PRE-PUBLICATION NOTICE

The EPA Administrator, Michael S. Regan, signed the following final rule on April 24, 2024, and EPA is submitting it for publication in the Federal Register (FR). It is not the official version of the notice of availability. This document is not disseminated for purposes of EPA's Information Quality Guidelines and does not represent an Agency determination or policy. While we have taken steps to ensure the accuracy of this internet version of this notice, the official version will be published in a forthcoming FR publication, which will appear on https://www.federalregister.gov and on Regulations.gov (https://www.regulations.gov) in Docket No. EPA-HQ-OW-2009-0819.

6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 423

[EPA-HQ-OW-2009-0819; FRL-8794-02-OW]

RIN 2040-AG23

Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA or the Agency) is finalizing a Clean Water Act regulation to revise the technology-based effluent limitations guidelines and standards (ELGs) for the steam electric power generating point source category applicable to flue gas desulfurization (FGD) wastewater, bottom ash (BA) transport water and legacy wastewater at existing sources, and combustion residual leachate (CRL) at new and existing sources. Last updated in 2015 and 2020, this regulation is estimated to cost an additional $536 million to $1.1 billion dollars annually in social costs and reduce pollutant discharges by an additional approximately 660 to 672 million pounds per year.

DATES: This final rule is effective on **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA-HQ-OW-2009-0819. All documents in the docket are listed on the *http://www.regulations.gov* web site. Although listed in the index, some information listed in the index is not publicly available, *e.g.*, CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through *http://www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT: For technical information, contact Richard Benware, Engineering and Analysis Division, telephone: 202-566-1369; email: *benware.richard@epa.gov*. For economic information, contact James Covington, Water Economics Center, telephone: 202-566-1034; email: *covington.james@epa.gov*.

SUPPLEMENTARY INFORMATION:

Preamble Acronyms and Abbreviations. The EPA uses multiple acronyms and terms in this preamble. To ease the reading of this preamble and for reference purposes, the EPA defines terms and abbreviations used in Appendix A (although the list of abbreviations in the appendix is not exhaustive).

Supporting Documentation. The rule is supported by several documents, including the following:

- *Technical Development Document for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* (TDD), Document No. 821R24004. This report summarizes the technical and engineering analyses supporting the rule. The TDD presents the EPA's updated analyses supporting the revisions to

FGD wastewater, BA transport water, CRL, and legacy wastewater. The TDD includes additional data that has been collected since the publication of the 2015 and 2020 rules, updates to the industry (e.g., retirements, updates to wastewater handling), cost methodologies, pollutant removal estimates, non-water quality environmental impacts associated with updated FGD and BA methodologies, and calculations for the effluent limitations. In addition to the TDD, the Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category (2015 TDD, Document No. EPA-821-R-15-007) and the Supplemental Technical Development Document for Revisions to the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category (2020 Supplemental TDD, Document No. EPA-821-R-20-001) provide a more complete summary of the EPA's data collection, description of the industry, and underlying analyses supporting the 2015 and 2020 rules.

- *Environmental Assessment for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category (EA)*, Document No. 821R24005. This report summarizes the potential environmental and human health impacts estimated to result from implementation of the revisions to the 2015 and 2020 rules.
- *Benefit and Cost Analysis for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* (BCA), Document No. 821R24006. This report summarizes the societal benefits and costs estimated to result from implementation of the revisions to the 2015 and 2020 rules.
- *Regulatory Impact Analysis for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* (RIA), Document No. 821R24007. This report presents a profile of the steam electric power generating industry, a summary of estimated costs and impacts associated with the revisions to the 2015 and 2020 rules, and an assessment of the potential impacts on employment and small businesses.
- *Environmental Justice Analysis for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* (EJA), Document No. 821R24008. This report presents a profile of the communities and populations potentially impacted by this rule, an analysis of the distribution of impacts in the baseline scenario and with the revisions, and a summary of inputs from potentially impacted communities that the EPA met with prior to publishing the proposed rulemaking.
- *Docket Index for the Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category*. This document provides a list of additional memoranda, references, and other information the EPA relied on for the final revisions to the ELGs.

Organization of this Document. The information in this preamble is organized as follows:

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I. Executive Summary

A. Purpose of Rule

The EPA is promulgating this final supplemental rule to update requirements that apply to wastewater discharges from steam electric power plants, particularly coal-fired power plants. In 2015, the EPA set the first Federal limitations on the levels of toxic metals in several of the largest sources of wastewater that can be discharged from power plants after last updating these regulations in 1982. (80 *Federal Register* (FR) 67838; November 3, 2015) (hereinafter the "2015 rule"). On an annual basis, the 2015 rule was projected to reduce the amount of toxic metals, nutrients, and other pollutants that steam electric power plants are allowed to discharge by 1.4 billion pounds and reduce water withdrawal by 57 billion gallons. This rule was reconsidered in 2020 and modified in part due to changing dynamics in the power sector (85 FR 64650; October 13, 2020) (hereinafter the “2020 rule”). Steam electric power plants are increasingly aging and less competitive sources of electric power in many portions of the United States.

Steam electric power plants, coal-fired power plants in particular, are subject to several environmental regulations designed to control (and in some cases eliminate) air, water, and land pollution over time. This rule, the Steam Electric Power Generating Effluent Limitations Guidelines and Standards—or steam electric ELGs—applies to the subset of the electric power industry where “generation of electricity is the predominant source of revenue or principal reason for operation, and whose generation of electricity results primarily from a process utilizing fossil-type fuel (*e.g.*, coal, oil, gas), fuel derived from fossil fuel (*e.g.*, petroleum coke, synthesis gas), or nuclear fuel in conjunction with a thermal cycle employing the steam-water system as the thermodynamic medium” (40 Code of Federal Regulations (CFR) 423.10). The 2015 rule addressed discharges from FGD wastewater, fly ash (FA) transport water, BA transport water, flue gas mercury control (FGMC) wastewater, gasification wastewater, CRL, legacy wastewater, and nonchemical metal cleaning wastes. The 2020 rule modified the 2015 requirements for FGD wastewater and BA transport water for existing sources only. The 2015 limitations for CRL from existing sources and legacy wastewater were vacated by the United States (U.S.) Court of Appeals for the Fifth Circuit in *Southwestern Electric Power Co., et al. v. EPA*, 920 F.3d 999 (5th Cir. 2019).

In the years since the EPA revised the steam electric ELGs in 2015 and 2020, new information has become available, which the EPA considered in finalizing this supplemental rule. For example, pilot testing and full-scale use of various, better performing treatment technologies have continued to develop, along with more data and information about their performance. The final supplemental rule updates requirements for discharges from two wastestreams addressed in the 2020 rule: BA transport water and FGD wastewater at existing sources. The final supplemental rule also replaces the court-vacated limitations for CRL (except for CRL discharges in one subcategory) and a subcategory of legacy wastewater. Finally, for the remaining CRL and legacy wastewaters, this rule finalizes a site-specific approach to developing technology-based limitations based on the permitting authorities' best professional judgment (BPJ), an option discussed by the Court in *Southwestern Electric Power Co. v. EPA*.

B. Summary of Final Rule

For existing sources that discharge directly to surface water, with the exception of the subcategories discussed below, the final rule establishes the following effluent limitations based on Best Available Technology Economically Achievable (BAT):

- A zero-discharge limitation for all pollutants in FGD wastewater, BA transport water, and CRL.
- Numeric (nonzero) discharge limitations for mercury and arsenic in unmanaged CRL[1] and for legacy wastewater discharged from surface impoundments during the closure process if those surface impoundments have not commenced closure under the Coal Combustion Residuals (CCR) regulations as of the effective date of this rule.

[1] As discussed in section VII.C.5 of this document, the EPA is defining unmanaged CRL in this rule to mean CRL which either: (1) the permitting authority determines are the functional equivalent of a direct discharge to waters of the United States (WOTUS) through groundwater or (2) CRL that has leached from a waste management unit into the subsurface and mixed with groundwater prior to being captured and pumped to the surface for discharge directly to a WOTUS.

The final rule eliminates the separate, 2020 rule's less stringent BAT requirements for two subcategories: high-flow facilities and low-utilization electric generating units (LUEGUs), except to the extent they apply to one new permanent cessation of coal combustion subcategory. The final rule leaves in place the existing subcategories for oil-fired and small (50 megawatts (MW) or less) electric generating units (EGUs) established in the 2015 rule. The final rule also leaves in place the existing subcategory for EGUs permanently ceasing the combustion of coal by 2028, which was established in the 2020 rule and amended in a 2023 direct final rule by extending the date for filing a Notice of Planned Participation (NOPP). *See* 88 FR 18440 (March 29, 2023). Lastly, the final rule creates a new subcategory for EGUs permanently ceasing coal combustion by 2034. For both the existing and new subcategories referenced immediately above, the EPA is finalizing additional reporting and recordkeeping requirements and zero-discharge limitations applicable after EGUs cease coal combustion, as well as procedural requirements for affected facilities to demonstrate permanent cessation of coal combustion or that permanent retirement will occur.

As stated above, the rule eliminates the 2020 rule subcategories for high flow and low utilization, except to the extent they apply to EGUs in the new permanent cessation of coal combustion by 2034 subcategory. The elimination of the 2020 rule's subcategories will affect the one known high-flow facility (the Tennessee Valley Authority (TVA) Cumberland Fossil Plant) that has indicated it is planning to close and the two known facilities with LUEGUs (GSP Merrimack LLC and Indiana Municipal Power Agency (IMPA) Whitewater Valley Station), one of which is also expected to close. For EGUs ceasing coal combustion by 2034, the final rule retains the 2020 rule requirements for FGD wastewater and BA transport water and the pre-2015 BPJ-based BAT requirements for CRL rather than requiring the new, more stringent zero-discharge requirements for these wastestreams. After the permanent cessation of coal combustion, however, EGUs in this subcategory must meet limitations on arsenic and mercury based on chemical precipitation for CRL.

Where BAT limitations in this final rule are more stringent than previously established Best Practicable Control Technology Currently Available (BPT) and BAT limitations, any new limitations for direct dischargers do not apply until a date determined by the permitting authority that is as soon as possible on or after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, but no later than December 31, 2029.

For indirect discharges (*i.e.*, discharges to publicly owned treatment works (POTWs)), the final rule establishes pretreatment standards for existing sources that are the same as the BAT limitations except where limitations are for total suspended solids (TSS), a pollutant that does not pass through POTWs. Pretreatment standards are directly enforceable and apply **[INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

While the EPA is not aware of any planned new sources that would be subject to the requirements of this final supplement rule, this action sets new source performance standards and pretreatment standards for discharges of CRL from new sources that are equivalent to the new BAT limitations – namely, zero discharge.

C. Summary of Costs and Benefits

The EPA estimates that the final rule will cost $536 million to $1.1 billion per year in social costs and result in $3.2 billion per year in monetized benefits using a 2 percent discount rate.[2]

The EPA's analysis reflects the Agency's understanding of the actions steam electric power plants are expected to take to meet the limitations and standards in the final rule, including the implementation of additional treatment technologies to reduce pollutant discharges. The EPA based its analysis on a modeled baseline that reflects the full implementation of the 2020 rule, the expected effects of announced retirements and fuel conversions, and the anticipated impacts of relevant final rules affecting the power sector. Not all costs and benefits can be fully quantified and monetized. While some health benefits and willingness to pay (WTP) for water quality improvements have been quantified and monetized, those estimates may not fully capture all important water-quality-related benefits. Furthermore, the EPA anticipates the final rule would generate important additional benefits that the Agency was only able to analyze qualitatively (*e.g.*, improved habitat conditions for plants, invertebrates, fish, amphibians, and the wildlife that prey on aquatic organisms).

For additional information on costs and benefits, *see* sections VIII and XII of this preamble, respectively.

[2] The EPA estimated the annualized value of future benefits and costs using a discount rate of 2 percent, following current Office of Management and Budget (OMB) guidance in Circular A-4 (OMB, 2023). In Appendix B of the BCA, the EPA also provides results of analyses performed using 3 percent and 7 percent discount rates to allow comparison of the final rule costs and benefits with those estimated at proposal, which followed the guidance applicable at the time the prior analysis was conducted (OMB, 2003).

II. Public Participation

During the 60-day public comment period on the 2023 proposed supplemental rule (from March 29, 2023, to May 30, 2023), the EPA received more than 22,000 public comment submissions from private citizens, industry representatives, technology vendors, government entities, environmental groups, and trade associations. The EPA also hosted two online public hearings during the public comment period—one on April 20, 2023, and one on April 25, 2023. These hearings had a combined total of 196 attendees, 46 of whom registered to provide comment on the proposed rule. Available documents from each public hearing include the presentations given by the EPA and two transcripts (document control number (DCN) SE10469, DCN SE10469A1, DCN SE10470 and DCN SE10470A1).

III. General Information

A. Does this action apply to me?

Entities potentially regulated by any final rule following this action include the following:

Category	Example of Regulated Entity	North American Industry Classification System (NAICS) Code
Industry	Electric Power Generation Facilities—Electric Power Generation	22111
	Electric Power Generation Facilities—Fossil Fuel Electric Power Generation	221112

This section is not intended to be exhaustive, but rather provides a guide regarding entities likely to be regulated by this final rule. Other types of entities that do not meet the above criteria could also be regulated. To determine whether a specific facility is regulated by this final rule, carefully examine the applicability criteria listed in 40 CFR 423.10 and the definitions in 40 CFR 423.11. If you still have questions regarding the applicability of this final rule to a particular entity, consult the person listed for technical information in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. What action is the EPA taking?

The Agency is revising certain BAT ELGs for existing sources in the steam electric power generating point source category that apply to FGD wastewater, BA transport water, CRL, and legacy wastewater.

C. What is EPA's authority for taking this action?

The EPA is finalizing this rule under the authority of sections 301, 304, 306, 307, 308, 402, and 501 of the Clean Water Act (CWA), 33 United States Code (U.S.C.) 1311, 1314, 1316, 1317, 1318, 1342, and 1361.

D. What are the monetized incremental costs and benefits of this action?

This final rule is estimated to have social costs of $536 million to $1.1 billion per year and result in $3.2 billion in benefits using a two percent discount rate.[3]

IV. Background

A. Clean Water Act

[3] See note 2.

Congress passed the Federal Water Pollution Control Act Amendments of 1972, also known as the CWA, to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. 1251(a). The CWA establishes a comprehensive program for protecting our nation's waters. Among its core provisions, the CWA prohibits the discharge of pollutants from a point source to waters of the United States (WOTUS), except as authorized under the CWA. Under section 402 of the CWA, discharges may be authorized through a National Pollutant Discharge Elimination System (NPDES) permit. The CWA also authorizes the EPA to establish nationally applicable, technology-based ELGs for discharges from different categories of point sources, such as industrial, commercial, and public sources.

Furthermore, the CWA authorizes the EPA to promulgate nationally applicable pretreatment standards that restrict pollutant discharges from facilities that discharge wastewater to WOTUS indirectly through sewers flowing to POTWs, as outlined in CWA sections 307(b) and (c), 33 U.S.C. 1317(b) and (c). The EPA establishes national pretreatment standards for those pollutants in wastewater from indirect dischargers that may pass through, interfere with, or are otherwise incompatible with POTW operations. Pretreatment standards are designed to ensure that wastewaters from direct and indirect industrial dischargers are subject to similar levels of treatment. *See* CWA section 301(b), 33 U.S.C. 1311(b); *Chem. Mfrs. Ass'n v. NRDC*, 470 U.S. 116, 119 (1985); *Envtl. Def. Fund v. Costle*, 636 F.2d 1229, 1235 n.15 (D.C. Cir. 1980); *Reynolds Metals Co. v. EPA*, 760 F.2d 549, 553 (4th Cir. 1985); *Chem. Mfrs. Ass'n v. EPA*, 870 F.2d 177, 249 (5th Cir. 1989). In addition, POTWs are required to implement local treatment limitations applicable to their industrial indirect dischargers to satisfy any local requirements. *See* 40 CFR 403.5.

Direct dischargers (*i.e.*, those discharging directly from a point source to surface waters rather than through POTWs) must comply with effluent limitations in NPDES permits. Discharges that flow through groundwater before reaching surface waters must also comply with effluent limitations in NPDES permits if those discharges are the "functional equivalent" of a direct discharge from a point source to a WOTUS. *County of Maui v. Hawaii Wildlife Fund*, 590 U.S. 165 (2020). Indirect dischargers, who discharge through POTWs, must comply with pretreatment standards. Technology-based effluent limitations in NPDES permits are derived from ELGs (CWA sections 301 and 304, 33 U.S.C. 1311 and 1314) and new source performance standards (CWA section 306, 33 U.S.C. 1316) promulgated by the EPA, or based on BPJ where the EPA has not promulgated an applicable effluent guideline or new source performance standard. CWA section 402(a)(1)(B), 33 U.S.C. 1342(a)(1)(B); 40 CFR 125.3(c). Additional limitations based on water quality standards are also required to be included in the permit in certain circumstances. CWA section 301(b)(1)(C), 33 U.S.C. 1311(b)(1)(C); 40 CFR 122.44(d). The EPA establishes ELGs by regulation for categories of point source dischargers, and these ELGs are based on the degree of control that can be achieved using various levels of pollution control technology.

The EPA promulgates national ELGs for major industrial categories for three classes of pollutants: (1) conventional pollutants (*i.e.*, TSS, oil and grease, biochemical oxygen demand (BOD_5), fecal coliform, and pH), as outlined in CWA section 304(a)(4) and 40 CFR 401.16; (2) toxic pollutants (*e.g.*, toxic metals such as arsenic, mercury, selenium, and chromium; toxic organic pollutants such as benzene, benzo-a-pyrene, phenol, and naphthalene), as outlined in section 307(a) of the Act, 40 CFR 401.15 and 40 CFR part 423 appendix A; and (3) nonconventional pollutants, which are those pollutants that are not categorized as conventional or toxic (*e.g.*, ammonia-N, phosphorus, total dissolved solids (TDS)).

B. Relevant Effluent Guidelines

The EPA develops effluent guidelines that are technology-based regulations for a category of dischargers. The EPA bases these regulations on the performance of control and treatment technologies. The legislative history of CWA section 304(b), which is the heart of the effluent guidelines program, describes the need to press toward higher levels of control through research and development of new processes, modifications, replacement of obsolete plants and processes, and other improvements in technology, while also accounting for the cost of controls. Legislative history and case law support that the EPA need not consider water quality impacts on individual water bodies as the guidelines are developed; *see* Statement of Senator Muskie (October 4, 1972), reprinted in Legislative History of the Water Pollution Control Act Amendments of 1972, at 170. (U.S. Senate, Committee on Public Works, Serial No. 93-1, January 1973); *see also Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1005 ("The Administrator must require industry, regardless of a discharge's effect on water quality, to employ defined levels of technology to meet effluent limitations.") (citations and internal quotations omitted).

There are many technology-based effluent limitations (TBELs) that may apply to a discharger under the CWA: four types of standards applicable to direct dischargers, two types of standards applicable to indirect dischargers, and a default site-specific approach. The TBELs relevant to this rulemaking are described in detail below.

1. Best Practicable Control Technology Currently Available

Traditionally, the EPA defines Best Practicable Control Technology (BPT) effluent limitations based on the average of the best performances of facilities within the industry, grouped to reflect various ages, sizes, processes, or other common characteristics. *See Southwestern Elec. Power Co. v. EPA*, 920 F3d at 1025. The EPA may promulgate BPT effluent limitations for conventional, toxic, and nonconventional pollutants. In specifying BPT, the EPA looks at several factors. The EPA considers the cost of achieving effluent reductions in relation to the effluent reduction benefits. The Agency also considers the age of equipment and facilities, the processes employed, engineering aspects of the control technologies, any required process changes, non-water quality environmental impacts (including energy requirements), and such other factors as the Administrator deems appropriate. CWA section 304(b)(1)(B), 33 U.S.C. 1314(b)(1)(B). If, however, existing performance is uniformly inadequate, the EPA may establish limitations based on higher levels of control than what is currently in place in an industrial category, when based on an agency determination that the technology is available in another category or subcategory and can be practicably applied.

2. Best Available Technology Economically Achievable

BAT represents the second level of stringency for controlling direct discharge of toxic and nonconventional pollutants. Courts have referred to this as the CWA's "gold standard" for controlling discharges from existing sources. *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003; *see also Kennecott v. EPA*, 780 F.2d 445, 448 (4th Cir. 1985) ("The BAT standard reflects the intention of Congress to use the latest scientific research and technology in setting effluent limits, pushing industries toward the goal of zero discharge as quickly as possible."). In general, BAT represents the best available, economically achievable performance of facilities in the industrial subcategory or category. As the statutory phrase intends, the EPA considers the technological availability and the economic achievability when determining what level of control represents BAT. CWA section 301(b)(2)(A), 33 U.S.C. 1311(b)(2)(A). Other statutory factors that the EPA considers in assessing BAT are the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, and non-water quality environmental impacts, including energy requirements, and such other factors as the Administrator deems appropriate. CWA section 304(b)(2)(B), 33 U.S.C. 1314(b)(2)(B). The Agency retains considerable discretion in assigning the weight to be accorded these factors. *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011, 1045 (D.C. Cir. 1978). The EPA usually determines economic achievability based on the effect the cost of compliance with BAT limitations has on overall industry and subcategory financial conditions.

BAT reflects the highest performance in the industry and may reflect a higher level of performance than is currently being achieved based on technology transferred from a different subcategory or category, bench scale or pilot plant studies, or foreign plants. *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1006; *Chem. Mfrs. Ass'n v.* EPA, 870 F.2d at 226; *Nat. Res. Def. Council v. EPA*, 863 F.2d 1420, 1426 (9th Cir. 1988); *American Paper Inst. v. Train*, 543 F.2d 328, 353 (D.C. Cir. 1976); *American Frozen Food Inst. v. Train*, 539 F.2d 107, 132 (D.C. Cir. 1976). BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice. *See American Frozen Foods*, 539 F.2d at 132, 140; *Reynolds Metals Co. v. EPA*, 760 F.2d at 562; *California & Hawaiian Sugar Co. v. EPA*, 553 F.2d 280, 285-88 (2nd Cir. 1977). "In setting BAT, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible." *Kennecott v. EPA*, 780 F.2d at 448 (citing *A Legislative History of the Water Pollution Control Act Amendments of 1972*, 93d Cong., 1st Sess. (Comm. Print 1973), at 798). As recently reiterated by the U.S. Court of Appeals for the Fifth Circuit, "Under our precedent, a technological process can be deemed available for BAT purposes even if it is not in use at all, or if it is used in unrelated industries. Such an outcome is consistent with Congress'[s] intent to push pollution control technology." *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1031 (citation and internal quotations omitted); *see also Am. Petroleum Inst. v. EPA*, 858 F.2d 261, 265 (5th Cir. 1988).

3. New Source Performance Standards

New Source Performance Standards (NSPS) reflect effluent reductions that are achievable based on the Best Available Demonstrated Control Technology (BADCT). Owners of new facilities 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 BADCT for all pollutants (that is, conventional, nonconventional, and toxic pollutants). In establishing NSPS, the EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements. CWA section 306(b)(1)(B), 33 U.S.C. 1316(b)(1)(B).

4. Pretreatment Standards for Existing Sources

Section 307(b), 33 U.S.C. 1317(b), of the CWA calls for the EPA to issue pretreatment standards for discharges of pollutants to POTWs. Pretreatment standards for existing sources (PSES) are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. Categorical pretreatment standards are technology-based and are analogous to BPT and BAT ELGs; thus, the Agency typically considers the same factors in promulgating PSES as it considers in promulgating BAT. The General Pretreatment Regulations, which set forth the framework for the implementation of categorical pretreatment standards, are found at 40 CFR part 403. These regulations establish pretreatment standards that apply to all non-domestic dischargers. *See* 52 FR 1586 (January 14, 1987).

5. Pretreatment Standards for New Sources

Section 307(c), 33 U.S.C. 1317(c), of the Act calls for the EPA to promulgate Pretreatment Standards for New Sources (PSNS). Such pretreatment standards must prevent the discharge of any pollutant into a POTW that may interfere with, pass through, or may otherwise be incompatible with the POTW. The EPA promulgates PSNS based on BADCT for new sources. New indirect dischargers have the opportunity to incorporate into their facilities the best available demonstrated technologies. The Agency typically considers the same factors in promulgating PSNS as it considers in promulgating NSPS.

6. Best Professional Judgment

CWA section 301 and its implementing regulation at 40 CFR 125.3(a) indicate that technology-based treatment requirements under section 301(b) of the CWA represent the minimum level of control that must be imposed in an NPDES permit. Where EPA-promulgated effluent guidelines are not applicable to a non-POTW discharge, or where such EPA-promulgated guidelines have been vacated by a court, such treatment requirements are established on a case-by-case basis using the permit writer's BPJ. Case-by-case TBELs are developed pursuant to CWA section 402(a)(1), which authorizes the EPA Administrator to issue a permit that will meet either: all applicable requirements developed under the authority of other sections of the CWA (*e.g.*, technology-based treatment standards, water quality standards, ocean discharge criteria) or, before taking the necessary implementing actions related to those requirements, "such conditions as the Administrator determines are necessary to carry out the provisions of this Act." The regulation at 40 CFR 125.3(c)(2) cites this section of the CWA, stating that technology-based treatment requirements may be imposed in a permit "on a case-by-case basis under section 402(a)(1) of the Act, to the extent that EPA-promulgated effluent limitations are inapplicable." Furthermore, section 125.3(c)(3) indicates, "[w]here promulgated effluent limitations guidelines only apply to certain aspects of the discharger's operation, or to certain pollutants, other aspects or activities are subject to regulation on a case-by-case basis in order to carry out the provisions of the Act." The factors considered by the permit writer are the same as those that the EPA considers in establishing technology-based effluent limitations. *See* 40 CFR 125.3(d)(1) through (3).

C. 2015 Steam Electric Power Generation Point Source Category Rule

1. 2015 Rule Requirements

On November 3, 2015, the EPA promulgated a rule revising the regulations for the Steam Electric Power Generating point source category, 40 CFR part 423. 80 FR 67838, November 3, 2015. The rule set the first Federal limitations on the levels of toxic pollutants (*e.g.*, arsenic) and nutrients (*e.g.*, nitrogen) that can be discharged in the steam electric power generating industry's largest sources of wastewater, based on technology improvements in the steam electric power industry over the preceding three decades. Before the 2015 rule, regulations for the industry were last updated in 1982 and, for the industry's wastestreams with the largest pollutant loadings, contained only limitations on TSS and oil and grease.

Over those 30 years, new technologies for generating electric power and the widespread implementation of air pollution controls had altered existing wastewater streams or created new wastewater streams at many steam electric facilities, particularly coal-fired facilities. Discharges of these wastestreams include arsenic, lead, mercury, selenium, chromium, and cadmium. Once in the environment, many of these toxic pollutants can remain there for years and continue to cause adverse impacts.

The 2015 rule addressed effluent limitations and standards for multiple wastestreams generated by new and existing steam electric facilities: BA transport water, CRL, FGD wastewater, FGMC wastewater, FA transport water, gasification wastewater, and legacy wastewater.[4] The rule required most steam electric facilities to comply with the effluent limitations "as soon as possible" after November 1, 2018, and no later than December 31, 2023. NPDES permitting authorities established particular applicability date(s) within that range for each facility (except for indirect dischargers) at the time they reissued the facility's NPDES permit.

The 2015 rule was projected to reduce the amount of metals the CWA defines as toxic pollutants, nutrients, and other pollutants that steam electric facilities are allowed to discharge by 1.4 billion pounds per year and reduce water withdrawal by 57 billion gallons. At the time, the EPA estimated annual compliance costs for the final rule to be $480 million (in 2013 dollars, discounted at 3 percent) and estimated annual benefits associated with the rule to be $451 to $566 million (in 2013 dollars, discounted at 3 percent).

2. Vacatur of Limitations Applicable to CRL and Legacy Wastewater

Seven petitions for review of the 2015 rule were filed in various circuit courts by the electric utility industry, environmental groups, and drinking water utilities. These petitions were consolidated in the U.S. Court of Appeals for the Fifth Circuit, *Southwestern Electric Power Co. v. EPA*, Case No. 15-60821 (5th Cir.). On March 24, 2017, the Utility Water Act Group submitted to the EPA an administrative petition for reconsideration of the 2015 rule. On April 5, 2017, the Small Business Administration (SBA) submitted an administrative petition for reconsideration of the 2015 rule.

[4] These wastestreams are defined in Appendix A to the Preamble.

On August 11, 2017, then EPA Administrator Scott Pruitt announced his decision to conduct a rulemaking to potentially revise the new, more stringent BAT effluent limitations and pretreatment standards for existing sources in the 2015 rule that apply to FGD wastewater and BA transport water. The Fifth Circuit subsequently granted the EPA's request to sever and hold in abeyance petitioners' claims related to those limitations and standards, and those claims are still in abeyance. With respect to the remaining claims related to limitations applicable to legacy wastewater and CRL, the Fifth Circuit issued a decision on April 12, 2019, vacating those limitations as arbitrary and capricious under the Administrative Procedure Act and unlawful under the CWA, respectively. *Southwestern Elec. Power Co. v. EPA*, 920 F.3d 999. In particular, the Court rejected the EPA's BAT limitations for each wastestream set equal to previously promulgated BPT limitations based on surface impoundments. In the case of legacy wastewater, the Court held that the EPA's record on surface impoundments did not support BAT limitations based on surface impoundments. *Id*. at 1015. In the case of CRL, the Court held that the EPA's setting of BAT limitations equal to BPT limitations was an impermissible conflation of the two standards, which are supposed to be progressively more stringent, and that the EPA's rationale was not authorized by the statutory factors for determining BAT. *Id*. at 1026. After the Court's decision, the EPA announced its plans to address the vacated limitations in a later action after the 2020 rule.

In September 2017, using notice-and-comment procedures, the EPA finalized a rule postponing the earliest compliance dates for the more stringent BAT effluent limitations and PSES for FGD wastewater and BA transport water in the 2015 rule, from November 1, 2018, to November 1, 2020 ("postponement rule"). The EPA also withdrew a prior action it had taken to stay parts of the 2015 rule pursuant to section 705 of the Administrative Procedure Act, 5 U.S.C. 705. The postponement rule received multiple legal challenges, but the courts did not sustain any of them.[5]

D. 2020 Steam Electric Reconsideration Rule and Recent Developments

1. 2020 Rule Requirements

On October 13, 2020, the EPA promulgated the *Steam Electric Reconsideration Rule* (85 FR 64650). The 2020 rule revised requirements for FGD wastewater and BA transport water applicable to existing sources. Specifically, the 2020 rule made four changes to the 2015 rule. First, the rule changed the technology basis for control of FGD wastewater and BA transport water. For FGD wastewater, the technology basis was changed from chemical precipitation plus high-hydraulic-residence-time biological reduction to chemical precipitation plus low-hydraulic-residence-time biological reduction. This change in the technology basis resulted in less stringent selenium limitations but more stringent mercury and nitrogen limitations. For BA transport water, the technology basis was changed from dry-handling or closed-loop systems to high-recycle-rate systems, allowing for a site-specific purge not to exceed 10 percent of the BA transport system's volume. This change in technology resulted in less stringent limitations for all pollutants in BA transport water. Second, the 2020 rule revised the technology basis for the voluntary incentives program (VIP) for FGD wastewater from

[5] *See Center for Biological Diversity v. EPA*, No. 18-cv-00050 (D. Ariz. filed January 20, 2018); *see also Clean Water Action. v. EPA*, No. 18-60079 (5th Cir.). On October 29, 2018, the District of Arizona case was dismissed upon the EPA's motion to dismiss for lack of jurisdiction, and on August 28, 2019, the Fifth Circuit denied the petition for review of the postponement rule.

vapor compression evaporation to chemical precipitation plus membrane filtration. This change in the technology basis resulted in less stringent limitations for most pollutants but added new limitations for bromide and nitrogen. Third, the 2020 rule created three new subcategories for high-flow facilities, LUEGUs, and EGUs permanently ceasing coal combustion by 2028. These subcategories were subject to less stringent limitations: high-flow facilities were subject to FGD wastewater limitations based on chemical precipitation; LUEGUs were subject to FGD wastewater limitations based on chemical precipitation and BA transport water limitations based on surface impoundments and a best management practice (BMP) plan; and EGUs permanently ceasing coal combustion by 2028 were subject to FGD wastewater and BA transport water limitations based on surface impoundments. Finally, the 2020 rule required most steam electric facilities to comply with the revised effluent limitations “as soon as possible” after October 13, 2021, and no later than December 31, 2025.[6] NPDES permitting authorities established the particular applicability date(s) of the new limitations within that range for each facility (except for indirect dischargers) at the time they reissued the facility’s NPDES permit.

2. Fourth Circuit Court of Appeals Litigation

Two petitions for review of the 2020 rule were timely filed by environmental group petitioners and consolidated in the U.S. Court of Appeals for the Fourth Circuit on November 19, 2020. *Appalachian Voices, et al. v. EPA*, No. 20-2187 (4th Cir.). An industry trade group and certain energy companies moved to intervene in the litigation, which the Court granted on December 3, 2020. On April 8, 2022, the Court granted the

[6] The 2015 rule’s VIP compliance date was revised to December 31, 2028, in the 2020 rule.

EPA's motion and placed the case into abeyance pending the completion of the current rulemaking.

3. Executive Order 13990 and Announcement of Supplemental Rule

On January 20, 2021, President Biden issued Executive Order 13990: *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*. 86 FR 7037. Executive Order 13990 directed Federal agencies to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of Federal regulations and other actions during the previous four years that conflict with the national objectives of protecting public health and the environment.

On July 26, 2021, the EPA announced a new rulemaking to strengthen certain wastewater pollution discharge limitations for coal-fired power plants that use steam to generate electricity. The EPA later clarified that, as part of its new rulemaking, it would be reconsidering all aspects of the 2020 rule. The EPA undertook an evidence-based, science-based review of the 2020 rule under Executive Order 13990, finding that there are opportunities to strengthen certain wastewater pollution discharge limitations. For example, the EPA discussed how treatment systems using membranes have advanced since the 2020 rule's promulgation and continue to rapidly advance as an effective option for treating a wide variety of industrial pollution, including pollution from steam electric power plants. In the announcement, the EPA also clarified that, until a new rule is promulgated, part 423 will continue to be implemented and enforced to achieve needed pollutant reductions.[7]

4. Preliminary Effluent Guidelines Plan 15

In September 2021, the EPA issued *Preliminary Effluent Guidelines Program Plan 15*.[8] This document discussed the annual review of ELGs, rulemakings for new and existing industrial point source categories, and any new or existing sources receiving further analyses. Here, in the context of the EPA's ongoing steam electric ELG rulemaking, EPA noted relevant wastestreams including pointing out that the 2015 rule limitations for CRL and legacy wastewater had been vacated and remanded to the Agency. For further discussion of the vacatur and remand of the 2015 limitations applicable to CRL and legacy wastewater, see section IV.D of this preamble.

E. Other Ongoing EPA Rules Impacting the Steam Electric Sector

The EPA has recently proposed or finalized several other rules to protect the nation's air, land, and water from pollution resulting from coal-fired power plants. The EPA has primarily considered these other rules to support this final rulemaking in two ways. First, when appropriate, the EPA has included the impacts of final rules in the baseline of its analyses. Second, the EPA has designed this final rule to harmonize compliance dates, subcategories, and other aspects of these rules to the extent possible

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[7] This includes both the 2020 rule and portions of the 2015 rule which were not revised or vacated.

[8] Available online at: *www.epa.gov/system/files/documents/2021-09/ow-prelim-elg-plan-15_508.pdf.*

and appropriate under different statutory schemes. The following sections summarize the solid waste and air rules that are most directly relevant to the electric power sector.

1. Coal Combustion Residuals Disposal Rule

On April 17, 2015, the EPA promulgated the Disposal of Coal Combustion Residuals from Electric Utilities final rule (2015 CCR rule). This rule finalized national regulations to provide a comprehensive set of requirements for the safe disposal of CCR, commonly referred to as coal ash, from steam electric power plants. The final 2015 CCR rule was the culmination of extensive study on the effects of coal ash on the environment and public health. The rule established technical requirements for CCR landfills and surface impoundments under subtitle D of the Resource Conservation and Recovery Act (RCRA), the nation's primary law for regulating solid waste.

These regulations established requirements for the management and disposal of coal ash, including requirements designed to prevent leaking of contaminants into groundwater, blowing of contaminants into the air as dust, and the catastrophic failure of coal ash surface impoundments. The 2015 CCR rule also set recordkeeping and reporting requirements, as well as requirements for each plant to establish and post specific information to a publicly accessible website. The rule also established requirements to distinguish the beneficial use of CCR from disposal.

As a result of the D.C. Circuit Court decisions in *Utility Solid Waste Activities Group v. EPA*, 901 F.3d 414 (D.C. Cir. 2018) ("*USWAG* decision" or "*USWAG*"), and *Waterkeeper Alliance Inc. et al. v. EPA*, No. 18-1289 (D.C. Cir. filed March 13, 2019), the Administrator signed two rules: *A Holistic Approach to Closure Part A: Deadline to*

Initiate Closure and Enhancing Public Access to Information (CCR Part A rule) on July 29, 2020, and *A Holistic Approach to Closure Part B: Alternate Liner Demonstration* (CCR Part B rule) on October 15, 2020. The EPA finalized five amendments to the 2015 CCR rule which are relevant to the management of the wastewaters covered by this ELG because these wastewaters have historically been co-managed with CCR in the same surface impoundments. First, the CCR Part A rule established a new deadline of April 11, 2021, for all unlined surface impoundments in which CCR are managed ("CCR surface impoundments"), as well as CCR surface impoundments that failed the location restriction for placement above the uppermost aquifer, to stop receiving waste and begin closure or retrofitting. The EPA established this date after evaluating the steps that owners and operators need to take for CCR surface impoundments to stop receiving waste and begin closure, and the timeframes needed for implementation. (This did not affect the ability of plants to install new, composite-lined CCR surface impoundments.) Second, the Part A rule established procedures for plants to obtain approval from the EPA for additional time to develop alternative disposal capacity to manage their wastestreams (both CCR and non-CCR) before they must stop receiving waste and begin closing their CCR surface impoundments. Third, the Part A rule changed the classification of compacted-soil-lined and clay-lined surface impoundments from lined to unlined. Fourth, the Part B rule finalized procedures potentially allowing a limited number of facilities to demonstrate to the EPA that, based on groundwater data and the design of a particular surface impoundment, the unit ensures there is no reasonable probability of adverse effects to human health and the environment. Should the EPA approve such a submission, these CCR surface impoundments would be allowed to continue to operate.

As explained in the 2015 and 2020 ELG rules, the ELGs and CCR rules may affect the same EGU or activity at a plant. Therefore, when the EPA finalized the ELG and CCR rules in 2015, and revisions to both rules in 2020, the Agency coordinated the ELG and CCR rules to minimize the complexity of implementing engineering, financial, and permitting activities. Likewise, the EPA considered the interaction of the two rules during the development of this final rule. The EPA's analytic baseline includes the final requirements of these rules using the most recent data provided under the CCR rule reporting and recordkeeping requirements. This is further described in Supplemental TDD, section 3. For more information on the CCR Part A and Part B rules, including information about their ongoing implementation, visit *www.epa.gov/coalash/coal-ash-rule*.

Concurrently with the final ELG, in a separate rulemaking, the EPA is also finalizing regulatory requirements for inactive CCR surface impoundments at inactive utilities ("legacy CCR surface impoundment" or "legacy impoundment"). This action is being taken in response to the August 21, 2018, opinion by the U.S. Court of Appeals for the District of Columbia Circuit in the *USWAG* decision that vacated and remanded the provision exempting legacy impoundments from the CCR regulations. This action includes adding a definition for legacy CCR surface impoundments and other terms relevant to this rulemaking. It also requires that legacy CCR surface impoundments comply with certain existing CCR regulations with tailored compliance deadlines.

The EPA is also establishing requirements to address the risks from currently exempt solid waste management that involves the direct placement of CCR on the land. The EPA is extending a subset of the existing requirements in 40 CFR part 257, subpart D to CCR surface impoundments and landfills that closed prior to the effective date of the 2015 CCR rule, inactive CCR landfills, and other areas where CCR is managed directly on the land. In this action, the EPA refers to these as CCR management units, or CCRMU. This rule will apply to all existing CCR facilities and all inactive facilities with legacy CCR surface impoundments subject to this final rule.

Finally, the EPA is making a number of technical corrections to the existing regulations, such as correcting certain citations and harmonizing definitions. For further information on the CCR regulations, including information about the CCR Part A and Part B rules' ongoing implementation, visit *www.epa.gov/coalash/coal-ash-rule*.

2. Air Pollution Rules and Implementation

The EPA is taking several actions to regulate a variety of conventional, hazardous, and greenhouse gas (GHG) air pollutants, including actions to regulate the same steam electric power plants subject to part 423. In light of these ongoing actions, the EPA has worked to consider appropriate flexibilities in this ELG rule to provide certainty to the regulated community while ensuring the statutory objectives of each program are achieved. Furthermore, to the extent that these actions have been published before this rule's signature and are already impacting steam electric power plant operations, the EPA has accounted for these changed operations in its Integrated Planning Model (IPM) modeling discussed in section VIII of this preamble.

a. The Revised Cross State Air Pollution Rule Update and the Good Neighbor Plan for the 2015 Ozone National Ambient Air Quality Standards

On June 5, 2023, the EPA promulgated its final Good Neighbor Plan, which secures significant reductions in ozone-forming emissions of nitrogen oxides (NO_X) from power plants and industrial facilities. 88 FR 36654. The Good Neighbor Plan ensures that 23 states meet the Clean Air Act's (CAA's) "Good Neighbor" requirements by reducing pollution that significantly contributes to problems attaining and maintaining EPA's health-based air quality standard for ground-level ozone (or "smog"), known as the 2015 Ozone National Ambient Air Quality Standards (NAAQS), in downwind states. Further information on this action is available on the EPA's website.[9]

As of September 21, 2023, the Good Neighbor Plan's "Group 3" ozone-season NO_X control program for power plants is being implemented in: Illinois, Indiana, Maryland, Michigan, New Jersey, New York, Ohio, Pennsylvania, Virginia, and Wisconsin. Pursuant to court orders staying the Agency's State Implementation Plan disapproval action in the following states, the EPA is not currently implementing the Good Neighbor Plan "Group 3" ozone-season NO_X control program for power plants in: Alabama, Arkansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nevada, Oklahoma, Texas, Utah, and West Virginia.[10]

[9] *See https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs.*

[10] Further information on EPA's response to the stay orders can be found online at: *https://www.epa.gov/Cross-State-Air-Pollution/epa-response-judicial-stay-orders.*

On January 16, 2024, the EPA signed a proposal to partially approve and partially disapprove State Implementation Plan submittals addressing interstate transport for the 2015 ozone NAAQS from Arizona, Iowa, Kansas, New Mexico, and Tennessee and proposed to include these states in the Good Neighbor Plan beginning in 2025.

On April 30, 2021, the EPA published the final Revised Cross-State Air Pollution Rule (CSAPR) Update, 86 FR 23054, which resolved 21 states' good neighbor obligations for the 2008 ozone NAAQS, following the remand of the 2016 CSAPR Update (81 FR 74504, October 26, 2016) in *Wisconsin v. EPA*, 938 F.3d 308 (D.C. Cir. 2019). Together, these two rules establish the Group 2 and Group 3 market-based emissions trading programs for 22 states in the eastern United States for emissions of NO_X from fossil fuel-fired EGUs during the summer ozone season.

b. Clean Air Act section 111 Rule

Concurrently with the final ELG, the EPA is finalizing the repeal of the Affordable Clean Energy Rule, establishing Best System of Emissions Reduction (BSER) determinations and emission guidelines for existing fossil fuel-fired EGUs, and establishing BSER determinations and accompanying standards of performance for GHG emissions from new and reconstructed fossil fuel-fired stationary combustion turbines and modified fossil fuel-fired EGUs. Specifically, for coal-fired EGUs, the EPA is establishing final standards based on carbon capture and storage/sequestration with 90 percent capture with a compliance date of January 1, 2032. For coal-fired EGUs retiring by January 1, 2039, the EPA is establishing final standards based on 40 percent natural gas co-firing with a compliance date of January 1, 2030.

While four subcategories for coal-fired EGUs were proposed, the EPA is finalizing just the two subcategories for coal-fired EGUs as described in the preceding paragraph. Consistent with 40 CFR 60.24a(e) and the Agency's explanation in the proposal, states have the ability to consider, *inter alia*, a particular source's remaining useful life when applying a standard of performance to that source.[11]

In addition, the EPA is creating an option for states to provide for a compliance date extension for existing sources of up to one year under certain circumstances for sources that are installing control technologies to comply with their standards of performance. States may also provide, by inclusion in their state plans, a reliability assurance mechanism of up to one year that under limited circumstances would allow existing EGUs that had planned to cease operating by a certain date to temporarily remain available to support reliability. Any extensions exceeding 1-year must be addressed through a state plan revision. Further information about the CAA section 111 rule is available online at *https://www.epa.gov/stationary-sources-air-pollution/greenhouse-gas-standards-and-guidelines-fossil-fuel-fired-power*.

c. Mercury and Air Toxics Standards Rule

On March 6, 2023, the EPA published a final rule which reaffirmed that it remains appropriate and necessary to regulate hazardous air pollutants (HAP), including mercury, from power plants after considering cost. This action revoked a 2020 finding that it was not appropriate and necessary to regulate coal- and oil-fired power plants

[11] See 88 FR 33240 (May 23, 2023) (invoking RULOF based on a particular coal-fired EGU's remaining useful life "is not prohibited under these emission guidelines").

under CAA section 112, which covers toxic air pollutants. The EPA reviewed the 2020 finding and considered updated information on both the public health burden associated with HAP emissions from coal- and oil-fired power plants, as well as the costs associated with reducing those emissions under the Mercury and Air Toxics Standards (MATS). After weighing the public risks these emissions pose to all Americans (and particularly exposed and sensitive populations) against the costs of reducing this harmful pollution, the EPA concluded that it remains appropriate and necessary to regulate these emissions. This action ensures that coal- and oil-fired power plants continue to control emissions of hazardous air pollution and that the Agency properly interprets the CAA to protect the public from hazardous air emissions.

Concurrently with the final ELG, the EPA is finalizing an update to the National Emission Standards for Hazardous Air Pollutants for Coal- and Oil-Fired Electric Utility Steam Generating Units (EGUs), commonly known as the Mercury and Air Toxics Standards (MATS) for power plants, to reflect recent developments in control technologies and the performance of these plants. This final rule includes an important set of improvements and updates to MATS and also fulfills the EPA's responsibility under the Clean Air Act to periodically re-evaluate its standards in light of advancements in pollution control technologies to determine whether revisions are necessary. The improvements consist of:

- Further limiting the emission of non-mercury HAP metals from existing coal-fired power plants by significantly reducing the emission standard for filterable particulate matter (fPM), which is designed to control non-mercury

HAP metals. The EPA is finalizing a two-thirds reduction in the fPM standard;[12]

- Tightening the emission limit for mercury for existing lignite-fired power plants by 70 percent;[13]
- Strengthening emissions monitoring and compliance by requiring coal-and oil-fired EGUs to comply with the fPM standard using PM continuous emission monitoring systems (CEMS);[14]
- Revising the startup requirements in MATS to assure better emissions performance during startup.

Additional information on the final MATS is available on the EPA's website.[15]

d. National Ambient Air Quality Standards Rules for Particulate Matter

On February 7, 2024, the EPA Administrator signed a final rule strengthening the National Ambient Air Quality Standards for Particulate Matter (PM NAAQS) to protect millions of Americans from harmful and costly health impacts, such as heart attacks and premature death. Particle or soot pollution is one of the most dangerous forms of air pollution, and an extensive body of science links it to a range of serious and in some cases deadly illnesses. The EPA set the level of the primary (health-based) annual particulate matter ($PM_{2.5}$) standard at 9.0 micrograms per cubic meter to provide increased public health protection, consistent with the available health science. The EPA did not change the current primary and secondary (welfare-based) 24-hour $PM_{2.5}$

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[12] Also, the EPA is finalizing the removal of the low-emitting EGU provisions for fPM and non-mercury HAP metals.

[13] This level aligns with the mercury standard that other coal-fired power plants have been achieving under the current MATS.

[14] PM CEMS provide regulators, the public, and facility owners or operators with cost-effective, accurate, and continuous emission measurements. This real-time, quality-assured feedback can lead to improved control device and power plant operation, which will reduce air pollutant emissions and exposure for local communities.

[15] *See https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards.*

standards, the secondary annual $PM_{2.5}$ standard, and the primary and secondary PM10 standards. The EPA also revised the Air Quality Index to improve public communications about the risks from $PM_{2.5}$ exposures and made changes to the monitoring network to enhance protection of air quality in communities overburdened by air pollution. More information about this action is available on the EPA's website.[16]

V. Steam Electric Power Generating Industry Description

A. General Description of Industry

For each previous regulatory action—the 2013 proposed rule, the 2015 final rule, the 2019 proposed rule, the 2020 final rule, and the 2023 proposed rule—the EPA provided general descriptions of the steam electric power generating industry. The Agency has continued to collect information and update this industry profile. The previous descriptions reflected the known information about the universe of steam electric power plants and incorporated final environmental regulations applicable at that time. For this rule, as described in the Supplemental TDD, section 3, the EPA has revised its description of the steam electric power generating industry (and its supporting analyses) to incorporate major changes such as additional retirements, fuel conversions, ash handling conversions, wastewater treatment updates, and updated information on capacity utilization.[17] The analyses supporting this rule use an updated baseline that incorporates these changes in the industry and include the 2015 and 2020 rules'

[16] *See https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm*.

[17] The data presented in the general description continue to reflect some conditions existing in 2009.The 2010 steam electric industry survey remains the EPA's best available source of information for characterizing operations across the industry in cases where the EPA has not received newer information.

limitations for FGD wastewater, BA transport water, CRL, and legacy wastewater. The analyses then compare the effect of the new rule's requirements to this baseline.

As described in the Regulatory Impact Analysis, of the 858 steam electric power plants in the country identified by the EPA, only those coal-fired power plants that discharge FGD wastewater, BA transport water, CRL, legacy wastewater and/or unmanaged CRL may incur compliance costs under this rule. The EPA estimates that 141 to 170 such plants may incur compliance costs under this rule, depending on the scenario used to model the occurrence of unmanaged CRL costs. See section VII.C.5 of this preamble for more information regarding subcategory for discharges of unmanaged CRL. See the EPA's memorandum, *Changes to Industry Profile for Coal-Fired Generating Units for the Steam Electric Effluent Guidelines Final Rule* (DCN SE11618), for more information about plant retirements, fuel conversions, ash handling conversions, wastewater treatment updates, and updated information on capacity utilization.

B. Current Market Conditions and Drivers in the Electricity Generation Sector

1. Inflation Reduction Act Implementation

On August 16, 2022, President Biden signed into law the Inflation Reduction Act (IRA). The IRA marks the most significant action Congress has taken on clean energy and climate change in the nation's history. The IRA provides tax credits, financing programs, and other incentives, some of which are administered by the EPA, that will accelerate the transition to forms of energy that produce little or no GHG emissions and other water and air pollutants. As such, it includes many provisions that will affect the steam electric power generating industry, causing both direct effects through changes in the production of electricity and indirect effects on electricity demand and changes to fuel markets.

In September 2023, the EPA published a report on the effect of the IRA on the electricity sector and on the economy in general.[18] The report found that the IRA would lead to emission reductions from the electric power sector of 49 to 83 percent below 2005 levels in 2030. The associated shifts from fossil fuel generation would also lead to reductions in water and air pollution from the sector. The study also found that the IRA would lower economy-wide CO_2 emissions, including emissions from electricity generation and use, by 35 to 43 percent below 2005 levels in 2030. Across the end-use sectors, the study found that buildings exhibit the greatest reductions from 2005 levels of direct plus indirect CO_2 emissions from electricity, followed by industry and transportation. Though it focuses on changes in climate-forcing emissions (in part attributable to the models it uses), the study also implies important changes in the emissions of other pollutants throughout the economy. The EPA used IPM to evaluate the impacts of the final ELG relative to a baseline that reflects impacts from other relevant policies and environmental regulations that affect the power sector, including the IRA and other on-the-books Federal and state rules (*see* section VIII.C.2 of this preamble for more information).

