 2014 DMR and TRI direct discharge data. This suggests that lower concentrations are potentially obtainable, however current copper concentrations in discharges from iron and steel facilities are generally on the same order of magnitude as those achieved by the technologies evaluated during the 2002 rulemaking and those identified by IWTT.

— ***Manganese.***

- The Iron and Steel Manufacturing ELGs do not regulate manganese; however, the EPA identified a large number of facilities with releases in the 2013 and 2014 TRI data. During the 2002 rulemaking, the EPA ultimately decided not to establish manganese limitations because manganese may be used as a treatment chemical.

  From the review of facility concentration data in DMR and data provided by facilities reporting direct and/or indirect releases to TRI, the EPA found that the median concentration values are above most of the concentrations achieved by the technologies considered during the 2002 rulemaking. The EPA followed up with two additional iron and steel manufacturing facilities; neither facility confirmed the source of manganese in their wastewater, but both suspect the discharges may result from background concentrations in the influent water. One state contact indicated that manganese is not contained in feedstock at iron and steel manufacturing facilities, but rather is a component of coal and could be a byproduct of burning coal and other substances. Of the treatment technology performance data for manganese removal in IWTT, only one study showed effluent manganese concentrations lower than the range of LTA manganese concentrations identified for the 2002 rulemaking, however, it was applied to petroleum refinery wastewater and was pilot scale. In general, manganese effluent concentrations observed from the studies in IWTT are also higher than, or the same order of magnitude as the median manganese concentrations identified from the 2014 DMR and TRI direct discharge data.

— ***Total Phosphorous (identified from the Canadian NPRI analysis).***

  - The EPA's review of NPRI identified 13 pollutants that were reported in NPRI in 2013 but not to TRI, over half of which are polycyclic aromatic hydrocarbons. The EPA focused its review on total phosphorus, as it was the only pollutant reported by more than 20 percent of the iron and steel manufacturing facilities to the 2013 NPRI. TRI does not require facilities to report discharges of total phosphorus, therefore, the EPA compared the magnitude of the 2013 NPRI discharges to total phosphorus discharges reported in 2013 DMR data. In general, the magnitude of total phosphorus releases in the 2013 NPRI is similar to the 2013 DMR total phosphorus loadings, with the exception of the top two discharges in the U.S., which are much higher.

- **Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) (40 CFR Part 414).** The EPA reviewed total residual chlorine, nitrate, and total phosphorus discharges from the OCPSF Category. From its continued preliminary review of the OCPSF Category, no additional follow-up is warranted for any of the identified pollutants at this time other than possibly nutrients. In its next review, the EPA plans to conduct a cross-industry review of nutrient discharges from industrial sources.

— ***Total Residual Chlorine.***

  - Total residual chlorine does not have limitations under the OCPSF ELGs; however, the EPA identified 103 facilities with reported discharges on 2014 DMRs.

    From the review of facility permit limits and discussion with state permitting authorities, the EPA found that total residual chlorine is often added to cooling tower blowdown and other non-process wastewater to inhibit biological growth. Discussions with Iowa and Nebraska suggest that (at least in these states), the permitted wastestream is subsequently dechlorinated. The EPA also found that some facilities, specifically in Texas and West Virginia, combine sanitary wastewater with non-process or process wastewater. In Texas, state code requires chlorination for disinfection purposes, and in these instances, facility permits establish a minimum total residual chlorine limit, often without establishing daily maximum and monthly average permit limits for total residual chlorine. Iowa, Nebraska, and West Virginia indicated that total residual chlorine limitations are based on state water quality criteria, that consider mixing zones and other factors applied when deriving water quality-based permit limits.

Collectively, the data suggest that OCPSF facilities may be adding chlorine to disinfect cooling tower water or other non-process wastewater, or to disinfect commingled sanitary wastewater. In most of these cases, facilities have daily maximum or monthly average total residual chlorine permit limits based on water quality criteria designed to protect the receiving water body.

— ***Nitrate.***

- Nitrate does not have limitations under the OCPSF ELGs; however, the EPA identified 120 facilities with reported releases to TRI in 2014. From the review of facility nitrate concentration data in DMR, and data provided by facilities reporting to TRI, the EPA determined that the majority of nitrate concentrations are likely present at levels that could be reduced by further treatment based on a comparison to the baseline value and the national primary drinking water regulation for nitrate. From the review of available treatment technology information in IWTT for industries other than OCPSF, the EPA found that the effluent concentrations associated with these treatment technologies are generally lower than the 2014 DMR OCPSF facility median nitrate concentrations; however, the technologies reviewed did not specifically target nitrate removals and were not specifically applied to OCPSF wastewater. These data collectively suggest that nitrate concentrations in discharges may be present at levels that can be further reduced through further treatment.