2. Recent Developments in Ensuring Electric Reliability and Resource Adequacy

[18] U.S. EPA (Environmental Protection Agency). 2023. *Electricity Sector Emissions Impacts of the Inflation Reduction Act: Assessment of Projected CO_2 Emission Reductions from Changes in Electricity Generation and Use*. U EPA 430-R-23-004. Available online at: *https://www.epa.gov/inflation-reduction-act/electric-sector-emissions-impacts-inflation-reduction-act.*

The nature and components of the bulk power sector have been evolving away from older and less efficient legacy fossil generation (mostly coal-fired power plants) towards more decentralized, renewable assets and flexible gas-fired generation. Stakeholders have raised concerns that centralized, dispatchable power plants are coming offline faster than new generation can replace the reliability attributes associated with them. However, a combination of technology innovation, revised market signals from the Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs), and reforms recently completed and underway by Federal Energy Regulatory Commission (FERC) are collectively poised to address current reliability challenges associated with the transition along with expected higher load growth and the increasing frequency of extreme weather events. EPA has continued to learn and engage on reliability issues, particularly as part of the Agency's implementation of the *Joint Memorandum on Interagency Communication and Consultation on Electric Reliability*.[19] As part of this process, EPA has engaged in regular meetings with Department of Energy (DOE), North American Electric Reliability Corporation (NERC), FERC, and the various ISOs/RTOs.

FERC, NERC, RTOs, and ISOs are already taking steps to ensure reliability during this period of asset evolution. Among FERC's actions to help address reliability is Order 2023, or "Improvements to Generator Interconnection Procedures," which will help expedite interconnections for new assets waiting to connect to the grid. This is a very important development to ensure future resource adequacy because interconnection

[19] Available online at: *https://www.epa.gov/power-sector/electric-reliability-mou.*

wait times for new energy assets entering energy markets have increased, which is stifling the ability of replacement generation to connect to the grid. FERC's final action on extreme cold weather preparedness will support the new peak demand hours, which have migrated to winter months. New reliability standards issued for inverter-based resources "will help ensure reliability of the grid by accommodating the rapid integration of new power generation technologies, known as inverter-based resources (IBRs), that include solar photovoltaic, wind, fuel cell and battery storage resources…."[20] FERC has also undertaken various transmission-related efforts, from inter-regional transmission capacity efforts to reconductoring and dynamic line rating, that would help bolster reliability by increasing the transmission capacity of existing lines and creating incentives for new, inter-regional transmission. Increasing transmission capacity can enhance reliability by increasing the amount of generation that can access the grid to help meet demand.

Furthermore, there are new technologies coming online that can also help provide reliability attributes. The deployment of many of these technologies has been accelerating due to the incentives in the IRA. The rapid increase in energy storage deployment across the nation is an important part of future grid reliability, particularly as the duration of storage assets expands. Examples of existing and emerging storage resources include various types of fuel cells, batteries, pumped hydro-electric reservoirs, and underground hydrogen caverns. Energy storage can help buttress reliability by storing renewable energy for dispatch when demand is high. Improved management of demand response

[20] For further information about FERC actions to address IBRs, *see* https://www.ferc.gov/news-events/news/ferc-moves-protect-grid-transition-clean-energy-resources.

assets, better designed electricity tariff structures, aggregation of distributed resources like roof-top solar panels, and integration of behind-the-meter battery storage can further support balancing peak demand on power grids. For example, programs to manage demand, which have shown value well before the recent energy transition, incentivize customers to shift their demand during periods when there is ample supply, which can help reduce instances when supply is tight.

Despite these concerns, there are also existing procedures in place to ensure electricity system reliability and resource adequacy over both the short and long-term. For example, regional planning organizations typically have incentive or planning procedures to ensure that there is sufficient capacity to meet future demand such as day-ahead reserve and capacity markets and seasonal reserve margins. Furthermore, the EPA understands that before a unit implements a retirement decision, the unit's owner will follow the processes put in place by the relevant RTO, balancing authority, or state regulator to protect electric system reliability. These processes typically include analysis of the potential impacts of the proposed EGU retirement on electrical system reliability, identification of options for mitigating any identified adverse impacts, and, in some cases, temporary provision of additional revenues to support the EGU's continued operation until longer-term mitigation measures can be put in place.

C. Control and Treatment Technologies

In general, control and treatment technologies for some wastestreams have continued to advance since the 2015 and 2020 rules. Often, these advancements provide plants with additional approaches for complying with any effluent limitations. In some cases, these advancements have also decreased the associated costs of compliance. For this rule, the EPA incorporated updated information and evaluated several technologies available to control and treat FGD wastewater, BA transport water, CRL, and legacy wastewater generated by the steam electric power generating industry. See section VIII of this preamble for details on updated cost information.

1. FGD Wastewater

FGD scrubber systems are used to remove sulfur dioxide from flue gas so it is not emitted into the air. Dry FGD systems use water in their operation but generally do not discharge wastewater because it evaporates during operation. Wet FGD systems do produce a wastewater stream.

Steam electric power plants discharging FGD wastewater currently employ a variety of wastewater treatment technologies and operating/management practices to reduce the pollutants associated with FGD wastewater discharges. The EPA identified the following types of treatment and handling practices for FGD wastewater:

- **Chemical precipitation.** Chemicals are added as part of the treatment system to help remove suspended solids and dissolved solids, particularly metals. The precipitated solids are then removed from the solution by coagulation/flocculation followed by clarification and/or filtration. The 2015 and 2020 rules focused on a specific design that employs hydroxide precipitation, sulfide precipitation (organosulfide), and iron coprecipitation to remove suspended solids and convert soluble metal ions to insoluble metal hydroxides or sulfides. Chemical precipitation was part of the BAT technology basis for the effluent limitations in the 2015 and 2020 rules.
- **High-hydraulic-residence-time biological reduction (HRTR).** The EPA identified three types of biological treatment systems used to treat FGD wastewater: anoxic/anaerobic fixed-film bioreactors (which target removals of nitrogen compounds and selenium), anoxic/anaerobic suspended growth systems (which target removals of selenium and other metals), and aerobic/anaerobic sequencing batch reactors (which target removals of

organics and nutrients). An anoxic/anaerobic fixed-film bioreactor designed to remove selenium and nitrogen compounds using high hydraulic residence times of approximately 10 to 16 hours was part of the BAT technology basis for the effluent limitations in the 2015 rule.

- **Low-hydraulic-residence-time biological reduction (LRTR).** LRTR is a biological treatment system that targets removal of selenium and nitrate/nitrite using fixed-film bioreactors in smaller, more compact reaction vessels. This system differs from the HRTR biological treatment system evaluated in the 2015 rule, in that the LRTR system is designed to operate with a shorter residence time (approximately one to four hours, compared to a residence time of 10 to 16 hours for HRTR) while still achieving significant removal of selenium and nitrate/nitrite. LRTR was part of the BAT technology basis for the effluent limitations in the 2020 rule.
- **Membrane filtration.** A membrane filtration system (*e.g.,* microfiltration, ultrafiltration, nanofiltration, forward osmosis, electrodialysis reversal, or reverse osmosis (RO)) is designed specifically for high-TDS and high-TSS wastestreams. These systems are designed to minimize fouling and scaling associated with industrial wastewater. These systems typically use pretreatment for potential scaling agents (*e.g.*, calcium, magnesium, sulfates) combined with one or more type of membrane technology to remove a broad array of particulate and dissolved pollutants from FGD wastewater. The membrane filtration units may also employ advanced techniques, such as vibration or creation of vortexes to mitigate fouling or scaling of the membrane surfaces. Membrane filtration can achieve zero discharge by recirculating permeate from an RO system back into plant operations.
- **Spray evaporation.** Spray evaporation technologies, which include spray dry evaporators (SDEs) and other similar proprietary variations, evaporate water by spraying fine misted wastewater into hot gases. The hot gases allow the water to evaporate before contacting the walls of an evaporation vessel, treating wastewater across a range of water quality characteristics such as TDS, TSS, or scale forming potential. Spray evaporation technologies use a less complex treatment configuration than brine concentrator and crystallizer systems (see the description of thermal evaporation systems) to evaporate water using a heat source, such as a slipstream of hot flue gas or an external natural gas burner. Spray evaporation technologies can be used in combination with other volume reduction technologies, such as membranes, to maximize the efficiency of each process. Concentrate from an RO system can then be processed through the spray evaporation technology to achieve zero discharge by recirculating permeate from the RO system back into plant operations.
- **Thermal evaporation.** Thermal evaporation systems use a falling-film evaporator (or brine concentrator), following a softening pretreatment step, to produce a concentrated wastewater stream and a distillate stream to reduce wastewater volume by 80 to 90 percent and reduce the discharge of pollutants.

The concentrated wastewater is usually further processed in a crystallizer that produces a solid residue for landfill disposal and additional distillate that can be reused within the plant or discharged. These systems are designed to remove the broad spectrum of pollutants present in FGD wastewater to very low effluent concentrations.

- Some plants operate their wet FGD systems using approaches that eliminate the discharge of FGD wastewater. These plants use a variety of operating and management practices to achieve this, including the following:
  - **Complete recycle.** The FGD wastestream is allowed to recirculate. Particulates (*e.g*., precipitates and other solids) are removed and landfilled. Water is supplemented when needed to replace water that evaporated or was removed with landfilled solids. This process does not produce a saleable product (*e.g*., wallboard grade gypsum) but it does not need a wastewater purge stream to maintain low levels of chlorides.
  - **Evaporation impoundments.** Some plants located in warm, dry climates use surface impoundments as holding basins where the FGD wastewater is retained until it evaporates. The evaporation rate from these impoundments is greater than the flow rate of the FGD wastewater and amount of precipitation entering the impoundments; therefore, there is no discharge to surface water.[21] These impoundments must be large enough to accommodate extreme precipitation events to prevent overtopping and runoff.
  - **FA conditioning.** Many plants that operate dry FA handling systems use the water from their FGD system in the FA handling system to suppress dust or improve handling and/or compaction characteristics in an on-site landfill.
  - **Combination of wet and dry FGD systems.** The dry FGD process involves atomizing and injecting wet lime slurry, which ranges from approximately 18 to 25 percent solids, into a spray dryer. The water contained in the slurry evaporates from the heat of the flue gas within the system, leaving a dry residue that is removed from the flue gas using a fabric filter (*i.e.*, baghouse) or electrostatic precipitator.
  - **Underground injection.** These systems dispose of wastes by injecting them into a permitted underground injection well as an alternative to discharging wastewater to surface waters.

The EPA also collected information on other FGD wastewater treatment technologies, including direct contact thermal evaporators and ion exchange. These

[21] Such impoundments must be lined based on the requirements in the CCR rule. This lining would significantly reduce the potential for a discharge through groundwater that would be the functional equivalent of a direct discharge to a WOTUS.

treatment technologies have been evaluated, in full- or pilot-scale, or are being developed to treat FGD wastewater. More information on these technologies is available in section 4.1 of the Supplemental TDD.

2. BA Transport Water

BA (bottom ash) consists of heavier ash particles that are not entrained in the flue gas and fall to the bottom of the furnace. In most furnaces, the hot BA is quenched in a water-filled hopper.[22] Some plants use water to transport (sluice) the BA from the hopper to an impoundment or dewatering bins. The water used to transport the BA to the impoundment or dewatering bins is usually discharged to surface water as overflow from the systems after the BA has settled to the bottom. The industry also uses the following BA handling systems that generate BA transport water:

- **Remote mechanical drag system (MDS).** These systems transport BA to a remote MDS using the same processes as wet-sluicing systems. A drag chain conveyor pulls the BA out of the water bath on an incline to dewater the BA. The system can be operated either as a closed-loop system (part of the technology basis for the 2015 rule) or a high-recycle-rate system (technology basis for the 2020 rule).[23]
- **Mobile MDS.** This technology is a smaller, mobile version of a remote MDS with an additional clarification system. It is not intended to be a permanent installation, which allows facilities to reduce capital costs. Once in place, the system works like a remote MDS—the incoming water is clarified and primary separation occurs. The clarified water is taken from the mechanical drag system to a mobile clarifier and polished to a level suitable for recirculation. The mobile clarifier thickens the collected solids, which are then sent back to the mechanical drag system portion and mixed with coarse BA. This mixture is sent up an incline, dewatered, and disposed of.

[22] Consistent with the 2015 and 2020 rule, EGU slag is considered BA.

[23] In some cases, additional treatment may be necessary to maintain a closed-loop system. This additional treatment could include polymer addition to enhance removal of suspended solids or membrane filtration of a slipstream to remove dissolved solids.

- **Dense slurry system.** These systems use a dry vacuum or pressure system to convey the BA to a silo (as described below for the "dry vacuum or pressure system"), but instead of using trucks to transport the BA to a landfill, the plant mixes the BA with a lower percentage of water compared to a wet-sluicing system and pumps the mixture to the landfill.

As part of the 2020 rule and this rule, the EPA identified the following BA handling systems that do not, by definition or practice, generate BA transport water.

- **MDS.** These systems are located directly underneath the EGU. The BA is collected in a water quench bath. A drag chain conveyor pulls the BA out of the water bath along an incline to dewater the BA.
- **Dry mechanical conveyor.** These systems are located directly underneath the EGU. The system uses ambient air to cool the BA in the boiler and then transports the ash out from under the EGU using a conveyor. There is no water used in this process.
- **Dry vacuum or pressure system.** These systems transport BA from the EGU to a dry hopper without using any water. Air is percolated through the ash to cool it and combust unburned carbon. Cooled ash then drops to a crusher and is conveyed via vacuum or pressure to an intermediate storage destination.
- **Vibratory belt system.** These systems deposit BA on a vibratory conveyor trough, where the ash is air-cooled and ultimately moved through the conveyor deck to an intermediate storage destination without using any water.
- **Submerged grind conveyor.** These systems are located directly underneath the EGU and are designed to reuse slag tanks, ash gates, clinker grinders, and transfer enclosures from the existing wet sluicing systems. The system collects BA from the discharge of each clinker grinder. A series of submerged drag chain conveyors transport and dewater the BA.

More information on these technologies is available in section 4.2 of the Supplemental TDD.

3. CRL

In promulgating the 2015 rule, the EPA determined that CRL from landfills and impoundments includes similar types of constituents as FGD wastewater, albeit at potentially lower concentrations and smaller volumes. Based on this characterization of the wastewater and knowledge of treatment technologies, the EPA determined that certain treatment technologies identified for FGD wastewater could also be used to treat CRL. These technologies, described in section V.C.1 of this preamble, include chemical precipitation, biological treatment (including LRTR), membrane filtration, spray evaporation, or other thermal treatment options. The EPA also identified other management and reuse strategies from responses to the 2010 *Questionnaire for the Steam Electric Power Generating Effluent Guidelines,* or steam electric survey, which included using CRL from either an impoundment or landfill for moisture conditioning FA, dust control, or truck wash. The EPA also identified plants that collect CRL from impoundments and recycle it directly back to the impoundment.

4. Legacy Wastewater

Legacy wastewater can be composed of FGD wastewater, BA transport water, FA transport water, CRL, gasification wastewater and/or FGMC wastewater generated before the “as soon as possible” date that more stringent effluent limitations from the 2015 or 2020 rules would apply. Discharges of legacy wastewater may occur through an intermediary source (*e.g.*, a tank or surface impoundment) or directly into a surface waterbody, with the vast majority of legacy wastewater currently contained in surface impoundments resulting from treating the wastestreams listed above to the previously established BPT limitations. The record indicates that the following technologies can be applied to treat this type of legacy wastewater: chemical precipitation, biological treatment (including LRTR), membrane filtration, spray evaporation, and other thermal treatment options. These technologies are described in section V.C.1 of this preamble.

Another option, which may be used in combination with other systems such as chemical and physical treatment, is zero valent iron (ZVI).

- **ZVI**. This technology can be used to target specific inorganics, including selenium, arsenic, nitrate, and mercury in this type of legacy wastewater. The technology entails mixing influent wastewater with ZVI (iron in its elemental form), which reacts with oxyanions, metal cations, and some organic molecules in wastewater. ZVI causes a reduction reaction in these pollutants, after which the pollutants are immobilized through surface adsorption onto iron oxide coated on the ZVI or generated from oxidation of elemental iron. The coated, or spent, ZVI is separated from the wastewater with a clarifier. The quantity of ZVI required and number of reaction vessels can vary based on the composition and amount of wastewater being treated.

The EPA recognizes that the characterization of legacy wastewater differs within the layers of a CCR impoundment as it is dewatered and prepared for closure. Therefore, treatment requirements may change as closure continues. Wastewater characteristics may also differ across CCR impoundments due to the different types of fuels burned at the plant, duration of pond operation, and ash type. Each of the treatment technologies identified for legacy wastewater above is applicable to all legacy wastewaters; treatment may require a combination of those technologies (*e.g.*, chemical precipitation and membrane filtration).

In addition, solids dewatering is necessary to dredge CCR materials from the impoundment. Mobile dewatering systems are typically self-contained units on a trailer, allowing for the entire system to be easily moved on-site and off-site. Legacy wastewater from a holding area (*e.g.*, pit, pond, collection tank) is pumped through a filter press to generate a filter cake and water stream. A shaker screen can be added to the treatment train to remove larger particles prior to the filter press. Furthermore, the filter press can be equipped with automated plate shifters to allow solids to drop from the end of the trailer directly into a loader or truck. The resulting wastestream may be further treated to meet any discharge requirements.

VI. Data Collection Since the 2020 Rule

A. Information from the Electric Utility Industry

1. Data Requests and Responses

In January 2022, the EPA requested the following pollution treatment system performance and cost information for coal-fired power plants from three steam electric power companies:

- FGD wastewater installations of the following technologies: thermal technology; membrane filtration technology; paste, solidification, or encapsulation of FGD wastewater brine; electrodialysis; and electrocoagulation.
- Overflow from an MDS, a compact submerged conveyor, or remote MDS installations, including purge rate and management from remote MDS systems, as well as any pollutant concentration data to characterize the overflow or purge.
- CRL treatment from on-site or off-site testing (full-, pilot-, or laboratory-scale).
- On-site or off-site testing (full-, pilot-, or laboratory-scale) and/or implementation of treatment technologies associated with surface impoundment dewatering treatment.
- Costs associated with these technologies.

In addition, after meeting with four additional power companies, the EPA sent each company a voluntary request inviting them to provide the same data described above.

In July 2023, the EPA requested any full-, pilot-, or laboratory-scale data associated with on-site or off-site testing or implementation of a recently commissioned spray dryer evaporator for FGD wastewater and legacy wastewater at a coal-fired power plant from Minnesota Power. The EPA also requested information on pretreatment or disposal systems necessary for continued spray dryer evaporator operations and any corresponding documentation (*e.g.*, wastestreams generated, process flow diagram).

2. Meetings with Individual Utilities

To gather information to support this supplemental rule, the EPA met with representatives from four utilities. Two of these utilities reached out to the EPA after the announcement of the supplemental rulemaking. The EPA contacted the remaining utilities due to their known or potential consideration of membrane filtration. At these meetings, the EPA discussed the operation of the utility's coal-fired EGUs and the treatment and management of BA transport water, FGD wastewater, legacy wastewater, and CRL since the 2020 rule. The EPA learned about updates associated with plant operations and studies at these plants, which were originally discussed during the 2015 and 2020 rules.

The objectives of these meetings were to gather general information about coal-fired power plant operations; pollution prevention and wastewater treatment system operations; ongoing pilot or laboratory scale study information for FGD wastewater treatment; BA system performance, characterization, and quantification of the overflow and purge from remote MDS installations; and treatment technologies and pilot testing associated with CRL and legacy wastewater. The EPA used this information to supplement the data collected in support of the 2015 and 2020 rules.

3. Voluntary CRL Sampling

In December 2021, the EPA invited eight steam electric power companies to participate in a voluntary program designed to obtain data to supplement the wastewater characterization data set for CRL. The EPA requested these data from facilities believed to have constructed new landfills pursuant to the 2015 CCR rule. Six power companies chose to participate in this program. The EPA incorporated these data into the CRL analytical dataset used to estimate pollutant loadings. More information on estimated CRL pollutant loadings is available in section 6 of the Supplemental TDD.

4. Electric Power Research Institute Voluntary Submission

The Electric Power Research Institute (EPRI) conducts industry-funded studies to evaluate and demonstrate technologies that can potentially remove pollutants from wastestreams or eliminate wastestreams using zero-discharge technologies. Following the 2015 rule, the EPA reviewed 35 EPRI reports published between 2011 and 2018 that were voluntarily provided regarding characteristics of FGD wastewater, FGD wastewater treatment pilot studies, BA transport water characterization, BA handling practices, halogen addition rates, and the effect of halogen additives on FGD wastewater. For this supplemental rule, EPRI provided an additional 25 reports generated since 2018. The EPA used the information in these reports to inform treatment technology performance and to update methodologies for estimating costs and pollutant removals associated with candidate treatment technologies.

5. Meetings with Trade Associations

In 2021 and 2022, the EPA met with the Edison Electric Institute and the American Public Power Association. These trade associations represent investor-owned utilities and community-owned utilities, respectively. They provided information and perspectives on the status of many utilities transitioning away from coal. The EPA also participated in meetings with one trade association following the 2023 proposed rule. This association requested meetings with the EPA to discuss the association's public comments.

B. Notices of Planned Participation

The 2020 rule required facilities to file a Notice of Planned Participation (NOPP) with their permitting authority no later than October 13, 2021, if the facility wished to participate in the LUEGU subcategory, the permanent cessation of coal combustion by 2028 subcategory, or in the VIP. For the permanent cessation of coal combustion by 2028 subcategory, this filing date was extended by a 2023 direct final rule to June 27, 2023. 88 FR 18440. While the facilities were not required to provide copies of the NOPPs to the Agency, the EPA nevertheless obtained a number of these filings. Some facilities provided the EPA a courtesy copy when filing with the relevant permitting authority. The Agency received notice of other filings when a state permitting authority sent new draft permits or modifications to the EPA for review. The EPA also asked some states for NOPPs after those states asked the EPA questions about the process or initiated discussions about specific plants. Environmental groups that collected some additional information about NOPPs also shared the information with EPA prior to the publication of the proposed rule.

The EPA is currently aware of NOPPs covering 94 EGUs at 38 plants. At the time of the proposed rule, four EGUs (at two plants) requested participation in the LUEGU subcategory, an additional 12 EGUs (at four plants) requested participation in the 2020 rule VIP, and the remaining 74 EGUs (at 33 plants) requested participation in the permanent cessation of coal combustion by 2028 subcategory.[24] Following the 2023 direct final rule, the EPA obtained one additional NOPP stating that two EGUs (at one plant) requested participation in the permanent cessation of coal combustion subcategory by 2028 instead of the 2020 rule VIP. The EPA notes that these counts are not a comprehensive picture of facilities' plans for two reasons. First, the EPA was unable to obtain information for all plants and states. Second, even where a facility has filed a NOPP, under the transfer provisions of 40 CFR 423.13(o)(1)(ii), it still retains flexibility to transfer between subcategories, or between a subcategory and the 2020 VIP provisions, until December 31, 2025.[25] For example, the EPA made industry profile updates to some of the 90 EGUs with corresponding NOPPs based on public comments and other power company data (*e.g.*, integrated resource planning reports). For further detail, the NOPPs the EPA is aware of have been placed in the docket along with a memorandum summarizing the information and providing record index numbers for locating each facility, entitled *Changes to Industry Profile for Coal-Fired Generating Units for the Steam Electric Effluent Guidelines Final Rule* (DCN SE11618).

C. Information from Technology Vendors and Engineering, Procurement, and Construction Firms

[24] Plant Scherer filed a permanent cessation of coal combustion by 2028 NOPP for two EGUs and a 2020 rule VIP NOPP for the remaining two EGUs; thus, the plant count for the three groupings does not equal 38.

[25] The ability to transfer into the LUEGU subcategory ended on December 31, 2023.

The EPA gathered data on the availability and effectiveness of FGD wastewater, BA handling, CRL, and surface impoundment dewatering operations and wastewater treatment technologies from technology vendors and engineering, procurement, and construction firms through presentations, conferences, meetings, and email and phone contacts. These collected data informed the development of the technology costs and pollutant removal estimates for FGD wastewater, BA transport water, CRL, and legacy wastewater.

D. Other Data Sources

The EPA gathered information on steam electric generating facilities from the DOE's Energy Information Administration (EIA) Forms EIA-860 (Annual Electric Generator Report) and EIA-923 (Power Plant Operations Report). The EPA used the 2019, 2020, and 2021 data to update the industry profile, including commissioning dates, energy sources, capacity, net generation, operating statuses, planned retirement dates, ownership, and pollution controls at the EGUs. The EPA also referenced 2022 EIA data to support the analysis of FGD halogen (bromide and iodine) loads. Finally, the EPA used a 2024 EIA study as the basis for estimating the costs of a new coal-fired steam power plant.[26]

The EPA conducted literature and Internet searches to gather information on FGD wastewater treatment technologies, including information on pilot studies, applications in

[26] U.S. Energy Information Administration. (2024). *Capital Cost and Performance Characteristics for Utility-Scale Electric Power Generating Technologies,* available at: *https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capital_cost_AEO2025.pdf*.

the steam electric power generating industry, and implementation costs and timelines. The EPA also used Internet searches to identify or confirm reports of planned facility plant and EGU retirements and reports of planned unit conversions to dry or closed-loop recycle ash handling systems. The EPA used this information to inform the industry profile and identify process modifications occurring in the industry.

VII. Final Regulation

A. Description of the Options

The EPA analyzed four main regulatory options at proposal, the details of which were discussed in the proposed rule. *See* 88 FR 18824, 18837-18838 (Mar 29, 2023). For the final rule, the EPA evaluated three main regulatory options, as shown in table VII–1 of this preamble. Option A corresponds to the proposed regulation with modifications, while Options B and C would require controls that would achieve greater pollutant reductions. All three options include the same technology basis for FGD wastewater (zero-discharge systems) and BA transport water (dry-handling or closed-loop systems), while incrementally increasing controls on CRL and legacy wastewater and removing certain subcategories as one moves from Option A to Option C. Each successive option from Option A to Option C would achieve a greater reduction in wastewater pollutant discharges. Each subcategorization is described further in section VII.C of this preamble.

1. FGD Wastewater

Under all three main options, the EPA would require zero discharge of FGD wastewater based on zero-discharge technologies and retain the 2020 FGD wastewater limitations and standards as an interim step toward achievement of zero-discharge requirements. Under all three options, the EPA would also eliminate the BAT and PSES subcategorizations for high-FGD-flow facilities and LUEGUs. Options A and B would also create a subcategory for EGUs that will permanently cease coal combustion no later than December 31, 2034, and instead of zero discharge would require discharges from these facilities to meet the 2020 rule limitations as included in their CWA permit. This subcategory modifies the proposed early adopters subcategory and is described further in section VII.C of this preamble. Under Option C, the EPA would not finalize a subcategory for those EGUs planning to cease coal combustion by December 31, 2034. Note that, for all three options, the EPA would retain the 2020 subcategory for EGUs permanently ceasing coal combustion by 2028.

2. BA Transport Water

Under all three main options, the EPA would require zero discharge of BA transport water based on dry-handling or closed-loop systems and retain the 2020 BA transport water limitations and standards as an interim step toward achievement of zero-discharge requirements. For all three options, the EPA would also eliminate the BAT and PSES subcategorizations for LUEGUs. Options A and B would also create a subcategory for EGUs that will permanently cease coal combustion no later than December 31, 2034, and instead would require discharges from these facilities to meet the 2020 rule limitations as permitted. Under Option C, the EPA would not finalize this subcategory. Note that, for all three options, the EPA would retain the 2020 subcategory for EGUs permanently ceasing coal combustion by 2028.

3. CRL

Under Option A, the EPA would establish BAT limitations and PSES for mercury and arsenic based on chemical precipitation treatment. Under Options B and C, BAT limitations and PSES would be zero discharge and the EPA would establish BAT limitations for mercury and arsenic based on chemical precipitation for discharges of unmanaged CRL. Options A and B would also create a subcategory for EGUs that would permanently cease coal combustion no later than December 31, 2034; CRL discharges from EGUs in this subcategory would be subject to case-by-case BPJ decision-making until permanent cessation of coal combustion, after which they would be subject to mercury and arsenic limitations based on chemical precipitation. Under Option C, the EPA would not finalize this subcategory.

4. Legacy Wastewater

Under Option A, the EPA would not specify a nationwide technology basis for BAT/PSES applicable to legacy wastewater at this time and such limitations would be derived on a site-specific basis by the permitting authorities, using their BPJ. Under Options B and C, the EPA would establish a subcategory for discharges of legacy wastewater discharged from surface impoundments commencing closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. For such discharges, the EPA would establish mercury and arsenic limitations based on chemical precipitation.

Table VII-1. Main Regulatory Options

Wastestream	**Subcategory**	**Technology Basis for the BAT/PSES Regulatory Options**		
		A	**B (Final Rule)**	**C**

FGD wastewater	N/A	Zero-discharge systems	Zero-discharge systems	Zero-discharge systems
	High-FGD-flow facilities/LUEGUs	NS	NS	NS
	EGUs permanently ceasing coal combustion by 2028	Surface impoundments	Surface impoundments	Surface impoundments
	EGUs permanently ceasing coal combustion by 2034	2020 rule limitations as permitted	2020 rule limitations as permitted	NS
BA transport water	N/A	Dry-handling or closed-loop systems	Dry-handling or closed-loop systems	Dry-handling or closed-loop systems
	LUEGUs	NS	NS	NS
	EGUs permanently ceasing coal combustion by 2028	Surface impoundments	Surface impoundments	Surface impoundments
	EGUs permanently ceasing coal combustion by 2034	2020 rule limitations as permitted	2020 rule limitations as permitted	NS
CRL	N/A	Chemical precipitation	Zero-discharge systems	Zero-discharge systems
	Discharges of unmanaged CRL	NS	Chemical precipitation	Chemical precipitation
	EGUs permanently ceasing coal combustion by 2034	Reserved; Chemical precipitation after closure	Reserved; Chemical precipitation after closure	NS
Legacy wastewater	N/A	Reserved	Reserved	Reserved
	Legacy wastewater discharged from surface	NS	Chemical precipitation	Chemical precipitation

	impoundments commencing closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**			

N/A = Not applicable

NS = Not subcategorized

Note: The table above does not present existing subcategories included in the 2015 rule or the 2020 VIP for FGD wastewater. The EPA did not propose, nor is it finalizing, any changes to the existing 2015 rule subcategorization of oil-fired units, units with a nameplate capacity of 50 MW or less, or the 2020 VIP.

B. Rationale for the Final Rule

After considering the technologies described in this preamble and the TDD, as well as public comments, and in light of the factors specified in CWA sections 301(b)(2)(A) and 304(b)(2)(B) (*see* section IV of this preamble), the EPA is establishing BAT effluent limitations based on the technologies described in Option B.[27] While the EPA is establishing new BAT effluent limitations for FGD wastewater and BA transport water based on more stringent technologies than the 2020 rule, the EPA is retaining the 2020 rule BAT effluent limitations for discharges before the applicability dates for new limitations on these wastewaters.

1. FGD Wastewater

[27] The EPA is including severability language in the final rule that makes clear that if any provisions of the final rule are reviewed and vacated by a court, it is the EPA's intent that as many portions of the rule remain in effect as possible.

The EPA is identifying zero-discharge systems as the technology basis for establishing BAT limitations to control pollutants discharged in FGD wastewater.[28] More specifically, the technology basis for BAT is membrane filtration systems, SDEs, and thermal evaporation systems, alone or in any combination, including any necessary pretreatment (*e.g.*, chemical precipitation) or post-treatment (*e.g.*, crystallization).[29] Furthermore, where a permeate or distillate is generated from the final stage of treatment, the BAT technology basis uses a process wherein this water would then be recycled back into the plant as either FGD makeup water or EGU makeup water.[30] After considering the factors specified in CWA section 304(b)(2)(B), the record shows that this suite of technologies is technologically available, is economically achievable, and has acceptable non-water quality environmental impacts. It is the EPA's intent that these three technologies considered together constitute BAT for FGD wastewater, and the EPA concludes that this BAT basis meets the requisite statutory factors. The EPA also finds, however, that each of the individual technologies within this suite supports a BAT determination on its own.

In the following subsections, the EPA discusses its rationale for selecting three zero-discharge systems as BAT for the control of FGD wastewater, as well as how each

[28] As described in section VII.B.5 of this preamble, the EPA is also finalizing a definitional change to certain wastewaters, including FGD wastewater, that excludes discharges necessary as a result of high intensity, infrequent storm events, as well as wastewater removed from FGD wastewater treatment equipment within the first 120 days of decommissioning the equipment.

[29] While three main technologies are listed here and are used to evaluate costs and non-water quality environmental impacts, the list is not meant to exclude use of other known zero-discharge treatment processes, including FA fixation, direct encapsulation, or evaporation ponds.

[30] The 2020 rule finalized a carve out from the definition of FGD wastewater applicable to "treated FGD wastewater permeate or distillate used as boiler makeup water."

individual zero-discharge technology supports the BAT technology basis on its own. The EPA also explains why it is not selecting a less stringent technology as BAT. For further discussion of the changes (now being finalized by the EPA) to the definition of FGD wastewater related to infrequent storm events and decommissioning wastewater, see section VII.B.5 of this preamble. For further discussion of the EPA's retention of the 2020 rule limitations as interim limitations, see section VII.C.7 of this preamble.

a. The EPA selects zero-discharge systems as BAT for FGD wastewater.

Technological availability of zero-discharge systems. At proposal, the EPA identified membrane filtration as a potential BAT on which to base zero-discharge limitations for FGD wastewater, but also solicited comment on several other zero-discharge technologies, such as thermal evaporation systems and SDEs, that the EPA thought might serve alone or in any combination as the BAT basis for a final rule.

The EPA received many comments that were specific to individual zero-discharge technologies, including both comments supporting and opposed to a finding of technological availability for these individual technologies as part of the BAT basis. Comments supporting zero-discharge limitations pointed to the large number of operating zero-discharge plants and pilot studies as evidence that more than just the best performing plant or pilot plants are using zero-discharge systems. Comments opposing such a finding primarily focused on membrane filtration, the EPA's proposed zero-discharge technology basis under the preferred regulatory option. The two concerns raised most commonly in opposition to the finding of membrane filtration availability were, first, that the EPA did not collect sufficient additional information to alter its findings in the 2020 rule regarding this technology's availability and, second, that the pilot studies and foreign plants cited by the EPA were conducted on small FGD wastewater flows that were not representative of domestic industry operations. For both membrane filtration systems and thermal evaporation systems, commenters who opposed a finding of availability also questioned whether back-end management options were available for the associated wastes from zero-discharge systems. To the extent it received comments suggesting that waste management alternatives are not available, the EPA has addressed these comments in the subsection discussing non-water quality environmental impacts, below.

After consideration of public comments and as further discussed below, the EPA is basing its determination that zero-discharge systems are available for control of pollutants found in FGD wastewater on the numerous full-scale domestic and foreign installations of zero-discharge systems to treat FGD wastewater, the large number of successful domestic and international pilot tests of zero-discharge systems on FGD wastewater, successful use of zero-discharge systems on other steam electric wastestreams, and the use of zero-discharge systems on wastestreams in many different industries besides the steam electric power generating industry. Alternatively, the EPA is basing its determination that each of the technologies that make up the suite of zero-discharge systems forming the BAT basis, standing alone, is available on the several full-scale domestic and/or foreign installations of each of these technologies to treat FGD wastewater and/or the successful domestic and international pilot tests of each of these technologies on FGD wastewater. The availability of each technology standing alone is also supported by the successful use of each of these technologies on other steam electric wastestreams and/or the use of each of these technologies on wastestreams in different industries besides the steam electric power generating industry. The weight of the evidence supports the Agency's conclusion that the suite of zero-discharge systems (or each of the individual technologies alone) are available in the industry to control FGD wastewater discharges, notwithstanding certain uncertainties the EPA described in the 2020 rule about one of the technologies that form the zero-discharge BAT technology basis. Agencies have inherent authority to reconsider past decisions and to revise, replace, or repeal a decision to the extent permitted by law and supported by a reasoned explanation. *FCC v. Fox Television Stations, Inc*., 556 U.S. 502, 515 (2009); *Motor Vehicle Mfrs. Ass'n v. State Farm Mutual Auto. Ins. Co*., 463 U.S. 29, 42 (1983). A finding that zero-discharge systems are available, or that each of the zero-discharge technologies forming the BAT basis is available, is also consistent with the technology-forcing nature of BAT as described in the legislative history and legal precedents discussing this provision (*see* section IV.B.2 of this preamble).

<u>Full-scale domestic zero-discharge systems</u>. In the 2020 rule, the EPA rejected membrane filtration as a standalone BAT technology basis due in part to the lack of a single full-scale domestic installation, which is still the case today. In that rule, however, the EPA did not evaluate a technology basis that includes the three zero-discharge technologies that form this final rule's BAT basis.

First, the EPA notes that 40 coal-fired power plants in the United States currently (as of 2024) operate wet FGD systems and manage their wastewater to achieve zero discharge.[31] These plants achieve zero discharge using evaporation ponds, recycling of FGD wastewater, ash fixation, thermal evaporation systems (*e.g.*, falling film evaporators), or SDEs. About 19 additional plants operated zero-discharge systems for FGD wastewater since 2009 but have since retired or converted fuels such that the FGD wastewater generation, and associated zero-discharge operations, have ceased. In total, more domestic facilities operate, or have operated, zero-discharge systems than the biological treatment systems used as the 2015 and 2020 rule bases.[32] Not only are there more of these systems, but the systems for which the EPA has information have achieved continuous, long-term zero discharge.

With respect specifically to the BAT basis identified in this final rule, the EPA finds that there are four U.S. coal-fired power plants currently operating full-scale thermal and three U.S. coal-fired power plants currently operating full-scale SDE systems.[33] The full-scale domestic application of the technologies identified in the BAT basis for this final rule support the EPA's finding that the BAT technology basis is available, as that term is used in the CWA. It also supports a finding that thermal

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[31] One of these 40 plants, which was already achieving zero discharge of its FGD wastewater, is now installing SDE. See *https://www.woodplc.com/insights/articles/engineering-solutions-for-wastewater-treatment* (DCN SE10284).

[32] The EPA accounted for four plants operating biological treatment systems in the 2015 rule analyses (DCN SE05832) and nine plants in the 2020 rule analyses (DCN SE08629).

[33] In the 2020 rule and 2023 proposal, the EPA has continually deferred to one company's representations that, contrary to representations from the technology vendor, its membrane filtration system is a long-term pilot system rather than a full-scale installation. This is a distinction without a difference, as the EPA can rely on both full-scale installations and pilot plants in establishing BAT limitations. Therefore, the EPA addresses this system in the section on pilot systems below (even though it could arguably be used to treat the facility's entire wastestream in the future).

evaporation systems are technologically available on their own and that SDEs are technologically available on their own.

Full-scale, foreign zero-discharge systems and zero-discharge pilot plants. While the full-scale, domestic operation of zero-discharge systems is sufficient to determine availability of the BAT technology basis, the EPA has also identified a number of full-scale, foreign zero-discharge systems, as well as domestic and international pilot systems; these could additionally or separately support the EPA's conclusion that the BAT basis identified in this final rule is available.

In 2020, the EPA declined to find that full-scale, foreign installations of membrane filtration demonstrated the availability of that technology, in large part because the EPA had not visited these systems or obtained long-term performance data on them, and thus stated there were uncertainties around these applications that prevented a finding of availability. At the time of the 2020 rule, the Agency cited 12 foreign installations of membrane filtration systems on FGD wastewater.[34] These systems began operating as early as 2015, and all of them were designed to operate as zero-discharge systems.[35] Importantly, however, the EPA did not dispute the availability of thermal

[34] ERG. 2020. *Technologies for the Treatment of Flue Gas Desulfurization Wastewater*. (DCN SE09218); ERG. 2020. *Notes from Call with DuPont*. (DCN SE08618); Beijing Jingneng Power. 2017. *Beijing Jingneng Power Company, Ltd. Announcement on Unit No. 1 of the Hbei Shuoshou Jingyuan Thermal Power Co., Ltd. Passing Through the 168-hours Trial Operation*. November 13. (DCN SE08624); Broglio, R. 2019. *Vendor FGD Wastewater Treatment Details – Doosan*. July 15. (DCN SE07107); Lenntech. 2020. *Lenntech Water Treatment Solutions. Flue Gas Desulfurization Treatment*. (DCN SE08622); Nanostone. 2019. *China Huadian Jiangsu Power Jurong Power Plant FGD Wastewater Zero Liquid Discharge Project was Awarded the Engineering Star Award*. June27. (DCN SE08623).

[35] *Technologies for the Treatment of Flue Gas Desulfurization Wastewater, Coal Combustion Residual Leachate, and Pond Dewatering* (DCN SE11695).

evaporation systems in the 2020 rule. This is consistent with the record, as even at the time of the 2015 rule, the EPA visited three thermal evaporation systems operating in Italy, obtaining relevant performance data on these systems, which it then used to establish BAT limitations for a voluntary incentive program based on such technology, as well as NSPS for FGD wastewater.[36]

Some commenters on the 2023 proposal reiterated the EPA's 2020 rule findings and argued that EPA has not collected sufficient new information on foreign installations of membrane filtration to reverse its 2020 findings. EPA first notes that, for this final rule, it has modified its BAT basis from proposal to consist of three zero-discharge systems (each of which was described in the proposal). Since the 2015 rule, EPA has collected information not just about membrane filtration systems abroad, but also about an additional four thermal evaporation systems and six SDE systems operating on FGD wastewater outside the United States.[37] The EPA finds that, when combined with the site visits and performance data EPA obtained on the three Italian thermal evaporation systems as part of the 2015 rulemaking, the current record is more than sufficient to determine, based on full-scale, foreign installations, that the suite of systems forming the BAT basis in this rule is available as that term is used in the CWA.

Furthermore, even looking at membrane filtration itself, as the EPA noted in the 2023 proposal, the foreign membrane filtration systems discussed in the 2020 rule have continued to successfully treat FGD wastewater and achieve zero discharge since 2020.

[36] This information was also used as the basis for the 2015 rule NSPS for FGD wastewater.

[37] *Technologies for the Treatment of Flue Gas Desulfurization Wastewater, Coal Combustion Residual Leachate, and Pond Dewatering* (DCN SE11695).

Despite commenters arguing that this additional information is not important because it does not change the overall number of plants known to operate the technology or the number of influent and effluent concentration data points collected from these plants, the EPA finds that continued operations constitute significant new information. This is because the longer each zero-discharge system operates, the less probability that some yet unknown operational difficulty will appear and the more certainty the EPA has that the technology is capable of achieving long-term zero-discharge treatment of this wastewater. Thus, foreign installations of the suite of technologies forming the BAT basis support the EPA's conclusion that the BAT basis is available as that term is used in the CWA. At the same time, use of thermal evaporation systems abroad supports a finding that thermal evaporation systems are technologically available on their own, use of SDEs abroad supports a finding that SDEs are technologically available on their own, and use of membrane filtration systems abroad support a finding that membrane filtration is technologically available on its own.

With respect to pilot studies, the 2020 rule found that pilot projects on membrane filtration did not provide sufficient long-term concentration data on which to base a finding of availability or calculate limitations.[38] Commenters on the 2023 proposal reiterated the EPA's 2020 rule findings and suggested that the EPA had not supplemented the record with enough pilot studies to reach a new conclusion on availability. The EPA disagrees. The Agency first notes that the BAT technology basis in this final rule has been updated to consist of three zero-discharge systems. When the 13 thermal pilot

[38] The EPA nevertheless established limitations based on membrane filtration technology in the 2020 VIP.

projects and one SDE pilot project on FGD wastewater in the record are combined with the 30 membrane filtration pilots on FGD wastewater discussed in the proposed rule (including eight pilot studies conducted since the 2020 rule), the EPA has significant evidence of the ability of this suite of systems to handle a variety of operating conditions.[39] These domestic and foreign pilots have demonstrated success removing pollutants from FGD wastewater under a number of pretreatment settings, whether performed without chemical precipitation pretreatment, with chemical precipitation pretreatment, or following biological treatment.[40] Furthermore, while some systems will not generate a clean permeate or distillate that needs to be handled, those that do will recycle this clean water source back into the plant to meet the final zero-discharge limitations. Thus, long-term pollutant removal information is no longer as relevant as it was in 2020 because the EPA is not calculating nonzero limitations in this final rule. While this discussion of pilot projects is used to support the availability of the BAT technology basis comprised of multiple technologies, the large number of successful pilot projects of membrane filtration and thermal evaporation systems also supports the EPA's finding that these individual technologies are available on their own.

[39] One of the systems is a long-term pilot project at one facility, which is a commercial-scale system that may have sufficient capacity to treat the full FGD wastestream moving forward. Nevertheless, because the company is still making changes to the operation of the plant's FGD system, has also pilot tested a biological treatment system, and has continued to leave the possibility of biological treatment for compliance open, the EPA defers to the company's characterization of this system as a pilot, rather than a domestic, full-scale installation.

[40] In one case, a utility conducted a successful membrane pilot even when there were significant failures in the performance of upstream pretreatment systems leading to excessive TSS passthrough to the membrane system.

In comments, one recurring criticism of the 2023 proposal was that conclusions about membrane filtration system availability should not be drawn from foreign installations and pilot plants due to their small FGD wastewater flow rates. While the EPA acknowledges that foreign installations and pilot plants may have had smaller FGD wastewater flow rates than some of the plants the Agency expects would use this technology to meet the final limitations in this rule, this does not weigh against the EPA considering them as evidence of the technology's availability because the record shows that membrane filtration systems can be readily modified to handle different flow rates. This same comment was raised as far back as the 2015 rule with respect to thermal evaporation systems. At that time, the EPA responded to comments on the scalability of zero-discharge thermal evaporation systems:

> "Additionally, even if the flow rates were smaller, the fact that the technology can treat the FGD wastewater demonstrates that the system is available, and the size of the system does not matter because the system design can be scaled and designed to accommodate different flow rates."[41]

The EPA has not received information since 2015 that suggests that technologies are no longer scalable to higher flows. With respect to membrane filtration scalability, in particular, the most common system design for operating membrane filtration technologies is to place modules of these systems in parallel and simply add more and more stacks to treat higher and higher flows. Therefore, the EPA concludes that use of zero-discharge systems in smaller flow rate pilots and full-scale foreign facilities supports the finding that the BAT technology basis is available; these uses also support the EPA's

[41] U.S. EPA (Environmental Protection Agency). 2015. *Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category: EPA's Response to Public Comments*. Part 6 of 10. Page 6-40.

finding that each of the individual technologies forming the BAT technology basis are available on their own.[42]

Application to other wastestreams. While the record above is sufficient to determine that the BAT basis of several zero-discharge systems is available, use of the BAT basis on other wastewaters also supports the EPA's finding regarding its availability. In the 2020 rule, the EPA declined to find that membrane filtration treatment of non-FGD wastewaters was sufficient to support a finding of availability. In that rule, EPA's conclusions were based on the ways in which each non-FGD wastewater appeared different from FGD wastewater. The EPA first notes that the BAT basis includes three zero-discharge systems, not just membrane filtration. When considering the success with which this suite of zero-discharge systems has operated on non-FGD wastewater that has similar characteristics to FGD wastewater, the EPA views application of these systems to such non-FGD wastewater as supporting EPA's conclusion that the suite of zero-discharge technologies identified as BAT in this rule is in fact available.

Examining all three zero-discharge systems that constitute the basis for BAT, these systems are used in full-scale applications to other wastestreams in the steam electric power sector and other industrial sectors. The domestic steam electric power sector applies membrane filtration and thermal evaporation systems to EGU makeup

[42] It is also possible that some plants may choose to treat only a slipstream of FGD wastewater with a similarly small flow rate to keep the system closed loop.

water,[43] cooling tower blowdown,[44] and ash transport water.[45] Other industrial sectors with full-scale applications of membrane filtration, thermal evaporation, and SDE

[43] EPRI (Electric Power Research Institute). 2015. *State of Knowledge: Power Plant Wastewater Treatment—Membrane Technologies*. August. 3002002143.

[44] *See*, *e.g.*, Drake, M., Wise, S., Charan, N., Venkatadri, R. 2012. ZLD Treatment of Cooling Tower Blowdown with Membranes. *WaterWorld*. December 1. Available online at: *https://www.watertechonline.com/process-water/article/16211541/zld-treatment-of-cooling-tower-blowdown-with-membranes* (DCN SE09089); ERG. 2019. *Final Notes from Meeting with New Logic Research*. July 22. (DCN SE07231) ERG. 2019. *Final Aquatech Meeting Notes*. July 26. (DCN SE07389).

[45] *See*, *e.g.*, *https://www.ge.com/in/sites/www.ge.com.in/files/GE_solves_ash%20pond_capacity_issue.pdf* (DCN SE09090).

systems include the textiles,[46] chemical manufacturing,[47] mining,[48] agriculture, [49] oil and gas extraction,[50] food and beverage,[51] landfills,[52] and automotive industries.[53]

Information in the record indicates that there are many similarities between the FGD and the non-FGD wastestreams where zero-discharge systems have been used. In the 2020 rule record, the EPA discussed that cooling tower blowdown at steam electric power plants and desalination in oil and gas extraction were examples of where membrane filtration has been used in full-scale applications for treating high-TDS wastewaters (high-TDS being a characteristic of FGD wastewater); 85 FR 64664-64665.

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[46] ERG. 2020. *Final Notes from Call with DuPont*. (DCN SE08618).

[47] ERG. 2020. *Final Notes from Call with DuPont*. (DCN SE08618); U.S. EPA (Environmental Protection Agency). 2022. *Notes from Vendor Call with Vacom on October 27, 2021*. November 14. (DCN SE10367).

[48] ERG. 2019. *Final Notes from Meeting with Pall Water*. March 5. EPA-HQ-OW-2009-0819-7613; Wolkersdorfer, C., et al. 2015. *Intelligent mine water treatment—recent international developments*. July 21. (DCN SE08581); U.S. EPA (Environmental Protection Agency). 2014. *Office of Superfund and Remediation and Technology Innovation. Reference Guide to Treatment Technologies for Mining-Influenced Water*. EPA 542-R-14-001. March. (DCN SE08582); ERG. 2019. *Final Aquatech Meeting Notes*. July 26. (DCN SE07389); U.S. EPA (Environmental Protection Agency). 2022. *Notes from Vendor Call with Vacom on October 27, 2021*. November 14. (DCN SE10367);

[49] U.S. EPA (Environmental Protection Agency). 2022. *Notes from Meeting with BKT—April 9, 2021*. (DCN SE10253).

[50] ERG. 2018. *Final Oasys Meeting Notes*. February 16. (DCN SE06915); ERG. 2019. *Final Aquatech Meeting Notes*. July 26. (DCN SE07389); ERG. 2019. *Final Veolia Meeting Notes*. August 30. (DCN SE07818); U.S. EPA (Environmental Protection Agency). 2022. *Notes from Vendor Call with Purestream on October 26, 2021*. November 14. (DCN SE10366); U.S. EPA (Environmental Protection Agency). 2022. *Notes from Vendor Call with Vacom on October 27, 2021*. November 14. (DCN SE10367).

[51] U.S. EPA (Environmental Protection Agency). 2022. *Notes from Meeting with BKT—April 9, 2021*. (DCN SE10253).

[52] ERG. 2019. *Sanitized_Saltworks Vendor Meeting Notes—Final*. (DCN SE07089); U.S. EPA (Environmental Protection Agency). 2022. *Notes from Vendor Call with Heartland on October 19, 2021*. September 26. (DCN SE10291).

[53] U.S. EPA (Environmental Protection Agency). 2022. *Notes from Meeting with ProChem—April 9, 2021*. (DCN SE10254).

The 2020 rule record also established that mining wastewaters, which are high in gypsum scaling potential (another characteristic of FGD wastewater), have been successfully treated with membrane filtration applications. Finally, the 2020 rule record established that, despite the high variability in ash transport water (a third characteristic of FGD wastewater), it has been successfully treated with membrane filtration. This information indicates that membrane filtration can operate effectively on wastestreams that contain several characteristics of FGD wastewater, including high TDS, high gypsum scaling potential, and high variability.[54] The similarities of other wastewaters to FGD wastewater are also relevant when considering the successful treatment by thermal evaporation systems. Thermal evaporation systems have been used to treat mining wastewaters, oil and gas wastewaters, and landfill leachate. SDE systems have been used to treat landfill leachate. Thus, based on the information, the use of zero-discharge systems on other wastestreams supports the Agency's conclusion that the BAT basis of zero-discharge systems is available for FGD wastewater discharges. These uses also support the Agency's conclusion that membrane filtration, thermal evaporation systems, or SDE systems are each available on their own.

For all the foregoing reasons, the EPA finds that the BAT basis of zero-discharge systems is technologically available for the control of discharges in FGD wastewater. Steam electric power plants have used membrane filtration systems to achieve zero discharge of FGD wastewater internationally for years, and they have used traditional

[54] Use of membrane filtration has since expanded into additional applications, treating wastewaters and industries beyond those where it was used at the time of the 2020 rule (*e.g.*, the food and beverage and automotive industries).

thermal evaporation systems[55] and SDEs[56] to achieve zero discharge of FGD wastewater domestically and internationally for years, as even recent electric utility reports acknowledge.[57,58,59,60] The widespread use across a variety of configurations of zero-discharge systems, when supplemented with the successful domestic and international pilot tests and use of such systems on other wastewaters in many industries (including the steam electric power generating industry itself and including wastewaters with characteristics that are similar to the FGD wastestream), further supports EPA's conclusion that the suite of zero-discharge technologies identified as the BAT basis in this rule is available. While this is not necessary to support its prior availability determination, the EPA further finds that any one of the technologies making up the BAT basis for FGD wastewater is available as that term is used in the Act. For membrane filtration, availability is demonstrated through full-scale use of membrane filtration abroad and in pilot projects both domestically and abroad, as well as its application to other wastestreams. For thermal evaporation, availability is demonstrated through use of full-scale thermal evaporation systems domestically and abroad and pilot projects both domestic and abroad, as well as their application to other wastestreams. For SDE

[55] The Italian thermal evaporation systems discussed first in the 2013 proposed rule have been in operation for over a decade.