— ***Total Phosphorus (identified from the Canadian NPRI analysis).***

- Twenty-three percent of Canadian OCPSF facilities in the 2013 NPRI (10 facilities) reported releases of total phosphorous. The EPA's investigation found that NPRI and TRI have different reporting requirements for different types of phosphorus, and TRI does not require reporting of total phosphorus. The EPA reviewed available 2013 DMR data and found that 16 percent of OCPSF facilities (54 facilities) reported total phosphorous loads greater than zero. In comparing the data, total phosphorus discharges reported on 2013 DMRs are higher than total phosphorus releases in the 2013 NPRI. The EPA has not previously reviewed total phosphorous discharges as part of recent annual reviews because total phosphorous does not have an associated toxic weighting factor and consequently does not come up as a pollutant of concern in the EPA's TRA. However, from the NPRI analysis and subsequent review of available DMR data, the EPA identified a substantial number of facilities that report total phosphorous discharges.

- **Pulp, Paper, and Paperboard (Pulp and Paper) (40 CFR Part 430).** The EPA reviewed lead, mercury, manganese, hydrogen sulfide, selenium, cadmium, total phosphorus, and total reduced sulfur discharges from the Pulp and Paper point source category. Based on its continued preliminary review of this category no additional follow-up is warranted for any of the identified pollutants at this time other than possibly nutrients.

  — ***Lead.***

  - Lead does not have limitations under the Pulp and Paper ELGs; however, the EPA identified 175 mills with reported releases to TRI in 2014. From the review of direct discharge concentration data on 2014 DMRs and provided by mills, the EPA found that the median concentrations for both the DMR and TRI data are an order of magnitude below the 2006 Form 2C median concentration and the EPA Method 200.7 minimum level (ML). From the review of indirect discharge concentration data provided by the mills, the EPA found that all average concentrations fall below the Method ML. Though not directly applicable to pulp and paper mill wastewater, the EPA's review of available treatment technology information in IWTT identified effluent concentrations of lead similar to the 2014 median effluent lead concentrations identified during this review and well below the Method ML for lead. Consistent with the findings during the 2006 detailed study, these analyses suggest that lead is not generally present at a level that could be controlled by further treatment.

  — ***Mercury.***

  - Mercury does not have limitations under the Pulp and Paper ELGs; however, the EPA identified 86 mills with reported releases to TRI in 2014. From the review of direct discharge concentration data on 2014 DMRs and provided by mills, the EPA found that the median concentrations for both the DMR and TRI data are two orders of magnitude below the 2006 Form 2C median concentration and the EPA Method 245.1 ML. From the review of indirect discharge concentration data provided by the mills, the EPA found that two of three average concentrations are below the Method ML and the third average concentration is the same order of magnitude as the Method ML. Though not directly applicable to pulp and paper mill wastewater, the EPA's review of available treatment technology information in IWTT found that effluent concentrations of mercury are similar to the 2014 median effluent mercury concentrations identified during this review. Consistent with the findings during the 2006 detailed study, these analyses suggest that mercury is not generally present at a level that could be controlled by further treatment. Additionally, several of the mills that provided data for this review indicate that they have put in place measures to monitor and control their sources of mercury.

— ***Manganese.***

- Manganese does not have limitations under Pulp and Paper ELGs; however, the EPA identified 110 mills with reported releases to TRI in 2014. The EPA found that the median direct and indirect discharge concentrations, including the additional concentration data provided by the trade associations, are generally two orders of magnitude or more above the EPA Method 200.7 ML, but similar to the 2006 Form 2C median concentration. These data are consistent with findings during the 2006 detailed study and suggest that manganese discharges may be generally present at a level that could be controlled by further treatment.

  During the 2006 detailed study, the EPA found that manganese concentrations are frequently higher in mill intake than in mill effluent and that the cost of treatment technologies targeting manganese make such technologies infeasible. The EPA's review of information provided by trade associations showed that wood furnish, and coal and oil used for energy generation may be primary sources of manganese in effluent discharges. Intake water may also be a source of manganese, though upstream monitoring data from the EPA's Water Quality Exchange suggest intake concentrations are generally lower than the evaluated effluent concentrations. At least one mill that the EPA contacted during the review (Georgia-Pacific Crossett) indicated that surface water is a large source of manganese.

  Trade associations suggest that treatment technologies currently implemented by the industry do not specifically target removal of manganese but may incidentally remove manganese. Though not directly applicable to pulp and paper mill wastewater, the EPA's review of available treatment technology information in IWTT identified effluent concentrations of manganese similar to the 2014 median effluent manganese concentrations identified during this review. These data do not indicate the availability of technologies that can reliably further reduce manganese below levels currently in pulp and paper mill discharges.

— ***Hydrogen Sulfide.***

- Hydrogen sulfide was added as a TRI reporting requirement in 2012. Due to the number of mills with hydrogen sulfide releases in TRI, lack of historical release data, and possible overestimation of hydrogen sulfide releases in TRI data due to the current sampling convention, the EPA further reviewed releases of hydrogen sulfide. The EPA contacted pulp and paper trade associations and found that sampling methods have not been updated. Additionally, pulp and paper mills identified errors in their 2014 hydrogen sulfide data reported to TRI and provided corrected data.

These corrections decreased the hydrogen sulfide 2014 TRI TWPE from 1,230,000 to 580,000. These analyses suggest that the hydrogen sulfide releases reported to TRI are still likely to be overestimated. In response, the industry is working to refine the sampling methods that will improve the accuracy of hydrogen sulfide data reported to TRI in the future.

— ***Cadmium and Selenium (identified from the Canadian NPRI analysis).***

- Large percentages of Canadian pulp and paper mills reported releases of cadmium and selenium in the 2013 NPRI data (72 percent and 33 percent, respectively). Cadmium and selenium are on the 2013 List of TRI Chemicals; however, no mills reported releases to TRI in 2013. The EPA found that the TRI reporting thresholds are higher than the NPRI reporting thresholds for these pollutants, and that the differences in reporting requirements may explain the difference in reporting rates. The EPA identified only three mills with cadmium discharges and two mills with selenium discharges reported on 2013 DMRs. Cadmium and selenium discharges reported on DMRs were also generally lower than releases of these chemicals reported to NPRI

  From review of additional information provided from pulp and paper trade associations, the EPA found that median cadmium and selenium concentrations provided by trade associations are below the respective ML (and ten times the ML), and therefore, may not be present at levels substantial enough for further treatment.

  Additionally, trade associations suggest that treatment technologies currently implemented by the industry do not specifically target removal of cadmium or selenium, but that biological treatment may incidentally remove cadmium or selenium. The EPA queried the IWTT database and did not identify information for technologies that achieve cadmium or selenium concentrations below levels currently measured in pulp and paper mill wastewater discharges; however, the data were not specific to pulp and paper mills.

— ***Total Phosphorus (identified from the Canadian NPRI analysis).***

- Seventy-eight percent of Canadian pulp and paper mills with NPRI data reported releases of total phosphorous in 2013 NPRI data. The EPA's investigation identified that NPRI and TRI have different reporting requirements for the different types of phosphorus, and TRI does not require reporting of total phosphorus. The EPA reviewed 2013 DMR data and found that 45 percent of pulp and paper mills reporting any pollutant loadings reported total phosphorous loads greater than zero. The EPA has not previously evaluated total phosphorous discharges from pulp and paper mills. In general, the magnitude of total phosphorus releases in the 2013 NPRI is similar to the 2013 DMR total phosphorus loadings. Additionally, trade associations confirmed that mills often add supplemental forms of phosphorus to nutrient deficient wastewaters to ensure effective biological treatment. Other sources of phosphorus in pulp and paper mill wastewaters include raw materials, intake water, and process additives. Pulp and paper mills may implement phosphorous residual minimization techniques, but few operate treatment systems for removing residual nutrients from biologically treated effluents.

— ***Total Reduced Sulfur (identified from the Canadian NPRI analysis).***

- NPRI has revised its reporting requirements for total reduced sulfur (TRS). Mills are no longer required to report TRS but are required to report water releases of some TRS components, including hydrogen sulfide, carbon disulfide, and carbonyl sulfide. The EPA found no pulp and paper mills with 2013 DMR carbon disulfide or carbonyl sulfide discharges.

4.3 The EPA's Review of Additional Industrial Categories

The EPA also continued review of four point source categories that were identified for further review in the Preliminary 2016 Plan: Battery Manufacturing, Electrical and Electronic Components, Metal Finishing, and Oil and Gas Extraction (specifically, in the Cook Inlet). In addition, the EPA reviewed food and beverage manufacturing based on results of a 2015 TRI National Analysis performed by the EPA's Office of Pollution Prevention and Toxics (OPPT). These reviews are summarized below.

Battery Manufacturing (40 CFR Part 461).

The EPA's research indicates that some battery technologies have changed since the promulgation of the Battery Manufacturing ELGs in 1984, with the advent of rechargeable batteries, including lithium-ion, nickel-hydrogen, nickel-metal hydride, and vanadium redox batteries. The ELGs apply to discharges from manufacturers using any of six types of metal for battery anodes. Some of the new battery technologies (e.g. lithium-ion) may not be covered under any of these specific ELG subcategories due to the variety of materials that can now be used for anodes. In addition, it is not clear that the existing ELGs cover or are applicable to several new battery technologies (e.g., lead carbon and nickel-hydrogen). However, in its review of the battery manufacturing industry, the EPA did not identify any uncontrolled pollutants that represent a category-wide issue. Further, the manufacture of emerging battery technologies in the U.S. is trending toward zero discharge and the EPA identified few discharges that are not subject to the current ELGs. Based on this review, no additional review or action is warranted at this time.

Electrical and Electronic Components (E&EC) (40 CFR Part 469).