[56] Spray dry absorbers, effectively the same technology as the SDE, have been in use for decades to capture the same pollutants present in FGD wastewater.

[57] "Proven technology (considered BAT for new sources by EPA). 3+ U.S. installations and 6+ European installations by Aquatech" (DCN SE07206).

[58] DCN SE10234.

[59] DCN SE09998.

[60] EPRI (Electric Power Research Institute). 2017. *Thermal Evaporation Technologies for Treating Power Plant Wastewater: A Review of Six Technologies*. 000000003002011665. (DCN SE06971).

systems, availability is demonstrated through use of full-scale SDE systems domestically and abroad, as well as their use in at least one known pilot project and application to a non-FGD wastestream.

Reliance interests in connection with 2020 BAT technologies. Several commenters on the 2023 proposal criticized EPA for continuing to support implementation of the 2020 rule while simultaneously revising that rule with potentially more stringent limitations. These commenters stated that utilities relied upon materials announcing the Agency's decision to reconsider the 2020 rule and statements in the 2023 proposal which both confirmed that utilities should continue to implement the 2020 rule. Thus, in reliance, utilities claimed that they have continued to install compliant technologies and that such reliance should lead the EPA to a decision not to finalize more stringent BAT for these wastewaters. In the alternative, some commenters recommended that such facilities reliance on, and compliance with, the 2020 rule should lead the EPA to build in additional flexibility for any more stringent BAT. Suggested flexibilities focused on subcategorization or longer timeframes for cost recovery before installation of more stringent technologies.

The EPA agrees that such reliance interests should be considered.[61] The EPA disagrees, however, with commenters who suggested these interests mean the Agency must retain only the 2020 limitations in all cases. First, no NPDES permittee has certainty of its limitations beyond its five-year NPDES permit term, as reissued permits must

[61] The Supreme Court has held that, while an agency may change policies based upon a reasoned explanation, where a prior policy has engendered serious reliance interests, those interests must be taken into account. *FCC v. Fox Television Stations, Inc.*, 556 U.S. at 515 (citation omitted).

incorporate any newly promulgated technology-based limitations as well as potentially more stringent limitations necessary to achieve water quality standards. *See* 40 CFR 122.44(a) & (d). The statute is designed for both technology-based and water quality-based effluent limitations to be revisited in each permit and, when necessary, revised consistent with these provisions and in light of the goal of ultimately eliminating pollutant discharges from point sources into WOTUS. *See* CWA section 101, 33 U.S.C. 1251.

Moreover, the EPA has included enough time for facilities to build in any reasonable reliance interest. As discussed in section VII.E of this preamble, the Agency is finalizing a “no later than” date for the new FGD wastewater BAT limitations of December 31, 2029. Having a “no later than” date approximately five-and-a-half years following promulgation allows facilities to rely on permitted limitations for the remainder of any permit existing as of the effective date of this final rule.

Third, the EPA has considered the arguments that facilities have unrecoverable costs, particularly for biological treatment systems that the final rule may render obsolete, by evaluating both the existing costs of the 2020 rule and the costs of this final rule together in the IPM analysis. As discussed in sections VII.F and VIII.C, the EPA uses IPM to analyze electric sector impacts.[62] IPM shows small impacts across the industry and leads the EPA to the conclusion that even the cumulative cost of the two technologies is economically achievable (this concept is explained in section VII.F of this preamble).

[62] While this modeling illustrates how the sector may comply with the rule, the EPA notes that the rule does not require any facilities to close.

Where more stringent technologies are available, are economically achievable, and have acceptable non-water quality environmental impacts as zero-discharge systems do here, the fact that facilities may have to spend more to supplement or replace existing treatment systems, even relatively new ones, is not a sufficient reason on its own to reject selection of the technology.

Lastly, to the extent that the facilities claiming to be most impacted by having to add treatment are those that will be permanently ceasing coal combustion by 2034, the EPA has created a new subcategory for these facilities that would allow them to continue to meet only the 2020 BAT limitations and thereby avoid recovering the costs of two treatment systems (*i.e.*, biological treatment and a zero-discharge system), each one designed to meet the requirements of the 2020 or 2024 rules, over the facility's short remaining useful life. EPA anticipates that approximately nine EGUs may be able to avail themselves of this subcategory with respect to FGD wastewater.[63]

Economic achievability of zero-discharge systems. The EPA finds that the costs of zero-discharge systems for control of FGD wastewater are economically achievable. The 2020 rule cited the increased cost of membrane filtration as compared to the selected technology basis as a reason for rejecting membrane filtration[64] but did not find that the costs of membrane filtration were not economically achievable at that time. The EPA also

[63] Additional EGUs are projected to participate in this subcategory for BA transport water and CRL as discussed in the sections below.

[64] While the relative costs of technologies differ from plant to plant, the 2020 rule acknowledged, and additional information obtained during the 2022 information collection confirms, that, in some cases, technologies such as membrane filtration may be less costly than biological treatment at individual plants even where, on average, they would be more expensive to the industry as a whole.

declined in the 2020 rule to establish BAT based on thermal evaporation systems, which the Agency stated were 2.4 times the costs of the 2020 BAT technology basis of chemical precipitation plus low-residence-time-reduction biological treatment and 1.04 times the cost of membrane filtration. The Agency said that these costs were unreasonably high, and it cited this finding, together with the costs that the industry was facing due to other EPA rules, to reject thermal technologies as not economically achievable.

After updating the cost analysis and IPM modeling for the final rule, the EPA finds that the costs of the BAT basis of zero-discharge systems for FGD wastewater are economically achievable for the industry, as discussed further below and in sections VII.F and VIII. Furthermore, the EPA notes that the estimates in IPM are conservative with respect to FGD wastewater. To the extent that costs would have been lower at six plants had the EPA used certain CBI costs for thermal evaporation systems in its primary cost analysis, the economic impacts modeled in IPM at these plants are overestimated.[65]

Non-water quality environmental impacts of zero-discharge systems. The EPA finds that the non-water quality environmental impacts of zero-discharge systems are acceptable.

The EPA proposed to find that the non-water quality environmental impacts of membrane filtration are acceptable. Specifically, the EPA proposed to reverse findings from the 2020 rule regarding FA use to encapsulate the brine generated by membrane

[65] To the extent that cost estimates for individual technologies are roughly of the same magnitude as indicated in the primary cost analysis, these costs would not be expected to alter the findings on economic achievability, even if the Agency were to rely on any one of the zero-discharge technologies as a standalone BAT basis.

filtration. The EPA also solicited comment on the non-water quality environmental impacts of other zero-discharge systems that might be used as a BAT technology basis.

Some commenters raised concerns relating to the non-water quality environmental impacts of zero-discharge systems. Specifically, commenters expressed concerns that the EPA had incorrectly evaluated FA availability because it did not use the most recent EIA data (which demonstrates that there is not enough FA available for brine encapsulation), did not use proper brine generation and encapsulation blending rates, and did not account for the costs of lost FA sales. Other commenters questioned the technological availability of one method of handling the solid waste generated from zero-discharge technologies—brine encapsulation—claiming that it has not been demonstrated to adequately retain pollutants in a landfill and, furthermore, that a particular form of brine encapsulation (paste encapsulation) has not been demonstrated and may not satisfy current disposal requirements. Finally, commenters claimed that pollutants in encapsulated brines and unencapsulated salt crystals could be remobilized in a landfill setting or could damage the landfill-liner system. While some comments argued these disposal issues spoke to availability of the zero-discharge technology, the EPA views this rather as a non-water quality environmental impact (solid waste disposal issue) that it must consider. After considering these comments and the record, the EPA finds that the non-water quality environmental impacts of zero-discharge systems are acceptable.

With respect to comments on FA availability, the EPA agrees with commenters that it should evaluate the most recent EIA data, brine generation data, and data on encapsulation blends. Therefore, the EPA has updated its analysis to consider the most recent information in *2024 Steam Electric Supplemental Final Rule: Fly Ash Analysis* (DCN SE11692). As noted in that document, FA sold for beneficial use fluctuates from year-to-year, but over the last five years the amount sold would still be less than the amount available for sale even after assuming that every plant uses FA to encapsulate brine from an FGD wastewater and/or CRL treatment system. Thus, the EPA does not expect that under worst-case scenarios the use of FA to encapsulate brine would hamper the fly ash sales market, let alone constitute an unacceptable non-water quality environmental impact.

Furthermore, the assumption that all facilities use membrane filtration and generate a brine for encapsulation represents a conservative estimate on FA usage. The EPA has updated its cost estimates as discussed in section VIII and section 5 of the TDD. These revised cost estimates consist of least-cost analysis across the various zero-discharge systems. Part of this update also included adjustments to better account for the amount of FA available for encapsulation, brine generation rates, and brine encapsulation blends, all to respond to commenters and improve the accuracy of the Agency's analysis. The EPA finds that the now higher costs of membrane filtration lead thermal and SDE systems to be a less costly option at many plants. This finding is consistent with cost information received from some companies showing that membrane filtration would not be the least-cost technology. As a result of this analysis selecting non-membrane systems at a number of plants, the assumptions of FA usage presented above can be seen as a likely worst-case scenario. To the extent that FA sales would be even less hampered than the scenario already found to be acceptable above, it would only further support the Agency's conclusion that FA use in brine encapsulation has acceptable non-water quality environmental impacts. For a further discussion of EPA's revised cost estimates, see section 5 of the TDD.

With respect to comments about potential remobilization of pollutants from brine encapsulation and demonstration of paste encapsulation; as far back as the 2015 rule, the EPA pointed to multiple waste-handling alternatives that were being employed by facilities with zero-discharge systems. Some facilities at that time used the brine generated by thermal systems to condition ash for disposal. In the 2020 rule record, the EPA discussed facilities that directly engage in FA fixation of the FGD wastewater for this purpose, skipping the volume reduction step that a membrane or thermal system would offer (see section 4.1.5 of the 2020 TDD, DCN SE08650). When commenters express concern that contaminants from encapsulated brines could be remobilized, these comments assume less processing than EPA contemplates. The commenters reference situations where FGD wastewater or brine are merely used to condition ash without employing the further pozzolanic reactions that the EPA expects to occur in the full encapsulation process and that EPA included in its cost estimates of zero discharge. Encapsulation studies demonstrate that concentrations of leachate pass leachate toxicity tests and are of lower concentration than raw FGD wastewater. Encapsulation would also result in far less remobilization than exiting ash conditioning practices. Furthermore, to the extent that the EPA considered and discussed paste encapsulation, it was as a potentially cost-saving alternative to these conditioning and encapsulation techniques that are already well-demonstrated. Thus, to the extent that it is a less costly solid waste management alternative, it only provides the promise of cost savings compared to the EPA's estimates, but the EPA does not rely on this particular form of brine encapsulation in determining that solid waste disposal issues as a whole have acceptable non-water quality environmental impacts.

Even if brine encapsulation had not been adequately demonstrated as a solid waste handling practice, other solid waste handling alternatives are available. For example, facilities in the 2015 and 2020 rule records took the brine generated from a thermal system all the way down to a salt crystal using a crystallizer (DCN SE11695). The EPA evaluated these costs in the *FGD Wastewater, CRL, and Legacy Wastewater Zero Discharge Treatment Technologies Costs, Loadings, and Non-Water Quality Environmental Impacts* file (DCN SE11709) as an alternative and found it would increase annualized costs by three percent. These slightly higher overall costs would still be economically achievable.[66]

With respect to comments about remobilization of pollutants, the EPA agrees with commenters that pollutants in a landfill can be remobilized through percolation of rainwater through the disposed solid wastes. These solid wastes would include not only any encapsulated brines but also certain solids and salt crystals that would be disposed of following use of some thermal and SDE alternatives where no brine is generated. Here, absent the pozzolanic reactions from either ash conditioning or encapsulation, remobilization of pollution is more possible as rainfall percolates through these disposed solids. Nevertheless, proper landfill management is designed to reduce infiltration of

[66] Facilities could also consider deep-well injection of their brine. The EPA found that these costs on a nationwide basis would be three times the costs of encapsulation, and so are unlikely to be pursued by most facilities, though this too would constitute an alternative disposal practice available for the management of brine.

water through a landfill and to capture leachate that makes it to the liner at the bottom of a landfill. The EPA received no comments that the facilities already generating these solids and salts have failed to properly operate their landfills such that contaminants were remobilized into the environment. Even where remobilization can reduce the overall effectiveness of the pollution treatment systems, as discussed in section VII.B.3 of this preamble, the EPA is also finalizing zero-discharge limitations for CRL during the life of the plant, unless they are discharges of unmanaged CRL.[67] This is designed to further ensure that these pollutants are kept in the landfill to the maximum extent possible rather than remobilized and released into the environment.

Many of the facilities presented in the record as having zero-discharge systems have also successfully disposed of conditioned ash or FGD solids in landfills for years. The record supports that a properly designed, installed, and maintained landfill can operate as intended. As the EPA learned during implementation of the CCR rule, many historical CCR landfills may suffer from the lack of an adequate liner system. However, the Agency has no evidence that, where liners are properly designed, installed, and maintained, they are incompatible with the additional pollutants in FGD wastewater that zero-discharge systems would capture.[68]

[67] Note that the EPA is finalizing zero-discharge limitations for CRL, except as specified in the subcategories discussed in Sections VII.C.4 and C.5. Where lined WMUs collect and treat CRL to zero-discharge standards during a facility's operation, permeate and distillate can be used to condition CCR for disposal in these WMUs.

[68] In contrast, FGD gypsum is already removed from FGD wastewater before discharge and is known to loosen clay soils which sometimes form the base of older landfills designed without composite liners.

Finally, the EPA finds that, even to the extent that there are any negative non-water quality environmental impacts, the positive non-water quality environmental impacts outweigh the negative ones. In particular, the EPA estimates that there are significant decreases in air pollution and water withdrawals[69] as a result of this rule. While the rule is not being promulgated to reduce these impacts, these resulting non-water quality environmental impacts further support the Agency's conclusion that zero-discharge systems for FGD wastewater are BAT.

b. The EPA rejects less stringent technologies than zero-discharge systems as BAT for FGD wastewater

Except for the new permanent cessation of coal combustion by 2034 subcategory discussed in section VII.C.4 of this preamble, and for discharges before the applicability dates of the new zero discharge-requirements in this final rule, the EPA is not selecting chemical precipitation followed by a low hydraulic residence time biological treatment including ultrafiltration, as the BAT technology basis. BAT is the "gold standard" for controlling water pollution from existing sources, and the Supreme Court has explained that BAT must achieve "reasonable further progress" toward the CWA's goal of eliminating pollution. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003, 1006 (citing *Nat'l Crushed Stone v. EPA*, 449 U.S. 64, 75 (1980)). The record shows that the 2020 rule industrywide BAT technology basis for FGD wastewater removes fewer pollutants than the zero-discharge BAT technology basis identified in this final rule that has been found to be technologically available, be economically achievable and have

[69] Reduced water withdrawals could also lead to reduced impingement and entrainment.

acceptable non-water quality environmental impacts.[70] Similarly, except for the permanent cessation of coal combustion by 2028 subcategory discussed in section VII.C.3 of this preamble, the EPA is not identifying the less stringent (and previously rejected in the 2015 and 2020 rules) technologies of surface impoundments or chemical precipitation, as these technologies too will remove fewer pollutants than the BAT technology basis in this rule.

2. BA Transport Water

The EPA is identifying the zero-discharge systems of dry-handling or closed-loop systems as the technology basis for establishing BAT limitations to control pollutants discharged in BA transport water.[71] Specifically, dry-handling systems include both waterless air-cooled conveyor systems and pneumatic systems, as well as under-boiler mechanical drag systems (*e.g.*, submerged chain conveyors) and submerged grind conveyors (*e.g.*, compact submerged conveyors), which use quench water to cool the ash but immediately remove the ash without generating BA transport water. Closed-loop systems consist of remote mechanical drag systems that actively sluice the ash (*i.e.*, transport the ash with water) and are paired with any necessary storage tanks, chemical addition systems, and/or RO treatment necessary to fully recycle BA transport water

[70] In contrast, nothing in the record or public comments indicates that chemical precipitation plus low hydraulic residence time biological reduction has ceased to be available, be economically achievable, and have acceptable non-water quality environmental impacts for discharges before the applicability dates of the new, more stringent limitations of this rule.

[71] As described in section VII.B.5 of this preamble, the EPA is also finalizing a definitional change to certain wastewaters, including BA transport water, that excludes discharges necessary as a result of high intensity, infrequent storm events, as well as wastewater removed from ash handling equipment within the first 120 days of decommissioning the equipment.

except during high intensity, infrequent storm events as discussed below.[72] The EPA finds that these technologies are technologically available, are economically achievable, and have acceptable non-water quality environmental impacts after evaluating the factors specified in CWA section 304(b)(2)(B).

In the 2020 rule, the EPA rejected dry-handling or closed-loop systems as the BAT technology basis in favor of high-recycle-rate systems with a site-specific purge allowance of up to 10 percent of the BA transport water system's volume to address four potential purge needs.[73] The EPA justified this change in BAT due to process changes plants were making to comply with the CCR regulations, as well as the additional costs of dry-handling or closed-loop systems. In the 2023 proposal, the EPA reevaluated the four asserted purge needs relied upon in establishing the 2020 purge, and for each asserted purge need, the Agency explained why the record no longer supported that these purges should be part of the BAT technology basis. As a result, the EPA proposed returning to the dry-handling or closed-loop systems that served as the BAT technology basis in the 2015 rule.

The EPA received comments both supporting and criticizing the proposed return to the BAT basis of dry-handling or closed-loop systems selected in the 2015 rule. Comments supporting the EPA's proposal to return to the 2015 BAT technology basis for

[72] In addition to remote MDSs, non-BAT technologies include many dewatering bins (also known as hydrobins), and surface impoundments may also have the flexibility to operate as closed-loop systems. Like remote MDSs, the latter systems may need to install chemical addition systems (acid, caustic, and/or flocculants), RO systems, and/or additional storage tanks to operate as fully closed loop.

[73] The four asserted purge needs related to precipitation, maintenance, water chemistry, and water balance.

BA transport water focused on the lack of evidence in the record of facilities with a demonstrated need to purge BA transport water. These comments also focused on the legal standard that BAT represents the best performing plant, arguing further that the EPA has never disputed that the best performing plant can achieve zero discharge. Comments opposing the return to the 2015 rule standard reiterated the four potential purge needs discussed in the 2020 rule. In the alternative, these commenters asked the EPA to formulate flexibilities for purges that in practice might be more or less flexible than the site-specific 10 percent volumetric purge allowance arrived at in the 2020 rule.

Commenters also responded to the EPA's solicitation about the potential disparity between the purges from closed-loop systems and the purges from under-boiler "dry" handling systems that still use quench water. These comments asked EPA not to further regulate quench water from under-boiler systems because the water is not used to transport ash and these facilities had relied on the quench water from dry-handling systems being treated as a "low volume waste source" rather than BA transport water.

After considering all public comments and the EPA's extensive record in light of the statutory factors, and as explained below, the EPA finds that dry-handling or closed-loop systems are available and economically achievable, and that they have acceptable non-water quality environmental impacts. Therefore, the EPA is selecting dry-handling or closed-loop systems as the BAT technology basis for BA transport water but is retaining the 2020 rule limitations for discharges before the applicability dates of the new zero-discharge requirement.

In the first subsection immediately below, the EPA discusses its rationale for selecting dry-handling or closed-loop systems as the BAT technology basis for BA transport water. In the following subsection, the EPA explains why it is not selecting less stringent technologies than dry-handling or closed-loop systems as the BAT technology basis for BA transport water. In the final subsection, the EPA discusses the definition of BA transport water and why, in light of the record, it declines to change how under-boiler "dry" systems with a discharge are regulated. For further discussion of the definitional changes to BA transport water that are being finalized with respect to high intensity, infrequent storm events, as well as decommissioning wastewater, see section VII.B.5 of this preamble. For further discussion of the EPA's retention of the 2020 rule limitations as interim limitations, see section VII.C.7 of this preamble.

a. The EPA selects dry-handling or closed-loop systems as BAT for BA transport water.

Technological availability of dry-handling or closed-loop systems. Based on the record, the EPA finds that dry-handling or closed-loop systems are technologically available. At the time of the 2020 rule, the EPA estimated that more than 75 percent of plants already employed dry-handling systems or wet-sluicing systems in a closed-loop manner, or they had announced plans to switch to such systems soon. Some of these systems have been in use since the 1970s, and today, most facilities have installed one or more such systems.[74] The high percentage of plants employing these systems indicates that they are technologically available.

[74] One vendor estimates that only seven ash conversions remain in the entire industry.

In the 2015 and 2020 rule preambles, the EPA discussed the widespread use of dry-handling systems for control of BA transport water servicing about 200 EGUs at over 100 plants. In the 2020 rule, the EPA also discussed advances in dry BA handling systems. Specifically, the Agency discussed a newer technology called submerged grind conveyors (one example of which is called a compact submerged conveyor). At the time, compact submerged conveyors were known to be installed and in operation at two plants. The EPA has since learned that an additional plant has installed compact submerged conveyors.[75,76] In addition to the increased use of compact submerged conveyors, a higher number and broader array of dry-handling systems are currently in place than the EPA originally forecasted. For example, as indicated in the 2020 rule record, one utility commented that it had space constraints at a facility that would preclude the installation of a compact submerged conveyor, and the EPA thus projected that this facility would employ a high recycle rate system under the 2020 rule. After the 2020 rule, however, that utility ultimately installed a different dry-handling system—which highlights the broad array of dry-handling options available for coal-fired power plants, regardless of their configuration. Even where space constraints may prohibit certain dry systems, a plant could use a pneumatic system, albeit at a somewhat greater cost. The 2020 rule record included information on 50 pneumatic installations from as early as 1992. Given that BAT is to reflect the best performing plant in the field, *Kennecott v. EPA*, 780 F.2d at 447, and that the facts in the record support the use of dry-handling technology to achieve

[75] Some utilities have even suggested that the discussion of compact submerged conveyors in the final 2020 rule preamble and additional compliance timeframes have led them to consider these newer dry systems rather than a previously contemplated high-recycle-rate/closed-loop system.

[76] *Final Burns & McDonnell Meeting Notes* (DCN SE10248).

zero discharge of BA transport water, it is likely the EPA could have selected dry-handling systems as the sole technology basis for control of BA transport water. Nonetheless, as it did in the 2015 rule, the EPA is also identifying closed-loop systems as a BAT technology basis for controlling discharges of BA transport water, given that a limited number of plants may find that option to be more attractive due to space constraints and lower costs when compared to a pneumatic system.

After the 2015 rule and during the 2020 rulemaking, certain industry representatives argued that there are challenges to operating a closed-loop BA handling system in a truly zero-discharge manner. They argued that closed-loop systems, including remote MDS and dewatering bins, cannot maintain fully closed-loop operations due to chemistry issues or water imbalances in the system, such as those that might occur from unexpected maintenance or large precipitation events. Even accounting for these issues, however, the 2020 rule did not find that closed-loop systems are not technologically available. Information in the EPA’s 2020 rule record indicated that plants can operate their closed-loop systems to achieve zero discharge, although this could require some process changes and their resulting costs. Instead, the Agency rejected this technology as a basis for BAT based process changes happening at plants to comply with the CCR regulations (addressed further below), while also noting the additional costs over the 2015 rule’s estimates. As explained below, the record indicates that closed-loop BAT handling systems are economically achievable. See section VIII of this preamble for a further discussion of costs associated with the closed-loop system technology basis.

In the 2020 rule, the EPA discussed four potential challenges with maintaining closed-loop systems: (1) managing non-BA transport water inflows, (2) managing precipitation-related inflows, (3) managing unexpected maintenance events, and (4) maintaining water system chemistry. The 2023 proposal discussed these issues at length, including why EPA did not view them as a basis for rejecting zero-discharge requirements. As explained in the proposal and further discussed below, based on the current record, the EPA continues to view none of these previously discussed challenges as providing a basis for rejecting closed-loop systems as not technologically available, although these issues may in certain circumstances require a plant to incur additional costs (which are found to be economically achievable) or to have an infrequent precipitation-related discharge (which would be addressed by the definitional changes the EPA is finalizing in this rule).

First, in 2020, the EPA stated that managing non-BA transport water inflows had the potential to result in water imbalances within a closed-loop system. In the 2023 proposal, the EPA found that closed-loop systems can be sized to handle additional wastestreams. The EPA received comments reiterating the 2020 rule findings; however, none of these comments provided specific data or information demonstrating that even one system cannot handle non-BA transport water inflows. Thus, EPA is maintaining its finding from proposal that a purge in response to water imbalance due to management of other wastestreams is not necessary.

Second, in 2020, EPA stated that managing precipitation-related inflows had the potential to result in water imbalances in the BA handling system. At proposal, EPA found that precipitation-related inflows can be adequately managed with design improvements, including the use of roofing where appropriate. The 2015 BAT technology basis and 2020 rule remote MDS technology designs included covers to avoid collecting precipitation, and the costs for covers were included in the associated cost analysis. The EPA received comments on the 2023 proposal reiterating the 2020 rule findings; however, none of these comments provided specific data or information demonstrating that even one system cannot handle common precipitation-related inflows.[77] To the extent that a plant experiences precipitation-related inflows as a result of a 10-year storm event of 24-hour or longer duration (*e.g.*, a 10-year, 30-day storm event), the EPA is finalizing a definitional change discussed in section VII.B.5 of this preamble.

The 2020 rule mentioned a third previously discussed challenge to operating a remote MDS as a closed-loop system: the possibility of infrequent maintenance events that might fall outside the 2015 rule exclusion of “minor maintenance” and “leaks” from the definition of BA transport water. EPRI[78, 79] listed several such maintenance events; most were expected to occur less than annually. EPRI provided information about the estimated frequency and volume of water associated with each maintenance event; however, EPRI did not provide information about a specific remote MDS unable to

[77] In one comment, a utility suggested that it could not employ roofing at its plant without jeopardizing the necessary cooling of the BA, but this plant did not provide any data showing that it could not manage this heat transfer with standard heating, ventilation, and air conditioning (HVAC) equipment.

[78] EPRI, 2018. *Closed-Loop Bottom Ash Transport Water: Costs and Benefits to Managing Purges* (DCN SE06920).

[79] EPRI, 2016. *Guidance Document for Management of Closed-Loop Bottom Ash Handling Water in Compliance with the 2015 Effluent Limitations Guidelines* (DCN SE06963).

manage these maintenance events with existing maintenance tanks. In the 2023 proposal, the EPA found that maintenance could be managed within a closed-loop system. Furthermore, even where maintenance wastewater volumes are too large to be managed in existing maintenance tanks, utilities can, at additional cost, lease storage tanks for short-term maintenance where these infrequent maintenance events are foreseeable. Commenters did not provide any information on maintenance activities that would require a purge if facilities properly planned and executed regular operation and maintenance (O&M). Thus, the EPA is maintaining its finding from proposal that a purge of BA transport water for maintenance is not necessary.

The final engineering challenge discussed in the 2020 rule record with respect to closed-loop systems was the need to maintain water system chemistry. The 2020 rule discussed potentially problematic system chemistries, such as extreme acidic conditions, high scaling potential, and the buildup of fine particulates that could clog pumps and other equipment. The 2015 closed-loop system BAT design basis included a chemical addition system to manage these system chemistries, as does the BAT basis in this final rule. In particular, corrosivity can be managed through pH adjustment, scaling can be managed with acid and/or antiscalants, and fines can be further settled out with polymers and other coagulants. EPRI has documented that some systems have gone slightly further, pairing the chemical addition systems with changes in operations, such as higher flow rates or longer contact time. Some commenters on the 2023 proposal suggested that systems would not be able to manage these chemistry problems but did not provide information supporting this assertion. In the absence of information, the EPA finds that, even assuming that the previously mentioned strategies would not apply at a given plant, the same slipstream of purge allowed under the 2020 rule could be treated with RO and recycled back in as clean makeup water. The EPA has considered these additional costs as discussed in sections VII.F and VIII, and outside the additional cost (which is found to be economically achievable), there is no record evidence that this chemistry-related challenge cannot be overcome with reasonable steps. Therefore, this concern does not provide a basis for rejecting closed-loop systems as BAT.

For all the foregoing reasons, the EPA finds that the record indicates that dry-handling or closed-loop systems are technologically available for control of discharges in BA transport water.

Economic achievability of dry-handling or closed-loop systems. The EPA finds that the costs of dry-handling or closed-loop systems are economically achievable. In the 2020 rule, the EPA cited the costs of closed-loop systems as an additional basis for selecting high recycle rate systems. In the 2020 rule, the EPA noted that it had "conservatively" estimated costs of $63 million per year based on all facilities using a remote MDS needing a 10 percent purge to be treated with RO in order to achieve complete recycle (*i.e.*, zero discharge operations). The EPA never found, however, that the additional costs to achieve zero discharge were not economically achievable.

The EPA's updated cost estimates demonstrate that, after including the costs of treating all wastestreams—including achieving zero discharge for BA transport water—the final rule would result in minimal economic impacts. (For further information, see sections VII.F and VIII.) After considering these results, the EPA finds that these additional costs are economically achievable as that term is used in the CWA.

Non-water quality environmental impacts of dry-handling or closed-loop systems. The EPA finds that the non-water quality environmental impacts associated with dry-handling or closed-loop systems for controlling BA transport water discharges are acceptable. See sections VII.G and X below for more details.

Process changes associated with dry-handling or closed-loop systems. In the 2020 rule, the EPA also rejected dry handling or closed-loop systems due to process changes happening at steam electric facilities as they moved toward compliance with the CCR regulations. The EPA stated that, as plants close their surface impoundments under the CCR regulations, they may choose to send certain non-CCR wastewaters to their BA handling system. This was said to potentially complicate their efforts to fully close their BA handling systems due to increased scaling, corrosivity, or plugging of equipment. Alternatively, a closed-loop requirement might incentivize plants to discharge their non-CCR wastes rather than send them to their BA handling systems for control, in which case they would be subject to less stringent requirements governing low volume waste sources. The EPA also suggested that requiring limitations based on closed-loop systems could result in plants using their surface impoundments longer, assuming plants cannot build alternative storage capacity and need to continue to send their non-CCR wastes to unlined impoundments.

The rationale in the 2020 rule is no longer persuasive as a reason to select high recycle rate systems rather than dry-handling or closed-loop systems because the changes happening at plants under the CCR regulations are expected to be complete by the time the final BAT limitations apply to any given plant. In particular, the final rule BA transport water requirements will be included in NPDES permits with an applicability date of no later than December 31, 2029. This is over a decade after the promulgation of the 2015 CCR rule and eight years after even the revised CCR surface impoundment deadline of April 11, 2021, by which facilities were required to cease receipt of all wastes into their unlined CCR surface impoundment.[80] As of the publication of this rule, most facilities have already completed conversions of their leaking, unlined CCR surface impoundments under the CCR regulations, which means that they no longer rely on these unlined surface impoundments as part of their BA handling systems, but rather have installed systems to handle their BA transport water that do not rely on unlined CCR surface impoundments.[81]

Of the remaining unlined CCR surface impoundments that might exist following promulgation of this rule, those operating under the CCR Part A rule flexibility found in section 257.103(f)(2) must permanently cease coal combustion, and as discussed below, the EPA is retaining the subcategory for EGUs permanently ceasing coal combustion by 2028, which does not require zero discharge of BA transport water. For those unlined CCR surface impoundments that are not permanently ceasing coal combustion and are required to close for cause but where alternative capacity is technically infeasible, there is some flexibility under the CCR Part A rule allowing for a maximum timeframe of October 15, 2023, or October 15, 2024, for the surface impoundment to cease receipt of

[80] 40 CFR 257.101(a)(1).

[81] *See, e.g., https://www.epa.gov/coalash/coal-combustion-residuals-ccr-part-implementation.*

waste.[82] The 2023 and 2024 extended timeframes require EPA approval.[83] Even with these extensions, the majority of facilities will have ceased receipt of waste in its non-compliant surface impoundment and completed its conversion to a CCR regulation-compliant BA handling method (necessary to remain in operation) within a few months of the effective date of this rule. Since there are no looming deadlines and tight timeframes under the CCR regulations that would justify continued flexibility, facilities with high recycle rate systems are free to focus on transitioning those high recycle rate systems to closed-loop operations.[84] Because ash handling changes will no longer be compelled by the CCR regulations by the time this final rule is effective, the EPA concludes that there are no "process change" or non-water quality environmental impact reasons related to the CCR regulations that weigh against the EPA's decision to select dry-handling or closed-loop systems as the BAT basis for control of BA transport water discharges.

b. The EPA rejects less stringent technologies than dry-handling or closed-loop systems as BAT for BA transport water.

Except for the new subcategory for EGUs permanently ceasing coal combustion by December 31, 2034, and for discharges before the applicability dates for the new zero-discharge requirement of this rule, the EPA is not establishing BAT limitations based on

[82] 40 CFR 257.103(f)(1)(vi).

[83] Further information on the implementation of these Part A applications is available on EPA's website at: *https://www.epa.gov/coalash/coal-combustion-residuals-ccr-part-implementation.*

[84] Although the EPA estimates that fully closing the loop would be less expensive than converting to a dry-handling system, nothing would preclude a facility with a high recycle rate system from installing one of the technologically available and economically achievable dry-handling systems.

high recycle rate systems. In the 2020 rule, the EPA reversed its decision from the 2015 rule and determined that dry-handling or closed-loop systems were not BAT. As a result, the EPA established a volumetric purge allowance (with a maximum of 10 percent of the system volume) to be determined on a case-by-case basis by the permitting authority, which required a permitting authority's BPJ analysis to determine any appropriate further control. As discussed above, the technological issues identified in the 2020 rule can be resolved, albeit at potentially additional costs, which the EPA finds are economically achievable. Furthermore, a dewatering bin or remote MDS with a purge removes fewer pollutants than the BAT basis of dry-handling or closed-loop systems, which the Agency finds is technologically available, economically achievable, and has acceptable non-water quality environmental impacts.[85] BAT is the "gold standard" for controlling water pollution from existing sources, and the Supreme Court has explained that BAT must achieve "reasonable further progress" toward the Act's goal of eliminating pollution. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003, 1006 (citing *Nat'l Crushed Stone v. EPA*, 449 U.S. at 75). For these reasons, the EPA is not selecting high-rate-recycle systems as BAT.

Except for the subcategory for EGUs permanently ceasing coal combustion by December 31, 2028, the EPA is also not identifying the less stringent (and previously rejected in the 2015 and 2020 rules) technology of surface impoundments as the technology basis for BAT, as this technology would also remove fewer pollutants than

[85] In contrast, nothing in the record or public comments indicates that high-recycle-rate systems ceased to be available, be economically achievable, and have acceptable non-water quality environmental impacts for discharges before the applicability dates of the new, more stringent limitations of this rule.

the BAT basis of dry-handling or closed-loop systems, which the EPA finds is technologically available, is economically achievable, and has acceptable non-water quality environmental impacts.

c. The EPA continues to regulate discharges from some dry-handling BA systems as a low volume waste source.

As previously discussed, the final BAT technology basis for BA transport water is dry-handling or closed-loop systems. This technology basis incorporates systems that operate so as to not generate BA transport water at all (so-called “dry” systems), as well as systems that do generate BA transport water but recycle that transport water in a closed-loop manner so as to achieve no discharge (so-called “wet” systems). At proposal, EPA solicited comment on the issue of whether the final rule could create unintended consequences if discharges from a “dry” BA handling system are regulated differently than discharges from a “wet” BA handling system. Historically, discharges from a dry bottom ash handling system have not been considered transport water or BA purge water, but rather have been considered a “low volume waste source,” and therefore subject to their own limitations. These limitations include BPT limitations on TSS and oil and grease, as well as any more stringent BAT limitations that the permitting authority determines appropriate on a case-by-case basis using its BPJ.

In the proposal, the EPA pointed to one instance of a reported purge at an under-boiler dry-handling system that uses quench water to cool the BA but did not transport the ash with water and thus did not generate BA transport water. After soliciting comment on a number of potential modifications the Agency could make to address potential disparities between allowable purges from a wet BA handling system and a dry BA handling system, the EPA received only one comment that provided meaningful data relevant to the solicitations. Santee Cooper provided findings of a third-party analysis of the Cross facility's under-boiler dry BA handling system. Over the two years of 2021 and 2022, the BA system at Cross was fully drained 10 times and partially drained 29 times for maintenance. Historically, BA contact water such as that discharged at Cross has been treated as a low volume waste source.

Based on public comments and a consideration of the record, the EPA is not modifying the regulations to address discharges that the EPA has historically not considered BA transport water. EPA did not receive any information to call into question its previous conclusions about the different characteristics of BA contact water and BA transport water, including the Agency's findings in 2015 and 2020 that BA contact water has lower pollutant concentrations than BA transport water. Moreover, no commenters provided information supporting a finding that the zero-discharge requirements in this rule could have the unintended effect of leading to more discharges of low volume waste from dry BA handling systems than would otherwise occur. Based on the limited information provided in comments, EPA concludes no changes to the regulatory treatment of purges from a dry BA handling systems are warranted, and they will continue to be regulated as low-volume wastes.[86]

[86] Furthermore, the EPA notes that the resulting average annual discharge of about 600,000 gallons per year of BA contact water at Cross results in small pollutant loadings in both relative and absolute terms. Contrast this to the three million gallons *per day* of BA transport water and the relative reduction in water volumes alone, not accounting for the lower pollutant concentrations of BA contact water, mean that the pollutant discharges are reduced by over 99.9 percent.

Aside from the under-boiler BA handling systems ("dry-handling" systems) that the EPA solicited comment on, some commenters also responded to EPA's solicitations by suggesting that purges from remote BA handling systems ("closed-loop" systems) should continue to be allowed to avoid creating disparities between dry-handling and closed-loop systems.[87] Comments in this vein tended to be very generalized and did not provide any meaningful reason for EPA to change direction from its proposal, with the exception of the EPA's definitional change described in section VII.B.5 of this preamble.

3. CRL

Except for the subcategory for discharges of unmanaged CRL, the EPA is identifying zero-discharge systems as the technology basis for establishing BAT limitations to control pollutants discharged in CRL.[88] More specifically, as with FGD wastewater, the technology basis for CRL is membrane filtration systems, SDEs, and thermal evaporation systems alone, or in any combination, including any necessary pretreatment (*e.g.*, chemical precipitation) or post-treatment (*e.g.*, crystallization).[89] Furthermore, where a permeate or distillate is generated from the final stage of treatment,

[87] For context, the requested purges from remote systems operating as high-recycle-rate rather than closed-loop systems are often in the range of 50,000 to 100,000 gallons *per day*, an amount far greater than the amounts of BA contact water (a low-volume waste source with fewer pollutants) discharged in the one dry-handling facility for which the EPA has information on purges.

[88] As described in section VII.B.5 of this preamble, the EPA is also finalizing a definitional change to certain wastewaters, including CRL, that excludes discharges necessary as a result of high intensity, infrequent storm events.

[89] While three main technologies are listed here and are used to evaluate costs and non-water quality environmental impacts, the list is not meant to exclude use of FA fixation, direct encapsulation, evaporation ponds, or other zero-discharge treatment options where a facility uses these technologies to meet the zero-discharge standard established in this rule.

the technology basis is a process wherein this water would then be recycled back into the plant as either FGD makeup water or EGU makeup water.[90] After evaluating the factors specified in CWA section 304(b)(2)(B), the record shows that these technologies are available, are economically achievable, and have acceptable non-water quality environmental impacts. For discussion of the subcategory for discharges of unmanaged CRL, see section VII.C.5.

Based on the BAT technology basis identified, the EPA is establishing zero-discharge limitations for CRL, as it does for FGD wastewater. However, because CRL is different from FGD wastewater in that it is expected to continue to be generated and discharged following even the retirement of the plant, the EPA is also using the BAT technology basis identified to establish nonzero numeric limitations following a plant's eventual retirement – limitations based on membrane filtration for CRL permeate and limitations based on thermal evaporation for CRL distillate.

In the subsection immediately below, the EPA discusses its rationale for establishing zero-discharge systems as BAT for control of CRL. In the following subsection, the EPA explains why it rejected less stringent technologies as BAT. In the final subsection, the EPA explains the rationale for establishing zero-discharge systems as NSPS for control of CRL. For further discussion of the new subcategories for

[90] The 2020 rule finalized a carve out from the definition of FGD wastewater applicable to "treated FGD wastewater permeate or distillate used as boiler makeup water." The EPA is making the equivalent change to the definition of CRL for the same reasons the change was made to the definition FGD wastewater and to support consistency across these two zero-discharge wastewater streams. *See* 85 Fed. Reg. 64675. No corresponding change is necessary for use to condition CCR destined for disposal where the disposal would be subject to the same zero-discharge limitations.

permanent cessation of coal combustion by 2034 and discharges of unmanaged CRL, see section VII.C of this preamble. For further discussion of the definitional change to CRL that is being finalized with respect to high intensity, infrequent storm events, see section VII.B.5 of this preamble.

a. The EPA selects zero-discharge systems as BAT for CRL.

Technological availability of zero-discharge systems. Although the EPA's preferred option at proposal was to identify BAT based on chemical precipitation, it solicited comment on a zero-discharge requirement based on other technologies as well, including the same technologies identified as the BAT basis for control of FGD wastewater in this rule. 88 FR at 18849. The EPA received comments both for and against the availability of zero-discharge systems. Commenters favoring zero discharge of CRL pointed to the EPA's record, which shows that one facility already employs a zero-discharge thermal evaporation system to co-treat its CRL and FGD wastewater, many non-CCR landfills use zero-discharge systems to treat their leachate, and zero-discharge systems have been used to treat other wastewaters similar to CRL, including FGD wastewater. In contrast, commenters opposed to zero-discharge systems claimed that the EPA did not sufficiently evaluate such systems at proposal and further disputed EPA's findings that pollutants in CRL are similar to those in FGD wastewater.

After consideration of the comments received and evaluation of the extensive record, the EPA finds that zero-discharge systems are technologically available for control of CRL discharges. BAT is supposed to reflect the highest performance in the industry and may reflect a higher level of performance than is currently being achieved based on technology transferred from a different subcategory or category, bench scale or pilot plant studies, or foreign plants. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1006; *Am. Paper Inst. v. Train*, 543 F.2d at 353; *Am. Frozen Food Inst. v. Train*, 539 F.2d at 132. The EPA disagrees with commenters who suggested the Agency had not sufficiently evaluated zero-discharge options at proposal and instead agrees with commenters that the best-performing plant treating CRL domestically in this industry is achieving zero discharge. At proposal, the EPA discussed a thermal evaporation system that has achieved zero discharge of CRL and FGD wastewater since 2015.[91,92] The record also includes two domestic pilot studies on CRL: one using membrane filtration and another using membrane filtration with SDE. Furthermore, the proposed rule record included information on treatment of non-CCR landfill leachate, including one thermal technology vendor with full-scale installations, one thermal technology vendor with a pilot study, and two installations of membrane filtration with SDE.[93] The successful use of these systems at non-CCR landfills is relevant to CRL because CRL contains the same pollutants as found in these landfills (*e.g.*, mercury, arsenic, selenium, nitrates), and indeed non-CCR landfills have potentially even more challenging characteristics that these systems are able to handle. In particular, these systems have proven able to successfully treat the same pollutants found in CRL, in addition to treating potentially

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[91] ERG. 2020. *Final Notes from Site Call with Duke Energy's Mayo Steam Station*. June 15. (DCN SE08964).

[92] The EPA notes that, while the utility employing this system filed comments on the proposed rule, it did not dispute in its comments that its system effectively operates zero discharge for CRL, nor did it dispute that zero discharge is technologically available for CRL.

[93] An additional three membrane filtration technology vendors successfully treat non-CCR landfill leachate, but the operators of these installations have so far chosen to discharge the clean permeate instead of operating with zero discharge.

more challenging organic pollutants and managing more challenging biological fouling agents found in non-CCR landfill leachate that are either absent from, or present in lower concentrations in, CRL. Since the absence of these pollutants and fouling agents make treatment simpler, these differences support the EPA's finding of technological availability.

Finally, since the record indicates that CRL is similar to FGD wastewater – which the record demonstrates can be effectively treated using zero-discharge systems – the EPA also independently relies on the record evidence discussed in section VII.B.1 of this preamble above and technology transfer from FGD wastewater to support its conclusion that zero-discharge systems are available for controlling CRL discharges. The EPA may rely on technology transfer to establish technology-based limitations such as those in this rule. *Am. Iron & Steel Inst. v. EPA*, 526 F.2d 1027, 1058, 1061, 1064 (3d Cir. 1975); *Weyerhaeuser Co. v. Costle*, 590 F.2d at 1054 n.70; *Reynolds Metals Co. v. EPA*, 760 F.2d at 562; *California & Hawaiian Sugar Co. v. EPA*, 553 F.2d at 287. In the 2015 rule record, EPA found that the pollutants of concern in CRL are the same pollutants that are present in, and in many cases are also pollutants of concern for, FGD wastewater, FA transport wastewater, BA transport water, and other CCR solids. This finding led the Agency to select chemical precipitation as the technology basis for the 2015 rule's NSPS and PSNS for CRL, based on technology transfer from the use of chemical precipitation on FGD wastewater.[94] This finding was never challenged. The EPA is basing the final

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[94] In establishing chemical precipitation as the basis for NSPS, the Agency stated:

> "For combustion residual leachate, chemical precipitation is a well-demonstrated technology for removing metals and other pollutants from a variety of industrial

rule CRL limitations on the same zero-discharge systems selected as BAT for treating FGD wastewater in this final rule. In contrast to comments that pollutants found in CRL are fundamentally different than those found in FGD wastewater, the EPA confirms its findings from the 2015 rule that CRL is characteristically like FGD wastewater. Even after accounting for additional data from 12 landfills gathered prior to the 2023 proposal, the EPA's analysis in the *CRL Analytical Data Evaluation – 2024 Final Rule* (DCN SE11715) memorandum shows that CRL continues to have the same pollutants of concern in similar concentrations as other wastewaters, including FGD wastewater. Zero-discharge systems are available to treat this type of wastewater, and the limitations based on this technology would eliminate all arsenic, mercury, and other toxic pollutants from CRL discharges by the steam electric power generating industry. Moreover, just as the use of each individual technology within the BAT technology basis for FGD wastewater discussed in section VII.B.1 of this preamble supports the availability of each individual technology as BAT for that wastestream, based on technology transfer from FGD wastewater, the use of each individual technology is sufficient on its own to support the availability of a zero-discharge limitation for CRL.

At proposal, the EPA solicited comment on zero discharge limitations for CRL as well as transferring the 2015 NSPS or 2020 VIP nonzero numeric limitations for FGD wastewater. Some commenters claimed the need to discharge from a zero-discharge system after retirement. While EPA is requiring zero discharge of pollutants from CRL

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wastewaters, including leachate from landfills not located at power plants. Chemical precipitation is also well demonstrated at steam electric power plants for treatment of FGD wastewater that contains the pollutants in combustion residual leachate." (80 FR 67859).

during active operations, this is based, in part, on the ability of active EGUs to use clean permeate or distillate resulting from CRL treatment either in an FGD absorber or as boiler makeup water. After the last EGU at a facility retires, it may become necessary for a facility to discharge the permeate or distillate from its zero-discharge treatment system. Thus, the EPA is transferring the BAT limitations from the 2020 VIP and 2015 NSPS to provide more flexibility to a plant post-retirement. Plants may discharge CRL permeate after retirement subject to the 2020 rule VIP limitations designed for permeate from a membrane filtration system. Alternatively, plants may discharge CRL distillate after retirement subject to the 2015 rule NSPS limitations designed for distillate from a thermal treatment system.[95]

Economic achievability of zero-discharge systems. The EPA finds that the costs of zero-discharge systems for control of CRL discharges are economically achievable. For further discussion of the economic analysis, see sections VII.F and VIII, below.

Non-water quality environmental impacts of zero-discharge systems. The EPA finds that the non-water quality environmental impacts associated with zero-discharge systems to control CRL discharges are acceptable. See discussion below in section VII.G and section X of this preamble.

b. The EPA rejects less stringent technologies than zero-discharge systems as BAT for

[95] SDEs and thermal systems that do not generate a distillate would not require this flexibility.

CRL.

Except for the new subcategories for permanent cessation of coal combustion by 2034 and discharges of unmanaged CRL, discussed in sections VII.C.4 and VII.C.5 of this preamble, EPA is not selecting less stringent technologies than the zero-discharge systems discussed above. BAT is the "gold standard" for controlling water pollution from existing sources, and the Supreme Court has explained that BAT must achieve "reasonable further progress" toward the CWA's goal of eliminating pollution. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003, 1006 (citing *Nat'l Crushed Stone v. EPA*, 449 U.S. at 75). The record shows that zero-discharge systems are available, are economically achievable, and have acceptable non-water quality environmental impacts. Therefore, with the exception of the new subcategory for permanent cessation of coal combustion by 2034, the EPA is not leaving BAT for determination on a case-by-case BPJ basis by the permitting authority. Similarly, except for the new subcategory for discharges of unmanaged CRL, the EPA is not identifying as BAT the less stringent technology of chemical precipitation, as this technology would remove fewer pollutants than the BAT basis in this final rule, which the EPA has found is available, is achievable, and has acceptable non-water quality environmental impacts. Finally, the EPA is also rejecting the less stringent technologies of surface impoundments and chemical precipitation followed by a low hydraulic residence time biological treatment, as these systems would also remove fewer pollutants than the BAT basis in this final rule, which the EPA has found meets the requisite statutory requirements.

c. The EPA selects zero-discharge systems as NSPS for CRL.

At proposal, the EPA solicited comments on the propriety of revising NSPS for CRL based on decisions made with respect to BAT for CRL.[96] The EPA did not receive any comments on its solicitation for updating NSPS for CRL. After considering all of the technologies described in this preamble and TDD section 7, and in light of the factors specified in CWA section 306, the EPA concludes that zero-discharge systems represent BADCT for CRL at steam electric power plants, and the final rule promulgates NSPS based on these systems. More specifically, the BADCT technology basis for CRL is membrane filtration systems, SDEs, and thermal evaporation systems alone, or in any combination, including any necessary pretreatment (*e.g.*, chemical precipitation) or post-treatment (*e.g.*, crystallization).[97] Furthermore, where a permeate or distillate is generated from the final stage of treatment, the technology basis is a process wherein this water would then be recycled back into the plant as either FGD makeup water or EGU makeup water.[98] The record indicates that the zero-discharge systems that serve as the basis for the final NSPS are well demonstrated. This is fully supported by the discussion of the

[96] The EPA did not solicit comment on revising any other NSPS because the proposed BAT technology bases for FGD wastewater and BA transport water would be similar to the 2015 BADCT technology bases for these wastestreams. The final rule is consistent with the proposal in that way.

[97] While three main technologies are listed here and are used to evaluate costs and non-water quality environmental impacts, the list is not meant to exclude use of FA fixation, direct encapsulation, evaporation ponds, or other zero-discharge treatment options where a facility uses these technologies to meet the zero-discharge standard established in this rule.

[98] The 2020 rule finalized a carve out from the definition of FGD wastewater applicable to "treated FGD wastewater permeate or distillate used as boiler makeup water." The EPA is making the equivalent change to the definition of CRL for the same reasons the change was made to the definition FGD wastewater and to support consistency across these two zero-discharge wastewater streams. *See* 85 Fed. Reg. 64675.

availability of zero-discharge systems for identifying BAT, both as a whole and as stand-alone technologies, as described above in section VII.B.3 of this preamble. As discussed in the preceding BAT discussion, because CRL is expected to continue to be generated and discharged even after the retirement of the plant, the EPA is also using the BAT technology basis identified to establish nonzero numeric limitations following a plant's eventual retirement – limitations based on membrane filtration for CRL permeate and limitations based on thermal evaporation for CRL distillate.

The NSPS in the final rule poses no barrier to entry. This is due, first, to the fact that no new coal-fired power plants are expected to be built. As the EPA's *Power Sector Trends Technical Support Document* states:

> "It is unlikely that new conventional coal-fired EGUs will come online in the US. The last year in which a new coal-fired EGU (greater than 25 MW) was completed was in 2014. There are no new announced plans to build new coal-fired EGUs."[99]

This is consistent with EIA data[100] and is due to the uncompetitive financial realities of coal-fired power. Existing coal is almost universally estimated to be more expensive than replacement capacity moving forward.[101] Since no new coal-fired power plants are expected, updating NSPS to the same zero-discharge systems as BAT is more of a safeguard to ensure a consistent regulation of CRL, even if it likely will never apply.

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[99] Available online at: *https://www.epa.gov/system/files/documents/2023-05/Power%20Sector%20Trends%20TSD.pdf.*

[100] Available online at: *https://www.eia.gov/todayinenergy/detail.php?id=54559#.*

[101] Energy Innovation Policy & Technology LLC®. 2023. Coal Cost Crossover 3.0: Local Renewables Plus Storage Create New Opportunities for Customer Savings and Community Reinvestment. January. Available online at: *https://energyinnovation.org/wp-content/uploads/2023/01/Coal-Cost-Crossover-3.0.pdf.*

Second, the final NSPS poses no barrier to entry based on the EPA's assessment of the possible impacts of the final NSPS on new sources using a comparison of the incremental costs of the final rule to the costs of hypothetical new generating units. The EPA developed NSPS compliance costs for new sources using a methodology similar to the one used to develop compliance costs for existing sources. The EPA's estimates for compliance costs for new sources are based on the net difference in costs between (1) wastewater treatment system technologies that would likely have been implemented at new sources under the previously established regulatory requirements and (2) those that would likely be implemented under the final rule. The EPA estimated that the incremental compliance costs for a new generating unit (capital and O&M) represent about one percent of the annualized cost of building and operating a new 650 MW coal-fired plant,[102] with capital costs representing approximately one percent of the overnight construction costs, and annual O&M costs also representing one percent of the fuel and other O&M cost of operating a new plant.

Finally, the EPA analyzed the non-water quality environmental impacts and energy requirements associated with the final BAT limitations for CRL. Since there is nothing inherently different between an existing and new source, the EPA drew on the analyses for existing sources and determined that NSPS based on the final rule BAT technologies have acceptable non-water quality environmental impacts and energy

[102] Energy Information Administration. 2024. *Capital Cost and Performance Characteristics for Utility-Scale Electric Power Generating Technologies*, January 2024. Available online at *https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capital_cost_AEO2025.pdf*.

requirements. For further discussion of the non-water quality environmental impacts evaluated for BAT, see sections VII.G and X.

The EPA did not retain chemical precipitation as the basis for NSPS for CRL because, under CWA section 306, NSPS reflect “the greatest degree of effluent reduction . . . achievable.” Zero-discharge systems are capable of eliminating all discharges associated with CRL, and they form the BAT technology basis used to establish limitations for existing sources of CRL discharges in this rule. Moreover, establishing NSPS for CRL based on zero-discharge systems does not add to the overall estimated cost of the rule because the EPA does not predict any new coal-fired generating units will be installed in the timeframe of the EPA’s analyses.

4. Legacy Wastewater

Except for the subcategory for legacy wastewater discharged from surface impoundments commencing closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the EPA is reserving BAT basis for legacy wastewater at this time and instead is continuing to reserve BAT limitations for case-by case determination by the permitting authority, using its BPJ. This potential case-by-case outcome was explicitly identified by the Fifth Circuit Court of Appeals as an alternative the EPA should have considered in the 2015 rule. *Southwestern Elec. Power Company v. EPA*, 920 F.3d at 1021 (“[E]ven assuming a lack of data prevented the EPA from determining BAT for legacy wastewater, nothing required the agency simply to set impoundments as BAT. Instead, the EPA could have declined to set nationwide effluent guidelines for legacy wastewater and allowed BAT determinations to be made by each facility's permitting authority through the NPDES permitting process on a site-specific basis.") (citations omitted).

In the 2015 rulemaking and subsequent litigation, petitioners argued that the EPA lacks authority to establish differentiated limitations for legacy wastewater, as compared to newly generated wastewater, because the text of the CWA does not contain specific distinctions based on when wastewater is produced. As explained in the 2015 rule and in briefs before the Fifth Circuit Court of Appeals, however, nothing in the statute requires the EPA to establish the same technology basis for each wastestream within a point source category when establishing limitations.[103] The CWA directs the EPA to take into account a variety of factors in establishing the best available technology economically achievable, including," "process changes," "non-water quality environmental impacts," and "such other factors ats the Administrator deems appropriate." 33 U.S.C. 1314(b)(2)(B). As discussed further below, the rule's differentiated BAT limitations for legacy wastewater are based on the changes happening at plants under the CCR regulations in relation specifically to legacy wastewater, which by and large is contained in surface impoundments. The EPA's conclusion that it is appropriate to set different BAT limits for legacy wastewater based on the different way this wastewater is handled in response to the CCR regulations is within the Agency's broad discretion under the statute. *See Texas Oil & Gas Ass'n v. EPA*, 161 F.3d 923, 934 (5th Cir. 1998) ("EPA has

[103] This was a question the Fifth Circuit never reached because it vacated and remanded the 2015 legacy wastewater limitations on other grounds. *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1015.

significant discretion in deciding how much weight to accord each statutory factor under the CWA.").

In contrast to the environmental group petitioners' arguments discussed above that legacy wastewater should be subject to the same limitations and standards as newly generated wastewater, some commenters on the 2023 proposed rule argued that the EPA lacks authority to establish BAT limitations on legacy wastewater *at all* since it was previously generated and "treated" under the prior ELGs. The CWA regulates discharges of pollutants, 33 U.S.C. 1311(a), and nothing in the CWA prohibits the EPA from applying discharge limitations to previously generated (and even "treated") wastewater. The Commenters' view would lead to results under the statute that Congress could not have intended. Under commenters' reading, if wastewater was treated to meet BPT regulations, it could not be treated any further to meet more stringent BAT regulations. This would be contrary to the CWA's technology-forcing scheme. In this case, the treatment referred to by the commenter is treatment using a surface impoundment. The Fifth Circuit has strongly suggested that, in light of the EPA's 2015 finding that surface impoundments are "largely ineffective" at removing dissolved metals, to achieve the BAT standard, something more than limitations based on surface impoundments should be required of legacy wastewater discharges. *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1015, 1017.

While commenters claim that it is not fair for plants to be subject to new limitations for wastewater generated when the plant was making operational decisions under a prior ELG, as further discussed below, the EPA finds that it is economically achievable for certain plants to meet additional limitations on their legacy wastewater, as required for Best Available Technology Economically Achievable under the CWA. Moreover, the EPA has considered the unique situation in which some plants may have already closed and, therefore, lack an active revenue stream to pay for additional pollution controls. For the case-by-case legacy wastewater limitations discussed below, permitting authorities can consider the site-specific economic achievability of particular requirements when identifying BAT. For the legacy wastewater subcategory described in section VII.C.6 of this preamble, the BAT limitations are based on chemical precipitation. The EPA rejected more stringent limitations than those based on chemical precipitation, alone, in part because of the higher costs of more advanced treatment-based limitations, given that many legacy discharges may occur after a plant ceases operating.

The EPA also disagrees with commenters that plants could not have known they might be subject to more stringent limits for wastewater already generated. The CWA has always regulated discharges, and plants should have known that their discharges would potentially be subject to more stringent requirements, given that the CWA envisions progressively more stringent limits to meet progressively more stringent standards. *See Texas Oil & Gass Ass'n v. EPA*, 161 F.3d at 927; *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1006-07. Plants should have known that the limitations to which their discharges are subject might changes, as ELGs are established or revised, including to account for technological advancements. *See* CWA sections 301(d) and 304(b), 33 U.S.C. 1311(d) and 1314(b). Indeed, water quality concerns might require water quality-based effluent limitations that change over time as well.

In the first subsection immediately below, the EPA discusses its rationale for reserving BAT limitations to be derived on a BPJ-basis to control legacy wastewater. In the second subsection, EPA discusses why it is not selecting surface impoundments as BAT for legacy wastewater. In the final subsection, the EPA discusses why it is not selecting more stringent technologies as BAT for legacy wastewater, except for a subcategory of legacy wastewater discussed in section VII.C.6 of this preamble. For further discussion of the subcategory for legacy wastewater discharged from surface impoundments commencing closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** see section VII.C.6 of this preamble.

a. BPJ-based BAT limitations will continue to apply to legacy wastewater.

The EPA is finalizing the approach proposed for this rule for legacy wastewater: permitting authorities will continue to develop BAT limitations on a case-by-case basis, using their BPJ. The EPA received comments supporting and opposed to the case-by-case approach. Commenters opposing this approach came from two perspectives. Some industry commenters believed that only BPT and water quality-based effluent limitations currently apply to legacy wastewater and that the EPA should finalize this approach. In contrast, other commenters viewed the proposed BPJ approach as impermissibly allowing permitting authorities to select surface impoundments as BAT. In the alternative, these commenters recommended that the EPA formally constrain the permitting authorities' discretion when determining BAT with a BPJ analysis. Commenters that supported the EPA's proposed approach opposed selecting more stringent technologies as BAT in large part because of the timelines for completing closure under the CCR regulations. Some commenters also stated that most or all legacy wastewater will have been discharged prior to the effective date of any final rule. Finally, commenters from multiple perspectives universally opposed certain definitional changes that the EPA solicited comment on at proposal, involving establishment of two new classes of legacy wastewaters called surface impoundment decant wastewater and surface impoundment dewatering wastewater. Their comments opposed the changes because of the unclear delineation between the two types of legacy wastewater and the view that all legacy wastewater should be regulated the same.

After considering the comments received and evaluating the record in light of the factors specified in CWA section 304(b)(2)(B), the EPA finds that no single technology is technologically available and economically achievable for control of pollutants in legacy wastewater, except for legacy wastewater from a subcategory of EGUs as discussed in section VII.C.6 of this preamble. Because of process changes happening at plants in the form of ongoing and soon-to-be-completed surface impoundment closures under the CCR regulations, the EPA finds that it is infeasible to finalize a nationwide BAT limitation for legacy wastewater mid-closure. The statute requires BAT to reflect what is technologically available, is economically achievable, and has acceptable non-water quality environmental impacts based on consideration of several factors, including “process changes,” “non-water quality environmental impacts,” and “such other factors” as the Administrator deems appropriate. Because many facilities with surface impoundments are in the process of closing their surface impoundments under the CCR regulations (regulations that create safeguards around the disposal of solid waste, as explained in section IV.E of this preamble), the technology that represents BAT for legacy wastewater treatment is likely to vary from site to site depending on several factors. These factors include, but are not limited to, the types of wastes and wastewaters present, the characteristics of the legacy wastewater in each layer of a surface impoundment, the amount of legacy wastewater remaining to be treated in a surface impoundment, the treatment already available on site, the treatment option costs, the extent to which CWA requirements could interfere with closure timeframes required under the CCR regulations, the potential for increased groundwater contamination, and the potential for increased discharges through groundwater that are determined to be the functional equivalent of direct discharges (FEDDs) to a WOTUS.

The effect of the EPA declining to identify a nationally applicable BAT for this wastewater is that permitting authorities will continue to establish site-specific technology-based effluent limitations using their BPJ.[104] Because the limitations under this rule are required to be derived on a site-specific basis, taking into account the requisite BAT statutory factors and applying them to the circumstances of a given plant, these case-by-case limitations would by definition be technologically available and economically achievable and have acceptable non-water quality environmental impacts, where the permitting record reflects that such is the case. While the dynamic and changing nature of this wastestream at this time means there is no typical site, given the

[104] Because some commenters took issue with the EPA's statements in the proposed rule that, under the prior regulations in effect, BAT limitations based on a permitting authority's BPJ are appropriate for legacy wastewater, the Agency is explicitly reserving BAT limitations for legacy wastewaters in the regulatory provisions setting forth BAT requirements for FGD wastewater, BA transport water, FA transport water, and flue gas mercury control wastewater to avoid any ambiguity regarding whether BPJ applies.

CCR regulations' closure requirements, the EPA agrees with commenters that, were permitting authorities to choose surface impoundments as the BAT technology for a particular site using the same rationale that the EPA put forth in 2015, this would run afoul of the Fifth Circuit's decision that found selecting surface impoundments as BAT was arbitrary, capricious, and inconsistent with the "technology-forcing mandate of the CWA." *Southwestern Elec. Power Company v. EPA*, 920 F.3d at 1017.

Factors the permitting authority must consider when establishing BPJ-based BAT effluent limitations for legacy wastewater are specified in section 304(b) of the CWA, 33 U.S.C. 1314(b), and 40 CFR 125.3(d). The EPA solicited comment on whether it should explicitly promulgate, in regulatory text, specific elements related to these factors for this steam electric wastewater. While some commenters advocated for further restrictions to deter or even prohibit permitting authorities from selecting surface impoundments as BAT through a BPJ analysis, the CWA and EPA regulations already require the permitting authority to evaluate whether more stringent technologies are available, are economically achievable, and have acceptable non-water quality environmental impacts. Moreover, given existing case law and information known about more advanced technologies, the EPA believes that a permitting authority which chooses to select surface impoundments as BAT would face substantial legal risk unless it could justify its decision based on the BAT statutory factors. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1018 n.20 ("EPA may have been uncertain about what the precise BAT for legacy wastewater should be, but the record fails to explain why impoundments are BAT, if that term is to have any meaning.").

The EPA agrees with commenters that differentiating legacy wastewaters into two distinct classes in the manner the EPA solicited comment on at proposal (*i.e.*, decant and dewatering wastewaters) is unnecessary and not useful; therefore, the EPA is not finalizing new definitions to distinguish classes of legacy wastewater. The proposal would have potentially doubled the number of BPJ analyses performed by permitting authorities – as there would have been two classes of legacy wastewater that each required BPJ determinations – without likely changing the ultimate outcome of treatment of the legacy wastewater as a whole. Moreover, it is doubtful that creating two new definitions of legacy would be useful given that, where a surface impoundment is already closing under the CCR regulations, both types of wastewater would likely be discharged before a new CWA permit incorporating the limitations in this final rule would take effect. Lastly, given the confusion commenters expressed over how to interpret the definitions, the EPA is concerned that finalizing these definitions would complicate implementation.

The EPA also agrees with commenters that the vast majority of legacy wastewater likely has been, or will be, discharged pursuant to BPJ determinations under existing permits. Rapid closure of many of these surface impoundments is ongoing under the CCR regulations. The EPA notes that most surface impoundments had to cease receipt of waste by April 11, 2021, and commenced closure soon after. These surface impoundments were either unlined, in violation of location restrictions, or both. The EPA estimates that 398 of 507 such surface impoundments are less than 40 acres and thus must close within seven years of commencing closure (five years plus a possible two-year extension).[105] The remaining 109 are over 40 acres and thus can receive additional two-year extensions. Even with the possibility of extensions, dewatering is one of the first steps of closure and, therefore, most of the 507 surface impoundments which have already begun the closure process will have completed dewatering before permitting authorities issue NPDES permits implementing this final ELG rule.

Moreover, as is the case for all promulgated effluent limitations guidelines, the requirements for direct dischargers[106] in this rule do not become applicable to a given discharger until they are contained in revised NPDES permits. NPDES permits are typically issued for the maximum allowed five-year permit term. Most permits are not immediately revised after the EPA issues a new ELG rule, rather permitting authorities incorporate the new ELG rule limitations at the time the next five-year permit is up for reissuance. In addition, it is not uncommon for permits to be administratively continued beyond the five-year permit term if a permittee submits a timely permit renewal application, in which case the existing permit stays in effect until a new permit is effective. *See* 40 CFR 122.6. Thus, even if these new ELG requirements were implemented into NPDES permits in a timely manner following their effective date on **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the vast majority of legacy wastewater would have been discharged or will be discharged pursuant to BPJ determinations in existing permits rather than pursuant to

[105] *See* 40 CFR 257.102(f).

[106] Indirect dischargers (those who discharge to POTWs) are subject to pretreatment standards that are directly implemented and enforceable. *See* CWA section 307, 33 USC 1317; 40 CFR part 403.

any regulations the EPA might promulgate. Much, if not all, of the remaining legacy wastewater is included in the 19 surface impoundments expected to be covered by the subcategory for legacy wastewater discharged from surface impoundments commencing closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. This subcategory is further described in section VII.C.6 of this preamble.

Reserving BAT limitations for this legacy wastewater to be developed by the permitting authority on a BPJ-basis would allow permitting authorities, on a case-by-case basis, to impose more stringent limitations (including potentially zero-discharge limitations) based on technologies that remove more pollutants than the previously promulgated BPT limitations based on surface impoundments, depending on what is technologically available and economically achievable for individual facilities. In this way, the final rule does not “freeze impoundments in place as BAT for legacy wastewater,” a criticism of the 2015 rule’s legacy wastewater limitations by the Fifth Circuit, which acknowledged that BAT has in inbuilt ‘reasonable further progress’ standard and that ‘BPT serves as the prior standard with respect to BAT.’ *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1017 (citation omitted). Moreover, this final rule record includes information about technologies beyond surface impoundments and their application to legacy wastewater that could be useful to permitting authorities in making their determinations.

b. The EPA rejects surface impoundments as BAT for legacy wastewater.

The EPA is not selecting surface impoundments as the BAT basis for controlling discharges of legacy wastewater because there are more effective technologies for controlling discharges that some plants could use. Several plants described in the record employ technologies ranging from chemical precipitation to zero-discharge systems for legacy wastewaters. The previously promulgated BPT limitations are based on surface impoundments. As the Fifth Circuit has acknowledged, BPT is merely the first step toward the CWA's pollution reduction goals and provides the "prior standard" against which the stricter BAT is to be measured. *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1006 (citing *Nat'l Crushed Stone*, 449 U.S. at 69, 77 & n.14). Therefore, the EPA is retaining the current case-by-case BAT approach rather than selecting surface impoundments.

c. The EPA rejects specific, across-the-board technologies more stringent than surface impoundments as BAT for legacy wastewater.

The EPA is not selecting more stringent, one-size-fits-all technologies, such as chemical precipitation, biological treatment, membrane filtration, thermal evaporation, and/or spray dryer evaporation as the BAT basis for controlling discharges of legacy wastewater, except for the legacy wastewater described in section VII.C.6 of this preamble. As explained previously, many plants with legacy wastewater have already begun closure of their surface impoundments under the CCR regulations. These plants are in different stages of the dewatering process, as they are trying to meet their closure deadlines under the CCR regulations. Requiring limitations based on a more stringent

BAT technology basis at all plants that are in the process of dewatering when their permit is renewed but before closure is complete would jeopardize their ability to meet their closure deadlines under the CCR regulations. This is because having to consider and add one or more treatment components would slow the dewatering process, at some plants more than others. If plants could not meet their closure deadlines under the CCR regulations, this would be an unacceptable non-water quality environmental impact.

Furthermore, some zero-discharge technologies are not available to plants after they cease coal combustion, even if the discharge of legacy wastewater will occur after that date. For example, while Boswell Energy Center has installed and is operating an SDE for treating several wastewaters including legacy wastewater, this SDE would not be available to a facility that no longer produces power because it is designed and operated using a slipstream of the hot flue gas to evaporate the wastewater, a heat source no longer available after retirement.

Although the EPA cannot determine that a particular technology is available within the meaning of CWA section 304(b) to treat the legacy wastewater described in this section, the Agency could expect the permitting authority to select more stringent technologies than surface impoundments on a site-specific basis. In some cases, the stage of closure and realities on site may point to use of a more stringent technology. For example, a facility in early closure stages may be able to lease commercial, off-the-shelf equipment to treat its legacy wastewater. Alternatively, permitting authorities could assess the technologies a plant already uses for treatment of other wastewaters and determine that the legacy wastewater could be readily directed to an existing treatment system.

5. Definitional Changes

The EPA is finalizing two definitional changes. The first definitional change applies to high intensity, infrequent storm events as described in subsection (a), below. The second definitional change applies to decommissioning wastewater from FGD wastewater treatment equipment and ash handling equipment as discussed in subsection (b), below.

a. Definitional Change for High-Intensity, Infrequent Storm Events

The EPA is finalizing a definitional change for all the wastewaters for which the Agency is establishing zero-discharge limitations in this final rule: FGD wastewater, BA transport water, and CRL. Specifically, the EPA is excluding from the definitions of these wastewaters any discharges which are necessary (*i.e.*, cannot be managed with existing systems or practices) as the result of high-intensity, infrequent storm events exceeding a 10-year storm event of 24-hour or longer duration (*e.g.*, a 10-year, 30-day storm event). The EPA is specifically selecting this duration storm event as this is a consistent duration storm event to the storm event described in 40 CFR part 423 with respect to regulation of coal pile runoff.[107] Due to these definitional exclusions, such discharges would not be subject to the zero-discharge requirements that otherwise apply to FGD wastewater, BA

[107] 40 CFR 423.12(b)(10) (BPT limitations) and 40 CFR 423.15(a)(12) & (b)(12) (NSPS) provide, "Any untreated overflow from facilities designed, constructed, and operated to treat the volume of coal pile runoff which is associated with a 10, year, 24 hour rainfall event shall not be subject to" the TSS limitations or standards that otherwise apply to discharges of coal pile runoff.

transport water, and CRL under this final rule. Instead, these discharges would be considered a “low volume waste source” and the TSS and oil and grease BPT limitations for such waste would apply, as well as any BAT limitations for the low volume waste source developed by a permitting authority using its BPJ. As discussed in section XIV.C.4 of this preamble, the EPA is also finalizing reporting and recordkeeping requirements that facilities must comply with when they discharge during these high intensity, infrequent storm events, which are intended to demonstrate that the discharge is necessary and to provide information about the time, place, and volume of the necessary discharge. Each of the wastestreams subject to this definitional change is discussed in turn below.

At the outset, the EPA notes that stormwater is not FGD wastewater, BA transport water, or CRL, though it may mix with these wastewaters. Instead, the EPA describes stormwater on its website as follows:

> “Stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. The runoff picks up pollutants like trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters. To protect these resources, communities, construction companies, industries, and others, use stormwater controls, known as best management practices (BMPs). These BMPs filter out pollutants and/or prevent pollution by controlling it at its source.”[108]

Since stormwater picks up different pollutants, for example dirt, it has inherently different characteristics from the wastewaters regulated in this final rule. Furthermore, larger storm events result in a higher fraction of stormwater and stormwater pollutants as compared to the pollutants in FGD wastewater, BA transport water, and CRL. Taken

[108] Available online at: *https://www.epa.gov/npdes/npdes-stormwater-program.*

together, this means that during these high intensity, infrequent storm events, a requirement to treat to zero discharge would essentially be requiring higher and higher amounts of stormwater treatment, rather than treatment of the pollutants of concern in these three wastewaters.

Based on the CWA statutory factors of “process employed,” “engineering aspects” of control techniques, and non-water quality environmental impacts, the EPA concludes that a zero-discharge requirement for discharges of CRL, FGD wastewater, and BA transport water that cannot be managed with existing systems or practices during a high-intensity, infrequent storm event is not warranted. The CWA statutory factor of “cost” provides additional support for EPA’s decision. Regarding CRL, the EPA solicited comment on the potential to exclude discharges from the definition of CRL to account for specific storm events. Several commenters expressed concerns that CRL collection systems in general, or at specific facilities, collected both CRL and stormwater. In such cases, segregation of the CRL and stormwater may not be possible for treatment. One specific design of concern to these commenters, although not the only problematic one, employs a chimney system to channel stormwater vertically through a landfill in order to minimize contact with the ash, and thus minimize the generation of CRL in the first place. In some cases, this design is used voluntarily as a BMP to reduce the potential for groundwater contamination; in other cases, commenters pointed out that such a design is required by state law. The EPA agrees that minimizing the formation of CRL promotes the goals of both RCRA and the CWA by reducing the pollutants mobilized into CRL that can potentially migrate into groundwater, be discharged into surface water, or both. It would be impracticable (and in some cases may also violate state law) for a facility with such a landfill design to rip out these chimney structures in order to segregate CRL from stormwater, but more importantly it would result in the mobilization of more pollutants into CRL (because more water would percolate through the CCR), not less.

Alternatively, it may be possible to design larger treatment systems that can handle even the additional flows resulting from the high intensity, infrequent storm events specified in the definitional change described above. However, here too the record does not support zero-discharge systems as BAT to control necessary discharges of CRL during the storm events described. First, the rainfall that reached the collection system via the chimneys would either be pristine rainfall or rainfall contaminated by runoff sediment, and thus would not be CRL. Second, CRL generated by the rainfall that does percolate through the landfill would not reach the leachate collection system at the same time as the rainfall that passes immediately through the chimneys. Depending on the infiltration rate and depth of the CCR, it may take hours, days, weeks, or longer for the additional CRL generated by the rainfall to ultimately pass through the layers of CCR and into the leachate collection system below. Until the leachate from the storm event migrates to the leachate collection system, the treatment system could be treating mostly or entirely non-CRL stormwater.

The EPA concludes that the considerations discussed above are sufficient to support its decision to exclude necessary discharges of CRL during high intensity, infrequent storm events from the definition of CRL and, thus, from the zero-discharge requirement that would otherwise apply to CRL. The EPA also notes that cost is a statutory factor that it must consider when establishing BAT, and that treatment of the higher flows comprised of primarily non-CRL during such high intensity, infrequent storm events would be more costly. EPA examined the data in the National Oceanic and Atmospheric Administration's *Precipitation Frequency Data Server*.[109] The amount of precipitation for a storm event in the 10-year to 25-year storm event range will be approximately double that of a 1-year storm event. It approximately doubles yet again for something even more extreme such as a 1,000-year storm event. Thus, were the EPA not to finalize a definitional change related to high-intensity, infrequent storm events, a facility would be forced to construct a system at least double the size, but potentially much larger, in order to manage volumes from these low-probability of occurrence precipitation events. As a result, costs could at least double.[110] The doubling of costs to have a system available to manage volumes from these low-probability events occurring once every 25 or 200 years would be a wholly disproportionate *costs per day in use* when compared to the costs actually considered in the EPA's cost estimates, costs that already treat the average annual flows of CRL under the more common storm events to zero discharge approximately nine years and 364 days out of every 10 years.[111] The EPA

[109] Available online at*: https://hdsc.nws.noaa.gov/pfds/.*

[110] Volume is one of the primary inputs to the EPA's cost models of zero-discharge systems. The relationships are not linear, but costs do increase at a similar enough rate for purposes of the illustrative argument above. For more information on the specific cost estimates the EPA used, see Section 5 of the TDD.

[111] Furthermore, doubling the costs of these systems would not be justified as the CRL, and thus the pollutants in CRL, would not reach the leachate collection system until much later. Instead, this larger system would be underutilized for years or decades at a time, only to treat a wastestream composed of mostly non-CRL wastewater on the infrequent occasion that it was ultimately called upon just for the sake of saying that the system eliminated all CRL discharges. Courts have recognized that while CWA section 301 is intended to help achieve the national goal of eliminating the discharge of all pollutants, at some point the technology-based approach has its limitations. *See Am. Petroleum Inst.* v. *EPA,* 787 F.2d 965, 972 (5th Cir. 1986) ("EPA would disserve its mandate were it to tilt at windmills by imposing BAT limitations which removed de minimis amounts of polluting agents from our nation's waters . . . .").

views the high cost of treating CRL discharges that cannot be managed by an existing zero-discharge system or practices during a high intensity, infrequent storm event as an additional factor supporting the EPA's decision to exclude such discharges from the definition of CRL.

The definitional change discussed for CRL is also appropriate for FGD wastewater. The EPA solicited comment on a zero-discharge requirement for discharges of FGD wastewater, including the availability of zero-discharge systems and ability of plants to meet zero-discharge limitations. The EPA received one comment suggesting that a zero-discharge requirement for FGD wastewater could force an offline plant to operate its coal-fired boilers for the sole purpose of recycling the excess water generated in its FGD treatment system during a storm event. The EPA acknowledges that some FGD treatment systems include open-air tanks and a few include lined surface impoundment pretreatment to increase physical settling. In these scenarios, it is possible that stormwater will increase the need to recycle the clean permeate or distillate from a zero-discharge system at a time when the plant is offline.[112] This scenario does raise concerns that there might be limited instances in which a discharge is necessary or otherwise might result in a plant running when it is not needed. This could result in unnecessary air emissions, a non-water quality environmental impact that the EPA is required to consider.

[112] Recall that recycling of the permeate or distillate into the FGD system or the boiler is part of the zero-discharge system technology basis.

The EPA also notes that several facilities already co-treat FGD wastewater and CRL.[113] Nothing in this final rule would prohibit facilities from achieving zero discharge of these two wastewaters with a single system. Therefore, the EPA expects that, where there are economies of scale, facilities may elect to co-treat these wastewaters. While nothing in the final rule would prohibit such co-treatment, not finalizing a stormwater flexibility for FGD wastewater where such flexibility exists for CRL, and a discharge is necessary for the co-treated CRL, could make such co-treatment impracticable. Furthermore, just as with CRL, discharges during high intensity, infrequent storm events would consist primarily of rainfall and runoff rather than of FGD wastewater. For the reasons above, the EPA finds that zero-discharge systems are not BAT for discharges of FGD wastewater that cannot be managed with existing systems or practices during these high intensity, infrequent storm events.

Finally, the definitional change discussed above for CRL and FGD wastewater is appropriate for BA transport water as well. The EPA solicited comment on the potential need for purges from a closed-loop BA handling system, including purges related to precipitation events, which were a basis for including a purge allowance in the 2020 rule. The EPA's record shows that remote MDS systems can install roofing to mitigate the need to discharge during storm events, and this feature is included in the Agency's cost estimate. One commenter provided information about the necessary cooling received from its open air remote MDS and suggested that it may need to install expensive heat exchangers to make up for the lost cooling once a roof is installed. The EPA agrees that

[113] Other commenters that do not yet have co-treatment also suggested that co-treatment be allowed.

cooling BA (a waste so hot that is sometimes generated in molten form) is one of the primary functions of a BA handling system. While this comment did not provide data showing that cooling would fall enough to jeopardize the ability to recycle wastewater, to the extent that roofing could affect the ability of a remote MDS to return water cool enough to quench BA,[114] the EPA would agree that this could jeopardize the ability of that system to attain zero discharge during high intensity, infrequent storm events.

The EPA also acknowledges that some BA handling systems must recycle some BA into their FGD wastewater treatment systems either by design or to manage the volume of water or chemistry of water in the closed-loop system. For the reasons stated above finding that a definitional change is warranted for FGD wastewater, it would also make sense to have a definitional change for BA transport water, especially to the extent that the BA transport water in closed-loop systems is used as FGD makeup water to comply with the zero discharge-requirements. For the reasons above, the EPA finds that zero-discharge systems are not BAT for BA transport water discharges that cannot be managed with existing systems or practices during high intensity, infrequent storm events.

While the previous considerations are sufficient to support the Agency's decision to exclude necessary discharges of BA transport water during high intensity, infrequent storm events from the definition of BA transport water and, thus, from the zero-discharge requirement that would otherwise apply to BA transport water, the EPA notes that the

[114] The commenter stated that its facility needed water below 140 degrees Fahrenheit in order to sufficiently cool its BA.

statutory factor of cost also supports the EPA's decision. Remote MDS systems are not the only systems that the EPA estimates will operate as closed-loop systems. At some facilities, larger settling systems such as concrete basins have already been constructed. In contrast to MDS systems, the EPA acknowledges that its cost estimates assume that some non-MDS wet systems (*e.g*., dewatering bins, lined surface impoundments, basins) would make low-cost changes to recirculate BA transport water rather than install a new BA handing system. A roof or other cover over surface impoundments or basins that could be acres in size would be cost prohibitive at such sites.

In summary, after considering public comments and the facts and analyses in the record, and in light of the requirements for the EPA to consider several statutory factors (including the process employed at the facility, the engineering aspects of the application of various types of control techniques, and non-water quality environmental impacts) the EPA rejects zero-discharge systems as BAT to control necessary discharges of FGD wastewater, BA transport water and CRL mixed with stormwater during high intensity, infrequent storm events exceeding a 10-year storm event of 24-hour or longer duration (*e.g.*, a 30-day storm event). The EPA's decision is further supported after considering the associated costs. While the EPA is excluding necessary discharges resulting from such storm events from the definitions of CRL, FGD wastewater, and BA transport water, this does not mean that no limitations apply to these discharges. As low volume waste sources (which are defined in 40 CFR part 423 as wastewater from all sources except those for which specific limitations or standards are otherwise established in this part), these discharges are subject to the BPT limitations for low volume waste sources as well as any BAT limitations developed by the permitting authority on a BPJ basis.

Furthermore, the EPA notes that facilities would still be required to follow any stormwater requirements. High-intensity, infrequent storm events are currently addressed in the *2021 Multi-Sector General Permit* (MSGP), the most recent to address industrial stormwater, including stormwater at steam electric power plants.[115] The MSGP requires a Stormwater Pollution Prevention Plan (SPPP), which is developed at each individual facility and is therefore tailored to the types and frequencies of storms experienced at each facility. This makes sense as a site prone to hurricanes may take different stormwater precautions than a site located in an arid climate.[116] As a result of site-specific permit requirements or voluntary efforts, some steam electric facilities already exceed the performance of a 10-year, 24-hour design standard and would have even less frequent stormwater-related discharge needs than envisioned by the definitional change in this final rule. For example, in a recent BA transport water purge request for the Four Corners Power Plant, the utility demonstrated the ability to fully recycle under a 10-year storm event, and only showed the need for discharge during a 100-year storm event.

For the final rule, in addition to requiring facilities to meet limitations applicable to low volume waste sources, to ensure facilities are not backing away from more protective management practices, the EPA is requiring that any necessary discharges of CRL, FGD wastewater, or BA transport water resulting from such a high-intensity, infrequent storm event be accompanied by an official certification statement that includes

[115] Available online at: *https://www.epa.gov/npdes/stormwater-discharges-industrial-activities-epas-2021-msgp.*

[116] While climate change may be driving more extreme storm events in some areas, it is possible that, given this design and the age of the facility, the facility will never experience a situation where a stormwater-related discharge under this rule would be required before its retirement from service.

information that these discharges were necessary (*i.e.*, could not be managed with existing systems or practices). Importantly, nothing in this definitional change or the associated reporting and recordkeeping requirement changes a facility's obligations for stormwater management under its current permit or general permit. For further discussion of this reporting and recordkeeping requirement, see section XIV.C.4 of this preamble.

b. Definitional Change for Decommissioning Wastewater

When the EPA finalized non-zero limitations for FGD wastewater and BA transport water in the 2020 rule, facilities could discharge these wastewaters when decommissioning equipment after retirement. The EPA proposed zero-discharge limitations and at proposal did not specifically address the scenario in which plants may be decommissioning their zero-discharge treatment equipment. One commenter said that wastewater must be discharged from such equipment at the time of decommissioning and recommended that the Agency either retain the 2020 rule purge allowance or finalize an end-of-life flexibility that the EPA proposed in 2019 for "wastewater present in equipment when a facility is retired from service." Another commenter, in the context of the permanent cessation of coal combustion subcategory, suggested that the Agency allow facilities to discharge wastewaters for 120 days after permanently ceasing coal combustion.

The EPA agrees with the commenter that, given the zero-discharge limitations being finalized for FGD wastewater and BA transport water in this rule, an end-of-life flexibility for certain discharges is warranted. More specifically, the EPA finds a limited definitional change, appliable to all EGUs, to allow one-time discharges associated with decommissioning an FGD wastewater treatment system or BA handling system after retirement is appropriate. Part of the basis for the zero-discharge limitations in this rule is tied to the ability of an active plant to recycle the wastewaters back into the plant (*e.g.*, as FGD makeup water). This is no longer the case when a facility retires. Furthermore, as discussed in the subsequent sections VII.C.3 and VII.C.4, the Agency is finalizing a tiered set of zero-discharge limitations for FGD wastewater and BA transport water at EGUs permanently ceasing coal combustion, but it is including time that allows for discharges of these wastewaters up to 120 days after the EGU ceases coal combustion, due to the technical constraints of achieving zero-discharge when active operations have ceased. Because there is no material difference in residual discharges from a decommissioned system at a plant retiring before the December 31, 2028, or December 31, 2034 dates in the permanent cessation of coal combustion subcategories, as compared to a plant retiring after those dates, it is consistent to treat facilities retiring before and after those dates the same. Thus, the EPA is excluding wastewater removed from wastewater treatment or ash handling equipment within the first 120 days of decommissioning the equipment from the definitions of FGD wastewater and transport water.

While the EPA is excluding this narrow class of wastewaters from the definitions of FGD wastewater and transport water, this does not mean that no limitations apply to discharges of such wastewater. As low volume waste sources (which are defined as wastewater from all sources except those for which specific limitations or standards are otherwise established in part 423), these discharges are subject to the BPT limitations for low volume waste sources, as well as any BAT limitations developed by the permitting authority on a BPJ basis. The EPA expects permitting authorities to consider any treatment technologies available at the plant in devising appropriate, case-by-case BAT limitations.

6. Clarification on the Interpretation of 40 CFR 423.10 (Applicability)

The EPA clarified at proposal that part 423 applies to discharges of legacy wastewater at inactive/retired power plants because the discharge of these wastewaters "result[s] from the operation of a generating unit." [117] This interpretation is consistent with the EPA's longstanding view on the applicability of 40 CFR part 423 to inactive/retired plants, as well as with implementation by state permitting authorities. For example, in 2016, the South Carolina Department of Health and Environmental Control reissued a permit to the South Carolina Electricity & Gas Company's Canadys Station Site (SC0002020) which stated, "Because electricity is not being generated, 40 CFR part 423-Steam Electric Power Generating Point-Source Category will only apply to the discharge of legacy wastewaters."[118] This is also consistent with the EPA's position provided in response to comments on the 2015 rule, in which the Agency stated:

> "EPA disagrees with the commenter that the 'effluent limits would not apply' to discharges associated with retired units. For example, combustion residual

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[117] **40 CFR 423.10 Applicability.** The provisions of this part apply to discharges resulting from the operation of a generating unit by an establishment whose generation of electricity is the predominant source of revenue or principal reason for operation, and whose generation of electricity results primarily from a process utilizing fossil-type fuel (coal, oil, or gas), fuel derived from fossil fuel (*e.g.*, petroleum coke, synthesis gas), or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium. This part applies to discharges associated with both the combustion turbine and steam turbine portions of a combined cycle generating unit.

[118] DHEC (Department of Health and Environmental Control). 2016. *FACT SHEET AND PERMIT RATIONALE: South Carolina Electric & Gas Company, Canadys Station Site*. NPDES Permit No. SC0002020. May 16.

> leachate from landfills or surface impoundments containing combustion residuals from the time a generating unit was operating may occur and continue to be subject to the effluent limitations and standards requirements long after a generating unit is retired. Similarly, if an impoundment containing wastewater created while the generating unit was in operation (*e.g.*, FGD wastewater, fly ash or bottom ash transport water) were to discharge, it would certainly be discharging wastewater 'resulting from the operation of a generating unit.' In these instances, even though the generating unit may no longer be in operation, the wastewater is the result of its previous operation. Therefore, to the extent that steam electric power plants discharge wastestreams like this resulting from the operation of a generating unit, the ELGs do apply."[119]

Due to the proposed expansion of the RCRA CCR closure requirements to inactive surface impoundments at inactive (*i.e*., retired) plants, some of these surface impoundments are expected to dewater and therefore discharge legacy wastewater. At proposal, the EPA sought to clarify the applicability of part 423 to these legacy wastewaters since the Agency was soliciting comment on establishing nationally applicable BAT limitations rather than reserving BAT limitations to be developed on a case-by-case basis using a permitting authority's BPJ. As described in section VII.B.4 of this preamble, the EPA is instead declining to establish a nationwide BAT for discharges of legacy wastewaters, except for those discharges of legacy wastewater described in section VII.C.6 of this preamble (which would not occur at previously retired facilities), and it is thus continuing to reserve these BAT limitations for case-by-case decision-making using the permitting authorities' BPJ. As a result, the applicability of part 423 to legacy wastewater discharges at inactive/retired plants would not impact the technology-based effluent limitations that apply to such discharges. In other words, the EPA's interpretation makes no difference to the ultimate disposition of legacy wastewater

[119] U.S. EPA (Environmental Protection Agency). 2015. *Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category: EPA's Response to Public Comments*. September. (SE05958A2) Page 3-563.

because, while the EPA interprets the rule to apply to legacy wastewater at inactive/retired steam electric power plants, the same BPJ approach called for in this rule would apply even if inactive/retired plants were not subject to part 423, given that BAT limitations must be developed on a BPJ basis where nationally applicable limitations do not apply. *See* CWA section 402(a)(1), 33 USC 1342(a)(1); 40 CFR 122.44, 125.3. For further discussion of these additional legacy surface impoundments, *see Legacy Wastewater at CCR Surface Impoundments – Estimated Volumes, Treatment Costs, and Pollutant Loadings*, (DCN SE11503).

At proposal, the EPA also solicited comment on whether there are other wastewaters that may continue to be discharged after the retirement of a facility and the generation of electricity is the "but for" cause of the discharge. Some commenters suggested that the Agency should clarify its interpretation to include additional wastewaters such as CRL, while others disagreed that this would be a permissible reading of the regulation. Commenters opposed to an expansive reading stated that other wastewaters such as CRL generated after closure were not generated as a result of operating a generating unit, but as the result of precipitation percolating through a waste management unit. Commenters opposed to an expansive reading also pointed to the history of 40 CFR part 423, suggesting that the EPA never intended to cover CRL from retired power plants as it never evaluated these facilities.

The EPA agrees with commenters stating that discharges of CRL, even after retirement, result from the operation of a steam EGU. Were it not for operation of the unit, there could be no CRL discharges, regardless of whether there are other conditions that also exist to facilitate the discharge. Moreover, the EPA disagrees with commenters that the Agency never intended to cover CRL from retired power plants. As can be seen from the response to comment excerpt above, in 2015, the EPA expected that CRL discharges would continue to be subject to 40 CFR part 423 after a facility retired. This is an important clarification that makes it clear that the limitations being finalized, including those for subcategories, would continue to apply after the facility retires. At the same time, two other statements from the 2015 rule record demonstrate that the Agency only intended the regulations to cover leachate prospectively from the 2015 rule. First, also in the 2015 response to comments is the EPA's statement that:

> "Retired landfills with or without leachate collection systems are not subject to the combustion residual leachate limitations and standards. EPA's methodology does not include costs or pollutant loadings removals from closed or retired landfills in its analyses."[120]

Second, in the 2015 TDD, the EPA stated that "combustion residual leachate from retired units is not regulated in the final rule." These two statements, together with the earlier response to comments discussed above, reflect the actual approach finalized in the 2015 rule; namely, that only CRL generated and discharged at EGUs operating after the effective date of the 2015 rule was covered.[121] The approach taken in this final rule is consistent with that of the 2015 rule. That is, discharges of CRL (including unmanaged CRL) are covered prospectively by the final rule, but they will continue to be covered even after that facility and any waste management units generating CRL have retired. To

[120] U.S. EPA (Environmental Protection Agency). 2015. *Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category: EPA's Response to Public Comments*. September. (DCN SE05958A6) Page 7-82.

[121] This is the case even though the Fifth Circuit Court of Appeals vacated and remanded the BAT limitations for CRL finalized in 2015.

the extent that a retired facility or closed waste management unit (WMU) is subject to 40 CFR part 423 but its discharges of CRL (including unmanaged CRL) are not subject to this rule, permitting authorities will instead continue to establish technology-based effluent limitations that reflect BAT using their BPJ. Thus, these facilities will have to meet BAT limitations for their discharges of CRL that are available, are economically achievable, and have acceptable non-water quality environmental impacts.[122]

C. Subcategories

The EPA has authority in a national rulemaking to establish different limitations for different plants after considering the statutory factors listed in CWA section 304(b). *See Texas Oil & Gas Ass'n* v. *EPA,* 161 F.3d at 938 (stating that the CWA does not "exclude a rule allowing less than perfect uniformity within a category or subcategory.").

In the 2015 rule, the EPA established subcategories for small EGUs (less than or equal to 50 MW nameplate capacity) and oil-fired EGUs. In this rulemaking, the EPA did not propose to revise or eliminate these subcategories and did not receive any comments on removing such subcategories; therefore, this final rule keeps the 2015 subcategories intact.

In the 2020 rule, the EPA established additional subcategories for high FGD flow facilities (EGUs with FGD purge flows of greater than 4 million gallons per day),

[122] The EPA conservatively included closed WMUs in its cost analyses when they were located at active facilities. CRL flows at composite-lined landfills could be comingled with the flows from adjacent, active landfill cells. Furthermore, unmanaged CRL flows could be caught up in site-wide pump-and-treat operations where both active and closed WMUs are present. Thus, while this is a conservative assumption, it is a reasonable estimate that helps ensure the costs of the rule are not underestimated and are economically achievable.

LUEGUs (EGUs with a capacity utilization rating of less than 10 percent per year), and EGUs permanently ceasing coal combustion by 2028. For these subcategorized units, the EPA established different limitations using different technology bases as compared to the limitations applicable to the rest of the steam electric point source category. In 2023, the EPA proposed to eliminate the 2020 rule's high FGD flow subcategory and LUEGU subcategory, but also proposed to retain the permanent cessation of coal combustion by 2028 subcategory.

Based on public comment, in this final rule, the EPA is eliminating the 2020 rule's high FGD flow subcategory, as well as the LUEGU subcategory, but is retaining the permanent cessation of coal combustion by 2028 subcategory. These three subcategories are addressed in subsections 1-3 below.

In addition, the final rule creates three new subcategories based on the proposal, as described further in subsections 4-6 below. These subcategories are for (1) EGUs permanently ceasing coal combustion by 2034, (2) discharges of unmanaged CRL, and (3) discharges of legacy wastewater from surface impoundments that will commence closure under the CCR regulations after the effective date of this final rule. For these subcategorized units, the EPA is establishing different limitations (using different technology bases) than the ones applicable to the rest of the steam electric point source category.

1. Plants with High FGD Flows

Except as discussed in section VII.C.4 of this preamble, as proposed, the EPA is eliminating the high FGD flow subcategory promulgated in the 2020 rule. The EPA finds that, after evaluating public comments, along with the record and factors specified in CWA section 304(b)(2)(B), the subcategory is no longer warranted.

At the time of the 2020 rule, the EPA's understanding was that this subcategory would apply to only one facility, TVA Cumberland, which operated with FGD purge flows of over 400 million gallons per day. The EPA based the creation of the subcategory on the supposedly disparately high costs that would result from high FGD flows at this facility and thus the need to install a larger, more costly treatment system than at other EGUs.

Several commenters on the 2019 and 2023 proposals claimed that this subcategory of one facility was inconsistent with the CWA, and further argued that the costs estimated for TVA were overestimated and not disparately high as compared to other facilities.[123] The EPA acknowledges that its cost estimates were higher than TVA's own estimates for installing biological treatment, and thus costs may not be as disparately high as indicated in the 2020 rule.

Since the 2020 rule, TVA has announced a notice in the *Federal Register* of plans to retire the facility, which are further detailed in a draft Environmental Impact Statement (EIS). *See* 86 FR 25933 (May 11, 2021). This draft EIS solicits comment on three alternatives, all of which include retirement but with different electricity replacement scenarios. While TVA's comments on the 2023 proposed rule still appear to support

[123] The EPA notes that these commenters were also petitioners in the consolidated *Appalachian Voices* case discussed in section IV of this preamble.

retaining this subcategory, its comments also confirm that TVA plans to retire the Cumberland plant.

Due to TVA's retirement plans, the EPA finds that this subcategory is no longer warranted based on the rationale provided in the 2020 rule. As appears in its *Federal Register* document, all the alternatives TVA is considering (including its preferred alternative) would result in the plant's retirement. To the extent that the plant is able to participate in the permanent cessation of coal combustion by 2028 subcategory, the plant's limitations would be based on surface impoundments.[124] To the extent that the plant operates beyond 2028, it would be able to participate in the permanent cessation of coal combustion by 2034 subcategory (discussed below in section VII.C.4) of this preamble and have limitations based on chemical precipitation (the same 2020 rule limitations applicable to plants in the high FGD flow subcategory). Thus, there would be no costs to TVA Cumberland associated with the more stringent, zero-discharge limitations in this final rule, and thus no disparate costs. Disparate costs were the sole rationale for the high FGD flow subcategory, and neither the EPA nor commenters have identified alternative bases that could serve to support this subcategory. Furthermore, after the retirement of TVA Cumberland, because this plant was the only one qualifying as a high flow facility, this subcategory becomes a null set; therefore, the EPA is eliminating the subcategory.

[124] TVA submitted a NOPP for the permanent cessation of coal combustion subcategory to the Tennessee Department of Environment and Conservation on October 6, 2021. To date, the EPA is not aware of any actions taken at the facility to meet the limitations in the high flow subcategory no later than December 31, 2023, as required to participate in this subcategory.

2. LUEGUs

Except as discussed in section VII.C.4 of this preamble for the new permanent cessation of coal combustion subcategory, as proposed, the EPA is eliminating the LUEGU subcategory after evaluating public comments received and the record as it informs the factors specified in CWA section 304(b)(2)(B). The EPA finds that the subcategory is no longer warranted. The EPA established the subcategory for LUEGUs in the 2020 rule based on cost (disparate capital costs), non-water quality environmental impacts (energy reliability), and other factors the Administrator deemed appropriate (*i.e.,* harmonization with CAA and RCRA regulations that apply to electric utilities).

The EPA received comments on the proposal both in support of and opposition to eliminating this subcategory. Commenters supporting elimination of the subcategory agreed with the statements and findings included in the EPA's proposal that the 2020 LUEGU subcategory is no longer warranted based on the factors originally cited. Commenters opposed to elimination of this subcategory faulted the EPA for several reasons. First, they contended that the EPA could not evaluate the subcategory without better understanding how many plants intend to make use of it. In particular, they claimed that the EPA's understanding of the universe of plants intending to make use of the subcategory is not based on a comprehensive accounting of NOPPs and facilities with LUEGU limitations included via the transfer provisions of the 2020 rule, contained in section 423.13(o), which allow facilities to transfer into the LUEGU subcategory automatically without requesting a permit modification. Second, these commenters reiterated the findings in the 2020 rule and claimed they supported creation of the subcategory. Finally, the commenters disputed the proposal's characterization of GSP Merrimack Station, the only plant currently seeking to participate in this subcategory.

Under the 2020 rule, a facility wishing to avail itself of the limitations available in the subcategories for low utilization or permanent cessation of coal combustion, or any facility wishing to participate in the VIP, was required to file a NOPP by October 13, 2021. The EPA acknowledges that facilities and permitting authorities were not required to provide NOPPs to the EPA as part of the 2020 rule. Instead, the EPA obtained NOPP submissions through normal permit reviews, as courtesy copies, in providing technical support to state permitting authorities, and via the sharing of a set of NOPPs that environmental groups had already collected. In total, these NOPPs cover 94 EGUs at 38 plants – about 34 percent of all facilities predicted to incur costs under the 2020 rule.[125] Furthermore, the EPA did not receive comments from any facilities stating that they had filed NOPPs of which the EPA was not aware. Most of these NOPPs are from plants wishing to avail themselves of flexibilities in the 2020 rule other than the LUEGU subcategory. Only one facility indicated it would like to avail itself of the BAT limitations in the subcategory for LUEGUs: the GSP Merrimack Station in Bow, New Hampshire.

On March 27, 2024, GSP issued a press release announcing a settlement with the EPA whereby GSP has committed to permanently ceasing coal combustion at Merrimack

[125] Four units at two plants are represented twice. NOPPs for two units were initially filed by one plant for the VIP, and NOPPs for two separate units were initially filed by another plant for the LUEGU subcategory. Both plants then filed new NOPPs for their two units to permanently cease coal combustion by 2028.

Station no later than June 1, 2028. This dates is memorialized in a Settlement Agreement that arose out of an Alternative Dispute Resolution process conducted in connection with an administrative appeal of an NPDES permit modification for Schiller Station.[126] As a result of the only known facility with LUEGUs retiring and no comments revealing the existence of any other LUEGU, the EPA is eliminating the LUEGU subcategory in this final rule, except to the extent it supports entry into the new permanent cessation of coal by 2034 subcategory discussed below.

3. EGUs Permanently Ceasing Coal Combustion by 2028

The EPA is retaining the subcategory for EGUs permanently ceasing coal combustion by 2028 after evaluating public comments and the record in light of the factors specified in CWA section 304(b)(2)(B) and finding that the subcategory continues to be warranted. For EGUs in this subcategory, the EPA is also retaining the 2020 rule BAT limitations based on surface impoundments.

The EPA proposed to retain the subcategory for EGUs permanently ceasing coal combustion by 2028 and simultaneously extended the NOPP filing date through a companion direct final rulemaking. *See* 88 FR 18440 (March 20, 2023). No commenter argued for the elimination of this subcategory, though commenters disagreed about any potential changes. Some commenters suggested extending the latest date to permanently cease coal combustion beyond December 31, 2028, while other commenters opposed any extension of this date. Similarly, some commenters sought additional transparency and

[126] *See, e.g., https://indepthnh.org/2024/03/27/last-coal-plants-in-new-england-to-voluntarily-close-transitioning-to-renewable-energy-parks/.*

enforceability of the criteria to permanently cease coal combustion while other commenters opposed such modifications. In the subsections below, the EPA discusses why this subcategory continues to be warranted and why it is retaining the BAT technology bases for this subcategory. The EPA also discusses the zero-discharge limitations that apply after ceasing coal combustion, as well as reporting and recordkeeping requirements in the final rule.

a. The subcategory continues to be warranted based on several statutory factors.