As part of the current review, the EPA studied the E&EC industry to understand how the industry profile, wastewater discharges, and wastewater treatment have changed since promulgation of the ELGs in 1983. The EPA analyzed all four subparts of the 1983 E&EC ELGs, with a specific emphasis on Subpart A, semiconductor manufacturing. The EPA found that the semiconductor manufacturing industry has implemented several new process operations using new chemicals and the resulting wastewater likely contains new pollutants that may not be controlled by the existing ELGs. Most noteworthy are perfluorooctanesulfonic acid (PFOS) and tetramethyl ammonium hydroxide (TMAH), which are toxic, persistent, and bioaccumulative. Most E&EC facilities are indirect dischargers and NACWA members also expressed concerns with higher concentrations of ammonia, nitrogen, sulfate, fluoride, and copper discharged from E&EC facilities. The EPA's review of wastewater treatment technologies to date indicates that the industry continues to rely on technologies identified at the time of the 1983 ELG rulemaking and is also actively evaluating new technologies (e.g., biological, ion exchange, reverse osmosis, electrowinning) and wastewater management practices (e.g., rinse recycle, RO reject recycle) aimed at treating some of the newer pollutants and conserving water. Given the evidence of changes within the industry since the 1983 rulemaking likely affecting wastewater characteristics as well as the investigation of new treatment technologies, a detailed study of the E&EC Category is warranted.

Metal Finishing (40 CFR Part 433)

As described in the Preliminary 2016 Plan, the EPA continued its review of the metal finishing industry. About 44,000 facilities perform various metal finishing operations and discharge wastewater primarily to POTWs. The EPA continued to evaluate information on the types of operations at facilities that are subject to the metal finishing ELGs, and their operations, wastewater management practices, and wastewater characteristics. Since the Preliminary 2016 Plan, the EPA visited 18 facilities to observe their metal finishing operations and wastewater management practices. These facilities covered a wide range of industrial sectors subject to the metal finishing ELGs, including aerospace, automotive, and medical equipment. The EPA also visited a vendor of environmentally friendly alternatives to hexavalent chromium plating baths. The EPA analyzed readily available current discharge data, reviewed information collected on the industry during the Metal Products and Machinery (MP&M) rulemaking development, and reviewed publicly available data to understand the types and prevalence of pollution prevention (P2) activities at metal finishing facilities. Finally, the EPA conducted various types of stakeholder outreach, from presentations at industry conferences to consultations with regulating authorities and industry groups.

Our review indicates that processes that generate wastewater in metal finishing operations have not changed substantially and that there have been advances in wastewater management at some facilities. The EPA does not have, nor have stakeholders provided, any data to demonstrate that pollutants in metal finishing discharges are leading to environmental problems or causing problems for POTWs. Based on this review, no additional review is warranted at this time. However, as the scope of the Metal Finishing ELGs is specific to "operations" such as electroplating, etching, and cleaning rather than a specific type of manufacturing, some stakeholders continue to have questions regarding the applicability of this rule, particularly at facilities for which metal finishing operations are ancillary. The EPA plans to continue to engage with stakeholders to resolve these applicability questions.

Oil and Gas Extraction in the Cook Inlet (40 CFR Part 435).

The EPA continued its review of the subcategorization that results in different discharge requirements in Subpart D of 40 CFR Part 435 for oil and gas extraction facilities operating in Cook Inlet, Alaska. The EPA reviewed available information describing current wastewater discharge practices in Cook Inlet, evidence of environmental impacts from oil and gas wastewater discharges, and current disposal practices. The EPA concluded that evidence of environmental impacts from these discharges is, at best, limited. The EPA also noted that produced waters are not being directly discharged to Cook Inlet by the fewer than 20 extraction platforms there but are, instead, managed through either injection at the platforms or transfer to onshore facilities for product recovery/treatment and, then, discharge to the Inlet. Moreover, the EPA noted that efforts are underway to decrease the amount of produced water that needs onshore transfers, such as through injection pilot tests at several extraction platforms. Therefore, even these discharges of produced waters are of a declining nature. Because of this, based on its review, no additional review or action is appropriate at this time.

Miscellaneous Food and Beverage Sectors

The EPA conducted a preliminary review of the miscellaneous food and beverage sectors not currently regulated by existing ELGs to identify water discharges that may warrant further review for potential development of ELGs. The EPA also reviewed these sectors because the EPA's 2015 TRI National Analysis found that food processing sectors, including those regulated by existing ELGs, accounted for approximately one third of water discharges reported to TRI. The EPA conducted the following analyses:

- Reviewed SIC codes for facilities that reported DMR information to ICIS-NPDES, and reviewed NAICS codes for facilities that reported water discharge estimates to TRI to ensure that the universe of facilities included in the analysis was representative of all food and beverage processing sectors not currently regulated by ELGs.

- Evaluated total estimated pounds of pollutants discharged in 2015 for the miscellaneous food and beverage sectors using the publicly available DMR Pollutant Loadings Tool and TRI water discharge estimates.

- For a subset of the sectors, contacted state and the EPA regional NPDES permitting authorities to better understand industry production and treatment characteristics.

Based on available data, the EPA found that further review of the miscellaneous food and beverage industry sectors is not warranted at this time. More specifically, the EPA found:

- Nutrients and conventional pollutants, such as BOD, TSS, and oil and grease accounted for most of the pollutants discharged by the miscellaneous food and beverage sectors.

- Distilleries and soft drink manufacturers accounted for approximately one third of the pollutant discharges from the combined miscellaneous food and beverage sectors. The other sectors contain a relatively small number of facilities with relatively low estimated discharge amounts.

- Most distilleries and soft drink manufacturers indirectly discharge their process wastewater to POTWs. In California for example, all 67 soft drink manufacturers indirectly discharge to POTWs, and the state's 21 distilleries either indirectly discharge to POTWs or land apply their wastewater.

4.4 The EPA's Continued Investigations of Pollutants and Treatment Technologies

The EPA continued several ongoing investigations. Specifically, the EPA continued (1) investigating the manufacture and processing of engineered nanomaterials (ENMs) as a potential new source of industrial wastewater discharge; (2) reviewing relevant literature documenting the performance of new and improved industrial wastewater treatment technologies for inclusion in its IWTT Database; and (3) reviewing specific pesticide active ingredients (PAIs) that do not currently have PAI-specific effluent limitations under the Pesticide Chemicals ELGs. These reviews are summarized below.

- **Continued Review of ENMs in Industrial Wastewater**

  Based on the information gathered during this current review, research continues to suggest that ENMs are used in a wide range of industrial applications and domestic products, but little is known about production quantities, waste management practices, or the potential for release of ENMs from most industrial wastestreams. Incremental progress has been made to date towards developing analytical methods for detecting and quantifying nanomaterials in complex media, including industrial wastewater. The EPA will continue to look for opportunities to inform current data gaps including 1) potential sources, quantities, and types of ENMs in industrial wastewater discharge, 2) fate, transformation, and treatment of ENMs in industrial wastewaters, including their potential impact to municipal wastewater treatment plants that may receive industrial wastewater discharges, and 3) the development of analytical methods to detect and quantify ENMs. Filling these data gaps will enable the EPA to more fully assess the potential presence and impact of ENMs in industrial process water.

- **Continued Review of Industrial Wastewater Treatment Technologies**

  The EPA continued to collect wastewater treatment performance data by identifying and screening references across a broad range of industries from two key technical conferences on wastewater treatment: 2015 Water Environment Federation's Technical Exhibit and Conference, and 2015 International Water Conference.

  The IWTT Database currently contains data for 54 different treatment technologies (e.g., unit processes such as membrane bioreactors), some of which may be components of a larger treatment system. The IWTT Database also contains wastewater treatment technology performance data for 27 out of the 58 regulated industrial point source categories and removal performance for 195 pollutants.

- **Continued Targeted Review of Pesticide Active Ingredients (PAIs) Without Pesticide Chemicals Manufacturing Effluent Limitations (40 CFR Part 455)**

Five of the 30 PAIs identified in the 2014 Annual Review are potentially manufactured in the U.S. (Coumaphos, Ethoprop, Etridiazole, Oxamyl, and Tokuthion), one of which is unregistered, but manufactured in the U.S. for export (Tokuthion). At this time, the EPA is not able to conclude that this is a comprehensive list due to the limitations of the datasets reviewed. The EPA did not identify any DMR or TRI wastewater discharges of the five PAIs potentially manufactured in the U.S. from pesticide chemical manufacturers in 2010 to 2015. The Pesticide Chemicals ELGs do not establish PAI-specific numeric limitations for these PAIs; therefore, facilities may not be required to report discharges of the PAIs on their DMRs. Additionally, only one of the five manufactured PAIs is a TRI listed chemical. Given these factors, the EPA plans to continue its review to evaluate their presence in wastewater discharges from pesticide chemical manufacturing.

5. ONGOING EPA STUDIES OF INDUSTRIAL DISCHARGES

As discussed in the Preliminary 2016 Plan, the EPA continued studies of the Petroleum Refining Category (40 CFR Part 419), and Centralized Waste Treatment (CWT) Category (40 CFR Part 437). This section presents the EPA's evaluations to date for each study.

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

The EPA will continue the detailed study as a way to gather sufficient data to allow a well-informed decision on whether to initiate rulemaking to revise the ELGs. The EPA worked with the American Petroleum Institute (API) and American Fuel and Petrochemical Manufacturers (AFPM) to develop a CWA Section 308 survey that was distributed to nine companies (representing 22 refineries) in July 2017. The EPA will continue to work with API and AFPM to develop a sampling campaign for these nine companies in 2018. The survey and sampling campaign are intended to provide a better understanding of the pollutant loadings discharged by refineries as well as the unit operations and treatment technologies in place and inform the EPA's decision as to whether or not a revised guideline may be warranted. If the EPA determines that a rulemaking effort is, in fact, appropriate, it would not base any resulting ELG solely on this sampling data but such data may be used to inform the EPA's decision-making. Also, the EPA has become aware that an array of new wastewater treatment technologies has been installed, full scale, at U.S. refineries since the ELGs were last updated. These technologies are used to treat pollutants that are not currently regulated in the ELGs including nitrate, selenium, mercury, and some toxic organic compounds. Lastly, there is insufficient data to demonstrate whether or not changes in crude type or the installation of wet air pollution control devices has or has not changed wastewater characteristics. The detailed study's survey and sampling campaign is intended to provide a dataset that can be used to help answer these questions.