The EPA established this subcategory in the 2020 rule based on the statutory factors of cost, the age of the equipment and plants involved, non-water quality environmental impacts (including energy requirements), and such other factors as the Administrator deems appropriate (harmonization with the CCR regulations' alternative closure provisions). The EPA notes the unanimous agreement that this subcategory should be retained, and it agrees with commenters, although the EPA is no longer relying on cost as a primary basis for this subcategory, as discussed below.

In particular, the EPA recognizes that, based on the creation of this subcategory, which was part of the 2020 rule, many plants have begun moving forward with plans to retire or repower in the then-eight-year time frame afforded under that rule. In the 2020 rule, EPA described how recent NERC reliability assessments showed one region that was not anticipated to meet its reference margin[127] and another region that was

[127] "Reference margins, which differ by region, are reserve margin targets based on each area's load, generation capacity, and transmission characteristics. In some cases, the reference margin level is a requirement implemented by states, provinces, independent system operators, or other regulatory bodies. Reliability entities in each region aim to have their anticipated reserve margins

anticipated to be very close to its reference margin (and these assessments are consistent with NERC's *2023 Long-Term Reliability Assessment*). Therefore, for the 2020 rule, the EPA found that premature closure of some plants and/or EGUs as a result of the general, industry-wide limitations would be an unacceptable non-water quality environmental impact because it could impact reliability. Utilities with a limited remaining useful life have planned and budgeted for replacement capacity under timelines approved by public utility commissions (PUCs) and public service commissions (PSCs) as part of the normal integrated resource planning process. These submissions were made since the 2020 rule, as part of the 2020 rule's eight-year window to permanently cease coal combustion. The EPA does not think that it should disrupt these ongoing plans by changing the date halfway through the period that plants have moved forward with those plans. Maintaining the same timeframe allowed by the prior rule supports efforts planned for the orderly transition of generating capacity as a result of the 2020 rule in a way that helps ensure grid reliability and weighs in favor of retaining the same date in this rule.

With respect to air pollution, a non-water quality environmental impact, the EPA notes that several utilities have decided to make use of this subcategory where they may not have previously had plans to retire by 2028. For example, the DTE Energy Company filed a NOPP for this subcategory for its Belle River Power Plant and is now planning to retire in 2028 rather than 2030. Replacing coal-fired capacity with natural gas, renewables, and other sources leads to decreased emissions of several air pollutants. The subcategory allows utilities seeking to retire by 2028 to do so and achieve the associated

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surpass their reference margins, which are generally set near 15% in most regions." Available online at: *https://www.eia.gov/todayinenergy/detail.php?id=31492*.

air pollution and solid waste reductions, which further supports the finding that the subcategory continues to be warranted.

In addition, the EPA still wishes to harmonize this rule with the CCR alternative closure provisions as described in the proposal, and those provisions have not changed. Twenty-five plants are seeking to use the alternative closure provisions under the CCR regulations, which allow for closure of the unlined impoundment(s) and the power plant no later than 2023 (for surface impoundments under 40 acres) or 2028 (surface impoundments over 40 acres).[128] Elimination of the permanent cessation of coal combustion subcategory from this ELG could interfere with the plans of utilities with surface impoundments in the 2028 category, complicating their compliance with the CCR regulations. Furthermore, the EPA has also finalized additional flexibility under the Good Neighbor Plan, discussed in section IV.E.2.a of this preamble.[129] Harmonization between regulations on air, water, and land pollution gives industry certainty to plan and implement these requirements in an orderly, efficient manner.

Although the EPA concludes that the previous factors are sufficient to justify the retention of this subcategory, the EPA also notes that, with respect to cost, the 2020 rule record included an analysis showing that amortization of capital costs for less than the

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[128] Further information is available online at: *https://www.epa.gov/coalash/coal-combustion-residuals-ccr-part-implementation.*

[129] "To facilitate a potentially economic and environmentally superior unit-level compliance response across these programs that nonetheless maintains the NO_X reductions required by the state budgets from 2026 forward in this proposal, the EPA is requesting comment on potentially deferring the application of the backstop daily rate for large coal EGUs that submit written attestation to the EPA that they make an enforceable commitment to retire by no later than the end of calendar year 2028." 87 FR 20036, 20122 (April. 6, 2022).

typical 20-year life of pollution control equipment leads to greater annualized costs per MWh as compared to costs at EGUs that are not retiring or repowering. Many plants made decisions at the time of the 2020 rule to opt for the alternative retirement compliance pathway, and they are now several years into meeting the milestones for that path. In this case, a change in the rule requiring these facilities to install new treatment technologies would result in even shorter timeframes and even greater costs per MWh. Thus, the EPA finds that cost provides an additional basis for the subcategory.

After considering all the information above, the EPA finds that the record and statutory factors discussed above continue to support this 2020 subcategory and associated limitations. Each of these bases, discussed above and supported by a statutory factor, provide a separate and independent basis for subcategorization, save for the cost basis which serves as additional support. Thus, the EPA is retaining this subcategory in its current form. This includes retaining the BAT technology basis for limitations applicable to EGUs in this subcategory, surface impoundments. Surface impoundments are technologically available, are economically achievable, and have acceptable non-water quality environmental impacts as applied to this subcategory. They represent BAT for this subcategory because they support the ability of plants with a limited remaining useful life to continue with their ongoing plans for orderly retirement or repowering. The EPA also notes that they would not lead to higher costs for facilities based on the remaining useful life of their EGUs. The EPA did not select any other technology for this subcategory because it would disrupt plants' already approved, ongoing plans for ceasing coal combustion by 2028. The EPA also notes that imposing more stringent BAT limitations on EGUs in this subcategory would subject them to greater costs per MWh, as compared to EGUs in the general industry, given that these EGUs have a limited remaining useful life.

b. The final rule includes post-coal combustion cessation zero-discharge limitations for EGUs in this subcategory to avoid circumvention.

The EPA proposed to include zero-discharge limitations applicable after the permanent cessation of coal combustion date, December 31, 2028, for all discharges in this subcategory. The goal of these limitations was to ensure that a facility does not manipulate the flexibilities in 40 CFR part 423 to avoid meeting industry-wide zero-discharge limitations and then simply keep discharging without relevant permit limitations being applicable to them. The EPA received several comments on these limitations that would apply after the permanent cessation of coal combustion date. Some commenters expressed a preference for them and sought an even stronger requirement that the zero-discharge limitations be retroactive. Other commenters suggested that these limitations are not necessary, are unduly burdensome, and are not cost-free, even where a facility successfully permanently ceases coal combustion by the specified date. One commenter in the latter category suggested a 120-day flexibility for facilities that permanently ceased coal combustion to allow for some residual discharges of these wastewaters as necessary, subject to requirements no more stringent than BPT limitations.

After considering these comments, the EPA is finalizing zero-discharge limitations that would apply after the permanent cessation of coal combustion date, December 31, 2028, with modifications from the proposal, in order to ensure that the eligibility for participation in this subcategory designed for EGUs that permanently cease coal combustion is not circumvented. The modifications the EPA made to these limitations following proposal are based on legitimate concern raised in public comments concerning the potential need to discharge for a relatively short period of about fourth months following the permanent cessation of coal combustion. For example, a facility retiring on December 31, 2028, may still need to discharge the wastewater remaining in existing tanks from the final hours and days of lawful operations. The EPA does not wish to interfere with owner/operator plans for the permanent cessation of coal combustion or discourage the use of this subcategory by unfairly preventing any residual discharges that are necessary after coal combustion has permanently ceased.

The final rule reflects that the EPA continues to view zero-discharge limitations that apply following the permanent cessation of coal combustion date as an appropriate tool to avoid circumvention, as well as some flexibility to account for legitimate concern regarding the need to discharge following the permanent cessation of coal combustion date. The final rule thus contains a tiered set of zero-discharge limitations applicable following December 31, 2028:

- The first tier of these limitations is composed of zero-discharge limitations for FGD wastewater and BA transport water after April 30, 2029. These limitations would apply if the EGU had in fact permanently ceased coal combustion by December 31, 2028, as the plant represented it would. As suggested in the comments, this date is 120 days after the latest permanent cessation of coal combustion date, allowing for facilities to complete any necessary residual decommissioning discharges.[130]
- The second tier is composed of zero-discharge limitations for these same wastewaters after December 31, 2028. If a plant fails to cease combustion of

[130] The EPA notes that these do not include discharges of legacy wastewaters from surface impoundments closing under the CCR rule, which are covered by different regulatory provisions.

> coal by 2028, as it represented it would, for any reason other than those specified in section 423.18, these zero-discharge limitations would automatically apply.

Dischargers to which the second tier applies, the EPA notes, would be subject not only to this rule's requirements, but also to enforcement for false statements in their filings under section 423.19 – for example, statements made in the NOPP, in the annual progress reports, in the notice of material delay, and for failure to file a notice of material delay in a timely fashion. Any reporting and recordkeeping violations would also be subject to enforcement. The EPA finds that, together, the zero-discharge limitations and reporting and recordkeeping requirements, as modified below, are sufficient to ensure that facilities do not unfairly benefit by continuing to discharge after the subcategory's permanent cessation of coal combustion date.

c. The final rule includes additional reporting and recordkeeping requirements for EGUs in this subcategory.

For a discussion of additional reporting and recordkeeping requirements, see section XIV.C.1 of this preamble.

4. EGUs Permanently Ceasing Coal Combustion by 2034

The EPA proposed a new "early adopter" subcategory for EGUs permanently ceasing coal combustion by December 31, 2032, with certain eligibility criteria targeted toward those plants that had already installed the FGD and BA technology bases on which the 2020 rule rested by the date of the 2023 proposed rule. The EPA solicited comment on whether the permanent cessation of coal combustion date should be earlier or later than 2032, as well as the propriety of the proposed criteria based on technology adoption for the subcategory. Based on public comments, the EPA is finalizing the new subcategory, except that the date for permanently ceasing coal combustion is December 31, 2034, rather than 2032. In addition, the EPA is not establishing strict eligibility criteria that would have narrowed the universe of plants to which this subcategory might apply. Through public comments, the EPA learned that, while many plants have continued to move toward compliance with the 2020 rule limitations, including by making various expenditures toward that goal (*e.g.*, securing contracts, conducting pilots, etc.), relatively few had actually installed the technologies on which the 2020 rule limitations were based by the time the 2023 proposed rule was published. In some cases, this was due to the timing of when a plant's NPDES permit was expected to be renewed. As a result, the cutoff that the EPA proposed – in terms of both the date for adoption and what steps constituted adoption – as well as other cutoffs that the EPA considered, would not necessarily capture the universe of plants that the EPA intended to capture. Moreover, the bases for this subcategory in terms of the statutory factors, as discussed further below, support this subcategory even without the proposed requirement for installation of the 2020 rule BAT technologies by the 2023 proposed rule date.

For EGUs that permanently cease coal combustion by December 31, 2034, the EPA is establishing limitations for FGD wastewater and BA transport water that are the same as those in place following the effective date of the 2020 rule. These limitations differed for some EGUs if they participated in a subcategory promulgated by the 2020 rule, but for the general industrial category consisted of limitations based on chemical precipitation followed by low residence time biological reduction treatment for FGD wastewater and limitations based on high recycle rate systems for BA transport water.

The final rule also covers discharges of CRL from EGUs in the new permanent cessation of coal combustion subcategory. The EPA notes that facilities discharge CRL either alone or in combination with FGD wastewater and BA transport water. The EPA solicited comment at proposal on the treatment of CRL at EGUs that will soon permanently cease coal combustion and close their CCR landfills. In response to this solicitation, several commenters recommended either including CRL in any new permanent cessation of coal combustion subcategory or creating a separate subcategory for CRL generated at landfills nearing closure. Several commenters recommended that CRL discharged from retired EGUs or EGUs that were about to retire should be subcategorized to avoid imposing disparate costs. One commenter pointed to the Agency's findings that the volume of CRL generated after closure of a landfill was approximately an order of magnitude lower than the volume of CRL generated during that landfill's operation.

The EPA agrees with many of these comments and is including CRL as one of the wastestreams covered by the new permanent cessation of coal combustion by 2034 subcategory. While an EGU is still combusting coal, that combustion generates CCR, which in turn generates CRL. As well as being tied to ongoing operations during a facility's remaining useful life (as are FGD wastewater and BA transport water), CRL can be comanaged with FGD wastewater (as is currently done at some facilities). Furthermore, including CRL in this subcategory promotes ease of administration, avoiding the creation of a separate subcategory for CRL designed to accomplish the same fundamental goals.

For CRL discharged at EGUs in this subcategory, the EPA is reserving BAT limitations to be developed on a BPJ basis by the permitting authority until the permanent cessation of coal combustion, after which the EPA is establishing mercury and arsenic limitations based on chemical precipitation, which are the same limitations that EPA proposed for all discharges of CRL.

The EPA received a number of comments on the overall propriety of the proposed subcategory. Though commenters were split, many supported a new subcategory for additional flexibility but disagreed with the contours of what the EPA proposed. After considering the comments and evaluating the record in light of the factors specified in CWA section 304(b)(2)(B), the EPA finds that a new permanent cessation of coal combustion subcategory is warranted. The statutory bases for this subcategory are discussed in the subsection below. The rationale for the selected BAT technology bases appears thereafter, as well as the rationale for rejecting other technologies. Importantly, this subcategory is in addition to the 2020 rule's permanent cessation of coal combustion by 2028 subcategory, which is carried forward in this rule. While the two subcategories are similar in that they apply to EGUs that plan to permanently cease combustion of coal, they differ as discussed below.

a. This subcategory is justified based on several statutory factors.

This subcategory is supported by consideration of three CWA section 304(b) statutory factors: age of equipment and facilities involved, non-water quality environmental impacts, and cost. The EPA notes that the cost factor supports subcategorization, but it is not relying on that factor as a primary basis for the subcategory. Each of the bases discussed below and supported by a statutory factor provide a separate and independent basis for subcategorization, except for cost, which simply provides additional support.

Age of the equipment and facilities involved. The EPA recognizes that this 2024 rule establishes new, more stringent limitations over the limitations promulgated in 2020. For some plants, that means that they may no longer be able to rely on parts of the wastewater treatment systems they installed to meet the 2020 limitations to meet the new 2024 limitations. Under the Act's technology-forcing regime, imposing limitations requiring facilities to shift installation to new pollution control technologies is warranted as more effective technologies are available and economically achievable. In the particular circumstances here, however, the "age of equipment and facilities involved" supports allowing plants with EGUs permanently ceasing combustion of coal by December 31, 2034, to continue to meet limitations under the 2020 rule. Such facilities either have recently or are in the process of installing technologies to meet the 2020 rule limitations and, rather than require these facilities to also install technologies to meet limitations under the 2024 rule as well, given the short remaining useful life of certain plants, the EPA views it as reasonable to provide flexibility in this rule for plants with EGUs permanently ceasing combustion of coal by December 31, 2034.

There are many coal-fired EGUs that have announced a retirement or fuel conversion that would occur after December 31, 2028, which is the date used to establish the 2020 subcategory applicable to EGUs permanently ceasing coal combustion. In Table

VII-2 below, the EPA presents all of the announcements at EGUs estimated to potentially make new investments under this final ELG rule.

TABLE VII-2. Announced Coal-Fired EGU Retirements and Fuel Conversions

#	EIA ID	Plant Name	State	Unit #	Nameplate Capacity	Year Retire or Convert
1	6113	Gibson Generating Station	IN	3	627	2029
2	6113	Gibson Generating Station	IN	4	631	2029
3	298	Limestone Electrical Generating Station	TX	1	893	2029
4	298	Limestone Electrical Generating Station	TX	2	956.8	2029
5	1893	Boswell Energy Center	MN	3	364.5	2029
6	8219	Ray D Nixon	CO	1	207	2029
7	6761	Rawhide Energy Station	CO	1	293	2029
8	2712	Roxboro Steam Plant	NC	1	410.8	2029
9	2712	Roxboro Steam Plant	NC	2	657	2029
10	6021	Craig Station	CO	C3; 3	474.4	2030
11	55479	Wygen 1	WY	1	95	2030
12	6641	Independence Plant	AR	1	850	2030
13	6641	Independence Plant	AR	2	850	2030
14	470	Comanche Station	CO	3	856.8	2030
15	8066	Jim Bridger Power Plant	WY	3	577.9	2030
16	8066	Jim Bridger Power Plant	WY	4	584	2030
17	6068	Jeffrey Energy Center	KS	3	680.936	2030
18	7210	Cope	SC	ST1	432.9	2030
19	663	Deerhaven Generating Station	FL	2	250.7	2031
20	2442	Four Corners Steam Electric Station	NM	4	818.1	2031
21	2442	Four Corners Steam Electric Station	NM	5	818.1	2031
22	6165	Hunter Plant	UT	1	461	2031
23	3403	Gallatin	TN	1	300	2031
24	3403	Gallatin	TN	2	300	2031
25	3403	Gallatin	TN	3	327.6	2031
26	3403	Gallatin	TN	4	327.6	2031
27	6249	Winyah Generating Station	SC	1	315	2031
28	6249	Winyah Generating Station	SC	2	315	2031
29	6249	Winyah Generating Station	SC	3	315	2031
30	6249	Winyah Generating Station	SC	4	315	2031
31	8223	Springerville Generating Station	AZ	2	424.8	2032

32	8069	Huntington	UT	1	498	2032
33	8069	Huntington	UT	2	498	2032
34	3298	Williams Station	SC	ST1	586.4	2032
35	6177	Coronado Generating Station	AZ	U1B; CO1	456	2032
36	6177	Coronado Generating Station	AZ	U2B; CO2	456	2032
37	1241	LaCygne Generating Station	KS	1	893	2032
38	2727	Marshall Steam Station	NC	3	710	2032
39	2727	Marshall Steam Station	NC	4	710	2032
40	1733	Monroe Power Plant	MI	1	817.2	2032
41	1733	Monroe Power Plant	MI	2	822.6	2032
42	6165	Hunter Plant	UT	2	461	2032
43	6165	Hunter Plant	UT	3	490	2032
44	1379	Shawnee	KY	1	175	2033
45	1379	Shawnee	KY	2	175	2033
46	1379	Shawnee	KY	4	175	2033
47	1379	Shawnee	KY	5	175	2033
48	1379	Shawnee	KY	6	175	2033
49	1379	Shawnee	KY	7	175	2033
50	1379	Shawnee	KY	8	175	2033
51	1379	Shawnee	KY	9	175	2033
52	7790	Bonanza Power Plant	UT	1	500	2033
53	628	Crystal River Energy Complex	FL	4; ST4	739.3	2034
54	628	Crystal River Energy Complex	FL	5	739.3	2034
55	1040	Whitewater Valley	IN	1	33	2034
56	1040	Whitewater Valley	IN	2	60	2034
57	6090	Sherburne County Generating Plant	MN	3	1000	2034
58	2712	Roxboro Steam Plant	NC	3	745.2	2034
59	2712	Roxboro Steam Plant	NC	4	745.2	2034
60	6113	Gibson Generating Station	IN	1	635	2035
61	6113	Gibson Generating Station	IN	2	635	2035
62	2721	James E Rogers Energy Complex (f.k.a. Cliffside Steam Station)	NC	6	909.5	2035
63	703	Georgia Power Company - Plant Bowen	GA	3	952	2035
64	703	Georgia Power Company - Plant Bowen	GA	4	952	2035
65	6018	East Bend Station	KY	2	600	2035
66	1004	Edwardsport Generating Station	IN	CT1; CT2; ST	618	2035
67	8042	Belews Creek Steam Station	NC	1	1245	2035
68	8042	Belews Creek Steam Station	NC	2	1245	2035
69	56068	Elm Road Generating Station	WI	1	701.3	2035

70	56068	Elm Road Generating Station	WI	2	701.3	2035
71	1356	Ghent	KY	1	557	2037
72	1356	Ghent	KY	3	557	2037
73	1356	Ghent	KY	4	556	2037
74	6138	Flint Creek Power Plant	AR	1	558	2038
75	6065	Iatan Generating Station	MO	1	726	2039
76	1241	LaCygne Generating Station	KS	2	685	2039
77	4158	Dave Johnston Plant	WY	4	360	2039
78	6068	Jeffrey Energy Center	KS	1	680.936	2039
79	6068	Jeffrey Energy Center	KS	2	680.936	2039
80	6101	Wyodak Power Plant	WY	1	362	2039
81	2876	OVEC - Kyger Creek Station	OH	1	217.26	2040
82	2876	OVEC - Kyger Creek Station	OH	2	217.26	2040
83	2876	OVEC - Kyger Creek Station	OH	3	217.26	2040
84	2876	OVEC - Kyger Creek Station	OH	4	217.26	2040
85	2876	OVEC - Kyger Creek Station	OH	5	217.26	2040
86	3948	Mitchell Plant	WV	1	816.3	2040
87	3948	Mitchell Plant	WV	2	816.3	2040
88	6264	Mountaineer Plant	WV	1	1300	2040
89	983	Clifty Creek Station	IN	1	217.26	2040
90	983	Clifty Creek Station	IN	2	217.26	2040
91	983	Clifty Creek Station	IN	3	217.26	2040
92	983	Clifty Creek Station	IN	4	217.26	2040
93	983	Clifty Creek Station	IN	5	217.26	2040
94	983	Clifty Creek Station	IN	6	217.26	2040
95	3935	John E. Amos Plant	WV	1	816.3	2040
96	3935	John E. Amos Plant	WV	2	816.3	2040
97	3935	John E. Amos Plant	WV	3	1300	2040
98	6095	Sooner Power Plant	OK	1	569	2044
99	3470	W. A. Parish E.G.S.	TX	5	734.1	2045
100	3470	W. A. Parish E.G.S.	TX	6	734.1	2045
101	3470	W. A. Parish E.G.S.	TX	7	614.6	2045
102	3470	W. A. Parish E.G.S.	TX	8	614.6	2045
103	6095	Sooner Power Plant	OK	2	569	2045
104	963	Dallman	IL	4	230.1	2045
105	2952	Muskogee Generating Station	OK	6	572	2049
106	1167	Muscatine Power and Water Generating Station	IA	7	25	2052
107	1167	Muscatine Power and Water Generating Station	IA	8A; 8	93.05	2052
108	1167	Muscatine Power and Water Generating Station	IA	9	175.5	2052
109	2828	Cardinal	OH	1	615.2	2052

110	2828	Cardinal	OH	2	615.2	2052
111	1364	Mill Creek	KY	3	411	2052
112	1364	Mill Creek	KY	4	496	2052
113	2817	Leland Olds Station	ND	1	216	2052
114	2817	Leland Olds Station	ND	2	440	2052
115	645	Tampa Electric - Big Bend Station	FL	ST4	486	2052
116	136	Seminole Generating Station	FL	2	714.6	2052
117	3943	Fort Martin Power Station	WV	1	552	2052
118	3943	Fort Martin Power Station	WV	2	555	2052
119	6071	Trimble County	KY	1	566	2066
120	6071	Trimble County	KY	2	737.7	2066

* Entries 55 and 106 are EGUs less than 50 MW and therefore are not expected to be impacted by the rule

**While the EPA could not confirm the retirement of Shawnee 3 based on publicly available announcements at the time of analysis, during the 12866 review process, TVA confirmed that Shawnee 3 is also retiring in 2033. To the extent that the EPA has overestimated costs for Shawnee in its analysis, the analysis is conservative.

As seen in the table above, there have been 120 announcements that cover the years from 2029 to 2066. Of these, the EPA assumes that the nine EGUs retiring in 2029 would already be able to retire without making new investments under this rule, as these facilities could obtain a “no later than” date for the final limitations in this rule from their permitting authority as late as December 31, 2029. In particular, the EPA notes that there is a cluster of announced retirements that tails off around 2034, with relatively few additional retirements in subsequent years until the 2039/2040 timeframe. These retirements have already been announced, planned for, and in some cases already approved by state and regional utility commissions or grid operators.

Some commenters expressed the view that the EPA had not considered reliance interests created by the 2020 rule and the EPA’s decision to continue to implement that rule. The EPA disagrees. As discussed in previous sections, a facility cannot reasonably rely on the limitations established in a permit beyond the life of the permit itself, which is typically issued for five-year term, and the technology-forcing nature of the statute contemplates establishment and revision of limitations based on the best available technology reflecting currently available information. Nevertheless, as noted above, there are around 50 EGUs planning to permanently cease coal combustion between 2030 and 2034. The plants where these EGUs are located are in the process of installing or have recently installed new technologies under the 2020 rule, as the latest date for compliance in that rule is December 31, 2025. Without establishment of this subcategory, these plants could now be expected, under this rule, to potentially abandon parts of their 2020 treatment systems and install different treatment systems to comply with this 2024 rule, which has a compliance date of December 31, 2029, at the latest. These plants, in particular, have adopted certain strategies for an orderly transition to retirement or an alternate fuel source. The owners and operators of these plants have planned this transition taking into consideration effects on the broader grid and the reasonable useful life of recently installed or soon-to-be installed water pollution treatment equipment under the 2020 rule. Under these circumstances, the EPA does not view it as reasonable, in view of all the relevant considerations, to expect this group of plants to abandon prior installations under the 2020 rule and make additional upgrades under this 2024 rule, given the relatively short remaining useful life of the EGUs and treatment systems. The EPA notes, moreover, that plants installing and operating technologies to meet the 2020 limitations will achieve reductions of pollutants of concern in their wastewaters.

For CRL, it is also relevant to consider the remaining useful life of the WMU. As discussed earlier in this section, commenters recommended providing flexibility for landfills which were nearing retirement, as these landfills would be closed and generate a much smaller volume of CRL after retirement. Thus, instead of installing an oversized system to operate for potentially only a couple of years, a more tailored system could be installed to treat the smaller, post-closure flow.

Non-water quality environmental impacts (including energy requirements). The already planned retirements and fuel conversions of coal-fired EGUs discussed above would not only reduce or eliminate the water pollution associated with the continued operation of coal-fired EGUs, but it would also reduce or eliminate air pollution and solid waste generation. Electric utilities have an interest in continuing the planned, orderly transition of this cluster of EGUs in a way that achieves an adequate amortization period for the water pollution treatment technologies. Without subcategorization, this cluster of facilities may choose to extend the life of these EGUs in order to better amortize the costs of both the existing technologies as well as the new technologies that would otherwise be required by this final rule. If that were to happen, the reductions in air pollution and solid waste generation associated with the planned retirement or repowering of the EGU would be forgone, and the EPA finds these non-water quality environmental impacts weigh in favor of this subcategory.

In addition, "energy requirements" are an express non-water quality environmental impact that EPA must consider under the statute, and several commenters raised concerns regarding electric reliability. These commenters suggested that a subcategory was necessary to maintain reliability. As discussed above, the retirements of EGUs in this subcategory have already been announced, planned for, and in some cases already approved by state and regional utility commissions or grid operators. The Agency finds that the creation of this subcategory provides flexibility for the orderly retirement or fuel conversion of coal-fired EGUs in a way that helps ensure grid reliability, as it allows plants to continue as planned while meeting the 2020 limitations. This provides additional support for this subcategory.

Cost. The EPA also notes that “cost’ is a factor that EPA must consider under CWA section 304(b), and, while not a primary basis, this factor provides additional support for this subcategory. Looking at the EGUs permanently ceasing coal combustion by December 31, 2034, absent the new subcategory, these EGUs would have additional capital costs of $708M and additional O&M costs of $93.0M. Given the short remaining useful life of the EGUs and associated wastewater treatment equipment, facilities with these EGUs would have fewer years of remaining life over which to amortize these costs, and thus the costs would be higher per MWh than the costs per MWh for EGUs not permanently ceasing coal combustion by 2034. This is especially true of plants that might not install the 2024 technologies until the latest compliance date of December 31, 2029. The EPA analyzed these costs in the 2020 rule with respect to the permanent cessation of coal by 2028 subcategory and similarly found unreasonably higher costs for that subcategory.

Selection of 2034 date. While the EPA proposed a permanent cessation of coal combustion date of December 31, 2032, several commenters advocated for different dates as early as 2030 and as late as 2040. The record discussed above does not provide a clear delineation for where such a cutoff should be placed; however, after careful consideration of the information in the record, the EPA finds that selecting a permanent cessation of coal combustion date of December 31, 2034, to be a reasonable way to account for the interests described above while still furthering the CWA's goals. First, as discussed above, there is a cluster of retirements occuring from 2030 to 2034. Relatively few additional EGUs would qualify for the subcategory if the date were placed a year or two further into the future, but many EGUs would be excluded if the date were kept at 2032 or moved even earlier as some commenters suggested. Furthermore, cost per MWh becomes greater as the amortization period of new equipment is shortened. An effective date for the final rule in 2024 and a "no later than" date of December 31, 2029, means that plants with retirements or fuel conversions in the 2030 to 2034 cluster would amortize costs over a period of several months to at most, 10 years. Finally, the use of December 31, 2034, would create parity for facilities regardless of where they were in their permit cycle. Since the 5-year permit cycle after the effective date of this rule would go from 2024 to 2029, one more 5-year permit cycle after that ends in 2034.

Finally, the EPA has considered how the requirements in this rule interact with the requirements in the CAA section 111 rule. One of the frequent comments received during the public comment period on the proposed ELG was that this rule and the CAA section 111 rule should be harmonized. Commenters argued that harmonization may consist of several aspects, including aligning compliance dates, aligning subcategories and other flexibilities, and aligning reporting and recordkeeping requirements. In the context of a subcategory for the permanent cessation of coal combustion, the EPA finds that the subcategory discussed here creates sufficient space for the flexibilities under the CAA section 111 rule to be utilized as appropriate.

As described in section IV.E.2 of this preamble, the final CAA section 111 rule consists of only two coal-fired EGU subcategories, and no longer has subcategories for EGUs retiring by 2032 or 2034 as were in the proposed CAA section 111 rule. Instead, the final CAA section 111 rule includes site-specific flexibilities to ensure reliability. While it is not always possible or necessary to harmonize the CAA and CWA requirements due to the different means by which flexibilities are implemented under the two statutes, EPA has provided flexibility under the ELG which would reasonably allow for the use of the site-specific flexibilities of the CAA section 111 rule. Specifically, since the two coal-fired EGU subcategories in the CAA section 111 final rule have compliance dates of January 1, 2030, and January 1, 2032, the use of the site-specific flexibilities tied to reliability would necessarily mean that some EGUs could retire after those dates with less stringent or delayed standards. Thus, the additional time provided by a 2034 permanent cessation of coal combustion date in the final ELG allows time for the corresponding site-specific flexibilities in the CAA 111 rule to be utilized.

While harmonization with the CAA section 111 rule supports the finding that this subcategory is appropriate, it is the EPA's intent that this new permanent cessation of coal combustion subcategory be retained even if the final CAA section 111 rule is not in effect. The EPA finds that, even in the absence of the CAA 111 rule, the other statutory factors of age, non-water quality environmental impacts, and cost are sufficient, either alone (save for cost) or together, to support the subcategory for EGUs permanently ceasing coal combustion by 2034.

b. The EPA is establishing BAT limitations for EGUs in this subcategory based on the currently applicable BAT technology bases for FGD wastewater, BA transport water, and CRL during the continued combustion of coal.

The EPA finds that the 2020 rule BAT technologies that formed the bases for the generally applicable limitations for FGD wastewater and BA transport water, as well as the BAT technologies that formed the bases for limitations in the high FGD flow subcategory and in the LUEGU subcategory, are available, are economically achievable, and have acceptable non-water quality environmental impacts, as explained in the 2020 rule and further confirmed by analyses in this rule. EPA is, therefore, identifying them as the BAT technology bases for FGD wastewater and BA transport water for EGUs in this subcategory.[131] The EPA is also declining to establish BAT limitations on CRL prior to permanently ceasing combustion of coal. The effect of EPA declining to establish BAT limitations for CRL discharged from EGUs in this subcategory prior to permanently ceasing coal combustion is that permitting authorities will continue to establish technology-based effluent limitations using their BPJ. Because the limitations are required to be derived on a case-by-case basis, taking into account the requisite statutory factors and applying them to the circumstances of a given plant, these limitations would by definition be technologically available and economically achievable and have acceptable non-water quality environmental impacts where the permitting authority supports in the record of the permit that such is the case.

[131] In identifying the BAT technology bases of the 2020 rule as BAT for the new permanent cessation of coal combustion by 2034 subcategory, the EPA is excluding the technology bases for EGUs permanently ceasing coal combustion by 2028. These EGUs can already seek an “as soon as possible” date for the new 2024 limitations later than the December 31, 2028 date for the permanent cessation of coal combustion.

The EPA rejects more stringent technologies, such as zero-discharge systems, for FGD wastewater, BA transport water, or CRL in this subcategory before the permanent cessation of coal combustion. Zero-discharge requirements for this subcategory may not allow electric utilities with a limited remaining useful life to continue their ongoing, approved plans for an organized phasing out of EGUs that are no longer economical, in favor of more efficient, newly constructed generating stations. This concern is reduced by maintaining the currently applicable BAT limitations for this subcategory.

While the previous basis is sufficient to reject technologies that would result in more stringent limitations, the EPA notes that limitations based on such technologies as zero-discharge systems would impose greater costs per MWh on this subcategory of EGUs, given their limited remaining useful life. This provides additional support for rejecting more stringent limitations. Retaining the currently applicable BAT for this subcategory alleviates the choice for these plants to either pass on the greater capital costs per MWh of zero-discharge systems over a shorter remaining useful life or risk the possibility that post-retirement rate recovery would be denied for the significant capital and operating costs associated with the final rule. In addition, with respect to CRL, requiring across-the-board BAT limitations before permanent cessation of coal combustion could lead to individual facilities experiencing disparate costs not only because of the short remaining useful life of the facility, but also because of the short remaining useful life of the waste management unit. The record indicates that the volumes of CRL generated by a retired landfill are approximately an order of magnitude lower than the volumes of CRL generated by an operating landfill. One of the primary inputs to EPA's cost model is the volume treated. Here, if the EPA mandated categorical limitations based on a treatment technology prior to ceasing combustion of coal, a facility would need to size that technology to treat the flows of a fully operating landfill. However, about 90 percent of that system would go idle only a few years later and remain idle into perpetuity. Thus, these capital investments would result in greater costs per MWh sold compared to the costs described to treat CRL discharges at plants continuing operations (see section VII.B.3 of this preamble). CRL costs for a post-retirement-sized system would be lower in absolute terms, but also lower in light of these costs being incurred later. This finding does not conflict with the EPA's finding that case-by-case BAT limitations developed using a permitting authority's BPJ are available, are economically achievable, and have acceptable non-water quality environmental impacts because a permitting authority can consider site-specific information, such as the availability of other existing wastewater treatment systems at the plant to accommodate the volumes of CRL generated.[132]

The EPA also rejects surface impoundments as BAT for FGD wastewater, BA transport water or CRL in this subcategory before the permanent cessation of coal combustion. Some commenters encouraged the EPA to finalize either a new or an extended permanent cessation of coal subcategory with surface impoundments as BAT. While EPA has today reaffirmed its 2020 rule findings that surface impoundments are BAT for the subcategory of EGUs permanently ceasing coal combustion by 2028 in the section above, part of those 2020 rule findings included the finding that more stringent

[132] For example, if an FGD wastewater treatment system already in place at a facility was under-utilized, the permitting authority might find that treatment with that system is available, economically achievable, and has acceptable non-water quality environmental impacts for that facility.

technologies *were* BAT for EGUs operating beyond December 31, 2028, because those technologies are available, are economically achievable, and have acceptable non-water quality environmental impacts. The EPA received several comments in the record from utilities that have done as the EPA indicated at proposal: they have continued to move forward with implementation of the 2020 rule. These utilities discussed the significant costs associated with interim steps toward implementation such as engineering design, bidding, contracting for systems, and commencing construction. EPA acknowledges these expenditures. To the extent that costs have already been incurred, these are sunk costs that cannot be recovered, and thus the marginal impact of the rule would not interfere with power plants' already approved, ongoing plans to transition to retirement or repowering or impose disparate costs. While EPA expects that most costs will already have been incurred, the 2020 rule limitations have a "no later than" date of December 31, 2025, rather than this rule's "no later than" date of December 31, 2029, for the new, more stringent BAT limitations. Thus, even in the rare case that a facility has failed to diligently pursue treatment that would meet the 2020 rule limitations, such a facility will have an additional four years to amortize any remaining capital costs of their treatment systems before ceasing coal combustion in 2034 as compared to the amount of time they would have to amortize the capital costs of treatments systems to meet this final rule's more stringent BAT limitations. Therefore, it is less likely that the investments made to comply with the 2020 rule would interfere with the orderly transition of generating capacity for those EGUs in this subcategory.

Moreover, the EPA finds that the costs to EGUs in this subcategory for meeting the currently applicable FGD wastewater and BA transport water limitations as compared to EGUs that are not permanently ceasing coal combustion by 2034 do not justify rejecting the 2020 rule limitations in favor of BAT limitations based on surface impoundments, especially where there are more stringent technologies capable of greater pollutant discharge reduction as described above that are available, are achievable, and have acceptable non-water quality environmental impacts. This finding is further confirmed in the EPA's evaluation of the 2020 rule costs in the baseline and policy runs of IPM, both of which demonstrate that the 2020 rule limitations continue to be economically achievable. The EPA's decision to continue to require permitting authorities to develop limitations on CRL discharges is also consistent with the Fifth Circuit's decision in *Southwestern Electric Power Co. v. EPA*. There, the Court vacated BAT limitations for CRL based on surface impoundments, citing the EPA's statements in the record that surface impoundments do not adequately control dissolved metals and the fact that there are more stringent technologies than surface impoundments that are available to control discharges of CRL. *Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1029-1030. Reserving BAT limitations for CRL discharged before an EGU permanently ceases coal combustion in this subcategory allows for the permitting authority to impose more stringent technologies as appropriate.

c. For EGUs in this subcategory, BAT limitations for CRL after the EGU permanently ceases combustion of coal are based on chemical precipitation.

The EPA expects that, unlike FGD wastewater and BA transport water, CRL will continue to be discharged even after a plant permanently ceases coal combustion. For EGUs in this subcategory, the EPA is establishing nationwide limitations for CRL on mercury and arsenic based on chemical precipitation after permanently ceasing combustion of coal. Specifically, the BAT technology basis after permanently ceasing coal combustion is a chemical precipitation system that employs hydroxide precipitation, sulfide precipitation (organosulfide), and iron coprecipitation.

With respect to BAT limitations after permanent cessation of coal combustion, the rule record is extensive in support of the EPA's finding that chemical precipitation is technologically available for the treatment of arsenic and mercury in CRL. As far back as the 2015 rule, the EPA found that four plants operated chemical precipitation systems on their CRL and, in fact, established NSPS for CRL based on chemical precipitation systems.[133] The EPA also found that chemical precipitation was in use on FGD wastewater (which EPA found was characteristically similar to CRL), metal products and machinery plants, iron and steel manufacturers, metal finishers, and mining operations (including coal mines).[134] All of these uses have demonstrated the ability of chemical precipitation technology to remove arsenic and mercury.[135]

One commenter suggested that chemical precipitation does not treat dissolved arsenic concentrations. This comment contradicts what is known about chemical precipitation. In the 2015 rule record, the EPA explained that chemical precipitation systems typically use pH adjustment to make soluble forms of pollutants insoluble. The

[133] U.S. EPA (Environmental Protection Agency). 2015. *Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category*. September. Washington, DC 20460. EPA-821-R-15-007. Available online at: *https://www.epa.gov/sites/default/files/2015-10/documents/steam-electric-tdd_10-21-15.pdf.*

[134] *Id.*

[135] *Id.*

EPA found that most systems operate with three chemicals that are added in one tank or in separate tanks, depending on the pH at which individual metals will settle out.[136] Thus, while plants may need to adjust systems until it is optimized for the specific CRL and target pollutant removals, the EPA sees nothing to indicate that dissolved arsenic concentrations are not treatable just because they are dissolved. The pre- and post-treatment dissolved arsenic data the commenter refers to are a subset of total arsenic (not just dissolved arsenic) that the EPA noted in 2015 was very low (near or below the limit of quantification). The fact that some data points are above the limit of quantitation does not change the fact that these are still very low dissolved arsenic numbers that demonstrate the ability of the technology to meet the established limitations. The fact that the technology did not continue to remove arsenic below the treatment levels that the EPA established in 2015 does not negate the fact that this same data demonstrates the technology *does* remove arsenic down to that limit.

Another commenter referenced 2010 survey data as showing elevated levels of iron, aluminum, and manganese in CRL from landfills where coal-handling byproducts were also disposed, which this commenter suggested would make treatment more complex. The commenter did not claim that these elevated influent concentrations make the waste untreatable through chemical precipitation, only that there may be additional solid wastes or a need for multiple treatment vessels. Without more information, the EPA

[136] *Id.*

has no reason to conclude that chemical precipitation would not work as intended in these scenarios.[137]

The EPA finds that BAT limitations based on chemical precipitation for EGUs discharging CRL after permanently ceasing coal combustion in this subcategory are economically achievable based on the results of IPM modeling, as explained in sections VII.F and VIII.

The EPA finds that BAT limitations based on chemical precipitation for EGUs discharging CRL after permanently ceasing coal combustion in this subcategory have acceptable non-water quality environmental impacts as discussed in sections VII.G and X.

For a further discussion of the availability timing of these limitations, see section VII.E of this preamble.

d. The EPA rejects surface impoundments as BAT for CRL after permanent cessation of coal combustion in this subcategory.

The EPA finds that surface impoundments are not BAT for CRL after permanent cessation of coal combustion for EGUs in this subcategory. The record shows that chemical precipitation is available, is economically achievable, and has acceptable non-water quality environmental impacts for treatment of CRL discharges after the permanent cessation of coal combustion. Moreover, chemical precipitation removes more pollutants

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[137] The EPA also notes that, should a facility with such a landfill generate CRL that is sufficiently different from the CRL evaluated in the record, the facility may be able to apply for a Fundamentally Different Factors variance.

than surface impoundments, which better achieves the BAT requirement of making reasonable further progress toward the CWA's goals. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003, 1006 (citing *Nat'l Crushed Stone v. EPA*, 449 U.S. at 75).

e. The EPA rejects more stringent technologies as BAT for CRL after permanent cessation of coal combustion in this subcategory.

The EPA finds that more stringent technologies are not BAT for CRL after permanent cessation of coal combustion for EGUs in this subcategory based on the statutory factors of age and cost, as well as given certain information gaps in the record. Specifically, the EPA finds that more stringent technologies are not commensurate with the age of the facility being in a retired status, which would lead to unacceptably higher capital costs that can no longer be spread over electricity sales.

Concerning CRL generated after retirement, the EPA notes that CRL will continue to be generated into perpetuity without any associated revenue stream tied to ongoing coal combustion, as several commenters pointed out.[138] This differs substantially from scenarios involved in a typical ELG, for which the EPA conducts a screening economic analysis that compares costs to revenues at the facility level in addition to the

[138] The EPA acknowledges that this subcategory also applies to fuel conversions. The EPA considered the fact that this subset of EGUs within this subcategory would have a future revenue stream, unlike EGUs that permanently retire. However, were the EPA to require more stringent treatment at this subset of EGUs, the result could be for a facility converting to natural gas (for example) to instead construct its replacement gas-fired capacity on an immediately adjacent greenfield to avoid the additional costs of treatment. This is a perverse incentive because it could implicate the development of additional land, perhaps even a greenfield, and construction of new transmission lines. These are adverse non-water quality environmental impacts that the EPA finds unacceptable, and it is thus declining to treat this subset differently from retiring EGUs. The EPA further notes that this outcome would result in additional costs of replacement capacity without achieving any additional pollutant discharge reductions.

owner level.[139] The EPA notes that this results not in a standard disparate cost, but rather an overall disparate circumstance. Since this unique scenario does not often play out in ELGs, the EPA does not have examples to draw from in evaluating economic achievability.

Given this unique aspect of this ELG, the EPA notes that any treatment system built to operate only after the permanent cessation of coal combustion will necessarily experience costs in a differing circumstance when compared to the costs recovered via ongoing electricity sales by EGUs not in this subcategory. For CRL that is not otherwise subcategorized in this rule, the EPA is requiring limitations based on zero-discharge systems during operations to continue to apply even after retirement. These EGUs will continue to combust coal beyond 2034, so systems will already be partially or fully paid for with rate recovery from electricity sales during the active phase of the EGU. Thus, the marginal cost of continuing to use such an existing treatment system are limited to O&M costs, and thus would not result in capital costs being incurred under the disparate circumstance of retired coal-fired EGUs.

As this discussion demonstrates, the selected BAT basis, chemical precipitation, already imposes costs in a disparate circumstance compared to EGUs not in this subcategory. Compared to chemical precipitation systems, however, biological and zero-discharge systems worsen already existing situational revenue disparities based on the

[139] While The EPA has performed that comparison here using the operating revenues prior to the cessation of coal combustion, the Agency has already found that subcategorization is warranted for a number of reasons and justified retaining the current requirement that case-by-case BPJ determinations be made by the permitting authority in controlling CRL discharges.

already passed retirement age for these EGUs when compared to the rest of the industrial category. Both chemical precipitation plus biological treatment systems and zero-discharge systems typically have capital costs about double the capital costs of chemical precipitation systems alone.[140] The EPA finds that the increased costs of these more stringent technologies renders them unacceptable in light of the post-retirement age of the EGUs to which they would apply. The EPA intends the age, cost, and economic achievability rationale discussed here is unique to the small number of industry-wide discharges at retired facilities with no revenue such as the landfill industrial point source category: it thus will not form a precedent for evaluating costs and economic achievability at the vast majority of facilities which continue to operate and have active revenue streams.

The EPA also considered the availability of biological treatment systems for CRL at closed landfills. Some commenters raised concerns that biological treatment systems could not handle low or fluctuating flows associated with CRL. The EPA agrees, in part, with these comments. Biological treatment systems require a minimum amount of feed source for the microorganisms to survive. While facilities have demonstrated the ability to supplement these nutrients in the FGD wastewater context, CRL generated after a landfill is closed is precipitation-dependent and may not be as easy to forecast as FGD wastewater flows. Thus, even if facilities provided a supplemental feed source, it would be possible to develop either too large or too small a bacterial colony. The EPA's record demonstrates that hydrogen sulfide formation can result from biological treatment when

[140] For biological treatment cost comparisons, the EPA is using the 2020 rule record with respect to FGD wastewater.

oxidation reduction potential (ORP) is too low. Sulfide produced in the system readily forms metal complexes with other metals and precipitate out of the FGD wastewater. During backwashing events, the system releases any trapped gasses generated in the process, including hydrogen sulfide (DCN SE02955). The EPA notes that large concentrations of sulfides are only a problem if the ORP goes too low for a long time.[141] The EPA's record lacks evidence of a biological treatment system operating on a retired landfill; therefore, no information is available on whether other issues related to biological treatment of CRL from retired landfills affect ORP or hydrogen sulfide production. In the absence of any record evidence of a biological treatment system operating on a retired landfill, the EPA concludes that these concerns, together with the age of the EGUs being in a retired status and the cost considerations regarding biological treatment discussed above, justify rejecting this technology as BAT for CRL post-cessation of coal combustion.

Zero-discharge systems can adapt to changes in flow rates more easily than biological treatment. Nevertheless, as with biological treatment, the record does not contain any information on zero-discharge systems operating on CRL or non-CCR landfill leachate after a facility has retired. The examples EPA has demonstrating availability consist of co-treatment with FGD wastewater or treatment of non-CCR landfill leachate during operations. During the development of this rule, the EPA sought information on treatment of CRL or non-CCR landfill leachate through vendors of applicable systems, but there were no known installations on retired landfills were

[141] For FGD wastewater, EPA recommends ORP monitors to avoid these scenarios.

indicated. While it may be possible for the EPA to establish zero-discharge systems even in record absence of operations post-cessation of coal combustion, when this information gap is combined with the age and cost considerations discussed above, it leads the EPA to conclude that zero-discharge systems do not represent BAT for post-cessation of coal combustion discharges of CRL in this subcategory.

f. The EPA is not including legacy wastewater in the permanent cessation of coal combustion subcategory.

The EPA received some comments suggesting that any new permanent cessation of coal combustion subcategory should cover discharges of legacy wastewater from EGUs in the subcategory. These comments did not provide information demonstrating that legacy wastewater discharges are tied to the marginal operating costs of steam EGUs. Rather, the record demonstrates that legacy wastewater discharges will primarily continue to occur through the dewatering of surface impoundments closing under the CCR regulations. Since treatment of legacy wastewater will occur whether an EGU continues to burn coal or not, investments made under this rule do not have the potential to interfere with the orderly transition of generating capacity, as they would be incurred even if the EGU had ceased operations years ago. Moreover, because the costs must be incurred whether or not the EGU closes, these costs do not differ based on the remaining useful life of the EGUs. Since the EPA does not find that the statutory factors discussed above as the bases to establish this subcategory would apply to legacy wastewater, the EPA is not subcategorizing legacy wastewater based on the permanent cessation of coal combustion. Instead, the case-by-case limitations described in section VII.B.4 of this preamble will continue to apply.

g. The EPA is finalizing post-coal combustion cessation zero-discharge limitations for EGUs in this subcategory to avoid circumvention.

As with the permanent cessation of coal combustion by 2028 subcategory, the EPA proposed to include zero-discharge limitations applicable after the permanent cessation of coal combustion date for this subcategory, December 31, 2034. The EPA received comments that opposed the finalization of this subcategory, but in the alternative these commenters advocated for post-coal combustion cessation limitations to help ensure that the cease combustion of coal criterion for the subcategory is met. EPA also received more general comments as described in section VII.C.3 of this preamble.

After considering these comments, and for the same reasons set forth in section VII.C.3 of this preamble, the EPA is finalizing a tiered set of zero-discharge BAT limitations that apply following the cease combustion of coal by 2034 date, as follows:

- The first tier of these limitations is composed of zero-discharge limitations for FGD wastewater and BA transport water after April 30, 2035.[142] These limitations would apply if the EGU has in fact permanently ceased coal combustion as it represented it would. As suggested in the comments, this is 120 days after the latest permanent cessation of coal combustion date, allowing for facilities to complete any necessary residual decommissioning discharges.[143]
- The second tier is composed of zero-discharge limitations for the same wastewaters, as well as CRL, after December 31, 2034. If a plant fails to cease

[142] The EPA is also finalizing requirements that the BAT limitations for CRL in this subcategory be met no later than April 30, 2035, to align with the dates in this backstop provision. For further discussion, see section VII.E of this preamble.

[143] The EPA notes that these do not include discharges of legacy wastewaters from surface impoundments closing under the CCR rule, which are covered by different regulatory provisions.

> combustion of coal by 2034 (as it represented it would) for any reason other than those specified in section 423.18, these zero-discharge limitations would automatically apply.

As explained in section VII.C.3 of this preamble, the EPA finds that together, the zero-discharge limitations and reporting and recordkeeping requirements are sufficient to ensure that facilities do not unfairly benefit by continuing to discharge after the subcategory's permanent cessation of coal combustion date.

5. Discharges of Unmanaged CRL

The EPA is establishing a new subcategory for discharges of unmanaged CRL, which EPA is defining in this rule to mean the following: (1) discharges of CRL that the permitting authority determines are the FEDD to a WOTUS through groundwater or (2) discharges of CRL that has leached from a waste management unit into the subsurface and mixed with groundwater before being captured and pumped to the surface for discharge directly to a WOTUS.[144] After evaluating public comments, and in light of the factors specified in CWA section 304(b)(2)(B), the EPA finds that the record demonstrates such a subcategory is warranted based on the unacceptably high costs to the plants in this subcategory associated with zero-discharge requirements, which would otherwise apply to CRL discharges under this rule (see discussion below). For units with discharges in this subcategory, The EPA is finalizing the proposed mercury and arsenic limitations, based on chemical precipitation, which the record shows are available, are

[144] The latter type of unmanaged CRL is no different than the former except that it is already being collected for treatment and discharge as of the effective date of the final rule. Since migration from the waste management unit and mixing with groundwater occurs in both cases, the characteristics and volumes of these two types of unmanaged CRL are expected to be consistent and, therefore, have been modeled consistently for the cost analysis discussed in section VIII.A of this preamble.

economically achievable, and have acceptable non-water quality environmental impacts. A discussion of the selected technology basis, as well as rejected technology bases, appears below, following two subsections that address several overarching comments the EPA received about discharges in this subcategory.