5.2 Detailed Study of CWT Category (40 CFR Part 437)

The EPA continued its study of CWT facilities that accept oil and gas wastewaters. Since the Preliminary 2016 Plan was released, the EPA has conducted additional data collection activities. This included collecting technical and financial information from facilities, using the EPA's authority under Section 308 of the CWA. The EPA also conducted sampling at two facilities to characterize wastewater received and the performance of treatment technologies. At this time, the EPA plans to continue its work studying CWT facilities in the context of an expanded study looking at the management of oil and gas extraction wastewaters more holistically, including at CWT facilities. See Section 7.4.

6. INDUSTRIES FOR WHICH THE EPA IS CURRENTLY UNDERTAKING AN ELG RULEMAKING

In the Preliminary 2016 Plan, the EPA explained that is was undertaking two rulemakings and provided a schedule for these rulemakings: Dental practices, and the Canned and Preserved Seafood Category (covering the Alaskan seafood processing subcategories).

On June 14, 2017, the EPA promulgated a rulemaking that established pretreatment standards for the dental office point source category (82 FR 27154). The rule requires dental offices to use amalgam separators and two best management practices recommended by the American Dental Association (ADA) and includes a provision to significantly reduce and streamline the oversight and reporting requirements in the EPA's General Pretreatment Regulations that would otherwise apply as a result of this rulemaking.

In July 2017, the EPA indicated no further intent to amend subparts of the Canned and Preserved Seafood Processing Category related to certain on-shore processors in Alaska. The Agency made this decision in light of the fact that all of the facilities that would be subject to this rulemaking are located in the State of Alaska and the EPA concludes that the State of Alaska will establish additional water pollution controls at these facilities if and where the State determines such controls are appropriate and necessary. The EPA will continue to work with the State as they consider appropriate controls through their individual permitting actions for such facilities.

The EPA has also initiated a new rulemaking since the publication of the preliminary plan, for the Steam Electric Power Generating Point Source Category. On November 3, 2015, the EPA published a final rule amending 40 CFR Part 423, the effluent limitations guidelines and standards for the Steam Electric Power Generating Point Source Category. The amendments addressed limitations and standards on various wastestreams at steam electric power plants: flue gas desulfurization (FGD) wastewater, bottom ash transport water, fly ash transport water, flue gas mercury control wastewater, gasification wastewater, and combustion residual leachate. Collectively, this rulemaking is known as the "Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category," or "2015 Rule." In April 2017, the EPA announced its intent to reconsider the 2015 Rule, and in August 2017, the EPA announced a rulemaking to potentially revise the new, more stringent Best Available Technology (BAT) effluent limitations and pretreatment standards for existing sources in the 2015 Rule that apply to bottom ash transport water and FGD wastewater. After reflecting on the time it typically takes the Agency to propose and finalize revised effluent limitations guidelines and standards, and in light of the characteristics of this industry and the anticipated scope of the next rulemaking, the EPA projects the following schedule for this rulemaking:

-Proposed Rule: December 2018

-Final Rule: December 2019

In light of the EPA's reconsideration of the 2015 Rule through rulemaking, with its associated schedule, the EPA also proposed and promulgated a rule postponing the earliest potential compliance dates for the BAT effluent limitations and PSES for bottom ash transport water and FGD wastewater in the 2015 Rule, from November 1, 2018, to November 1, 2020 (82 FR 43494).

7. ADDITIONAL TOPICS FOR FUTURE INVESTIGATION

The EPA has identified the following additional topics for investigation in its next review: re-visiting pretreatment standards for discharges of Unconventional Oil and Gas (UOG) Extraction wastewater for certain operators in Pennsylvania, and studies of: nutrient discharges from industrial sources, perfluoroalkyl substances (PFASs) in industrial discharges, and oil and gas wastewater management.

7.1 Re-visiting Pretreatment Standards for Discharges of UOG Extraction Wastewater for Certain Operators

On June 28, 2016, the EPA promulgated revisions to Effluent Guidelines and Standards for the Oil and Gas Extraction Point Source Category (40 CFR Part 435) that established pretreatment standards for wastewater discharges from unconventional oil and gas (UOG) extraction facilities. Based in part on the record information indicating that all UOG facilities were currently achieving zero discharge of pollutants to POTWs, the standards prohibit the discharge of pollutants in UOG wastewater to POTWs.

Following promulgation, the EPA received new, post-promulgation information that some facilities in Pennsylvania subject to the rule were discharging to POTWs. The Pennsylvania Grade Crude Oil (PGCC) Coalition subsequently filed a petition for review of the rule in the U.S. Court of Appeals for the Third Circuit on November 7, 2016, regarding these facilities. The EPA filed a motion for voluntary remand without vacatur on August 31, 2017, which was granted by the Court on October 3, 2017. In the motion, the EPA discussed the post-promulgation information, acknowledging that this information is inconsistent with the record for the rule. Further, the motion explained that the EPA requested the remand in order to consider any additional evidence relevant to the UOG rule, develop the record, and take any follow-up action as appropriate, including providing the public notice and an opportunity to comment as appropriate. The EPA is proceeding accordingly.