The EPA solicited comment on an option to subcategorize EGUs with discharges through groundwater. Leachate is typically managed through the use of a liner and leachate collection system. In the context of municipal solid waste landfills and hazardous waste landfills, a leachate collection system is designed to maintain less than a 30-centimeter depth over the liner.[145,146] As stated in *Solid Waste Disposal Facility Criteria Technical Manual*:

> "The primary function of the leachate collection system is to collect and convey leachate out of the landfill unit and to control the depth of the leachate above the liner. The leachate collection system (LCS) should be designed to meet the regulatory performance standard of maintaining less than 30 cm (12 inches) depth of leachate, or "head," above the liner. The 30-cm head allowance is a design standard and the Agency recognizes that this design standard may be exceeded for relatively short periods of time during the active life of the unit. Flow of leachate through imperfections in the liner system increases with an increase in leachate head above the liner. Maintaining a low leachate level above the liner helps to improve the performance of the composite liner."[147]

In contrast, many CCR landfills and surface impoundments have unmanaged CRL, which is allowed to percolate out of the WMU and into the subsurface and this subcategory applies to such unmanaged CRL. Specifically, the final subcategory covers such discharges of CRL that are determined, on a case-by-case, site-specific basis by the

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[145] 40 CFR 258.40(a)(2).

[146] 40 CFR 264.251(a)(2).

[147] U.S. EPA (Environmental Protection Agency). 1993. *Solid Waste Disposal Facility Criteria Technical Manual*. November. EPA530-R-93-017.

permitting authority to constitute the FEDD to a WOTUS. The EPA is also including certain direct discharges of CRL in this subcategory – in particular, discharges of CRL that has leached from a waste management unit into the subsurface and mixed with groundwater before being captured and pumped to the surface – because the EPA is aware that some plants could independently choose to pump and treat groundwater as a result of the CCR regulations, sometimes before wastewater from the impoundments traveling through groundwater has reached a WOTUS and become the FEDD to a WOTUS. This subcategory applies to any direct discharges of such CRL to a WOTUS. Both types of unmanaged CRL could occur at a plant with an unlined WMU, and both present the same basic issues in terms of costs for treatment, given the volumes of wastewater that would need to be treated to meet BAT limitations for unmanaged CRL.

a. The EPA has CWA authority to regulate certain discharges through groundwater from landfills and surface impoundments.

The EPA proposed that CRL limitations would apply not only to traditional end-of-pipe discharges, but also to discharges of CRL through groundwater, which a permitting authority deems to be the FEDD from a point source to a WOTUS. EPA received many comments related to the discharge of CRL through groundwater. Comments expressed varying views as to whether CRL discharged through groundwater from landfills and surface impoundments would be the FEDD.

As a threshold matter, as it explained in the proposed rule, the EPA is not determining that all discharges through groundwater from landfills and surface impoundments are the FEDD from a point source to a WOTUS. Rather, in this rule, the

EPA is establishing limitations that apply to any discharge of this kind that a permitting authority or facility owner or operator determines to be the FEDD from a point source to a WOTUS, and thus requires an NPDES permit. The threshold standard for the "functional equivalence" determination is outside the scope of this rule.

Some comments argue that the EPA lacks the legal authority to regulate ***any*** leachate that reaches navigable waters through groundwater from landfills or surface impoundments because landfills and surface impoundments are not point sources. These comments cite two cases in support of this position. *See Sierra Club v. Va. Elec. & Power Co.,* 903 F.3d 403 (4th Cir. 2018); *Ky. Waterways All. V. Ky, Utils. Co.,* 905 F.3d 925 (6th Cir. 2018). Related comments suggest that, in *County of Maui*, there were unique facts regarding the existence of a point source that are not applicable in the CRL context.

In response to these comments, the EPA reaffirms its longstanding position, which is consistent with the *Maui* decision: a point source determination is case-specific, and some landfills and surface impoundments may likely meet the definition of point sources under the CWA. "The term 'point source' means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." 33 U.S.C. 1362(14). At least some of the landfills and surface impoundments at steam electric facilities may fit this definition, in that they are "discernible, confined, and discrete conveyances." A permitting authority may also deem surface impoundments at these facilities to be analogous to "wells" or "containers" some of the illustrative examples in the definition. As the Fifth Circuit noted in *Southwestern Elec. Power Co. v. EPA*, where leachate occurs at a steam electric power plant, it is typically collected and transported to an impoundment, and "[u]nlined landfills or impoundments simply 'allow the leachate to potentially migrate to nearby ground waters, drinking water wells, or surface waters.'" 920 F.3d at 1011 (citing the 2015 rule preamble); *id*. at 1029 (noting that the EPA's environmental assessment document reports that "[c]ombustion residual leachate can migrate from the site in the ground water at concentrations that could contaminate public or private drinking water wells and surface waters, even years following disposal of combustion residuals") (citation omitted). And the Fifth Circuit had earlier addressed the question of whether sump pits into which miners channeled contaminated runoff and which sometimes overflowed to "waters of the United States" were point sources, holding on these facts that "[g]ravity flow, resulting in a discharge of a pollutant into a navigable water, may be a point source discharge if the miner at least initially collected or channeled the water and other materials." *Sierra Club v. Abston Construction Co., Inc*., 620 F.2d 41, 45 (5th Cir. 1980). Under this rule, permitting authorities will continue to determine whether a particular landfill or surface impoundment meets the definition of point source, and then they will determine whether or not that point source has a discharge of pollutants subject to the CWA.

To the extent that the Fourth Circuit's decision in *Sierra Club v. Va. Elec. & Power Co.* held that an impoundment can never be a "point source" under the CWA, the

Supreme Court's decision in *Maui* calls that holding into question.[148] While commenters correctly point out that the parties in *Maui* conceded that there was a point source, so the issue was not directly before the Court, the injection wells at issue in *Maui* are factually very similar to some EGU surface impoundments. The Supreme Court in *Maui* described the facts of the case as a wastewater reclamation facility that "collects sewage from the surrounding area, partially treats it, and pumps the treated water through four wells hundreds of feet underground. This effluent, amounting to about 4 million gallons each day, then travels a further half mile or so, through groundwater, to the ocean." *County of Maui*, 590 U.S. at 171. Furthermore, the Supreme Court rejected EPA's argument that "all releases of pollutants to groundwater" are excluded from the scope of the permitting program, "even where pollutants are conveyed to jurisdictional surface waters via groundwater," in part because of the definition of "point source," concluding:

> "It is difficult to reconcile EPA's interpretation with the statute's inclusion of 'wells' in the definition of 'point source,' for wells most ordinarily would discharge pollutants through groundwater. And it is difficult to reconcile EPA's interpretation with the statutory provisions that allow EPA to delegate its permitting authority to a State only if the State (among other things) provides 'adequate authority' to 'control the disposal of pollutants into wells.' § 402(b), 86 Stat. 881. What need would there be for such a proviso if the Federal permitting program the State replaces did not include such discharges (from wells through groundwater) in the first place?"

County of Maui, 590 U.S. at 181.

Similarly, some EGU impoundments, like wells, may discharge through groundwater to a WOTUS in a manner that is the FEDD. For example, suppose leachate

[148] The decision in *Ky. Waterways All. v. Ky, Utils. Co*., 905 F.3d 925, cited by some commenters did not address the question of whether an impoundment is a point source but rather held that "The CWA does not impose liability on surface water pollution that comes by way of groundwater." The decision has been abrogated by *Maui*.

from a coal-fired power plant is collected and contained in a waterfront surface impoundment dug below the groundwater table, and the leachate flows through the groundwater into the nearby "water of the United States." Excluding such a discharge from CWA permitting requirements would create a loophole in the Act's coverage similar to the one that concerned the Supreme Court in *Maui*: "We do not see how Congress could have intended to create such a large and obvious loophole in one of the key regulatory innovations of the Clean Water Act." *County of Maui*, 590 U.S. at 178-79. *Cf. California ex rel. State Water Resources Control Bd.*, 426 U.S., at 202-204 (basic purpose of Clean Water Act is to regulate pollution at its source); *The Emily*, 9 Wheat. 381, 390 (1824) (rejecting an interpretation that would facilitate "evasion of the law")."

Thus, to the extent that landfills, surface impoundments, or other features that could be considered point sources and from which FEDDs of CRL occur to a WOTUS, this rule informs the permitting authority of the appropriate technology-based effluent limitations that would apply. At this time, the EPA cannot agree with commenters who presume to know the extent of such potential discharges. The EPA need not speculate as to the myriad of possible scenarios. Determining which impoundments and landfills meet the definition of "point source" is a task for permitting authorities and outside the scope of this rulemaking. Instead, the EPA points out that, based on current law and facts as they appear in the record, the CRL limitations the EPA is promulgating will apply to *some* discharges from *some* impoundments and landfills—*i.e.*, those that a permitting authority determines to be the FEDD from a point source to a WOTUS.

b. Potential interactions with RCRA and the CCR regulations do not justify rejection of a nationwide BAT for certain CRL discharges through groundwater.

With respect to RCRA and the CCR regulations, some commenters stated that regulation of CRL discharged through groundwater would "nullify" the CCR regulations in violation of RCRA's industrial wastewater exclusion or anti-duplication provision. Other commenters argued that imposing any CWA requirements on FEDDs of CRL could not be harmonized with RCRA requirements found in the CCR regulations and recommended that the EPA leave such discharges to be managed by the CCR program and states. Each of these comments is addressed in a separate discussion below.

RCRA industrial wastewater exclusion. The EPA disagrees with commenters stating that establishing BAT limitations for certain CRL discharges through groundwater would "nullify" the CCR regulations due to RCRA's industrial wastewater exclusion. At the outset, as explained above, this rule does not address the scope of the CWA, as it does not address which discharges may require an NPDES permit, but rather it establishes appropriate technology-based limitations to include in such a permit. Since this rule does not expand CWA jurisdiction over any discharges – in particular, it does not require CWA regulation of discharges, such as certain CRL discharges through groundwater, that would not already be regulated by the CWA – it does not alter the existing RCRA framework that accounts for the CWA.

The EPA also disagrees with commenters that regulation of certain CRL discharges through groundwater would block regulation by the CCR regulations. RCRA excludes from the definition of "solid waste" any "industrial discharges which are point sources subject to permits" under the CWA. 42 U.S.C. 6903(27). As the EPA has explained before, this RCRA exclusion applies to discharges to jurisdictional waters under the CWA, and not to any activity, including groundwater releases or contaminant migration, that occurs prior to that point. The EPA explained this in more detail in a "Question and Answer" on the EPA's website:

> **Does the issuance of an NPDES permit covering discharges from a CCR unit exempt the owner/operator from any requirements under the CCR rule?**
>
> No, discharges covered by an NPDES permit are not a "solid waste" pursuant to RCRA section 1004(27). The RCRA exclusion only applies to "industrial discharges that are point sources subject to permits," *i.e.*, to the discharges to jurisdictional waters, and not to any activity, including groundwater releases or contaminant migration, that occurs prior to that point. See title 40 of the Code of Federal Regulations (CFR) 261.4(a)(2) ("This exclusion applies only to the actual point source discharge. It does not exclude industrial wastewaters while they are being collected, stored or treated before discharge."). For purposes of the RCRA exclusion, EPA considers the "actual point source discharge" to be the point at which a discharge reaches the jurisdictional waters, and not in the groundwater or otherwise prior to the jurisdictional water. Thus, the issuance of an NPDES permit for discharges from a facility's CCR surface impoundment would not exempt the owner/operator from any requirements under the CCR rule applicable to the disposal unit, such as the requirements to ensure the structural stability of the unit, to clean up all releases to the aquifer, and to meet all closure standards.[149]

Compare RCRA's "solid waste" definition, 42 U.S.C. 6903(27), with the CWA's definition of the "discharge of pollutants," 33 U.S.C. 1362(12) ("any addition of any pollutant to navigable waters from any point source"). Until the point at which the discharge reaches "navigable waters," any collection, storage, treatment, or even groundwater contamination is still subject to RCRA and the requirements of the CCR regulations.

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[149] Available online at: *https://www.epa.gov/coalash/relationship-between-resource-conservation-and-recovery-acts-coal-combustion-residuals-rule.*

RCRA anti-duplication provision. The EPA also disagrees with commenters who asserted that regulation of certain CRL discharges through groundwater would be inconsistent with or duplicative of regulation by the CCR regulations due to RCRA's anti-duplication provision. RCRA, by its terms, requires administration and enforcement that is "not inconsistent" with, among other Federal statutes, the CWA. 42 USC 6905(a). It further requires both integration and non-duplication with the CWA "to the maximum extent *practicable*." 42 U.S.C. 6905(b) (emphasis added). The requirements do not mean there can be no overlap to accomplish the purposes of each statute.

Circuit courts have found several similar instances of RCRA and the CWA operating in tandem.[150] For example, in *Goldfarb v. Mayor and City Council of Baltimore,* 791 F.3d 500 (4th Cir. 2005), construction activities allegedly spread/worsened existing soil, water, and groundwater contamination. The defendants maintained their NPDES permit shielded them from RCRA liability because of RCRA's anti-duplication provision. The court rejected this contention, explaining:

> To be "inconsistent" for purposes of [RCRA's] § 6905(a), then, the CWA must require something fundamentally at odds with what RCRA would otherwise require*** RCRA mandates which are just different, or even greater, than what the CWA requires, are not necessarily the equivalent of being 'inconsistent' with the CWA.***It is not enough that the activity or substance is already regulated under the CWA; it must also be 'incompatible, incongruous, and inharmonious.'***The district court's conclusion is thus built on the faulty premise that the CWA and RCRA cannot regulate the *same* activity under any circumstance.

[150] In contrast, the EPA acknowledges that the *Ky. Waterways All.* case found that RCRA's anti-duplication provision barred CWA authority, a finding which is not only not supported by the text of the CWA but is also to the EPA's knowledge not found in the case law of any other circuit.

Goldfarb v. Mayor and City Council of Baltimore, 791 F.3d at 505-06, 510. Similarly, *Ecological Rights Foundation v. Pacific Gas & Electric Co.*, 874 F.3d 1083 (9th Cir. 2017), involved an action against owners of mining activities that allegedly leached toxic substances into navigable waters. The court held that so long as RCRA's application is not "inconsistent" with the CWA, the anti-duplication provision is no bar to a RCRA action. *Id.* at 1089, 1095-97 (collecting cases and a Department of Justice Office of Legal Counsel opinion). It further held that the term "inconsistent" must be "mutually repugnant or contradictory" such that "one implies abrogation or abandonment of the other." *Id*. at 1095 (citations omitted). The case expressly recognized that there can be overlap between these regulatory schemes. Since case law generally supports the operation of the CWA in tandem, not *in lieu* of RCRA, the EPA disagrees with commenters. *See also Chemical Waste Management v. EPA*, 976 F.2d 2, 23, 25 (D.C. Cir. 1992).

Practical interaction of the CCR and ELG rules. The EPA also disagrees with commenters who stated that imposing any CWA requirements on FEDDs of CRL could otherwise not be harmonized with RCRA requirements found in the CCR regulations. The RCRA CCR regulations, which post-date the CWA, were written with integration in mind. That is, 40 CFR 257.52(b) provides: "Any CCR landfill, surface impoundment, or lateral expansion of a CCR unit continues to be subject to the requirements in §§ 257.3-1, 3-2, and 3-3." And 40 CFR 257.3-3(a) provides: "For purposes of section 4004(a) of the [Resource Conservation and Recovery] Act, a facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the

Clean Water Act, as amended." Critically, nothing in section 257.3-3(a) or other sections establish a RCRA permitting scheme for discharges to navigable waters, nor in any other ways contradicts the CWA's NPDES permit program. The CCR regulations generally, and section 257.3-3(a) specifically, leave the regulation of point source discharges to navigable waters to the CWA. The CCR regulations regulate the management of CCR to protect human health and the environment, including groundwater, from contamination associated with the mismanagement of these wastes. *See, e.g.,* 40 CFR 257.91 through 257.98.. They do so because, among other important reasons, CCR is a potential source of contamination in wells used for drinking water.

Given the above, the EPA does not agree with commenters that establishing limitations for functionally equivalent CRL discharges through groundwater would conflict with the CCR regulations. Instead, the CCR regulations require CRL-contaminated groundwater to meet specific levels or to be cleaned up to those levels through corrective action. The EPA expects that in many cases this would require pump-and-treat operations.[151] To the extent that a facility elects to pump CRL-contaminated groundwater to the surface and discharge it directly, this final subcategory and corresponding limitations would apply to the end of that pipe. While groundwater monitoring may be appropriate to ensure that CRL is not evading the pump-and-treat operations and resulting in an unpermitted discharge to a WOTUS, the groundwater concentrations would not be subject to this final rule.

[151] The EPA acknowledges that, at present, many facilities have instead selected monitored natural attenuation as a remedy even though this remedy would, by definition, patently fail to meet the cleanup standards established in section 257.97(b).

To further elaborate the point that the limitations established in this final rule are for surface water discharges, consider the alternatives to pump-and-treat operations. Facilities are not required to employ the specific technology of chemical precipitation established as BAT today. Some commenters specifically requested that the EPA consider the flexibility for facilities to clean close their surface impoundments or to perform *in situ* treatment or impermeable barriers. But this flexibility already exists. If a facility were to install an impermeable barrier that prevented groundwater contamination from discharging to a WOTUS, or a semi-permeable barrier that treated the discharge to remove toxic pollutants, it could satisfy the specific mercury and arsenic limitations that the EPA is finalizing. It also might be possible for facilities to avoid the need for an NPDES permit by clean closing and eliminating any point source itself. In these cases, there very well may continue to be CRL-contaminated groundwater, but this is outside the purview of the CWA because the CRL would not be reaching WOTUS, as discussed in the sections above. Thus, the EPA does not find any conflict between the CCR regulations' protection of groundwater and the establishment of BAT limitations for CRL discharged through that groundwater that is found to be the FEDD; nor does it find any way in which the two sets of requirements cannot be harmonized.

c. The EPA selects chemical precipitation as BAT for discharges of CRL in this subcategory.

For this subcategory, the EPA is establishing BAT limitations for mercury and arsenic based on chemical precipitation. Specifically, the technology basis for BAT is a chemical precipitation system that employs hydroxide precipitation, sulfide precipitation (organosulfide), and iron coprecipitation.

As described in section VII.C.4 of this preamble, the rule record is extensive in support of the EPA's finding that chemical precipitation is technologically available for the treatment of arsenic and mercury in CRL. As far back as the 2015 rule, the EPA found that four plants operated chemical precipitation systems on their CRL.[152] EPA also found that chemical precipitation was in use on FGD wastewater (which the EPA found was characteristically similar to CRL), metal products and machinery plants, iron and steel manufacturers, metal finishers, and mining operations (including coal mines).[153] All of these uses have demonstrated the use of chemical precipitation technology to remove arsenic and mercury.[154]

At proposal, the EPA's preferred regulatory option would have established chemical precipitation as BAT for all types of CRL discharges. Several commenters took issue with the EPA's proposed findings and BAT selection for FEDDs of CRL. These commenters stated that EPA failed to evaluate how CRL changes in groundwater. Commenters stated that differences from end-of-pipe CRL suggest that the EPA should decline to set national limitations and retain case-by-case BPJ determinations for, or alternatively require only monitoring of, FEDD of CRL at this time.

[152] U.S. EPA (Environmental Protection Agency). 2015. *Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category*. September. EPA-821-R-15-007. Available online at: *https://www.epa.gov/sites/default/files/2015-10/documents/steam-electric-tdd_10-21-15.pdf.*

[153] *Id.*

[154] *Id.*

With respect to the interaction of CRL with groundwater, while the EPA received general comments about the possibility of interactions in groundwater, commenters did not provide data to demonstrate that CRL in groundwater changes to the extent that pollutant concentrations would no longer fall within the range of concentrations evaluated by the EPA for CRL. Nor did commenters provide data that CRL becomes untreatable via chemical precipitation from any such changes. Instead, comments describe "attenuation" such as through adsorption. However, to the extent that adsorption and other attenuation processes would *remove* pollutants, this would only make it easier for chemical precipitation to meet the established limitations.

In addition to being technologically available, chemical precipitation for this subcategory is economically achievable. At proposal, EPA could not prospectively determine how many or which instances of CRL discharged through groundwater would ultimately be found to require CWA permits. As described above, to be a covered discharge, there must be a discharge (or FEDD) of pollutants from a point source into a WOTUS. Since this determination is outside the scope of the rule, EPA examined this cost via a sensitivity analysis entitled *Evaluation of Unmanaged CRL* (DCN SE11501). The fact that EPA estimated these costs (and pollutant loadings) in a separate document from the more traditional end-of-pipe discharges does not mean that the EPA concluded that none would be subject to CWA permitting, as some commenters claimed. Neither did the EPA's assumption for the purposes of a worst-case costing analysis suggest that the EPA was concluding that all of these potential discharges would be subject to CWA permitting, as other commenters claimed. Instead, when total costs (and pollutant loadings) are viewed in conjunction with this separate analysis, they provide the range within actual costs (and pollutant loadings) are expected to fall. The EPA acknowledges that a best estimate would be helpful, but in the absence of permitting determinations on which discharges are subject to CWA permitting, the EPA declines to speculate as to the ultimate coverage. This position is consistent with the position outlined above. All that the EPA is required to do for this rulemaking is make a reasonable estimation of costs, which EPA has does done. *See Chem. Mfrs. Ass'n v. EPA*, 870 F.2d at 237-38.

For the final rule, EPA has updated these CRL costs in *Evaluation of Unmanaged CRL* (DCN SE11501). These engineering costs were then used to develop an upper bound and lower bound that more accurately reflects the range of costs of treating unmanaged CRL as described in section VIII.A of this preamble. Using these costs, the EPA then conducted a screening-level analysis of economic impacts, which helped inform EPA's determination that the final rule's unmanaged CRL limitations are economically achievable. For further discussion of the screening-level analysis and economic achievability, see sections VII.F and VIII.C.1 of this preamble.

The EPA notes that some commenters suggested that state permitting authorities would face an incredible regulatory burden if the rule were finalized as proposed.[155] The EPA disagrees that it is creating any additional burden to permitting authorities in finalizing this subcategory. Permitting authorities are already required to determine whether a discharge is subject to CWA permitting and to act on applications for CWA permits or certain modification requests for such permits. Furthermore, FEDDs are

[155] Some comments also pointed to the state amicus brief filed in *Maui*, where states made this very argument in a broader context (an argument ultimately rejected by the *Maui* Court itself).

already subject to the CWA under *Maui*. Thus, to the extent that permitting authorities are already required to evaluate and develop technology-based and water quality-based effluent limitations for FEDDs, this existing burden will not change, regardless of the EPA's selection of BAT. If burden is changing at all, it is decreasing, because EPA is selecting chemical precipitation as BAT, as discussed in the section below. Since this replaces BPJ determinations, it means that permitting authorities can avoid BPJ analyses that they otherwise would have performed for FEDDs of CRL.

d. The EPA rejects surface impoundments as BAT for discharges of CRL in this subcategory.

The EPA is not selecting surface impoundments as BAT for FEDDs of CRL. BAT must achieve "reasonable further progress" toward the CWA's goal of eliminating pollution. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003, 1006 (citing *Nat'l Crushed Stone v. EPA*, 449 U.S. at 75). The record shows that chemical precipitation removes more pollutants than surface impoundments and that chemical precipitation is technologically available, is economically achievable, and has acceptable non-water quality environmental impacts.

With respect to comments suggesting the EPA finalize only a monitoring requirement, the EPA does not view monitoring alone as satisfying the statutory obligation to identify BAT to control all discharges, particularly where there is a technology that can be applied to control discharges of CRL, chemical precipitation, that is technologically available, is economically achievable and has acceptable non-water quality environmental impacts. As described in section XIV.C.3 of this preamble below, however, the EPA is finalizing additional monitoring requirements to support the implementation of the limitations in this subcategory.

e. The EPA rejects more stringent technologies as BAT for discharges of CRL in this subcategory.

EPA rejects zero-discharge systems as BAT for this subcategory. The EPA finds that the potential zero discharge costs for CRL discharges in this subcategory are unacceptably high. EPA's CRL costs as reflected in *Evaluation of Unmanaged CRL* (DCN SE11501) show that the capital costs of zero-discharge treatment could range as high as $17.4 billion while O&M costs could range as high as $2.04 billion per year. The annualized total costs of zero discharge could be as high as $3.69 billion. These costs are nearly an order of magnitude higher than total costs to the industry for all of the remaining end-of-pipe discharges from every wastestream combined (including costs associated with discharges of CRL that is not covered by this subcategory). The EPA finds that these additional zero discharge costs are unreasonable. Costs are one of the statutory factors that the EPA must consider, and courts have found that the EPA can properly rely on costs in rejecting potential BAT technologies. *See e.g., BP Exploration & Oil Inc.* v. *EPA,* 66 F.3d 784, 799–800 (6th Cir. 1995).[156] For further discussion of costs and economic achievability, see sections VII.F and VIII.

[156] The high costs in this case were estimated to be about $3 billion in capital costs, or $6.7 billion after adjusting for inflation to 2023 dollars. The EPA notes that the $17.4 billion in capital costs for zero discharge here, even if only half of such discharges are covered, would still be higher (about 2.5 times).

The EPA also rejects chemical precipitation plus low hydraulic residence time biological reduction as BAT for this subcategory. While no commenter recommended that the EPA select chemical precipitation plus low-hydraulic-residence-time biological reduction as BAT for discharges of CRL in this subcategory, the record does contain two plants treating traditional, end-of-pipe CRL with biological treatment. The EPA does not have sufficient data from these plants on which to base possible limitations. Therefore, the EPA declines to identify chemical precipitation plus biological treatment as BAT.[157]

6. Legacy Wastewater Discharged from Surface Impoundments Commencing Closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**

The EPA is establishing a new subcategory for legacy wastewater discharged from surface impoundments which commence closure under the CCR regulations after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDRAL REGISTER]**. For units in this subcategory, the EPA is establishing mercury and arsenic limitations based on chemical precipitation. More specifically, the technology basis for BAT includes the same chemical precipitation system described in the 2015 rule, which employs hydroxide precipitation, sulfide precipitation (organosulfide), and iron coprecipitation.

[157] Although the EPA did not conduct a sensitivity analysis on costs of this technology as it did for chemical precipitation or zero discharge, the EPA notes that this cost would be between these two costs based on the cost estimation results of the previous rulemakings. Since these costs would be higher than chemical precipitation alone, they may also be unacceptably high, as are the costs for zero discharge.

At proposal, the EPA solicited comment on a legacy wastewater subcategory for composite-lined surface impoundments that meet the location restrictions of the CCR regulations. In contrast to most surface impoundments, the EPA identified 22 surface impoundments at 17 facilities in *Legacy Wastewater at CCR Surface Impoundments* (DCN SE10252) that the record indicated met these criteria. The EPA solicited comment on this subcategory because its view was that these surface impoundments can continue to operate and thus would likely not begin closure and dewatering until after the effective date of any final ELG. Since these surface impoundments would not already be in the midst of dewatering under the tight closure timeframes of the CCR regulations, these facilities would have time to develop a CCR closure plan that included wastewater treatment during the dewatering phase of closure. Many commenters were opposed to the establishment of such a subcategory based on liner type. The EPA also received comments, however, recommending that, in order to address the issue that it had raised at proposal about potentially differentiated limitations for certain impoundments that have not already begun to dewater, a legacy wastewater subcategory should be created that is defined based on a deadline under the CCR regulations.

After considering the comments received and evaluating the record in light of the factors specified in CWA section 304(b)(2)(B), the EPA concludes that a subcategory is warranted for certain legacy wastewater discharges based on process changes at these plants happening under the CCR regulations. First, the EPA agrees with commenters that a liner-based subcategory would be inappropriate. On the one hand, some composite-lined surface impoundments may have already commenced closure under the CCR regulations. Thus, a subcategory that included these units would still include surface impoundments in the midst of closure under the tight deadlines of the CCR regulations, the very scenario described in section VII.B.4 of this preamble, for which the EPA found it is inappropriate to establish nationwide BAT limitations. On the other hand, the CCR regulations include flexibilities that allow a facility needed for reliability to continue to receive waste in an unlined surface impoundment or to make an alternate liner demonstration to continue to receive waste in an unlined surface impoundment. In both cases, the unlined surface impoundment could continue operation and not commence closure until after the ELG effective date. Thus, similar to the lined units discussed at proposal, these facilities would be able to build wastewater treatment into their closure plans. As is apparent from this discussion, a subcategory based on liner type is potentially both overinclusive and underinclusive, which was not the EPA's intent.

The EPA does, however, agree with comments suggesting an alternative subcategory designation more appropriately aligned with the EPA's intent and tied to the regulatory triggers in the CCR rule. It was suggested that the EPA consider using the CCR regulations' cease receipt of waste date; however, after a more thorough examination of 40 CFR part 257, the EPA finds that the "commence closure" date of section 257.102(e) is the appropriate regulatory trigger. This provision applies to surface impoundments that are not closed for cause (*i.e.*, unlined or failing location restrictions), but rather because the surface impoundment will no longer be used.[158] This subcategorization solves the dual problem described for the proposed liner-based

[158] Commencing closure is triggered when a unit ceases receipt of waste or ceases extraction of materials for beneficial use, though facilities are also permitted to postpone this commence closure date if they make a filing that the facility intends to restart the receipt of waste or extraction of materials for beneficial use at a specific future date.

subcategorization above. If a lined surface impoundment has already commenced closure under section 257.102(e), then it would not be subject to this subcategory, and if an unlined surface impoundment is continuing to operate under one of the CCR rule flexibilities, then it will not yet have commenced closure pursuant to this provision. Thus, the final rule subcategory captures only surface impoundments that are not in the midst of closure, as the proposed rule intended. While the EPA declined to establish nationwide BAT limitations for legacy wastewater in section VII.B.4 of this preamble based on process changes, specifically the ongoing closure of these units under the CCR rule, the EPA finds that this factor is inapplicable to the legacy wastewater that will be discharged in the future at these subcategorized surface impoundments.

a. The EPA selects chemical precipitation as BAT for legacy wastewater in this subcategory.

Since nationwide limitations are appropriate for this subcategory, the EPA next evaluates the final rule technology basis of chemical precipitation. For this subcategory of legacy wastewater discharges, EPA is establishing chemical precipitation-based limitations, as they are available, are economically achievable, and have acceptable non-water quality environmental impacts, as described below.

The EPA finds that chemical precipitation is available to treat legacy wastewater in this subcategory. At the time of the 2015 rule, the Agency acknowledged that chemical precipitation was being used on legacy wastewater discharges comprised of ash transport water. 80 FR at 67855. Since that time, the EPA has learned of additional use on legacy wastewater of chemical precipitation at two Duke facilities and an SDE system at

Boswell Energy Center. In addition to the use of chemical precipitation at a number of legacy wastewaters domestically, the EPA notes that, in the 2015 record, it did not discuss potential technology transfer of chemical precipitation-based limitations to legacy wastewater based on its performance in treating other wastestreams that comprise legacy wastewater. The Agency has consistently found, however, that two of the other three wastewaters regulated in this final rule (FGD wastewater and CRL) have the same pollutants and are amenable to treatment with the same treatment systems. As a result of this finding, the 2015 rule established NSPS for CRL based on chemical precipitation. Furthermore, in 2015, also found that CRL has the same pollutants as BA transport water, a wastewater that some facilities treated with chemical precipitation at the time of that final rule. *See* EPA-HQ-OW-2009-0819-6230. In short, the three wastewaters being regulated in this final rule for which the EPA is amending the legacy wastewater limitations have all been successfully treated with chemical precipitation systems. Based on what is known about the properties of these treatment systems, the characteristics of the various wastestreams at issue, and the demonstrated ability of chemical precipitation to treat such wastestreams, the EPA is transferring mercury and arsenic limitations from FGD wastewater and CRL to the subcategory of legacy wastewater described in this section for the final rule. As previously explained, EPA may rely on technology transfer to establish technology-based limitations such as those in this rule. *See Am. Iron & Steel Inst. v. EPA*, 526 F.2d at 1058, 1061, 1064; *Weyerhaeuser Co. v. Costle*, 590 F.2d at 1054 n.70; *Reynolds Metals Co. v. EPA*, 760 F.2d at 562; *California & Hawaiian Sugar Co. v. EPA*, 553 F.2d at 287.

The EPA also finds that the costs of chemical precipitation systems are economically achievable for the subcategory. At proposal, the EPA evaluated the costs for legacy wastewater in a sensitivity analysis. For this final rule, EPA has included these costs in its primary cost estimates and economic screening analysis. IPM, which projects decisions on dispatch of EGUs, is not affected by these costs, which occur irrespective of generation. Thus, the costs are not included in the IPM analysis. However, the cost analysis demonstrates that costs for treating this wastestream are low, a finding that is bolstered by the relatively low impacts as a percent of revenues as seen in the economic screening analysis of the final rule. (For further information, see sections VII.F and VIII.) Because the EPA is required to consider whether the cost of BAT can be reasonably borne by the industry and confers on the EPA discretion in consideration of the BAT factors, *see, e.g., Chem. Mfrs. Ass'n v. EPA*, 870 F.2d at 262; *Weyerhaeuser v. Costle*, 590 F.2d at 1045, EPA finds that these additional costs are economically achievable as that term is used in the CWA.

Finally*,* the EPA finds that the non-water quality environmental impacts associated with chemical precipitation systems for controlling legacy wastewater discharges in this subcategory are acceptable. See sections VII.G and X below for more details.

b. The EPA rejects less stringent technologies as BAT for legacy wastewater in this subcategory.

The EPA did not select surface impoundments as BAT for legacy wastewater in this subcategory, as surface impoundments would remove fewer pollutants than the BAT technology selected above, which is available, is achievable, and has acceptable non-water quality environmental impacts, and which will better achieve the BAT requirement of making reasonable further progress toward the CWA's goals. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003, 1006 (citing *Nat'l Crushed Stone v. EPA*, 449 U.S. at 75).

c. The EPA rejects more stringent technologies as BAT for legacy wastewater in this subcategory.

The EPA is not selecting chemical precipitation plus biological treatment as BAT for legacy wastewater in this subcategory. Biological treatment requires a period of optimization for concentration and composition of the microorganisms to reach a steady state in which the reduction-oxidation activity of the microorganisms can reduce pollutants of concern without creating excessive levels of hydrogen sulfide gas. Unlike FGD wastewater, however, which is a relatively consistent wastewater that can be equalized in tanks to moderate differences before treatment, legacy wastewater being drained from a surface impoundment is known to quickly change pollutant concentrations as the surficial water is drained and dewatering progresses down through one or more layers of CCR. Due to the relatively short timelines for dewatering when compared to the equalization timeframes for the bacteria, biological reduction would not be able to consistently meet the biological treatment-based limitations established for FGD wastewater in the 2015 or 2020 rules.

The EPA is also not selecting chemical precipitation plus ZVI systems as BAT. The EPA acknowledges that it learned of a plant using this technology to treat its legacy wastewater. The EPA does not, however, have any information in the record on the influent or effluent data from this system to establish limitations, nor has the EPA developed ZVI-based limitations for any other wastestream that it can transfer. Commenters did not advocate for establishment of limitations based on ZVI systems, nor submit any information related to the performance of these systems, including data that would allow the Agency to develop numerical limitations; therefore, the EPA cannot, at this time, establish limitations based on chemical precipitation plus ZVI systems.

The EPA finds that zero-discharge systems are not BAT for legacy wastewater in this subcategory based on the statutory factor of age and cost, as well as given certain information gaps in the record. Specifically, the EPA finds that more stringent zero-discharge technologies are not commensurate with the age of the facility being in a retired status, which would lead to unacceptably higher capital costs that can no longer be spread over electricity sales.

As described in section VII.C.4 of this preamble with respect to CRL generated and discharged after a plant retires, surface impoundment dewatering at EGUs in this subcategory is also likely to take place when a facility would no longer be generating revenue, as several commenters pointed out. Thus, any treatment system, including the selected BAT basis of chemical precipitation, built to operate only after retirement will necessarily have to incur capital costs in a disparate circumstance of a post-retirement age when compared to costs to EGUs that dewater their impoundments while still generating revenue. Compared to chemical precipitation systems, however, zero-discharge systems worsen the disparate circumstance of EGUs facing costs while in a retired status. Zero-discharge systems typically have capital costs approximately double the capital costs of chemical precipitation systems alone. The EPA finds that the increased cost of these more stringent technologies renders them unacceptable in light of the unique position of the EGUs to which they would apply. The EPA intends that the cost and economic achievability rationale discussed here is unique to the small number of industry-wide discharges at retired facilities with no revenue, and thus will not form a precedent for evaluating costs and economic achievability at the vast majority of facilities which continue to operate and have active revenue streams.

The EPA also notes that there are data gaps in the record for zero-discharge technologies. The current record reflects only a single facility employing a zero-discharge SDE system to treat legacy wastewater, and unlike Boswell Energy Center, many facilities in this subcategory will dewater and close their ash impoundments after the facility ceases generating electricity. Without electricity production, there is no slipstream of flue gas with which to operate the same type of SDE system that is achieving zero discharge at Boswell. The EPA is not aware of any other facility that is employing a zero-discharge technology, such as membrane filtration or thermal evaporation, to treat its legacy wastewater. While it is possible that the EPA could transfer non-zero numerical limitations from treatment of other wastestreams using these technologies, given the information gap and the additional costs in the context of these EGUs unique position discussed above, the EPA declines to select zero-discharge systems as BAT for legacy wastewater in this subcategory.

7. Interim Limitations Applicable to FGD Wastewater and BA Transport Water

The EPA is retaining the final 2020 rule BAT technology bases and limitations for FGD wastewater and BA transport water as interim limitations until the applicability dates of the new zero-discharge limitations (see section VII.E of this preamble for availability timing of the new requirements). Specifically, the 2020 rule established BAT limitations for FGD wastewater based on chemical precipitation plus low hydraulic residence time biological reduction or, in the case of the high FGD flow and LUEGU subcategories, based on chemical precipitation only. BAT limitations for BA transport water were based on high recycle rate systems with up to a 10 percent volumetric purge or, in the case of the LUEGU subcategory, based on surface impoundments with a BMP plan. The EPA finds that the 2020 BAT technology bases continue to be available, economically achievable, and have acceptable non-water quality environmental impacts for all of the reasons stated in the 2020 rulemaking and as supplemented by the new IPM analyses updating the Agency's economic achievability determination and further discussed below.

Although it proposed more stringent zero-discharge limitations in 2023, the Agency always intended that the 2020 rule limitations would continue to apply. For example, when EPA explained its reasoning as to why it did not postpone the requirements in the 2020 rule, it stated, "There is no basis in the record indicating that the limitations finalized in 2020 are not available or economically achievable, and thus there is no reason for the EPA to postpone their implementation. EPA is focused on progress toward eliminating discharges, consistent with CWA section 301(b)(2)(A)." 88 FR at 18886. Similarly, the EPA's earlier announcement of this supplemental rulemaking stated (and the proposal reiterated) that "the pollutant reductions accomplished by the existing rules will occur while the Agency engages in rulemaking to consider more stringent requirements." 86 FR at 41802.

The EPA received many comments from electric utilities arguing that this approach was not appropriate. Some commenters claimed that the EPA should have halted implementation while it considered rule revisions. Some commenters stated that costs of the 2020 rule technologies would not be fully recovered over the timeframe before new, more stringent limitations would come into effect. Others described these costs as high, or potentially drawing investment away from the transition to cleaner energy sources. One commenter claimed that the EPA violated its own policy of only revisiting ELGs for seven years after a final regulation is issued. Finally, the EPA received comments that the 2020 rule limitations were well founded.

After considering public comments, including those mentioned above, the EPA is retaining the 2020 rule limitations applicable to FGD wastewater and BA wastewater as interim limitations before the applicability dates of the zero-discharge limitations finalized. The EPA disagrees that it should have halted implementation of the 2020 rule. The EPA found the 2020 rule technologies to be available, economically achievable, and to have acceptable non-water quality environmental impacts. While the EPA agrees that cost recovery periods for the 2020 rule technologies will be curtailed, and that it is possible that this would divert investment dollars from clean energy projects, the record shows that the total costs of implementing the technologies of both rules under the corresponding timeframes are economically achievable according to the Agency's IPM modeling, discussed further in section VII.F of this preamble. Furthermore, the EPA disagrees with comments suggesting it cannot revisit an ELG for seven years. The EPA has revisited many final ELG rules within this time frame, either as the result of a court's vacatur or remand, or as the result of an administrative petition. In fact, the same commenter arguing against the EPA's supplemental rulemaking here submitted administrative petitions for the EPA to reconsider the 2015 rule, and at that time found no procedural problem with the EPA revising a rule before seven years had elapsed.

The EPA views the retention of the 2020 BAT limitations for FGD wastewater and BA wastewater in the interim as in keeping with the technology-forcing nature of the CWA and essential for meeting the statutory requirement that BAT result in reasonable further progress toward the CWA's goal of zero discharge of pollutants. *See Nat. Res. Def. Council v. EPA*, 808 F.3d 556, 563-64 (2d Cir. 2015) ("Congress designed this standard to be technology-forcing, meaning it should force agencies and permit applicants to adopt technologies that achieve the greatest reductions in pollution.") (citation omitted). Without these interim limitations, which have a latest applicability date of December 31, 2025, plants could potentially have up to December 31, 2029 (the latest applicability for the zero-discharge requirements in this final rule), before they are required to meet limitations beyond the 1982 limitations based on surface impoundments. The EPA never intended that, as part of this rulemaking to explore additional pollutant discharge reductions that this industry could achieve, plants could thereby avoid taking available and achievable steps toward discharge control in the interim. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1003-1004 (describing the 1982-era regulations as from a "by-gone era" in which limitations were based on the "archaic" technology of surface impoundments, "which are essentially pits where wastewater sits, solids (sometimes) settle out, and toxins leach into groundwater.”). More information on implementation of the 2020 rule limitations as an interim step toward achievement of the new zero-discharge FGD wastewater limitations is available in section XIV.A of this preamble.

D. Additional Rationale for the Proposed PSES and PSNS

Before establishing PSES/PSNS for a pollutant, the EPA examines whether the pollutant “passes through” a POTW to WOTUS or interferes with the POTW operation or sludge disposal practices. In determining whether a pollutant passes through POTWs for these purposes, the EPA typically compares the percentage of a pollutant removed by well-operated POTWs performing secondary treatment to the percentage removed by the BAT/NSPS technology basis. A pollutant is determined to pass through POTWs when the median percentage removed nationwide by well-operated POTWs is less than the median percentage removed by the BAT/NSPS technology basis. The EPA establishes pretreatment standards for those pollutants regulated under BAT/NSPS that pass through POTWs.

The EPA received comments that it should update this analysis to include more recent POTW pollutant removal data. Specifically, one commenter pointed to more recent analyses that POTWs remove 45 percent of arsenic and 60 percent of mercury. This comment also faulted the EPA for summarily finding that pollutants treated by a zero-discharge system would pass through a POTW since the POTW does not achieve 100 percent removals of these pollutants.

After considering these comments, the EPA finds that the 2015 rule pass-through analyses of these same technologies is still representative of current pollutant behavior. Specifically, the EPA is continuing to rely on the pass-through analyses as the basis of the limitations and standards in the 2015 rule as the Agency did in the 2020 rule. This analysis found that POTWs do not significantly remove mercury and arsenic in several wastewaters. Contrary to commenters' assertions that new data show some significantly improving removals of these pollutants, the EPA notes that Table 10-1 of the 2015 TDD shows median arsenic removals of 65.8 percent and median mercury removals of 90.2 percent, higher removals than the new removal data cited by the commenters. Thus, because the EPA considered pass-through using higher pollutant removals, the EPA's findings would not change substituting the new pollutant removal data. With respect to zero discharge, the EPA is establishing zero-discharge limitations for three wastestreams in this rule. As in the 2015 rule, the EPA did not conduct its traditional pass-through analysis for wastestreams with zero-discharge limitations or standards. Zero-discharge limitations and standards achieve 100 percent removal of pollutants, including salts like boron and bromide which are not treated at all by the typical POTW treatment system.[159] Therefore, the EPA concludes that all pollutants in those wastestreams treated by the zero-discharge technologies would otherwise pass through the POTW absent application of the zero discharge technologies that form the BAT bases for FGD wastewater, BA transport water, and CRL.

[159] The commenter has, in fact, historically sent its FGD wastewater to a POTW, thereby diluting the wastewater to the extent that it can meet a water quality-based effluent limitation for boron.

PSES. After considering public comments and the record in light of the relevant CWA statutory factors, the EPA is establishing PSES for indirect discharges based on the technologies described in Option B. EPA is establishing Option B technologies as the bases for PSES for the same reasons that it is finalizing the Option B technologies as the bases for BAT for direct dischargers. The EPA's analysis shows that, for both direct and indirect dischargers, the final rule technologies are available and economically achievable, and they have acceptable non-water quality environmental impacts, including energy requirements (*see* sections VIII and X). For the final rule, the EPA is not selecting other technology bases for PSES for the same reasons that it is not finalizing other technology bases for BAT.

Furthermore, the EPA reaches the same conclusions for the same reasons discussed in section VII.C of this preamble with respect to several subcategories. EPA finds that retention of differentiated PSES for EGUs permanently ceasing coal combustion by 2028 are warranted. The EPA also finds establishing two new subcategories with differentiated PSES for EGUs permanently ceasing coal combustion by 2034 and legacy wastewater discharged from surface impoundments commencing closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** is warranted. In contrast, the EPA is not establishing a subcategory with differentiated PSES for discharges of unmanaged CRL because that subcategory is only intended to address CRL discharges that are found by a permitting authority to be the functional equivalent of a *direct* discharge to WOTUS or that are *direct* discharges of CRL to a WOTUS that result from the capture and pumping to the surface of CRL that has leached from a waste management unit into the subsurface and mixed with groundwater. Given the high volumes associated with operations that might capture and pump to the surface CRL that has leached from a waste management unit into the subsurface, the EPA does not expect facilities to find it a cost-feasible alternative to send such volumes to a POTW.

With respect to the low utilization subcategory, the EPA is eliminating the PSES subcategory for LUEGUs, as it does for direct dischargers, after further considering specific facts about the universe of plants that would potentially qualify for this subcategory. The EPA is only aware of one indirect discharger that has filed a NOPP to potentially avail itself of this subcategory, the Whitewater Valley Station; the EPA received no further comments indicating other indirect dischargers that planned to make use of the 2020 LUEGU subcategory. Whitewater Valley Station consists of two EGUs (Coal Boiler #1 and Coal Boiler #2). Coal Boiler #1 has a nameplate capacity of 35 MW, and it had 2019 and 2020 CURs of 5 percent and 3.67 percent, respectively. Coal Boiler #2 has a nameplate capacity of 65 MW, and it had 2019 and 2020 CURs of 5.5 percent and 5.1 percent, respectively. On its website, IMPA states that the station "has been utilized by IMPA during peak load periods during the hot summer months and cold winter months."[160] This utilization profile was confirmed by IMPA's comments on the 2023 proposed rule. At proposal, the EPA noted that Coal Boiler #1 is small enough to avail itself of the 2015 rule subcategory for small EGUs (*i.e.*, less than or equal to 50 MW nameplate capacity). While IMPA agreed, it also conveyed in its comments that it may not be able to increase the utilization of this small EGU without changes to its

[160] *See www.impa.com/about-impa/generation-resources/giant-tcr.*

permits, and furthermore that this would not make up for any loss of operation of Coal Boiler #2 since both EGUs perform winter and summer peaking operations in tandem.

IMPA also clarified in its comments that the ash handling system it employs to comply with the CCR rule has not resulted in the elimination of its BA transport water discharges. The system includes dewatering bins followed by the addition of flocculant and coagulant to facilitate particulate removals in geotubes. Remaining wastewater is then sent to four polishing surface impoundments that are not designed to hold an accumulation of CCR, and thus not subject to the CCR rule, before the wastewater is sent to the POTW. While IMPA also provided concentration data from its BA transport water, none of this information demonstrated removals of pollutants to a degree that would change the results of the pass-through analysis from the 2015 rule.

Finally, IMPA provided comments describing the costs of potential BA transport water modifications, the impacts to the local community, and the potential for the facility to continue to support reliability.[161] In the comments regarding reliability, IMPA appeared to suggest that the facility would be operating until 2032. IMPA and the EPA had a follow-up conversation to discuss these comments and the EPA confirmed that, in the absence of outside factors, the facility is expecting to cease operations in 2032.

After considering the comments and information in the record, the EPA is eliminating the LUEGU subcategory for indirect dischargers as unnecessary and not

[161] While the EPA received comments from other parties about the elimination of this PSES subcategory, only IMPA provided site-specific information that was potentially relevant to the EPA's discussion here. For further discussion of comments, see *Response to Public Comments for Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, April 2024* (SE11794).

supported by the factors relied on in 2020. With respect to FGD wastewater under the LUEGU subcategory, no NOPPs were filed from indirect dischargers requesting this subcategory for this wastestream. Thus, continued existence of this subcategory is unnecessary. With respect to BA transport water, EPA notes that, under the final rule's subcategory for EGUs permanently ceasing coal combustion by 2034, the one facility with indirect discharges to a POTW known to be interested in using the 2020 LUEGU subcategory would be able to continue to operate under the BA transport water PSES of the 2020 rule and retire in 2032 as planned without incurring any additional treatment costs and without creating an energy reliability concern. Thus, the LUEGU subcategory is no longer supported by the factors the EPA cited in the 2020 rule, nor any other factors.

PSNS. The EPA selects zero-discharge systems as the bases for the CRL PSNS for the same reasons that EPA selects these systems as the bases for the CRL NSPS (see section VII.B.3 of this preamble). The EPA's record demonstrates that zero-discharge systems are available and demonstrated, do not pose a barrier to entry, and have acceptable non-water quality environmental impacts, including energy requirements (see sections VII.G and X of this preamble). The EPA rejected other options for CRL PSNS for the same reasons that it rejected other options for CRL NSPS. And, as with the final CRL PSES, the EPA concludes that the final CRL PSNS prevent pass through of pollutants from POTWs into receiving streams and help control contamination of POTW sludge.

E. Availability Timing of New Requirements

Where BAT limitations in the 2015 and 2020 rules are more stringent than previously established BPT limitations, those BAT limitations do not apply until a date determined by the permitting authority that is "as soon as possible" after considering four factors. Depending on the particular wastewater, the 2015 and 2020 rules also established a "no later than" date of December 31, 2023, or December 31, 2025, for reasons discussed in the record of those rules, including that, without such a date, implementation could be substantially delayed, and a firm "no later than" date creates a more level playing field across the industry.

As part of the consideration of the technological availability and economic achievability of the new BAT limitations in this regulation, the EPA considered the magnitude and complexity of process changes and new equipment installations that would be required for plants to meet the final rule's new, more stringent limitations and standards. Specifically, the EPA considered timeframes that enable many plants to raise needed capital, plan and design systems, procure equipment, and construct and test systems. The EPA also considered the timeframes needed for appropriate consideration of any plant changes being made in response to other Agency rules affecting the steam electric power generating industry. The EPA understands that some plants may have already installed, or are now installing, technologies that could comply with the rule's limitations. Therefore, EPA finds that the earliest date some plants can achieve compliance with these new limitations would be **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Where this is not the case, nothing in this rule would preclude a permitting authority from establishing a later date, up to the "no later than" date, after considering the four specific factors in 40 CFR 423.11(t).[162]

With respect to the latest compliance dates, the EPA collected updated information on the technical availability of the BAT technology bases. Information in EPA's rulemaking record indicates that a typical timeframe to raise capital, plan and design systems (including any necessary pilot testing), procure equipment, and construct and test systems falls well within the existing five-year permit cycle.[163] Furthermore, the chemical precipitation and zero-discharge BAT technologies here do not implicate the same industrywide competition over a small number of biological treatment vendors that the 2020 rule implicated. The EPA notes that while plants may not need about five years to comply with the final limitations, the "no later than" date creates an outer boundary beyond which no discharger may seek additional time and creates a level playing field regarding the latest date. Therefore, the EPA is finalizing the requirement that the new limitations for FGD wastewater, BA transport water, and CRL be achieved "no later than" December 31, 2029.

The EPA received comments that these "no later than" dates should be shortened or lengthened. Comments suggesting shortening these timeframes focused on record information describing that individual facilities can install certain technologies in

[162] These factors are: (1) time to expeditiously plan (including to raise capital), design, procure, and install equipment to comply with the requirements of the final rule; (2) changes being made or planned at the plant in response to GHG regulations for new or existing fossil fuel-fired power plants under the CAA, as well as regulations for the disposal of coal combustion residuals under subtitle D of RCRA; (3) for FGD wastewater requirements only, an initial commissioning period to optimize the installed equipment; and (4) other factors as appropriate. *See* 40 CFR 423.11(t).

[163] *See* FGD and Bottom Ash Implementation Timing (DCN SE08480).

timeframes shorter than out to 2029. EPA declines to establish "no later than" dates shorter than one permit cycle from the final rule. Some permits may not be renewed and able to incorporate the new limitations until 2029, and this later date creates an even playing field for the industrial category. In contrast, commenters suggesting lengthening these timeframes did not provide specific data that demonstrate a legitimate need for a longer timeframe. In the absence of data demonstrating different timelines are necessary or appropriate (*e.g*., engineering dependency charts), the EPA cannot justify timeframes longer than those in the Agency's current record.