7.2 Review of Nutrient Discharges

Nutrient pollution is one of America’s most widespread, costly and challenging environmental problems impacting water quality. Excessive nitrogen and phosphorus in our waters 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 can contribute to nutrient pollution including stormwater discharges and runoff, agriculture, and wastewater discharges. The EPA plans to integrate industrial wastewater nutrient discharges into the annual review and planning process more comprehensively through a cross-industry review of nutrient discharges.

The EPA’s primary objectives in reviewing nutrient discharges are to identify industries discharging nutrients where there is the potential to reduce those discharges and prioritize for further review or study those industries that may be candidates for ELG development or revision to control their nutrient discharges. As part of its next review, the EPA plans to provide information on its methodology and preliminary findings.

7.3 Review of PFASs

The EPA is reviewing per- and polyfluoroalkyl substances (PFASs) to determine if there are surface water discharges of these compounds from industrial categories that warrant regulation through ELGs. The EPA's current review of PFASs incorporates new information that has become available since the Agency examined discharge estimates of PFASs in the 2012 Annual Review. In that review fluorinated compounds were referred to more generally as perfluorinated chemicals (PFCs). It is now the EPA's policy to use the term PFASs rather than PFCs because PFCs is also used an acronym for perfluorocarbons, which are a related but different group of compounds.

PFASs are a large group of persistent, bioaccumulative, and potentially toxic synthetic compounds that have been used in surfactants and as oil and water-repellant coatings in numerous consumer and industrial products since their production began in the early 1950s. Due to their highly stable carbon-fluorine bonds, PFASs are not readily degradable by most natural processes. Consequently, PFASs have been found worldwide in humans, animals, plants, surface water, groundwater, finished drinking water, rainwater, soils, sediments, ice caps, and outdoor and indoor air.

There are two broad subcategories of PFASs: perfluoroalkane sulfonates, which include PFOS; and perfluoroalkyl carboxylic acids, which include perfluorooctanoic acid (PFOA). Both PFOS and PFOA are long-chain PFASs. The EPA defines long-chain PFAS as perfluoroalkyl carboxylic acids with eight or more carbons and perfluoroalkane sulfonates with six or more carbons. Long-chain PFASs bind more readily to blood proteins, and thus are retained longer in the human body, than short-chain PFASs. Most domestic production of long-chain PFASs has been phased out in the United States and generally has been replaced by short-chain PFASs, although there are still ongoing uses of long-chain PFAS that are available in existing stocks or are being newly introduced via imports by companies that did not participate in the EPA Stewardship Program phaseout.

The EPA's review of PFASs will include examination of surface water discharges from industrial categories that still may be using existing supplies of long-chain PFASs, as well as assessment of industrial categories that may be producing or using short-chain PFASs. This work will build on the actions that the Agency has already taken with the 2010/2015 PFOA Stewardship Program to phase out the long-chain PFASs as well as the work done by the EPA's New Chemicals Program.

7.4 Study of Oil and Gas Extraction Wastewater Management

Currently, onshore oil and gas extraction facilities primarily manage their wastewater via underground injection in disposal wells. Reuse of wastewater in oil and gas exploration and production activities is also a primary management practice utilized by producers. Treating and discharging of wastewaters produced at onshore facilities is not common, but does occur in some cases, primarily through off-site centralized waste treatment facilities.

Recently, in some areas of the country, it has been reported that there are emerging constraints on underground injection of oil and gas wastewaters (e.g., capacity, earthquakes[9]). In addition, particularly in areas of water scarcity, there is increased interest in treating and discharging these wastewaters so that they can be made available for other uses where appropriate (also referred to as renewable water). Based on information collected by the EPA to date during the Centralized Waste Treatment Study, there are technologies that are capable of treating oil and gas extraction wastewaters from onshore facilities in a way that improves discharge quality. Given a variety of factors including 1) potential emerging constraints on certain wastewater management practices utilized by onshore producers; 2) water scarcity in certain geographic locations; 3) projections that onshore oil and gas extraction may increase in some areas of the country in the future[10] (leading to similar increases in the generation of oil and gas extraction wastewaters in those areas); and 4) changes in wastewater treatment technologies, the EPA is initiating a new study to look holistically at the management of oil and gas extraction wastewaters from onshore facilities.