For the new subcategory for EGUs permanently ceasing coal combustion by 2034, the EPA is finalizing different availability timing for the BAT limitations applicable to CRL discharged after cessation of coal combustion. Since CRL was not covered by the 2020 permanent cessation of coal subcategory, plants with EGUs retiring both before and after 2028 may wish to avail themselves of the CRL limitations applicable to the subcategory for EGUs permanently ceasing coal combustion by 2034. Furthermore, as discussed in section VII.C.4 of this preamble, the new subcategory for EGUs permanently ceasing coal combustion by 2034 takes into account the changes expected to occur in CRL flow after closure of the WMU, the timing of which depends on, but is not the same as, the date the EGU will cease coal combustion. To facilitate administration, the EPA is adopting the same "as soon as possible" applicability timing framework as used for other limitations in this rule. Thus, the BAT limitations for mercury and arsenic in CRL discharges from this subcategory must be met as soon as possible beginning 120 days after permanent cessation of coal combustion. Since the subcategory allows for permanent cessation of coal combustion by December 31, 2034, with an additional 120 days allowed for the discharge of FGD wastewater, the Agency is adopting an April 30, 2035 “no later than” date for meeting BAT limitations for discharges of CRL from this subcategory.[164] Thus, while a permitting authority must establish availability timing that is “as soon as possible,” nothing in this rule would preclude a permitting authority from establishing a later date, up to the “no later than” date, after considering the four specific factors in 40 CFR part 423.11(t). For PSES in this subcategory the statute does not allow for flexible availability timing and so here, to provide the same flexibility, the Agency is adopting tiered limitations with the second tier applying no later than April 30, 2035.

For the discharge of legacy wastewater, the EPA is not establishing the same “no later than” date framework as the other wastewaters. Instead, the limitations for legacy wastewater are simply effective on **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. For legacy wastewater generally, this makes sense because the BAT limitations are based on a permitting authority’s BPJ, and permitting authorities may consider the availability timing of technologies to a particular plant as part of its BAT determination. For legacy wastewater in the new subcategory described in section VII.C.6 of this preamble, this will have no impact because, as of the effective date of this rule, these surface impoundments will not have triggered the requirements under the CCR regulations to cease receipt of waste and commence closure. Furthermore, allowing for up to five years before the limitations’ “no

[164] Where EGUs are ceasing coal combustion near the end of this timeframe, or where closure of a WMU is lengthy such that it extends past this latest date, it is possible that a facility may not be able to fully take advantage of this flexibility for all of its WMUs.

later than" date could provide time for circumvention of these limitations where a plant quickly drains its surface impoundment under the existing case-by-case approach.

As with the new BAT effluent limitations, in considering the availability and achievability of the new PSES, the EPA concluded that existing indirect dischargers need some time to achieve the final standards, in part to avoid forced outages. While the BAT limitations apply on a date determined by the permitting authority that is as soon as possible beginning on the effective date of the final rule, but no later than December 31, 2029, under CWA section 307(b)(1), pretreatment standards shall specify a time for compliance not to exceed three years from the date of promulgation, so the EPA cannot establish a longer implementation period. Moreover, unlike requirements on direct discharges, requirements on indirect discharges are not implemented through NPDES permits. Nevertheless, the EPA finds that all existing indirect dischargers can meet the standards within three years of promulgation as discussed below.

At proposal, the EPA projected that there would be no remaining indirect dischargers of FGD wastewater. In response to this finding, City Water, Light and Power (CWLP) filed comments indicating that it retains the option of either sending its treated FGD wastewater to the local POTW, or directly discharging. The EPA takes CWLP at its word that it will continue to be an indirect discharger at least some of the time. Nevertheless, the EPA estimates that it would take a single plant 18 to 28 months to achieve zero discharge for both FGD wastewater and CRL. Similarly, with respect to BA transport water, the EPA estimates that a closed-loop system can achieve zero discharge within 35 months, and substantially sooner if a high recycle rate system is already operating.[165] Finally, with respect to legacy wastewater and CRL generated after permanent cessation of coal combustion, the EPA estimates the chemical precipitation systems can achieve the mercury and arsenic limitations within 22 months.[166] Thus, the final PSES are available 3 years after publication of the final rule. Further discussion of availability timing can be found in section XIVB.1 of this preamble.

F. Economic Achievability

Under the CWA, BAT limitations must be economically achievable. Courts have interpreted the economic achievability requirement as a test of whether the regulations can be "reasonably borne" by the industry as a whole. *Chem. Mfrs. Ass'n v. EPA*, 870 F.2d at 262; *BP Exploration & Oil v. EPA*, 66 F.3d at 799-800; *see also Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1006; *Nat'l Wildlife Fed'n v. EPA*, 286 F.3d 554, 570 (D.C. Cir. 2002); *CPC Int'l Inc. v. Train*, 540 F.2d 1329, 1341-42 (8th Cir. 1976), *cert. denied,* 430 U.S. 966 (1977). "Congress clearly understood that achieving the CWA's goal of eliminating all discharges would cause 'some disruption in our economy,' including plant closures and job losses." *Chem. Mfrs. Ass'n v. EPA*, 870 F.2d at 252 (citations omitted).

At proposal, the EPA found that the rule was economically achievable, but solicited comment on whether and how to include the impacts of the IRA for the final rule analysis. The EPA received comments recommending modifications to its use of

[165] DCN SE08480.

[166] The EPA expects this timing to be similar to a chemical precipitation installation for FGD wastewater, DCN SE10289.

IPM. Specifically, some commenters recommended including the impacts of the IRA in the baseline, while other comments disagreed that the EPA should include the IRA impacts, with the latter commenters suggesting that any results with the IRA included would be speculative and uncertain. The EPA also received comments that its findings should consider the joint impact of multiple regulations on this industry.

The EPA acknowledges these comments. The EPA used IPM to perform cost and economic impact assessments, using a baseline that reflects impacts from the IRA and final environmental regulations that were published before this rule was signed (*see* RIA).[167] As explained in detail in section VIII of this preamble, the IPM baseline used for this analysis includes the impacts of the IRA and several other final power sector regulations published before this rule. This is consistent with OMB Circular A-4 and EPA's *Guidelines for Preparing Economic Analysis*.[168] The EPA did not, however, include all the regulations some comments suggested. For example, two CAA rules, the MATS and section 111 rules, are being issued contemporaneously with this ELG and none of these rules includes the others in the baseline of the primary IPM analysis. This too is consistent with OMB guidelines and established EPA practice.

EPA's analysis for the final BAT limitations and PSES demonstrates that they are economically achievable for the steam electric industry, as required by CWA section 301(b)(2)(A). For the final rule, the model projected very small additional effects on the

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[167] IPM is a comprehensive electricity market optimization model that can evaluate such impacts within the context of regional and national electricity markets. See section VIII of this preamble for additional discussion.

[168] Available online at: *https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses-2016*

electricity market, on both a national and regional sub-market basis. Based on the results of these analyses, the EPA estimated that the final rule requirements would result in a net reduction of 5,782 MW in steam electric generating capacity as of the model year 2035, reflecting full compliance by all plants. This capacity reduction corresponds to a net effect of approximately five early plant retirements.[169] These IPM results support the EPA's conclusion that the final rule is economically achievable.

Furthermore, before the IPM analysis, the EPA also performed a cost-to-revenue screening analysis which included costs to wastestreams not tied to ongoing electric generation (*i.e.*, costs which would not change operational decisions in IPM). Specifically, this analysis included the upper bound and lower bound costs for treating unmanaged CRL as well as the costs of treating legacy wastewater discharged from surface impoundments commencing closure after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. For further discussion of these costs, see section VIII.A of this preamble. The screening-level assessment of economic impacts showed a greater potential for impacts with 13 to 17 parent entities incurring annualized costs representing one percent or more of their revenues, including 6 to 9 parent entities that would incur costs representing more than three percent of revenue. Since the EPA estimates that there are between 220 and 391 parent entities, this means that between three and eight percent of parent entities would incur costs representing one percent or more of their revenues and a subset of between two and four

[169] Given the design of IPM, unit-level and thereby plant-level projections are presented as an indicator of overall regulatory impact rather than a precise prediction of future unit-level or plant-specific compliance actions. The projected net plant closure occurs at a plant whose only steam electric EGU had a capacity utilization of only six percent in the baseline.

percent of parent entities would incur costs representing more than three percent of revenue. However, as noted in the RIA, these results are based on the conservative assumption that zero costs are passed on to consumers and represent a worst-case scenario from the plant owners' perspective. The combination of the screening analysis (including unmanaged CRL costs) and the IPM market-level results (excluding unmanaged CRL costs) supports the EPA's conclusion that the final rule is economically achievable.

Other considerations also support the EPA's findings on economic achievability. While EPA properly excluded from its main analysis regulations that are being issued contemporaneously with this rule and that were not published before this rule was signed, the Agency conducted a supplemental analysis to evaluate the cumulative effect of multiple rules affecting the electric power sector. This multi-rule modeling includes this final rule, CAA sections 111(d) and 111(b) EGU rules, and MATS as a combined policy scenario, and includes the EPA vehicle rules (LDV, MDV and HDV) in the baseline (*i.e.*, relevant EPA rules). As such, the results of this modeling cannot be used to show the individual effect of this final rule and are not a substitute for the rule-specific modeling EPA conducted to determine economic achievability of the final rule. However, the multi-rule modeling does clearly illustrate that the cumulative effect of these rules in terms of reduction in steam electric generating capacity is less than the sum of each of these rules individually. This means that, considering the rules together, the affected universe of EGUs with significant mitigation responsibilities under the EPA rules that make up the policy case is overlapping, not purely additive, as it largely reflects the same segment of the grid's generation portfolio. In other words, if the same EGU at baseline that has new regulatory requirements for both its air and water wastestreams chooses to retire rather than adopting control technologies, it would not do so twice, and so the generation lost from that EGU would only need to be replaced once. Hence, simply adding the independently modeled costs of each of the rules, which include effects associated with coal-fired EGU retirements attributable to each rule, would be inappropriate, as these effects are not additive. The sensitivity analysis bears this out over the time periods of relevance to the ELG.[170]

In terms of reductions in coal-fired generating capacity and coal plant closures, affected EGUs are expected to undertake investment decisions to comply with multiple rules simultaneously, as seen in the sensitivity analysis for the combined policy scenario. For example, EGUs that decide to invest in CCS in relevant years may also decide to invest in a dry-handling system, depending on the operational need of the unit. In this case, the costs of CCS and a dry-handling system may be summed. However, if an EGU decides to retire, then the costs associated with the retirement decision would occur only once. For the reasons discussed above, had the Agency done an IPM analysis of ELG impacts in which the other relevant EPA rules were in the baseline, EPA expects that the results of such an analysis would likely show comparable or fewer impacts attributable to the ELG than projected in EPA's main analysis..[171] Thus, nothing in the multi-rule modeling suggests EPA's conclusion that the final ELG rule is economically achievable would be meaningfully different, particularly where courts have upheld EPA's BAT

[170] See *IPM Sensitivity Runs Memo* (SE11829) for further details.

[171] The multi-rule run also confirms that resource adequacy is maintained, even taking into account the collective impact of the various EPA rules discussed here. See *Resource Adequacy Analysis: Vehicle Rules, 111 EGU rule, ELG, and MATS Technical MEMO* (SE11830).

regulations as economically achievable even under circumstances of much greater industry-wide economic impact than projected here. *See Chem. Mfrs. Ass'n v. EPA*, 870 F.2d at 252 n.337 (reviewing cases in which courts have upheld EPA's regulations that projected up to 50 percent closure rates).

Finally, the EPA notes that coal-fired power plants with the wastestreams subject to this final rule are only a fraction of all coal-fired power plants, which are only a fraction of all steam electric power plants subject to part 423. The combination of the screening analysis (including unmanaged CRL and legacy wastewater costs), the IPM market-level results (excluding unmanaged CRL and legacy wastewater costs), and the other considerations in this paragraph support the EPA's conclusion that the rule is economically achievable.

G. Non-Water Quality Environmental Impacts

For the 2023 proposed rule, the EPA assessed non-water quality environmental impacts, including energy requirements, air impacts, solid waste impacts, and changes in water use and found them to be acceptable. The EPA reevaluated these impacts in light of the changed industry profile and public comments, as well as the requirements of the final rule. Based on the results of these analyses, the EPA determines that the final rule has acceptable non-water quality environmental impacts. See additional information in section 7 of the Supplemental TDD, as well as section X of this preamble.

H. Impacts on Residential Electricity Prices and Communities with Environmental Justice Concerns

The EPA presents the effects of the final rule on consumers as part of the RIA. While the CWA section 304(b)'s "consideration" factors do not require these details, the EPA presents them for informational purposes. If all annualized compliance costs were passed on to residential consumers of electricity instead of being borne by the operators and owners of power plants (a conservative assumption), the average yearly electricity bill increase for a typical household would be $1.61 to $3.14 under the final rule, or a change of less than 0.1 percent relative to the baseline. For further information see section 7 of the RIA.

The EPA also presents the effect of the final rule on communities with environmental justice concerns under Executive Order 14096. As explained in sections XIII and XV.J, using demographic data on who resides closest to steam electric power plant discharges, who fishes in downstream waterbodies, and who consumes drinking water from downstream drinking water treatment plants, the EPA concludes that, although benefits are likely to accrue to all members of the affected public, communities with environmental justice concerns will experience health and environmental benefits more than the general population from the reductions in discharges associated with the final rule due to their disproportionate exposure.

VIII. Costs, Economic Achievability, and Other Economic Impacts

The EPA evaluated the costs and associated impacts of the three main final regulatory options on existing EGUs at steam electric power plants. The Agency analyzed these costs within the context of existing environmental regulations, market conditions, and other trends that have affected steam electric power plant profitability and generation, as described in section V.B of this preamble. This section provides an overview of the methodology the EPA used to assess the costs and the economic impacts and summarizes the results of these analyses. The methodology is largely the same as for the proposed rule analysis, but with updates to reflect more recent data and comments the EPA received on the proposal. See the RIA in the docket for additional detail.

In developing ELGs, and as required by CWA section 301(b)(2)(A), the EPA evaluates the economic achievability of regulatory options to assess the impacts of applying the limitations and standards to the industry as a whole, which typically includes an assessment of incremental plant closures attributable to a regulatory option. As described in more detail below, this supplemental ELG is expected to result in incremental costs when compared to baseline. Like the prior analysis of the 2015 and 2020 rules and the 2023 proposal, the cost and economic impact analysis for this final rule focuses on understanding the magnitude and distribution of compliance costs across the industry and the broader market impacts. The EPA used indicators to assess the impacts of the three regulatory options on the whole steam electric power generating industry. These indicators are consistent with those used to assess the economic achievability of the 2015 and 2020 rules and the 2023 proposal. As was done at proposal, the EPA compared the values to a baseline that reflects implementation of existing environmental regulations (as of this final rule), including the 2020 rule and the effects of the IRA of 2022, but does not include the effects of regulations discussed in section IV.E of this preamble that had not been published at the time of signature of this final rule. As such, the baseline appropriately includes the costs of achieving the 2020 rule limitations and standards, and the policy cases show the impacts resulting from potential changes to the existing 2020 limitations and standards. More specifically, the EPA considered the total cost to the industry and the change in the number and capacity of specific EGUs and plants expected to close under the final rule (Option B) compared to the baseline. The EPA also analyzed the ratio of compliance costs to revenue to see how the three main regulatory options affect how many plants (and their owning entities) exceed thresholds indicating potential financial strain. In addition to the analyses supporting the economic achievability of the regulatory options, the EPA conducted other analyses to (1) characterize other potential impacts of the regulatory options (*e.g.*, on electricity rates) and (2) meet the requirements of Executive Orders or other statutes (*e.g.*, Executive Order 12866, Regulatory Flexibility Act, Unfunded Mandates Reform Act).

A. Plant-Specific and Industry Total Costs

The EPA estimated plant-specific costs to control FGD wastewater, BA transport water, CRL, and legacy wastewater discharges at existing EGUs at steam electric power plants to which the ELGs apply.

The EPA assessed the operations and treatment system components currently in place at each unit (or expected to be in place because of other existing regulations, including the 2020 ELG rule), identified equipment and process changes that plants would likely make under each of the three regulatory options presented in table VII-1 of this preamble, considering the subcategory applicable to each EGU, and estimated the capital and O&M costs to implement those changes. As explained in the TDD, the baseline also accounts for additional announced unit retirements, conversions, and relevant operational changes that have occurred since the EPA promulgated the 2020 rule. Following the same methodology used for the 2015 and 2020 rules and the 2023 proposal analyses, when estimating the annualized industry compliance costs, the EPA used a private rate of capital to annualize one-time costs and costs recurring a nonannual basis. For this analysis, this rate is 3.76 percent and represents estimated weighted average cost of capital for the industry. For capital costs and initial one-time costs, the EPA used a 20-year amortization period. For O&M costs incurred at intervals greater than one year, the EPA used the interval as the annualization period (*e.g.*, five years, 10 years). The EPA added annualized capital, initial one-time costs, and the nonannual portion of O&M costs to annual O&M costs to derive total annualized plant costs. The EPA estimated after-tax costs based on the type of entity owning each plant. The EPA then calculated total industry costs by summing plant-specific annualized costs.

The EPA proposed that membrane filtration was BAT for FGD wastewater; therefore the Agency continued to rely primarily on the costs of membrane filtration to evaluate economic achievability at proposal while analyzing costs of SDEs and thermal evaporation systems using sensitivity analyses. Comments supportive of zero discharge suggested that sometimes thermal evaporation systems were less costly than membrane filtration systems and that these systems can achieve zero discharge alone or in combination. Other commenters suggested that the EPA's cost estimates were too low. Specifically, commenters suggested that the EPA did not properly reflect the costs of FA diversion to a landfill as part of the proposal's membrane filtration costs.

The EPA has updated its cost estimates to more accurately reflect the costs of FA used for brine encapsulation. As a result of these updates, the EPA estimates that membrane filtration is no longer the least costly FGD treatment technology nationwide.

Furthermore, because the final rule identifies the BAT technology basis for FGD wastewater as membrane filtration, SDEs, and thermal evaporation systems alone or in combination, the EPA performed a least-cost analysis to determine which technology each plant would select. While the EPA costed all three technologies, the cost estimates for thermal technologies contain CBI and cannot be released publicly.[172] To increase transparency of this final rule, the EPA ran an alternative set of costs selecting the least-cost technology between only membrane filtration and SDEs. The EPA found that only six plants would select thermal evaporation systems as the lowest cost option when considering all three technologies. Moreover, when comparing the least-cost analysis among the three technologies to the least-cost analysis with only membrane filtration and SDEs, the EPA found that the overall costs associated with the latter exceed the former by only five percent. Since the non-CBI costs do not substantially differ from the CBI costs, the EPA ran these non-CBI costs through IPM so that model's inputs and outputs could also be made public.

With respect to BA transport water, the 2020 rule record never demonstrated that a full 10 percent purge at all facilities was a realistic costing assumption. The primary basis for the 2020 rule purge allowance was a 2016 report from EPRI that involved

[172] Standard thermal evaporation system costs are analyzed in DCN SE11694 but not included in this least cost analysis because portions of those costs are being treated as CBI pursuant to claims made by vendors under the EPA's CBI regulations.

continuous purges, the majority of which were well under one percent. Thus, in the 2020 rule record, the EPA presented a sensitivity analysis with costs for a two percent purge treatment, which better reflect the handful of facilities for which the EPA has record evidence of a purge.

At proposal, the EPA retained this dual costing approach. Based on IPM modeling results, including the 10 percent purge treatment cost estimates, the EPA proposed to find that dry-handling or closed-loop systems are economically achievable. The EPA received comments suggesting that a 10 percent purge is not realistic of the potential purge needs of facilities. EPA agrees that the record reflects very few facilities with demonstrated purge needs, and that these were all two percent or less. Thus, the Agency has now adopted the more realistic two percent purge treatment cost estimate as its primary analysis but has retained the 10 percent purge treatment costs as a sensitivity analysis.[173]

With respect to CRL, the EPA proposed to establish limitations based on chemical precipitation systems but estimated the costs of alternative zero-discharge systems for treating CRL in a separate memorandum. Some commenters asked the EPA to repropose CRL limitations since these analyses were not presented as part of the main regulatory options. Commenters also presented various reasons why they believed that the EPA's cost estimates were too low. Specifically, commenters suggested that the EPA did not properly reflect the costs of fly ash diversion to a landfill as part of the proposal's membrane filtration costs.

[173] This primary use of the two percent numbers is also more reasonable when considering the definitional change whereby necessary discharges from storm events are not considered BA transport water, and thus would not require any additional purge or purge treatment.

The EPA disagrees with commenters that it should repropose CRL limitations because costs and pollutant loadings of additional technologies were estimated in a separate document. The Agency provided commenters with a fair opportunity to present their views on the contents of the final rule, which is all that is required to satisfy notice and comment requirements. *BASF Wyandotte Corp. v. Costle*, 598 F.2d 637, 641-644 (1st Cir. 1979) (rejecting notice and comment objections to a final ELG rule based on changes from proposal). The EPA has also updated its cost estimates to reflect more accurate costs of using FA for brine encapsulation as was done for FGD wastewater in section VII.B.1 of this preamble.

With respect to unmanaged CRL, the proposed rule included a bounding sensitivity analysis with costs for every facility and every unlined landfill and surface impoundment (WMU) to treat their unmanaged CRL either with chemical precipitation or SDEs. These bounding analyses were presented as a conservative estimate to demonstrate the potential universe of discharges of unmanaged CRL and potential costs. Some commenters stated their view that the EPA had not sufficiently evaluated unmanaged CRL and argued that the EPA should re-propose CRL limits after conducting a more accurate costing analysis. The EPA also received comments disagreeing with two misunderstandings of the Agency's proposed application of the rule to unmanaged CRL, with commenters believing either all or none of the facilities in the Agency's analyses were covered. One commenter further suggested that the EPA should include additional WMUs under the new CCR proposed rule (88 FR 31982).

The EPA disagrees with commenters that it did not sufficiently evaluate unmanaged CRL and that CRL limits should be re-proposed. The proposed rule gave commenters notice of the basic engineering cost and economic screening approaches that the Agency applied in evaluating discharges of unmanaged CRL for the final rule, as those approaches have not changed. Furthermore, at proposal, the EPA analysis included the broadest set of potential facilities and WMUs estimated to be potentially subject to these limitations to ensure that the public was given fair notice of how the final rule could apply, even in cases where such an application might be highly unlikely. The EPA disagrees with commenters that making this assumption for the purposes of a bounding analysis had any implications as to whether a permitting authority would ultimately find the existence of a point source with a functional equivalent direct discharge to a WOTUS at any given WMU.

For the final rule, to better reflect on-the-ground reality, and in response to public comment, the EPA has refined the bounding analyses from proposal to remove the WMUs least likely to incur costs under this final rule. The EPA began by compiling groundwater monitoring information from unlined WMUs reported under the CCR regulations. This information consisted of detection monitoring data, assessment monitoring data, statistical analyses, and other narrative discussion in the groundwater monitoring reports. WMUs which are still in detection monitoring, and where there is either no statistically significant increase (SSI) of specified parameters[174] above the groundwater background, or an increase that is not attributable to the WMU, are the least

[174] Appendix III to Part 257—Constituents for Detection Monitoring includes TDS.

likely to be sources of pollutants and therefore also the least likely to potentially incur treatment costs under the rule. Thus, the EPA excluded these units from its revised bounding analysis.

In addition to the updated bounding analysis, for the final rule, also in response to public comments, the EPA now presents a range of more likely costs consisting of a revised upper bound and revised lower bound analysis. These lower and upper bounds provide a likely more accurate range of cost estimates and other impacts for treating unmanaged CRL. The revised upper bound estimate probabilistically considers three separate scenarios, described in the next paragraph. The revised lower bound estimate probabilistically considers an additional four scenarios, also described below. Together, the resulting range represents a reasonable range of nationwide costs of treatment for unmanaged CRL, but as discussed in the following paragraphs, it could overestimate costs at some facilities and underestimate costs at others.

The revised upper bound cost estimate uses proxies for the factors that make unmanaged CRL more likely to be subject to the limitations in the final rule, and therefore more likely to incur costs. The first scenario the EPA modeled was one in which unmanaged CRL treatment costs are assigned only to each plant's WMU closest to a surface waterbody. The Supreme Court in *County of Maui* recognized the importance of distance in determining whether a discharge might fall within the CWA's jurisdiction. *County of Maui v. Hawaii Wildlife Fund,* 590 U.S. at 184. For any given facility, for purposes of this cost estimate, the EPA assumes that the unlined WMU that is most likely to have unmanaged CRL subject to this rule's limitations is the unlined WMU nearest a surface waterbody. In selecting the nearest such WMU for the purposes of analysis, the EPA is not making any findings that these unmanaged CRL discharges would be subject to the final rule requirements or that discharges from other WMUs would not be. In reality, WMUs further from a surface waterbody could be found to be point sources with FEDDs of CRL to a WOTUS which are subject to CWA permitting. In addition, any of the closest WMUs modeled here may be found not to be point sources with FEDDs of CRL and thus subject to CWA permitting. Nevertheless, the EPA finds that it is reasonable to assume that the closest WMUs are more likely to incur costs under this final rule.

The other two scenarios the EPA modeled focused not on distance, but on which WMUs are more likely to be a source of pollutants. For these WMUs, the Agency estimated costs of chemical precipitation treatment at both the WMU level and at the facility level. As discussed in the preceding paragraphs, the EPA's updated bounding analysis already removed those WMUs with less probability of incurring costs for unmanaged CRL treatment due to the absence of a WMU-caused SSI in detection monitoring pollutants (*e.g.*, TDS). Just because a facility finds an SSI for a detection monitoring parameter does not indicate that it will incur costs under this final rule. This final rule imposes mercury and arsenic limitations based on chemical precipitation, a treatment system that does not treat all pollutants which might be found in TDS and other detection monitoring parameters. Instead, the EPA notes that nearly all of the assessment monitoring pollutants in Appendix IV to part 257 are pollutants treated by chemical precipitation. The EPA finds that WMUs that are the source for an SSI of one or more Appendix IV pollutants, and thus trigger corrective action under the CCR regulations, are the most likely to incur chemical precipitation-related costs under this final rule. This is so for two reasons.

First, there is the possibility that these facilities could, in the future, select a pump-and-treat remedy under the corrective action requirements of the CCR regulation, which will be discharged. Any resulting direct discharge would need to comply with the limits in this rule. Second, where a pump-and-treat remedy is not selected, the EPA examined treatment of arsenic. Arsenic has historically been one of the most prevalent pollutants in CCR damage cases and under this final rule is also one of the two indicator pollutants monitored to demonstrate compliance with the BAT limitations for discharges of unmanaged CRL. While this regulation establishes technology-based limitations, the daily and monthly arsenic limitations being finalized are very close to, and bracket, the health-based arsenic standard in the CCR regulations.[175] Thus, for purposes of determining the facilities and WMUs most likely to incur costs with respect to unmanaged CRL, the EPA finds that focusing on arsenic is reasonable.

While the EPA believes that using WMUs that have triggered corrective action is a reasonable proxy for estimating WMUs most likely to incur costs associated with unmanaged CRL under this rule, EPA notes that here too, just because a facility is in corrective action for its groundwater contamination does not mean that the WMU at issue would necessarily be found to be a point source with a FEDD of CRL to a WOTUS. Thus, in some cases, these costs will be overestimated for specific facilities. At the same

[175] The daily and monthly BAT limitations being established are 11 ug/L and 8 ug/L, respectively as compared to the maximum contaminant level of 10 ug/L, which is the trigger for corrective action under the CCR regulations.

time, it may be possible that unmanaged CRL is subject to CWA permitting but does not trigger corrective action under the CCR regulations.

Due to the uncertainties surrounding future permitting authority findings regarding unmanaged CRL, the EPA probabilistically combined the three cost scenarios discussed above with equal weights: those involving (1) each plant's closest WMU, (2) cases of corrective action at the WMU level, and (3) cases of corrective action where surface impoundment flows are combined at the facility level. These modeling assumptions should not be interpreted as a finding that any specific site is subject to the unmanaged CRL limitations in the final rule. Rather, these assumptions should be considered as assisting in a reasonable estimation of costs nationwide, with actual site-specific costs under- or overestimated.

The revised lower bound cost estimate uses proxies for the factors that make unmanaged CRL most likely to be subject to the limitations in the final rule, and therefore most likely to incur costs. Specifically, as of January 22, 2022, the EPA was aware of 67 WMUs at 38 facilities which had selected corrective action remedies that includes pumping and treating of groundwater now or in the future.[176] These data are summarized in Table VIII-1 below.

Table VIII-1. CCR Corrective Action Remedies Selected by 2021

Unit/Facility	Count	Pump & Treat	GW Extraction/ Collection	Both	Pump & Treat %	Both %
Individual LFs	18	3	2	5	17%	28%
Individual Sis	49	11	6	17	22%	35%

[176] EPA presents this dataset in DCN SE11501.

Facilities w/LFs	16	3	2	5	19%	31%
Facilities w/Sis	26	2	4	6	8%	23%

* Notes: LF = landfill; SI = surface impoundment; Facility counts add to 42 rather than 38 because four facilities have both landfills and surface impoundments

While the statistics are based on a 2022 subset of the facilities that have selected corrective action remedies thus far or will select corrective action remedies in the future, this empirical data provides the best available information on which to base the fraction of WMUs or facilities that may ultimately select a remedy that generates a CRL wastestream that could potentially be discharged, and thus potentially incur treatment costs under the final rule. While some of these facilities selected a remedy that explicitly included pump-and-treat operations, others included other categories of groundwater extraction or collection that may or may not ultimately result in a discharge. The EPA probabilistically used four scenarios to account for the uncertainty in the likelihood of a discharge that would incur ELG compliance costs.

Two scenarios relied on the fraction of WMUs where such discharges were possible based on the remedy selected. Due to the number of WMUs at different facilities being unequal, the EPA also evaluated two scenarios that instead relied on the fraction of facilities with landfills and the fraction of facilities with surface impoundments where such discharges were possible. For each of these, a pair of estimates was generated assuming the fraction that would ultimately discharge subject to the ELG would include either only the pump-and-treat operations or, alternatively, both pump-and-treat operations and other remedies with groundwater collection or extraction that could potentially discharge in the future. For the two scenarios using the facility-based extrapolation, the EPA used the costs for facility-wide corrective action described as one scenario in the revised upper bound scenario in the preceding paragraphs. Finally, by treating each of these scenarios with an equal likelihood to occur, the revised lower bound estimate avoids attaching too much certainty to any individual estimate based on this data set.

The EPA notes that the revised upper bound analysis still represents a conservative estimate of the costs for unmanaged CRL. As facilities continue to implement the CCR regulations, landfills and surface impoundments continue to close and conduct corrective action. In some cases, closure may eliminate the continued source of pollutants (*e.g.*, WMUs which are clean closed) or may reduce the concentrations of pollutants, making treatment costs under this final ELG less likely. Furthermore, where corrective action is taken pursuant to the CCR regulations, it is possible that the corrective action selected would reduce the probability that the facility would incur costs under the final rule. This could be the result of installing impermeable or semi-permeable barriers, conducting *in-situ* treatment, or undergoing pump-and-treat operations where the water is returned to the ground rather than discharged. Even where unmanaged CRL in groundwater is pumped to the surface, some of that water may be reused within the plant or treated and returned to the ground. When considered against this backdrop, the revised upper bound costs estimated for unmanaged CRL can be considered a reasonable, conservative estimate for purposes of ensuring that these costs are considered and found to be economically achievable.

Similarly, the revised lower bound analysis still represents a likely underestimate of the costs of unmanaged CRL. Once regulations establishing a Federal CCR permit program are finalized, the EPA or state agencies may find that some previously selected corrective action remedies may not satisfy the corrective action requirements under the CCR regulations and, thus, a new remedy which does result in a discharge could be required. Furthermore, it may be possible that some unmanaged CRL satisfying the health-based requirements of the CCR regulations could still result in a FEDD of CRL into a WOTUS and, therefore, incur costs for complying with the ELG. For these reasons, the EPA believes the ultimate costs and economic impacts associated with unmanaged CRL are most likely to fall between the revised upper bound and revised lower bound estimates evaluated in the Agency's cost and economic analyses.

With respect to legacy wastewater, the EPA proposed to retain the existing case-by-case limitations but estimated the costs of alternative treatment systems for treating legacy wastewater in a separate memorandum at proposal. Some commenters asked the EPA to repropose legacy wastewater limitations since these analyses were not presented as part of the main regulatory options. The EPA disagrees with commenters for the same reasons presented in the CRL discussion immediately above. For the subcategory of surface impoundments continuing to operate after the effective date of the rule, the EPA expects that many plants may only close and dewater their ponds after 2049, which is outside of the period of analysis (and thus, for the purposes of this analysis, would be zero). The Agency has also evaluated a worst-case scenario where all plants close and dewater their ponds soon after the final rule is effective (see RIA Appendix C). These costing scenarios bound the potential costs of the final subcategory; however, the likely costs fall somewhere in between. While the EPA cannot know with certainty when a surface impoundment may be closed in the future, the Agency compiled data in the 2015 CCR rule record which revealed a median operating life of 40 years for a surface impoundment[177] and this 40-year life was used for estimating costs, benefits, and other impacts in *Regulatory Impact Analysis for EPA's 2015 Coal Combustion Residuals Final Rule*. To ensure that the costs of the final legacy wastewater subcategory were included in the Agency's main cost analyses, the Agency assumed that these costs would be incurred in 2044. This corresponds to 20 years after the effective date of the final rule (*i.e.*, half of a useful operating life).[178]

Pre-tax annualized costs provide insight on the total expenditure as incurred, while after-tax annualized costs are a more meaningful measure of impact on privately owned for-profit entities and incorporate approximate capital depreciation and other relevant tax treatments in the analysis. The EPA uses pre- and/or after-tax costs in different analyses, depending on the concept appropriate to each analysis (*i.e.*, social costs are calculated using pre-tax costs whereas cost-to-revenue screening-level analyses are conducted using after-tax costs).

[177] See Section 4.3.1 of *Human and Ecological Risk Assessment of Coal Combustion Residuals*.

[178] Assuming the same 40-year surface impoundment operating life used in the 2015 CCR rule record and acknowledging that these impoundments could be anywhere in that 40-year lifespan, the Agency uses the midpoint of 20-years as a reasonable approximation for purposes of ensuring that these costs are included in the main cost analyses of the final rule. To the extent that costs could be incurred before this date at some facilities and after this date at other facilities, these nationwide costs may either over- or underestimate the site-specific costs at any particular facility.

The after-tax annualized costs of the final rule range between $479 million and $956 million for the lower and upper bound cost scenarios, respectively, whereas the pre-tax annualized costs range between $596 million and $1,164 million.

B. Social Costs

Social costs are the costs of the supplemental ELG from the viewpoint of society as a whole, rather than the viewpoint of regulated plants and owning entities (which are private costs). They include costs incurred by both private entities (*e.g.,* in complying with the regulation) and by the government (*e.g.*, in implementing the regulation). To calculate social costs, the EPA tabulated the pre-tax costs in the year they are estimated to be incurred, which varies across plants based on the estimated compliance year. The EPA performed the social cost analysis over a 25-year period of 2025 to 2049, which combines the length of the period during which plants are anticipated to install the control technologies (which could be as late as 2029) and the useful life of the longest-lived technology installed at any plant (20 years). The EPA calculated the social cost of the final rule using a two percent discount rate, following current OMB guidance in Circular A-4.[179]

As described further in section 10 of the RIA, there are no incremental increases in the cost to state governments to revise NPDES permits. Consequently, the only category of costs used to calculate social costs are those pre-tax costs estimated for steam electric power plants. Note that the annualized social costs differ from pre-tax industry

[179] OMB. (2023). Circular A-4: Regulatory Analysis. Washington DC. Available at *https://www.whitehouse.gov/wp-content/uploads/2023/11/CircularA-4.pdf*

compliance costs discussed in section VIII.A of this preamble due to differences in both the discount rate used (2 percent) and the year-explicit accounting of the costs. Whereas the costs in section VIII.A of this preamble represent the annualized costs of each option if they were incurred in 2024, the annualized social costs are estimated based on the stream of future costs starting in the year that individual plants are projected to comply with the requirements of the final rule. The final rule has estimated annualized incremental social costs of $536 million to $1,064 million.

C. Economic Impacts

The EPA assessed the economic impacts of this final rule in two ways: (1) a screening-level assessment of the cost impacts on existing EGUs at steam electric power plants and the entities that own those plants, based on a comparison of costs to revenue and (2) an assessment of the impacts within the context of the broader electricity market, which includes an assessment of changes in predicted plant closures attributable to the final rule. The following sections summarize the results of these analyses. The RIA discusses the methods and results in greater detail.

The first set of cost and economic impact analyses—at both the plant and parent company level—provides screening-level indicators of the impacts of costs for FGD wastewater, BA transport water, and CRL controls relative to historical operating characteristics of steam electric power plants incurring those costs (*i.e.*, level of electricity generation and revenue).[180] The EPA conducted these analyses for baseline

[180] As discussed in section VIII.A of this preamble, in analyzing the costs and benefits of the final rule, the EPA estimated that the costs to meet future legacy wastewater limitations would occur

and for the three regulatory options presented in table VII-1 of this preamble, then compared these impacts to understand the incremental effects of the regulatory options, including the final rule (Option B).

The second set of analyses looks at broader electricity market impacts, considering the interconnection of regional and national electricity markets. This analysis also looks at the distribution of impacts at the plant and EGU level. This second set of analyses provides insight on the impacts of the final rule on steam electric power plants, as well as the entire electricity market, including changes in capacity, generation, and wholesale electricity prices. The market analysis compares model predictions for the final rule to a base case that includes the predicted and observed economic and market effects of the 2020 rule and other environmental regulations.

1. Screening-Level Assessment

The EPA conducted a screening-level analysis of each regulatory option's potential impact on existing EGUs at steam electric power plants and parent entities based on cost-to-revenue ratios. For each of the two levels of analysis (plant and parent entity), the Agency assumed, for analytic convenience and as a worst-case scenario, that none of the compliance costs would be passed on to consumers through electricity rate increases and would instead be absorbed by the steam electric power plants and their parent entities. This assumption overstates the impacts of compliance expenditures since steam electric power plants that operate in a regulated market may be able to pass on

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outside the period of analysis and therefore focused on the FGD wastewater, BA transport water and CRL wastestreams for this analysis.

changes in production costs to consumers through changes in electricity prices. It is, however, an appropriate assumption for a screening-level estimate of the potential cost impacts.

a. Plant-Level Cost-to-Revenue Analysis

The EPA developed revenue estimates for this analysis using EIA data. The EPA then calculated the change in the annualized after-tax costs of the three regulatory options presented in Table VII-1 of this preamble as a percentage of baseline annual revenues. See section 4 of the RIA for a more detailed discussion of the methodology used for the plant-level cost-to-revenue analysis.

Cost-to-revenue ratios are screening-level indicators of potential economic impacts. For this analysis, the EPA assessed plants incurring costs below one percent of revenue as unlikely to face economic impacts, plants with costs between one percent and three percent of revenue as having a higher chance of facing economic impacts, and plants incurring costs above three percent of revenue as having a still higher probability of economic impact.

Under the final rule (Option B), the EPA estimates that 50 to 72 plants would incur incremental costs greater than or equal to one percent of revenue under the lower and upper bound cost scenarios respectively, including 18 to 31 plants that have costs greater than or equal to three percent of revenue. An additional 91 to 98 plants would incur costs that are less than one percent of revenue. section 4.2 in the RIA provides results for the other regulatory options the EPA analyzed.

b. Parent Entity-Level Cost-to-Revenue Analysis

The EPA also assessed the economic impact of the regulatory options presented in table VII-1 of this preamble at the level of the firm that own steam electric power plants to analyze the potential impacts on these firms, referred to as "parent entities." In this analysis, the domestic parent entity associated with a given plant is defined as the entity with the largest ownership share in the plant. For each parent entity, the EPA compared the incremental change in the total annualized after-tax costs and the total revenue for the entity to the baseline (see section 4 of the RIA for details). Following the methodology employed in the analyses for the 2015 and 2020 rules, the EPA considered a range of estimates for the number of entities owning an existing EGU at a steam electric power plant to account for partial information available for steam electric power plants that are not expected to incur ELG compliance costs.

Like the plant-level analysis above, cost-to-revenue ratios provide screening-level indicators of potential economic impacts, this time to the owning entities; higher ratios suggest a higher probability of economic impacts. The EPA estimates that the number of entities owning existing EGUs at steam electric plants ranges from 220 (lower-bound estimate) to 391 (upper-bound estimate), depending on the assumed ownership structure of plants not incurring ELG costs and not explicitly analyzed. The EPA estimates that under the final rule (Option B) and for the lower and upper bound cost scenarios, 13 to 17 parent entities would incur annualized costs representing one percent or more of their revenues, including 6 to 9 parent entity that would incur costs representing more than three percent of its revenue.

2. Electricity Market Impacts

To analyze the impacts of regulatory actions on the electric power sector, the EPA commonly uses IPM, a comprehensive electricity market optimization model that can evaluate such impacts within the context of regional and national electricity markets. The model is designed to evaluate the effects of changes in EGU-level electric generation costs on the total cost of electricity supply, subject to specified demand and emissions constraints. Use of a comprehensive market analysis system is important in assessing the potential impact of any power plant regulation because of the interdependence of EGUs that supply power to the electric transmission grid. Changes in electricity production costs at some EGUs can have a range of broader market impacts affecting other EGUs, including the average likelihood that various units are dispatched. The analysis also provides important insight on steam electric capacity closures (*e.g.*, retirements of EGUs that become uneconomical relative to other EGUs), based on a more detailed analysis of market factors than in the screening-level analyses above.

In contrast to the screening-level analyses, which are static and do not account for the interdependence of EGUs supplying power to the electric transmission grid, IPM accounts for potential changes in the generation profile of steam electric and other EGUs, as well as the consequent changes in market-level generation costs as the electric power market responds to changes in generation costs for steam electric EGUs due to the regulatory options. Additionally, in contrast to the screening-level analyses, in which the EPA assumed no cost pass-through of ELG compliance costs, IPM depicts production activity in wholesale electricity markets where the specific increases in electricity prices for individual markets would result in some recovery of compliance costs for plants. IPM is based on an inventory of U.S. utility- and nonutility-owned EGUs and generators that provide power to the integrated electric transmission grid, including plants to which the ELGs apply.

The EPA analyzed the final rule (Option B) using IPM to further inform the Agency's understanding of the potential impacts of the ELGs. The base case used for this analysis, which the EPA was developed using IPM Version 6, embeds an energy demand forecast that is derived from DOE's "Annual Energy Outlook 2023."[181] The base case also includes the effects of the IRA provisions reflecting supply-side impacts, final Federal rules (*e.g.,* 2020 ELG rule, CSAPR and CSAPR Update, 2012 MATS rule, the 2014 CWA section 316(b) rule, and 2015 CCR rule and CCR Part A rule), and state rules and programs such as the Regional Greenhouse Gas Initiative, California's Global Warming Solutions Act, and state-level Renewable Portfolio Standards policies.

In analyzing the final rule, the EPA estimated incremental fixed and variable costs for the steam electric power plants and EGUs to comply with Option B. Because IPM is not designed to endogenously model the selection of wastewater treatment technologies as a function of electricity generation, effluent flows, and pollutant discharge, the EPA estimated these costs exogenously for each steam EGU and input these costs into the IPM model as fixed and variable O&M cost adders in addition to the costs already reflected in the base case, which included compliance with the 2020 ELG rule (the baseline analysis)

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[181] U.S. Energy Information Administration. (2023b). Annual Energy Outlook 2023. Available at *https://www.eia.gov/outlooks/aeo/*

and other applicable regulations. The EPA then ran IPM with these new cost estimates to determine the dispatch of EGUs that would meet projected demand at the lowest costs, subject to the same constraints as those in the baseline analysis. The estimated changes in plant- and EGU-specific production levels and costs—and, in turn, changes in the electric power sector's total costs and production profile—are key data elements in evaluating the expected national and regional effects of the final rule, including closures or avoided closures of EGUs and plants.

The EPA considered impact metrics of interest at three levels of aggregation: (1) impact on national and regional electricity markets (all electric power generation, including steam and nonsteam electric power plants); (2) impact on steam electric power plants as a group, and (3) impact on individual steam electric power plants incurring costs. section 5 of the RIA discusses the first analysis; the sections below summarize the last two, which are further described in section 5 of the RIA. All results presented below are representative of modeled market conditions in the model year 2035, when the plants will have implemented changes to meet the revised ELGs.

a. Impacts on Existing Steam Electric Power Plants

The EPA used IPM results for 2035 to assess the potential impact of the final rule on existing EGUs at steam electric power plants. The purpose of this analysis is to assess any fleetwide changes from baseline impacts on EGUs at steam electric plants. Table VIII-2 of this preamble reports estimated results for existing EGUs at steam electric power plants, as a group. EPA looked at the following metrics: (1) incremental early retirements and capacity closures, calculated as the difference between capacity under the regulatory option and capacity under the baseline; (2) incremental capacity closures as a percentage of baseline capacity; (3) changes in electricity generation from plants subject to the ELGs; (4) changes in variable production costs per MWh, calculated as the sum of total fuel and variable O&M costs divided by net generation; and (5) changes in annual costs (fuel, variable O&M, fixed O&M, and capital). Items (1) and (2) provide important insight for determining the economic achievability of the ELG rule. Note that changes in electricity generation at steam electric power plants presented in Table VIII-2 are attributable both to changes in retirements and changes in capacity utilization at operating EGUs and plants.

Table VIII-2. Estimated Impact of the Final Rule (Option B) on Steam Electric Power Plants as a Group in the Year 2035

Metric	Baseline Value	Change Attributable to the Final Rule as Compared to the Baseline	
		Value	Percent
Total capacity (MW)	220,237	-5,782	-2.6%
Early retirement or closure (MW)	104,544	5,782	5.5%
Early retirement or closure (number of plants)	78	5	6.4%
Total generation (GWh)	789,529	-23,579	-3.0%
Average variable production cost (2023$/MWh)	$20.18	-$0.21	-1.1%
Annual cost (million 2023$)	$28,580	-$840	-2.9%

MW = megawatt; MWh = megawatt-hour; GWh = gigawatt-hour = 1,000 MWh

Under the final rule, generation at steam electric power plants is projected to decrease by 23,579 GWh (3.0 percent) nationally when compared to baseline. IPM projects a net decline in total steam electric capacity by 5,782 MW (approximately 2.6 percent of total baseline steam electric capacity) due to early retirement attributable to this final rule. Five additional plants are projected to retire early under the final rule when compared to baseline. These incremental early retirements represent a 6.4 percent increase relative to projected baseline plant retirements, but only represent 0.7 percent of the total 688 steam electric power plants modeled in IPM. See section 5.2.2.2 in the RIA for details.

These findings suggest that the final rule can be expected to have small economic consequences for steam electric power plants as a group. Option B would affect the operating status of very few steam electric power plants, with five projected additional plant closures (including one plant that was not estimated to incur costs under Option B).

b. Impacts on Individual Plants Incurring Costs

To assess potential plant-level effects, the EPA also analyzed plant-specific changes attributable to the final rule for the following metrics: (1) capacity utilization (defined as annual generation (in MWh) divided by the product of [capacity (MW) and 8,760 hours]), (2) electricity generation, and (3) variable production costs per MWh, defined as variable O&M cost plus fuel cost divided by net generation. The analysis of changes in individual plants is detailed in section 5 of the RIA. The results indicate that most plants would experience only slight effects—*i.e.*, no change or a reduction/increase of less than one percent. Across the full set of steam electric power plants modeled, 36 plants would incur a reduction in generation of at least one percent; 17 of these plants are also estimated to incur a reduction in capacity utilization of at least one percent. At the same time, 21 plants would increase generation by at least one percent, and 10 plants see their capacity utilization increase by at least one percent. Of the subset of 35 steam electric power plants that were estimated to incur costs under the final rule (Option B), four plants would incur a decrease in generation, whereas four plants would see either no change or an increase in generation. Moreover, 13 plants for which the EPA estimated costs are projected to close in the baseline scenario, and four additional plants are projected to close under the final rule (Option B).

IX. Pollutant Loadings

In developing ELGs, the EPA typically evaluates the pollutant loading reductions of the final rule to assess the impacts of the compliance requirements on discharges from the whole industry. The EPA took the same approach to the one described above for plant-specific costs for estimating pollutant reductions associated with this rule. That is, the EPA compared the values to a baseline that reflects implementation of existing environmental regulations, including the 2020 rule for FGD wastewater and BA transport water.

The general methodology that the EPA used to calculate pollutant loadings is the same as that described in the 2020 rule. The EPA first estimated—on an annual, per plant basis—the pollutant discharge load associated with the technology bases evaluated for plants to comply with the 2020 rule requirements for FGD wastewater and BA transport water, accounting for the current or planned conditions at each plant. For CRL and legacy wastewater, the EPA estimated the pollutant discharge load associated with current discharges. For all wastestreams, the EPA similarly estimated plant-specific post-compliance pollutant loadings as the load associated with the technology bases for plants to comply with the effluent limitations in this rule. The EPA then calculated the changes in pollutant loadings at a particular plant as the sum of the differences between the estimated baseline and post-compliance discharge loadings for each applicable wastestream.

For plants that discharge indirectly to POTWs, the EPA adjusted the baseline and option loadings to account for pollutant removals expected from POTWs. These adjusted pollutant loadings for indirect dischargers therefore reflect the resulting discharges to receiving waters. For details on the methodology the EPA used to calculate pollutant loading reductions, see section 6 of the TDD.

A. FGD Wastewater

For FGD wastewater, the EPA continued to use the average pollutant effluent concentration with plant-specific discharge flow rates to estimate the mass pollutant discharge per plant for the baseline and the final rule. EPA used data compiled for the 2015 and 2020 rules as the initial basis for estimating discharge flow rates and updated the data to reflect retirements or other relevant changes in operation. As in the 2020 rule, the EPA also accounted for increased rates of recycle through the scrubber that would affect the discharge flow.

The EPA assigned pollutant concentrations for each analyte based on the operation of a treatment system designed to comply with baseline or the final rule. The EPA used data compiled for the 2020 rule to characterize FGD chemical precipitation plus LRTR effluent and chemical precipitation plus membrane filtration effluent. In addition, the EPA used data provided by industry and other stakeholders during the 2020 rule and 2023 proposed rule, as described in section IV of this preamble, to quantify bromide in FGD wastewater under baseline conditions and the final rule.

B. BA Transport Water

The EPA estimated baseline and post-compliance loadings for the final rule using pollutant concentrations for BA transport water and plant-specific flow rates. The EPA used data compiled for the 2020 rule as the basis for estimating BA transport water discharge flows and updated the data set to reflect retirements and other relevant changes in operation (*e.g.,* ash handling conversions, fuel conversions) that have occurred since collecting the 2020 rule data. Under the baseline, which reflects the 2020 rule requirement for the high recycle rate technology option (or BMP plan in the case of Merrimack Station), the EPA estimated discharge flows associated with the purge from remote MDS operation, based on the generating unit capacity and the volume of the remote MDS. Under the zero-discharge option, the EPA estimated a flow rate of zero.

C. CRL

For CRL, the EPA used the average pollutant effluent concentration with plant-specific discharge flow rates to estimate the mass pollutant discharge per plant for baseline and the final rule. The EPA used data compiled for the 2015 rule as the initial basis for estimating discharge flow rates and updated the data to reflect retirements. The EPA also used utilities' "CCR Rule Compliance Data and Information" websites to identify new landfills constructed since 2015 and waste management units that may discharge unmanaged CRL. For new landfills, the EPA used the 2015 methodology to estimate leachate flow proportionate to landfill size, if available, or as the median leachate volume (in gallons per day) calculated from the 2010 steam electric survey. For plants with EGUs no longer burning coal by 2034 (*e.g.*, retired, converted EGUs to natural gas), the EPA adjusted CRL discharge flow rates to account for an expected decrease in CRL volume following the closure of the waste management unit. For discharges of unmanaged CRL, the EPA estimated the volume of leachate-laden groundwater captured from pumping systems that draw down the groundwater elevation along the hydraulically downgradient cross-sectional width of the CCR management unit.

The EPA assigned pollutant concentrations for each analyte based on current operating conditions or treatment in place for the baseline and the operation of a treatment system designed to comply with the final rule. The EPA used data compiled for the 2015 rule, in addition to data gathered as part of this rulemaking (see section VI.A.3 of this preamble), to characterize untreated CRL. Consistent with its methodology for the 2015 rule, the EPA evaluated the new CRL data for use in the untreated CRL analytical dataset and incorporated the data acceptable for the loadings analyses (see section 6.4 of the TDD for more information). The EPA transferred the average FGD effluent concentrations for chemical precipitation, as it did in the 2015 rule.