As indicated in Section 4.1, treatment of oil and gas extraction wastewaters received the most comments on the preliminary plan from a wide range of stakeholders. In addition, the EPA has received requests to 1) assess management of oil and gas extraction wastewaters broadly, rather than on a guideline specific basis; and 2) ensure an option that allows for the discharge of treated oil and gas wastewaters at facilities equipped to do so. The focus of this study is not to look specifically at any one existing effluent guideline. Rather, the EPA intends to engage with stakeholders and consider approaches to manage both conventional and unconventional oil and gas extraction wastewaters from onshore facilities, including but not limited to, an assessment of technologies for facilities that treat and discharge oil and gas extraction wastewaters. The EPA is particularly interested in working with its regulatory partners, the states. States bring experience in identifying and understanding current management practices for wastewaters, current or emerging constraints on management practices, the performance and availability of treatment technologies, emerging environmental challenges associated with wastewater management practices, and in developing effective programmatic options and alternatives. Following this study, if appropriate, the EPA will identify any future activities, such as rulemaking to further address oil and gas extraction wastewaters. Note that efforts being undertaken under this study are being conducted independently of those relating to the pretreatment standards for UOG Extraction Facilities (Section 7.1) even though the study will include consideration of such facilities.

[9] See, for example: https://earthquake.usgs.gov/research/induced/.

[10] Some scenario's in the U.S. Energy Information Administration's *Annual Energy Outlook 2017* project increases in production nationally, and particularly in certain regions. See: https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf.

8. SUMMARY TABLE OF PLANS FOR EXISTING POINT SOURCE CATEGORIES

Table 8-1 summarizes the plans for future activity based on the EPA's review of the effluent guidelines and pretreatment standards of the existing point source categories and provides a status update. The EPA uses the following codes to describe its findings and potential next steps for each industrial category:

1. The EPA recently promulgated or revised effluent guidelines or pretreatment standards for this category.
2. The EPA is undergoing rulemaking for this category.
3. The EPA concluded that no further action is warranted at this time for the effluent guidelines and pretreatment standards for this category.
4. The EPA intends to continue the review or study of this category.
5. The EPA intends to initiate a review or study of this category.

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

No.	Industry Category (listed alphabetically)	40 CFR Part	Findings
1	Airport Deicing	449	(1)
2	Aluminum Forming	467	(3)
3	Asbestos Manufacturing	427	(3)
4	Battery Manufacturing	461	(3)
5	Canned and Preserved Fruits and Vegetable Processing	407	(3)
6	Canned and Preserved Seafood Processing	408	(3)
7	Carbon Black Manufacturing	458	(3)
8	Cement Manufacturing	411	(3)
9	Centralized Waste Treatment	437	(4)
10	Coal Mining	434	(3)
11	Coil Coating	465	(3)
12	Concentrated Animal Feeding Operations (CAFO)	412	(3)
13	Concentrated Aquatic Animal Production	451	(3)
14	Construction and Development	450	(1)
15	Copper Forming	468	(3)
16	Dairy Products Processing	405	(3)
17	Dental Office	441	(1)
18	Electrical and Electronic Components	469	(4)
19	Electroplating	413	(3)
20	Explosives Manufacturing	457	(3)
21	Ferroalloy Manufacturing	424	(3)
22	Fertilizer Manufacturing	418	(3)
23	Glass Manufacturing	426	(3)
24	Grain Mills	406	(3)

No.	Industry Category (listed alphabetically)	40 CFR Part	Findings
25	Gum and Wood Chemicals	454	(3)
26	Hospitals	460	(3)
27	Ink Formulating	447	(3)
28	Inorganic Chemicals	415	(3)
29	Iron and Steel Manufacturing[a]	420	(3)
30	Landfills	445	(3)
31	Leather Tanning and Finishing	425	(3)
32	Meat and Poultry Products[a]	432	(3)
33	Metal Finishing	433	(3)
34	Metal Molding and Casting	464	(3)
35	Metal Products and Machinery	438	(3)
36	Mineral Mining and Processing	436	(3)
37	Nonferrous Metals Forming and Metal Powders	471	(3)
38	Nonferrous Metals Manufacturing	421	(3)
39	Oil and Gas Extraction[b]	435	(1), (5)
40	Ore Mining and Dressing	440	(3)
41	Organic Chemicals, Plastics, and Synthetic Fibers[a]	414	(3)
42	Paint Formulating	446	(3)
43	Paving and Roofing Materials (Tars and Asphalt)	443	(3)
44	Pesticide Chemicals	455	(3)
45	Petroleum Refining	419	(4)
46	Pharmaceutical Manufacturing	439	(3)
47	Phosphate Manufacturing	422	(3)
48	Photographic	459	(3)
49	Plastics Molding and Forming	463	(3)
50	Porcelain Enameling	466	(3)
51	Pulp, Paper and Paperboard[a]	430	(3)
52	Rubber Manufacturing	428	(3)
53	Soap and Detergent Manufacturing	417	(3)
54	Steam Electric Power Generating	423	(2)
55	Sugar Processing	409	(3)
56	Textile Mills	410	(3)
57	Timber Products Processing	429	(3)
58	Transportation Equipment Cleaning	442	(3)
59	Waste Combustors	444	(3)

[a] The EPA plans to conduct a cross-industry review of nutrient discharges from industrial sources and may investigate nutrient discharges from this category as part of that effort. See section 7.2 for additional details.
[b] See Section 7.1 for details concerning Unconventional Oil and Gas Extraction Wastewaters.

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