D. Legacy Wastewater

The EPA estimated baseline and post-compliance loadings for the final rule using pollutant concentrations for legacy wastewater and plant-specific flow rates. The EPA used utilities' "CCR Rule Compliance Data and Information" websites to estimate the volume and type of CCR and water stored in impoundments. The EPA estimated the volume of impounded water (*i.e.*, decant wastewater) and dewatering wastewater for each impoundment primarily using information from the annual inspection reports. To estimate the flow rate, the EPA divided the total volume of legacy wastewater by the closure duration, specified in utilities' closure plans or estimated based on permit cycles. For surface impoundments where the total wastewater volume was unknown, the EPA used the median total estimated volume of wastewater from the impoundments in its analysis and a closure duration of seven years.

The EPA used 2015 rule surface impoundment effluent concentration data sets to estimate baseline loadings as each impoundment in the population varies in the CCR material it contains, including FA, BA, combined ash, and FGD wastewater. The EPA transferred the average FGD effluent concentrations for chemical precipitation, as it did with CRL.

E. Summary of Incremental Changes of Pollutant Loadings from the Final Rule

Compared to the 2020 rule (baseline), the final rule results in a reduction of 656 million pounds of pollutants to surface waters annually. The EPA estimates pollutant removals associated with discharges of unmanaged CRL could amount to between 3.62 and 16.4 million pounds annually. See section VII.C.5 of this preamble for more information regarding the subcategory for discharges of unmanaged CRL.

X. Non-Water Quality Environmental Impacts

The elimination or reduction of one form of pollution may create or aggravate other environmental problems. Therefore, sections 304(b) and 306 of the CWA require the EPA to consider non-water quality environmental impacts (including energy requirements) associated with ELGs. Accordingly, the EPA has considered the potential impacts of this rule on air emissions, solid waste generation, and energy consumption. In general, to conduct this analysis, the EPA used the same methodology (with updated data as applicable) as it did for the analyses supporting the 2015 and 2020 rules. The following sections summarize the methodology and results. See section 7 of the supplemental TDD for additional details.

A. Energy Requirements

Steam electric power plants use energy when transporting ash and other solids on or off site, operating wastewater treatment systems (*e.g.,* chemical precipitation, membrane filtration, SDEs), or operating ash handling systems. For this final rule, the EPA considered whether there would be an associated change in the incremental energy requirements compared to the baseline. The EPA estimated the increase in energy usage in MWh for equipment added to the plant systems or in gallons of fuel consumed for transportation/operating equipment and summed the facility-specific estimates to calculate the net change in energy requirements from the baseline for the final rule.

The EPA estimated the amount of energy needed to operate wastewater treatment systems and ash handling systems based on the horsepower ratings of the pumps and other equipment. The EPA also estimated any changes in the fuel consumption associated with transporting solid waste and combustion residuals (*e.g.,* ash) from steam electric power plants to landfills (on- or off-site). The frequency and distance of transport depends on a plant’s operation and configuration; specific factors include the volume of waste generated and the availability of either an on-site or off-site nonhazardous landfill and its distance from the plant. Table X-1 of this preamble shows the net change in annual electrical energy usage associated with the final rule compared to the baseline, as well as the net change in annual fuel consumption requirements associated with the final rule compared to the baseline.

Table X-1. Estimated Incremental Change in Energy Requirements Associated with the Final Rule Compared to the Baseline

Non-Water Quality Environmental Impact	Energy Use Associated with Final Rule
Electrical energy usage (MWh)	309,000
Fuel (thousand gallons)	116

The EPA estimates that energy use associated with discharges of unmanaged CRL could amount to as much as 280,000 MWh and 442 thousand gallons of fuel annually. See section VII.C.5 of this preamble for more information regarding the subcategory for discharges of unmanaged CRL.

B. Air Pollution

The final rule is expected to affect air pollution through three main mechanisms: (1) changes in auxiliary electricity use by steam electric power plants due to the need to operate wastewater treatment, ash handling, and other systems for compliance with regulatory requirements; (2) changes in transportation-related emissions due to the trucking of CCR waste to landfills; and (3) the change in the profile of electricity generation due to regulatory requirements. This section discusses air emission changes associated with the first two mechanisms and presents the corresponding estimated net changes in air emissions. See section XII.B.3 of this preamble for additional discussion of the third mechanism.

Steam electric power plants generate air emissions from operating transport vehicles, such as dump trucks, which release criteria air pollutants and GHGs. A decrease in energy use or vehicle operation would result in decreased air pollution.

The final rule is projected to result in changes in electrical energy compared to the baseline. To estimate the net air emissions associated with these changes, the EPA combined the energy usage estimates with air emission factors associated with electricity production to calculate air emissions associated with the incremental energy requirements. The EPA estimated NO_X, sulfur dioxide (SO_2), and CO_2 emissions using plant- or NERC-specific emission factors (tons/MWh) obtained from IPM for run year 2035.

To estimate net air emissions changes in the operation of transport vehicles, the EPA used the MOVES4.0 model to identify air emission factors (tons/mile) for the air pollutants of interest. The EPA estimated the annual number of miles that dump trucks moving ash or wastewater treatment solids to on- or off-site landfills would travel for the final rule. The EPA used these estimates to calculate the net change in air emissions for the final rule. Table X-2 of this preamble presents the estimated net change in air emissions associated with auxiliary electricity and transportation for the final rule.

Table X-2. Estimated Net Change in Industry-Level Air Emissions Associated with Auxiliary Electricity and Transportation for the Final Rule Compared to the Baseline

CO_2 (million tons/year)	CH_4 (thousand tons/year)	NO_X (thousand tons/year)	SO_2 (thousand tons/year)
0.14	0.008	0.09	0.12

CH_4 = methane

The EPA estimates that air emissions associated with discharges of unmanaged CRL could amount to as much as 0.048 million tons of CO_2, 0.022 thousand tons of NO_X, and 0.014 thousand tons of SO_2 annually. See section VII.C.5 of this preamble for more information regarding the subcategory for discharges of unmanaged CRL.

The modeled output from IPM predicts that compliance costs attributable to the final rule will result in changes in electricity generation compared to the baseline. These changes in electricity generation are, in turn, predicted to affect the amount of NO_X, SO_2, and CO_2 emissions from steam electric power plants.[182] Table X-3 of this preamble shows a summary of the net change in annual air emissions associated with the final rule for all three mechanisms for the IPM run year 2035. As with costs, the IPM run from the final rule reflects the range of non-water quality environmental impacts associated with the final rule. To provide some perspective on the estimated changes, the EPA compared the estimated change in air emissions to the net amount of air emissions generated in a year by all electric power plants throughout the United States. For a detailed breakout of each of the three sources of air emission changes, see section 7 of the TDD.

Table X-3. Estimated Net Change in Industry-Level Air Emissions Associated with Changes in Auxiliary Electricity, Transportation, and Electricity Generation for the Final Rule Compared to the Baseline in IPM Run Year 2035 and 2020 Emissions

[182] The EPA also considered changes in particulate matter (see section XII.B.3 of this preamble). As explained in the BCA Section 8.1: "IPM outputs include estimated CO_2, NO_X, and SO_2 emissions to air from EGUs. The EPA also used IPM outputs to estimate EGU emissions of primary PM2.5 based on emission factors described in U.S. EPA (2020c). Specifically, the EPA estimated primary $PM_{2.5}$ emissions by multiplying the generation predicted for each IPM plant type (ultrasupercritical coal without carbon capture and storage, combined cycle, combustion turbine, etc.) by a type-specific empirical emission factor derived from the 2016 National Emissions Inventory and other data sources. The emission factors reflect the fuel type (including coal rank), FGD controls, and state emission limits for each plant type, where applicable."

Non-Water Quality Environmental Impact	Change in Emissions	2020 Emissions by Electric Power Generating Industry
CO_2 (million tons/year)	-13	1,650
NO_X (thousand tons/year)	-8.7	1,020
SO_2 (thousand tons/year)	-13	954

C. Solid Waste Generation and Beneficial Use

Steam electric power plants generate solid waste associated with sludge from wastewater treatment systems (*e.g.,* chemical precipitation). The EPA estimates the change in the amount of solids generated under the final rule compared to the baseline as 1.74 million tons per year. The EPA estimates that solid waste generation associated with the treatment of discharges of unmanaged CRL could amount to as much as 4.2 million tons per year.

The EPA also evaluated the potential impacts of diverting FA from current beneficial uses toward encapsulation of membrane filtration brine for disposal in a landfill. According to the latest American Coal Ash Association survey,[183] more than half of the FA generated by coal-fired power plants is being sold for beneficial uses rather than disposed of, and the majority of this beneficially used FA is replacing Portland cement in concrete. This also holds true for the specific facilities currently discharging FGD wastewater and expected to achieve zero discharge under the final rule, as seen by

[183] Available online at: *https://acaa-usa.org/wp-content/uploads/2022/12/2021-Production-and-Use-Survey-Results-FINAL.pdf.*

sales of FA in Schedule 8A of the 2021 EIA-923.[184] Summary statistics of the FA beneficial use percentage for these facilities is displayed in table X-4.

Table X-4. Percent of FA Sold for Beneficial Use at Facilities Discharging FGD Wastewater

Statistic	FA Percent Sold for Beneficial Use
Min	0%
10th	0%
25th	5%
Median	56%
Mean	48%
75th	83%
90th	93%
Max	100%

The EPA also evaluated FA sales at facilities with CRL discharges that achieve zero discharge under the final rule in Schedule 8A of the 2021 EIA-923.[185] Summary statistics of the FA beneficial use percentage for these facilities are displayed in table X-5.

Table X-5. Percent of FA Sold for Beneficial Use at Facilities Discharging CRL

Statistic	FA Percent Sold for Beneficial Use
Min	0%
10th	0%
25th	0%
Median	23%
Mean	38%
75th	81%
90th	100%
Max	100%

[184] Available online at: *https://www.eia.gov/electricity/data/eia923/.*

[185] Available online at: *https://*www.eia.gov/electricity/data/eia923/.

In the CCR rule,[186] the EPA noted that FA replacing Portland cement in concrete would result in significant avoided environmental impacts to energy use, water use, GHG emissions, air emissions, and waterborne wastes.

For the final rule, the EPA is identifying zero-discharge systems as the technology basis for establishing BAT limitations to control pollutants discharged in FGD wastewater and CRL. More specifically, the technology basis for BAT is membrane filtration systems, SDEs, and thermal evaporation systems (see section VII.B of this preamble for more details). For the final rule, the EPA made several updates to its FA analysis, including the following: revising estimates of the amount of FA required for brine encapsulation, revising estimates of the amount of FA available at each plant for brine encapsulation, adding costs for steam electric power plants that would need to purchase additional FA for brine encapsulation, adding costs for disposal of the additional FA, and revising compliance costs by selecting the least costly zero-discharge technology for FGD and/or CRL. See section 5 of the TDD and the EPA's *2024 Steam Electric Supplemental Final Rule: Fly Ash Analysis* memorandum (DCN SE11692) for more details. The EPA found that 17 of the 26 steam electric power plants with FGD wastewater discharges produce enough FA for the EPA's estimated brine encapsulation if they do not sell any FA. Two plants with a FA deficit are expected to retire or undergo fuel conversion prior to December 31, 2034, and will not need to meet zero-discharge requirements under the final rule. The EPA expects that the other seven plants with a FA deficit will install SDEs (or another technology at a lower cost) that will not require the

[186] Available online at: *https://www.regulations.gov*. Docket ID: EPA-HQ-RCRA-2009-0640.

use of FA for encapsulation to meet the final rule requirements. In addition, plants may be able to manage the FA deficit through FGD scrubber purge management and using a different brine encapsulation recipe (*e.g.*, include additional lime).

The EPA also found 61 of the 90 steam electric power plants with CRL discharges produce enough FA for the EPA's estimated brine encapsulation, even after accounting for encapsulation for FGD wastewater treatment. Thirteen of the 29 plants with a FA deficit will retire or undergo fuel conversion prior to December 31, 2034, and will not need to meet zero discharge requirements under the final rule. The EPA expects that the other 16 plants with a FA deficit will either purchase FA (accounted for in the EPA's cost estimates), manage the deficit using approaches described above for FGD wastewater, or install SDEs (or another technology at a lower cost) which will not require the use of FA for encapsulation to meet the final rule requirements. See additional discussion in section VII.B.1.a of this preamble.

D. Changes in Water Use

Steam electric power plants typically use water for handling solid waste, including ash, and for operating wet FGD scrubbers. The technology basis for FGD wastewater in the 2020 rule, chemical precipitation plus LRTR, was not expected to reduce or increase the volume of water used. Under this final rule, plants that install a membrane filtration or thermal evaporation system for FGD wastewater treatment are assumed to decrease their water use compared to the baseline by recycling all permeate back into the FGD system, which would avoid the costs of pumping or treating new makeup water. Therefore, the EPA estimated the reduction in water use resulting from membrane filtration or thermal evaporation treatment as equal to the estimated volume of the permeate stream from the membrane filtration system.

The BA transport technologies associated with the baseline and the final rule for BA transport water eliminate or reduce the volume of water used by wet sluicing BA operating systems. The 2020 rule established limitations based on plants operating a high recycle rate system, allowing up to a 10 percent purge of the total system volume. As part of this rule, the EPA is establishing zero-discharge requirements for BA handling. Thus, for the final rule, the EPA expects to see a decrease in water use for BA handling operations because plants that operate zero discharge BA handling systems are assumed to decrease their water use compared to baseline by recycling all transport water back to the BA handling system, which would avoid the costs of pumping or treating new makeup water. The EPA estimated the reduction in water use resulting from complete recycle as equal to the estimated volume of the percent purge (estimated to be 2 percent).

The EPA does not expect a change in water use associated with the treatment technology considered for the treatment of CRL or legacy wastewater as part of this final rule.

Overall, the EPA estimates that plants would decrease their water use by 5.52 million gallons per day (MGD) compared to the baseline under the final rule.

XI. Environmental Assessment

A. Introduction

The EPA conducted an environmental assessment for this final rule. The Agency reviewed available literature on the documented environmental and human health effects of the pollutants discharged in steam electric power plant FGD wastewater, BA transport water, CRL, and legacy wastewater. The EPA conducted modeling to determine the impacts of pollutant discharges from the plants that are regulated by this final rule. For the reasons described in section VIII of this preamble, the baseline for these analyses appropriately consists of the environmental and human health results of achieving the 2020 rule requirements (the same baseline the EPA used to evaluate costs, benefits, and pollutant loadings). Under this assessment, the EPA compared the change in impacts associated with the final rule to those projected under the baseline.

The EA presents information from the EPA's review of the scientific literature and documented cases of impacts of pollutants discharged in steam electric power plant wastewater on human health and the environment, as well as a description of EPA's modeling methodology and results. The EA contains information on literature that the EPA has reviewed since the 2020 rule, updates to the environmental assessment analyses, and modeling results for the final rule. The 2015 EA (EPA-821-R-15-006) and 2020 EA (EPA 821-R-20-002) provide information from the EPA's earlier review of the scientific literature and of documented cases of the impacts on human health and the environment associated with the wider range of steam electric power plant wastewater discharges addressed in the 2015 rule, as well as a full description of the EPA's modeling methodology.

Current scientific literature indicates that untreated steam electric power plant wastewaters, such as FGD wastewater, BA transport water, CRL, and legacy wastewater, contain large amounts of a wide range of pollutants, some of which are toxic and bioaccumulative and cause detrimental environmental and human health impacts. For additional information, see section 2 of the EA. The EPA also considered environmental and human health effects associated with changes in air emissions, solid waste generation, and water withdrawals. sections X and XII of this preamble discuss these effects.

B. Updates to the Environmental Assessment Methodology

For this rule, the EPA used the steady-state, national-scale immediate receiving water (IRW) model to evaluate the direct and indirect discharges from steam electric power plants. This model was also used for the 2015 and 2020 ELG rules and 2015 CCR rule. The model focused on impacts within the immediate surface waters where discharges occurred (defined as the closest segments of approximately 0.25 miles to five miles long). The EPA also modeled receiving water concentrations downstream from steam electric power plant discharges using a downstream fate and transport model (*see* section XII). For this final rule, the Agency updated pollutant-specific benchmarks based on revised guidance and standards. The environmental assessment also incorporates changes to the industry profile outlined in section V of this preamble.

C. Outputs from the Environmental Assessment

Based on comparisons to the baseline, the EPA estimated environmental and ecological changes associated with the changes in pollutant loadings expected under the final rule. These environmental and ecological changes include changes in impacts to wildlife and humans. More specifically, the environmental assessment evaluated changes in: (1) surface water quality, (2) impacts to wildlife, (3) number of receiving waters with potential human health cancer risks, (4) number of receiving waters with potential to cause noncancer human health effects, and (5) metal and nutrient discharges to sensitive waters (*e.g.*, CWA section 303(d) impaired waters).[187] The EPA also evaluated other unqantified environmental changes (*e.g*., ground water quality and attractive nuisances), as well as further impacts as described in section XII.

As described in the EA, the EPA focused its quantitative analyses on the changes in environmental and human health impacts associated with exposure to toxic, bioaccumulative pollutants via the surface water pathway. The EPA modeled changes levels of toxic, bioaccumulative pollutants in discharges of FGD wastewater, BA transport water, CRL, and legacy wastewater into rivers, streams, and lakes, including reservoirs. The EPA also addressed environmental impacts from nutrients in the EA, as well as in a separate analysis in section XII of this preamble.

The environmental assessment concentrates on impacts to aquatic life based on changes in surface water quality; impacts to aquatic life based on changes in sediment quality in surface waters; impacts to wildlife from consumption of contaminated aquatic organisms; and impacts to human health from consumption of contaminated fish and water. The EA discusses, with quantified results, the estimated environmental

[187] For the proposed rule, the EPA evaluated potential cumulative impacts (joint toxic action) based on interaction profiles (*Supplemental Environmental Assessment for the Proposed Revisions to the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* (EPA-821-R-23-004). DCN SE10328). EPA did not receive any comment on the analysis and provides a qualitative summary in the EA for the final rule based on the previous analysis.

improvements within the immediate receiving waters due to the pollutant loading reductions associated with the final rule compared to the 2020 rule.

XII. Benefits Analysis

This section summarizes the national environmental benefits due to changes in steam electric power plant discharges. The BCA report provides additional details on the benefits methodologies and analyses. The analysis methodology for quantified benefits is generally the same that EPA used for the 2015 and 2020 rule*s*, but with revised inputs and assumptions that reflect updated data and regulatory options. Consistent with the analysis of social costs, the EPA analyzed benefits of changes occurring in 2025 through 2049. The rule benefits are projected to begin accruing when each plant implements the control technologies needed to comply with any applicable BAT effluent limitations or pretreatment standards. As discussed in the BCA, for the purpose of the economic impact and benefit analysis, EPA generally estimates that plants will implement control technologies to meet the applicable rule limitations and standards as their permits are renewed, and no later than December 31, 2029. This schedule recognizes that control technology implementation is likely to be staggered over time across the universe of steam electric power plants. The period of analysis extends to 2049 to capture the estimated life of the compliance technology at any steam electric power plant (20 or more years), starting from the year of technology implementation, which can be as late as 2029. Benefits are annualized over 25 years.

A. Categories of Benefits Analyzed

Table XII-1 of this preamble summarizes benefit categories associated with the final rule. Analyzed benefits fall into four broad categories: (1) human health benefits from surface water quality improvements, (2) ecological conditions and recreational use effects from surface water quality changes, (3) market and productivity benefits, and (4) air-related effects.[188] Within these broad categories, the EPA was able to assess the benefits of the final rule with varying degrees of completeness and rigor. Where possible, the EPA quantified the expected changes in effects and estimated monetary values. However, data limitations, modeling limitations, and gaps in the understanding of how society values certain environmental changes prevented the EPA from quantifying and/or monetizing some benefit categories.

The following section summarizes the EPA's analysis of the benefit categories the Agency was able to partially quantify and/or monetize to various degrees (identified in the columns of table XII-1 of this preamble). The EPA reviewed comments received in response to the proposed rule on the extent to which partially quantified benefits (*e.g.*, some health endpoints) or unquantified benefits (*e.g.*, cost savings to drinking water systems) could be more fully quantified and/or monetized. In the final rule analysis, the Agency revised its approach to quantify and monetize additional benefits, including those associated with avoided cardiovascular disease premature mortality from reduced lead exposure and those associated with avoided drinking water treatment costs. The final rule

[188] Consistent with Office of Management and Budget Circular A-4 (2023), EPA appropriately considers additional benefits of this action (*e.g.*, air benefits). Circular A-4 (2023) states:

> "Your analysis should look beyond the obvious benefits and costs of your regulation and consider any important additional benefits or costs, when feasible. . . . These sorts of effects sometimes are referred to by other names: for example, indirect or ancillary benefits and costs, co-benefits, or countervailing risks."

also affects additional benefit categories that the Agency was not able to quantify or monetize at all. The BCA further describes some of these important nonmonetized benefits. The EPA notes that all human health and environmental improvements discussed in the EA also represent benefits of the final rule (whether quantified or unquantified).

Table XII-1. Summary of Estimated Benefits Categories

Benefit Category	Quantified and Monetized	Quantified, but Not Monetized	Neither Quantified nor Monetized (Analyzed Qualitatively)
Human Health Benefits from Surface Water Quality Improvements			
Changes in incidence of bladder cancer from exposure to total trihalomethanes (TTHM) in drinking water	✓		
Changes in incidence of cancer from arsenic exposure via consumption of self-caught fish		✓	
Changes in incidence of cardiovascular disease from lead exposure via consumption of self-caught fish	✓		
Changes in incidence of other cancer and noncancer adverse health effects (*e.g.*, reproductive, immunological, neurological, circulatory, or respiratory toxicity) due to exposure to arsenic, lead, cadmium, and other toxics from consumption of self-caught fish or drinking water		✓	
Changes in IQ loss in children from lead exposure via consumption of self-caught fish, including changes in specialized education needs for children from lead exposure via consumption of self-caught fish	✓		
Changes in IQ loss in infants from *in utero* mercury exposure via maternal consumption of self-caught fish	✓		
Changes in health hazards from exposure to pollutants in waters used recreationally (*e.g.*, swimming)		✓	

Ecological Condition and Recreational Use Effects from Surface Water Quality Changes			
Benefits from changes in surface water quality, including: aquatic and wildlife habitat; water-based recreation, including fishing, swimming, boating, and near-water activities; aesthetic benefits, such as enhancement of adjoining site amenities (*e.g.*, residing, working, traveling, and owning property near the water);[a] and nonuse value (existence, option, and bequest value from improved ecosystem health)[a]	✓		
Benefits from protection of threatened and endangered species		✓	
Changes in sediment contamination			✓
Market and Productivity Benefits			
Changes in water treatment costs for municipal drinking water	✓		
Changes in water treatment costs for irrigation water and industrial process			✓
Changes in commercial fisheries yields			✓
Changes in tourism and participation in water-based recreation			✓
Changes in property values from water quality changes			✓
Changes in maintenance dredging of navigational waterways and reservoirs due to changes in sediment discharges	✓		
Air-Related Effects			
Human health benefits from changes in morbidity and mortality from exposure to NO_X, SO_2, and $PM_{2.5}$	✓		
Avoided climate change impacts from GHG emissions	✓		

[a]. Some, although not necessarily all, of these values are implicit in the total willingness to pay (WTP) for water quality improvements.

B. Quantification and Monetization of Benefits

1. Human Health Effects From Surface Water Quality Changes

Changes in pollutant discharges from steam electric power plants affect human health in multiple ways. Exposure to pollutants in steam electric power plant discharges via consumption of fish from affected waters can cause a wide variety of adverse health effects, including cancer, kidney damage, nervous system damage, fatigue, irritability, liver damage, circulatory system damage, vomiting, diarrhea, and IQ loss. Exposure to drinking water containing brominated disinfection byproducts can cause adverse health effects such as bladder cancer and reproductive and fetal development issues. Because the final rule will reduce discharges of steam electric pollutants into waterbodies that directly receive or are downstream from these discharges, it may reduce the incidence of associated illnesses, even if by relatively small amounts.

Due to data limitations and uncertainties, the EPA can only monetize a subset of the health benefits associated with changes in pollutant discharges from steam electric power plants resulting from the final rule. The EPA estimated changes in the number of individuals experiencing adverse human health effects in the populations exposed to steam electric discharges and/or altered exposure levels and valued these changes using different monetization methods for different benefit endpoints.

The EPA estimated changes in health risks from the consumption of contaminated fish from waterbodies within 50 miles of households. The EPA used Census block group population data and region-specific average fishing rates to estimate the exposed population. The EPA used cohort-specific fish consumption rates and waterbody-specific fish tissue concentration estimates to calculate potential exposure to steam electric pollutants in recreational fishers' households. Cohorts were defined by age, sex, race/ethnicity, and fishing mode (recreational or subsistence). EPA used these data to quantify and monetize changes in three categories of human health effects, which are further detailed in the BCA Report: (1) reduction in IQ loss from lead exposure via fish consumption in children aged zero to seven, (2) reduction in cardiovascular disease premature mortality from lead exposure via fish consumption and (3) reduction in *in* *utero* mercury exposure via maternal fish consumption and associated IQ loss. The EPA also analyzed the reduction in the incidence of skin cancer from arsenic exposure via fish consumption but found negligible changes and therefore did not monetize the associated benefits.

EPA estimated the annualized human health benefits of surface water quality changes of the final rule and the resultant reduction in pollutant exposure from consuming self-caught fish to range between $2.18 million and $2.45 million using a two percent discount rate. Most of these monetized benefits are associated with the changes in mercury exposure. section 5 of the BCA provides additional detail on the methodology.

The EPA also estimated changes in bladder cancer incidence from the use and consumption of drinking water with lower levels of total trihalomethanes (TTHMs) resulting from reductions in bromide discharges under the final rule. The EPA estimated changes in cancer risks within populations served by drinking water treatment plants with intakes on surface waters affected by bromide discharges from steam electric power plants. The EPA used the service area of each public water system to estimate and characterize the exposed population. The EPA modeled changes in waterbody-specific bromide concentrations and changes in facility-specific TTHM concentrations at drinking water treatment facilities to calculate potential reductions in TTHM exposure and associated health benefits. To value changes in the economic burden associated with cancer morbidity, the EPA used base WTP estimates from Bosworth, Cameron, and DeShazo (2009) for colon/bladder cancer. To value changes in excess mortality from bladder cancer, the EPA used the estimated value of a statistical life (VSL) for each year in the period of analysis (from $13.54 million per death in 2025 to $16.36 million per death in 2049).

The final rule is estimated to result in a total of 98 avoided cancer cases and 28 avoided premature excess deaths by reducing TTHM exposure during the period 2025-2049. The associated annualized benefits are $13.4 million using a two percent discount rate.

The formation of TTHM in a particular water treatment system is a function of several site-specific factors, including chlorine, bromine, and organic carbon concentrations; and temperature and pH of the water; and the system residence time. The EPA did not collect site-specific information on these factors at each potentially affected drinking water treatment facility. Instead, the EPA's analysis only addresses the estimated site-specific changes in bromides. The EPA used the national relationship between changes in TTHM exposure and changes in incidence of bladder cancer modeled by Regli et al. (2015)[189] and Weisman et al. (2022).[190] Thus, while the national changes in TTHM exposure and bladder cancer incidence are the EPA's best estimate given estimated changes in bromide, the EPA cautions that estimates for any specific drinking

[189] Regli, S., Chen, J., Messner, M., Elovitz, M. S., Letkiewicz, F. J., Pegram, R. A., . . . Wright, J. M. (2015). *Estimating Potential Increased Bladder Cancer Risk Due to Increased Bromide Concentrations in Sources of Disinfected Drinking Waters*. Environmental Science & Technology, 49(22), 13094–13102. Available online at: *https://doi.org/10.1021/acs.est.5b03547*.

[190] Weisman, R., Heinrich, A., Letkiewicz, F., Messner, M., Studer, K., Wang, L., . . . Regli, S. (2022). *Estimating National Exposures and Potential Bladder Cancer Cases Associated with Chlorination DBPs in U.S. Drinking Water*. Environmental Health Perspectives, 130:8, 087002-1–087002-10. Available online at: *https://ehp.niehs.nih.gov/doi/full/10.1289/EHP9985*.

water treatment facility could be over- or underestimated. Additional details on this analysis are provided in section 4 of the BCA.

2. Ecological Condition and Recreational Use Effects from Changes in Surface Water Quality Improvements

The EPA evaluated whether the final rule would alter aquatic habitats and human welfare by reducing concentrations of harmful pollutants such as arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, nitrogen, phosphorus, and suspended sediment relative to baseline. These changes may affect the usability of some recreational waters relative to baseline, thereby affecting recreational users. Changes in pollutant loadings can also change the attractiveness of recreational waters by making recreational trips more or less enjoyable. The final rule may also change nonuse values stemming from bequest, altruism, and existence motivations. Individuals may value water quality maintenance, ecosystem protection, and healthy species populations independent of any use of those attributes.

The EPA uses a water quality index (WQI) to translate water quality measurements, gathered for multiple parameters that indicate various aspects of water quality, into a single numerical indicator. The indicator reflects achievement of quality consistent with the suitability for certain uses. The WQI includes seven parameters: dissolved oxygen, biochemical oxygen demand, fecal coliform, total nitrogen, total phosphorus, TSS, and one aggregate subindex for toxics. The EPA modeled changes in four of these parameters and held the remaining parameters (dissolved oxygen, biochemical oxygen demand, and fecal coliform) constant for the purposes of this analysis.

The EPA estimated the change in monetized benefit values using an updated version of the meta-regressions of surface water valuation studies used in the benefit analyses of the 2015 and 2020 rules. The meta-regressions quantify average household WTP for incremental improvements in surface water quality. section 6 of the BCA provides additional detail on the valuation methodology.

An estimated 58.9 million households reside in Census block groups that are within 100 miles of reaches that are affected by the final rule.[191] The central tendency estimate of the total WTP for water quality changes associated with reductions in metal pollutants (arsenic, cadmium, chromium, copper, lead, mercury, zinc, and nickel), nonmetal pollutants (selenium), nutrient pollutants (phosphorus and nitrogen under the final rule is $1.24 million using a two percent discount rate. The average WTP per household is $0.02 per year.

3. Changes in Air-Quality-Related Effects

The EPA expects the final rule to affect air pollution through three main mechanisms: (1) changes in auxiliary electricity use by steam electric facilities due to the need to operate wastewater treatment, ash handling, and other systems for compliance with the final rule; (2) changes in transportation-related air emissions due to changes in the trucking of CCR waste to landfills; and (3) changes in the electricity generation

[191] A reach is a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope.

profile due to increases in wastewater treatment costs compared to baseline and the resulting changes in EGU relative operating costs.

Changes in the electricity generation profile can increase or decrease air pollutant emissions because emission factors vary for different types of EGUs. For this analysis, the changes in air emissions are based on the change in dispatch of EGUs as projected by IPM after overlaying the costs of complying with the final rule onto EGUs' production costs. As discussed in section VIII of this preamble, the IPM analysis accounts for the effects of other regulations on the electric power sector, as well as provisions of the IRA.

The EPA evaluated potential effects resulting from net changes in air emissions of five pollutants: CO_2, CH_4, NO_X, SO_2, and primary $PM_{2.5}$. CO_2 and CH_4 are key GHGs linked to a wide range of climate-related effects. CO_2 is also the main GHG emitted from coal power plants. NO_X and SO_2 are precursors to $PM_{2.5}$, which are also emitted directly, and NO_X is an ozone precursor. These air pollutants cause a variety of adverse health effects including premature mortality, nonfatal heart attacks, hospital admissions, emergency department visits, upper and lower respiratory symptoms, acute bronchitis, aggravated asthma, lost work and school days, and acute respiratory symptoms.

Table XII-2 of this preamble shows the changes in emissions of CO_2, CH_4, NO_X, SO_2, and primary $PM_{2.5}$ under the final rule relative to the baseline for selected IPM run years. The final rule will result in a net reduction in air emissions of four pollutants, and a small increase in CH_4 emissions due to the increased trucking of CCR waste to landfills. This effect is driven mostly by the estimated changes in the profile of electricity generation, as emission reductions due to shifts in modeled EGU dispatch and energy sources offset relatively small increases in air emissions from increased electricity use and trucking by steam electric power plants.

Table XII-2. Estimated Changes in Air Pollutant Emissions Under the Final Rule Compared to Baseline

Year	CO_2 (Million Short Tons/Year)	CH_4 (Thousand Short Tons/Year)	NO_X (Thousand Short Tons/Year)	SO_2 (Thousand Short Tons/Year)	Primary $PM_{2.5}$ (Thousand Short Tons/Year)
2028	-16.4	0.0042	-8.9	-10.7	-0.63
2030	-10.8	0.0083	-7.3	-2.4	-0.38
2035	-12.6	0.0083	-8.7	-12.5	-0.25
2040	-1.9	0.0083	-3.1	-2.2	-0.16
2045	-1.3	0.0083	-0.6	-0.9	-0.09
2050	-0.6	0.0079	-0.4	-0.7	-0.12

The EPA estimated the monetized value of human health benefits among populations exposed to changes in $PM_{2.5}$ and ozone. The final rule is expected to alter the emissions of primary $PM_{2.5}$, SO_2 and NO_X, which will in turn affect the level of $PM_{2.5}$ and ozone in the atmosphere. Using photochemical modeling, the EPA predicted the change in the annual average $PM_{2.5}$ and summer season ozone across the United States. The EPA next quantified the human health impacts and economic value of these changes in air quality using the environmental Benefits Mapping and Analysis Program—Community Edition.

To estimate the climate benefits associated with changes in CO_2 and CH_4 emissions, the EPA used social cost of greenhouse gas (SC-GHG) estimates specifically, estimates of the social cost of carbon (SC-CO_2) and social cost of methane (SC-CH_4). The SC-GHG is an estimate of the monetary value of the net harm to society associated with emitting a metric ton of the GHG in question into the atmosphere in a given year, or the benefit of avoiding those emissions.[192]

To estimate the net climate benefits of CO_2 emission reductions expected from the final rule and disbenefits of increases in CH_4 emissions, the EPA used the SC-GHG estimates presented in the 2023 final rule Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review (U.S. EPA, 2023). These estimates reflect recent advances in the scientific literature on climate change and its economic impacts and incorporate recommendations made by the National Academies (National Academies, 2017). See section 8 of the BCA for more discussion of the SC-GHG values.

Table XII-3 of this preamble shows the annualized climate change, $PM_{2.5}$, and ozone-related human health benefits for the final rule. Climate change benefits are presented for the three near-term Ramsey discount rates used in developing the SC-GHG values, whereas the $PM_{2.5}$ and ozone-related human health benefits are based on long-term ozone exposure mortality risk estimates and with a two percent discount rate. See section 8 of the BCA for benefits based on pooled short-term ozone exposure mortality risk estimates.

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[192] In principle, the SC-GHG includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk and natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. The SC-GHG therefore, reflects the societal value of reducing emissions of by one metric ton. The EPA and other Federal agencies began regularly incorporating estimates of SC-CO_2 in their benefit-cost analyses conducted under Executive Order 12866 since 2008, following a Ninth Circuit Court of Appeals remand of a rule for failing to monetize the benefits of reducing CO_2 emissions in a rulemaking process.

Table XII-3. Annualized Benefits of Estimated Changes in Air Pollutant Emissions Under the Final Rule Compared to the Baseline (Millions of 2023$)

SC-GHG Near-term Ramsey Discount Rate	Climate Change Benefits	PM2.5 and Ozone Related Human Health Benefits at 2% Discount Ratea	Total
2.5%	$990	$1,600	$2,600
2.0%	$1,600	$1,600	$3,200
1.5%	$2,600	$1,600	$4,200

[a]. Reflects long-term ozone exposure mortality risk estimate.

The estimates of monetized benefits shown here do not include several important benefit categories, such as direct exposure to SO_2, NO_X, and HAPs, including mercury and hydrogen chloride. Although the EPA does not have sufficient information or modeling available to provide monetized estimates of changes in exposure to these pollutants for the final rule, the EPA includes a discussion of these unquantified benefits in the BCA. For more information on the benefits analysis, see section 8 of the BCA.

4. Other Quantified and/or Monetized Benefits

a. Changes in Drinking Water Treatment Costs

The final rule will decrease discharges of pollutants that affect the costs of treating drinking water. TSS affects turbidity of source water, which drinking water systems treat by adding chemical coagulants to bond to the sediment particles. Drinking water systems thus accrue incremental costs related to purchases of coagulants as well as costs from disposal of coagulant sediment sludge. In addition, drinking water systems address taste and odor issues linked to excess nutrients (such as nitrogen) and associated eutrophication in source water. The EPA identified drinking water systems whose source waters are likely to see reductions in TSS and total nitrogen under the final rule, then estimated changes in source water concentrations of the pollutants for those systems. The

EPA then estimated treatment cost savings associated with reductions in TSS and total nitrogen using a treatment cost elasticity approach (see Price and Heberling (2018) for a review of the literature on drinking water treatment cost elasticities). The EPA estimated cost changes relating to treatment O&M costs alone, assuming no net savings from any capital improvements drinking water systems already made. The EPA did not quantify avoided drinking water treatment costs associated with reductions in pollutants such as phosphorus, halogens, and metals due to uncertainties in the elasticity between source water concentrations of these parameters and drinking water treatment costs, lack of information on baseline concentrations of these pollutants at source water intakes, and the possibility of double-counting treatment cost savings for particular pollutants. The EPA expects that the final rule will provide relatively small annualized benefits from reductions in nitrogen and total suspended solids in the form of drinking water treatment cost savings of $460,000 to $552,000 per year, calculated using a 2 percent discount rate.

b. Changes in Dredging Costs

The final rule affects discharge loadings of various categories of pollutants, including TSS. As a result, the final rule is expected to change the rate of sediment deposition in affected waterbodies, including navigable waterways and reservoirs that require dredging for maintenance. The EPA estimated very small benefits from changes in sedimentation and associated maintenance dredging costs in reaches and reservoirs affected by steam electric power plant discharges. section 9 of the BCA provides additional detail on the methodology.

c. Benefits to Threatened and Endangered Species

To assess the potential for the final rule to benefit threatened and endangered species (both aquatic and terrestrial) relative to the 2020 ELG baseline, the EPA analyzed the overlap between waters expected to see reductions in wildlife water quality criteria exceedance status under the final rule and the known critical habitat locations of high-vulnerability threatened and endangered species. The EPA examined the life history traits of potentially affected threatened and endangered species and categorized the species by potential for population impacts due to surface water quality changes. section 7 of the BCA provides additional detail on the methodology. The EPA's analysis showed that, of the species categorized as having higher vulnerability to water pollution, 30 have known critical habitats overlap with surface waters affected by steam electric power plant discharges. Improvements under the final rule between 2025 and 2029 are estimated to potentially benefit 10 of these species, whereas improvements projected after 2030 are estimated to benefit 12 species. Principal sources of uncertainty include the specifics of how changes under the final rule will impact threatened and endangered species, exact spatial distribution of the species, and additional species of concern not considered.

C. Total Monetized Benefits

Using the analysis approach described above, the EPA estimated annualized benefits of the final rule for all monetized categories. The final rule has monetized benefits estimated at $3,217 million using a two percent discount rate, as shown in table XII-4.

Table XII-4. Summary of Total Estimated Annualized Monetized Benefits at Two Percent [Millions of 2023$]

Benefit Category	Annualized Benefits (Million 2023$, 2 Percent Discount)
Human Health Effects from Water Quality Changes	
Changes in IQ losses in children from exposure to lead[a]	<$0.01
Changes in cardiovascular disease premature mortality from exposure to lead	$0.16 – $0.43
Changes in IQ losses in children from exposure to mercury	$1.98
Reduced cancer risk from disinfection byproducts in drinking water	$13.37
Ecological Conditions and Recreational Use Changes	
Use and nonuse values for water quality improvements	$1.24
Market and Productivity[a]	
Changes in drinking water treatment costs	$0.46 – $0.55
Changes in dredging costs[a]	<$0.01
Air-Related Effects	
Changes in GHG air emissions[b,c]	$1,600
Changes in human health effects from Changes in NO_X and SO_2 emissions[b]	$1,600
Total	**$3,217**

[a] An annualized benefit of "<$0.01" indicates that the monetary value is greater than $0 but less than $0.01 million.

[b] Values for air-quality related effects are rounded to two significant figures.

[c] Changes in CO_2 and CH_4 emissions monetized using SC-GHG estimates under the 2% near-term Ramsey discount rate. See section XII.B.3 and section 8 in the BCA for benefits monetized using SC-GHG estimates based on 1.5% and 2.5% near-term Ramsey discount rates.

D. Additional Benefits

The monetary value of the final rule's effects on social welfare does not account for all effects of the rule because, as described above, the EPA is currently unable to quantify and/or monetize some categories. The EPA anticipates that the final rule will also generate important unquantified benefits, including but not limited to:

- health benefits to over 30 million people who, due to reductions in PWS-level arsenic, lead, and thallium concentrations, will experience reductions in unmonetized cancer and non-cancer effects from exposure to toxic pollutants from consumption of fish or drinking water;

- unquantified and unmonetized averted IQ losses and educational effects from childhood lead exposure and *in-utero* mercury exposure from fish consumption by households that do not engage in recreational or subsistence fishing;
- improved habitat conditions for plants, invertebrates, fish, amphibians, and the wildlife that prey on aquatic organisms;
- enhanced ecosystem productivity and health, including reduced toxic discharges into habitats of over 100 high-vulnerability threatened and endangered species;
- additional changes to water treatment costs for drinking water, irrigation, and agricultural uses;
- changes in fisheries yield and harvest quality from aquatic habitat changes;
- changes in health hazards from recreational exposures; and
- groundwater quality impacts.

While some health benefits and WTP for water quality improvements have been partially quantified and/or monetized, those estimates may not fully capture all important water quality-related benefits. Although the following quantifications cannot necessarily be combined with other monetized effects, another way to characterize the benefits is that the final rule is expected to result in a 53 percent reduction in chronic exceedances and a 33 percent reduction in acute exceedances of the national recommended water quality criteria. It is also expected to result in a reduction of up to a 63 percent in the number of immediate receiving water reaches with ambient concentrations exceeding human health criteria for at least one pollutant.

The BCA discusses changes in these potentially important effects qualitatively, indicating their potential magnitude where possible.

XIII. Environmental Justice Impacts

Consistent with the EPA's commitment to advancing environmental justice (EJ) in the Agency's actions, the Agency has analyzed the impacts of this action on communities with EJ concerns and sought input and feedback from stakeholders representing these communities. The EPA has prepared this analysis to implement the recommendations of the Agency's EJ Technical Guidance.[193] For ELG rulemakings, an analysis of EJ impacts is typically conducted as part of the BCA alongside other non-statutorily required analyses such as monetized benefits. However, for this action, the analysis was placed in a standalone EJA document to provide the public with a more detailed discussion of the potential EJ impacts of this action and the initial outreach to communities with potential EJ impacts. The analysis does not form a basis or rationale for any of the actions the EPA is taking in this rulemaking.

Overall, EPA's EJ analysis showed the final rule will reduce differential baseline exposures to pollutants in wastewater and resulting human impacts for population groups of concern when considering potential EJ implications of this regulatory action. E.O. 12898 identifies a number of population groups of concern including minority populations, low-income populations, and Indigenous peoples in the United States and its territories and possessions. In this particular analysis, improvements to water quality, wildlife, and human health resulting from reductions in pollutants in surface water will be distributed more among low-income populations and some people of color under some or all of the regulatory options for this final rule.

[193] U.S. EPA (Environmental Protection Agency). 2016. *Technical Guidance for Assessing Environmental Justice in Regulatory Analysis*. June. Available online at: *https://www.epa.gov/environmentaljustice/technical-guidance-assessing-environmental-justice-regulatory-analysis.*

Reductions in TTHM concentrations in drinking water and resulting reductions in bladder cancer cases and excess bladder cancer deaths will also be distributed more among communities with EJ concerns under the final rule. Remaining exposures, impacts, and benefits analyzed are small enough that EPA could not conclude whether changes in baseline disproportionate impacts would occur, such as reductions in avoided IQ point losses among children exposed to lead from fish consumption which were estimated to be a total of one avoided IQ point loss across approximately 1.5 million children.

Although the changes in GHGs attributable to the final rule are small compared to worldwide emissions, findings from peer-reviewed evaluations demonstrate that actions that reduce GHG emissions are also likely to reduce climate-related impacts on communities with EJ concerns.

At the national level, upper bound average compliance costs per residential households under the final rule are $3.14 per year. Costs of the final rule in terms of electricity price increases among residential households may impact low-income households and households of color more relative to all households as low-income households and households of color tend to spend a greater proportion of their income on energy expenditures. Despite this, the potential price increases under the upper bound cost scenario represent between less than 0.1 percent and 0.2 percent of energy expenditures for all income, race groups, and income quintiles, and therefore the EPA does not expect costs to have a substantial impact on low-income households and households of color. The methodology and findings of the EJA are described in further detail below.

A. Literature Review

The EPA conducted a literature review to identify academic research and articles on EJ concerns related to coal-fired power plants. The EPA identified eight papers that focused on coal-fired power plants in the United States that were directly relevant to this final rule. The findings of these papers suggest that coal-fired power plants tend to be in poor communities, Indigenous communities, and communities of color. Toomey (2013) reported that 78 percent of African Americans in the United States live within a 30-mile radius of a coal-fired power plant.[194] Impacts discussed in the reports included adverse health impacts resulting from air pollutants (*e.g.*, SO_2, NO_X, $PM_{2.5}$) for those living in proximity to coal-fired power plants, climate justice issues resulting from GHG emissions, and risk of impoundment failures for populations living in proximity to coal waste surface impoundments where coal is mined.[195, 196, 197] All these impacts were found

[194] Toomey, D. 2013. *Coal Pollution and the Fight for Environmental Justice*. Yale Environment 360. June 19. Available online at: *https://www.e360.yale.edu/features/naacp_jacqueline_patterson_coal_pollution_and_fight_for_environmental_justice.*

[195] Liévanos, R.S., Greenberg, P., Wishart, R. 2018. *In the Shadow of Production: Coal Waste Accumulation and Environmental Inequality Formation in Eastern Kentucky*. Social Science Research, Vol. 71: pp. 37–55.

[196] Israel, B. 2012. *Coal Plants Smother Communities of Color. Scientific American. Available online at: https://www.scientificamerican.com/article/coal-plants-smother-communities-of-color/#:~:text=People%20living%20near%20coal%20plants,percent%20are%20people%20of%20color*.

[197] NAACP (National Association for the Advancement of Colored People). 2012. *Coal Blooded: Putting Profits Before People*. Available online at: https://*www.naacp.org/resources/coal-blooded-putting-profits-people*.

in one or more papers to differentially impact poor communities, Indigenous communities, and communities of color. For further discussion of the literature review, see section 2 of the EJA.

B. Proximity Analysis

The EPA performed proximity analyses to identify and characterize the communities that are expected to be impacted by discharges from steam electric plants via relevant exposure pathways. First, the EPA used geographic information system (GIS) software to map out 1- and 3-mile buffers around each facility. A buffer is a zone that extends a specified distance in every direction from a point on a map. The EPA then assessed potential air impacts within those zones. The 1- and 3- mile distances were chosen to be consistent with the buffer distances used by the Office of Air and Radiation when performing screening analyses for communities surrounding industrial sources that are expected to be exposed to air emissions (U.S. EPA, 2021a).[198] These are the distances at which air pollution concentrations will be highest before the plume disperses, and an analysis of air impacts with these zones may capture other localized impacts such as air emissions from truck traffic due to changes in activities at steam electric power plants.

Second, the EPA assessed potential impacts in downstream surface waterbodies using 1-, 3-, 50-, and 100-mile buffer distances around each waterbody segment downstream of the initial common identifiers (COMIDs) identified for each effluent discharge. These buffers distances were used to capture impacts to local populations as

[198] U.S. EPA. 2021a. Regulatory Impact Analysis for Phasing Down Production and Consumption of Hydrofluorocarbons (HFCs). (September). EPA-HQ-OAR-2021-0044-0046.

well as impacts to those traveling to fish or recreate in downstream waterbodies (Sohngen et al, 2015; Sea Grant – Illinois-Indiana, 2018; Viscusi et al., 2008).[199,200]

Finally, the EPA assessed potential drinking water impacts using information about the service area of PWSs with surface intakes downstream from steam electric power plants.

Overall, the EPA found that 90,000 people live within 1 mile of at least one of the 112 steam electric power plants expected to be affected by the final rule and modeled for the benefits analysis, and about 790,000 people live within 3 miles. When comparing the demographic characteristics of these populations to national demographic characteristics, small exceedances of the national average are observed. Of the population living within 3 miles of a steam electric power plant, the percentage of people identified as low-income is 0.1 percent greater than the national average, and the percent of the population identified as American Indian/Alaska Native and Other living within one and three miles of a steam electric power plant is one percent greater than the national average. The results show relatively greater proportions of people who identify as Asian (non-Hispanic), people who identify as American Indian or Alaska Native (non-Hispanic), and people who identify as Hispanic or Latino.

[199] For this analysis, a downstream waterbody is defined as a segment of water 300 kilometers (~187 miles) downstream of a point of discharge from a steam electric power plant.

[200] Sohngen, B., Zhang, W., Bruskotter, J., & Sheldon, B. (2015). Results from a 2014 survey of Lake Erie anglers. Columbus, OH: The Ohio State University, Department of Agricultural, Environmental and Development Economics and School of Environment & Natural Resources; Sea Grant - Illinois-Indiana. (2018). Lake Michigan anglers boost local Illinois and Indiana economies; Viscusi, W. K., Huber, J., & Bell, J. (2008). The economic value of water quality. Environmental and resource economics, 41(2), 169-187.

C. Community Outreach

During the public comment period, the EPA received a comment requesting that the Agency conduct additional outreach with the nine communities identified for outreach during the 2023 proposal. Commenters urged the EPA to not extend the written public comment period and to move forward expeditiously to finalize the proposed rule. Given the time required to plan and conduct the community outreach for the proposed rule (meetings with five of the nine communities were held between May and September 2022, with planning starting in February 2022), the EPA determined that it could not hold additional outreach meetings with all nine communities and also finalize the proposed rule expeditiously, as requested by the commenters. Therefore, the EPA did not hold additional outreach meetings for the final rule. The EPA presents the feedback received from the community outreach meetings conducted for the proposed rule in section 7.5 of the 2023 EJA[201], which the EPA took into consideration for the final rule.

For the proposed rule, the EPA conducted initial outreach in all nine communities to local environmental and community development organizations, local government agencies, and individual community members involved in community organizing. Between May and September of 2022, EPA was able to meet with community members in five of the identified communities either virtually or in a hybrid format with some in-person participation. The EPA was not able to hold a virtual or hybrid meeting with the remaining four communities. For detailed information of the EPA's community selection

[201] U.S. Environmental Protection Agency. (2023b). *Environmental Justice Analysis for Proposed Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category*

methodology, the communities selected, and the structure of the community meetings, see section 7.4 of the 2023 EJA.[202]

The EPA received a broad range of input from individuals in these communities on regulatory preferences, environmental concerns, human health and safety concerns, economic impacts, cultural/spiritual impacts, and ongoing communication/public outreach. Community members also expressed interest in other EPA actions. Two broad themes were conveyed consistently across communities. First, community members identified several perceived harmful impacts from steam electric power plants and conveyed their desire for more stringent regulations to reduce these harmful impacts. Second, community members expressed that more transparency and communication is needed to overcome their decreasing trust in the regulated steam electric power plants and state regulatory agencies and their feelings of skepticism that their communities will be protected from these harmful impacts. In addition to these broad themes, commenters also raised concerns unique to each community. For example, members of the Navajo Nation discussed with the EPA the spiritual and cultural impacts to the community from pollution related to steam electric power plants. In Jacksonville, Florida, community members raised concerns about tidal flows that carry pollution upstream and about storm surges that occur during extreme weather events, causing additional challenges in their community. More detailed summaries of these meetings are presented in section X of the EJA.

[202] *Ibid*.

The EPA considered all feedback received in these outreach meetings, including feedback on the stringency of potential new regulations and negative impacts experienced as a result of steam electric discharges. The final rule will result in more stringent limitations that will further reduce negative impacts associated with steam electric discharges. The EPA also considered feedback expressing the desire for increased transparency and communication. As discussed in section XIV.C.6, the EPA requiring posting of required reports to a publicly available website to improve transparency. In addition, the EPA recently added a new feature called ECHO Notify to the Enforcement and Compliance History Online (ECHO) website. ECHO Notify provides weekly email notifications of changes to enforcement and compliance data in ECHO. Notifications are tailored to the geographic locations, facility IDs, and notification options that users select. The EPA encourages interested community members to sign up for these alerts. Further information is available at *https://www.echo.epa.gov/tools/echo-notify.* The EPA also encourages individual facilities to work with local communities to foster trust and communication, for example, through text alert systems.

D. Distribution of Risks

The EPA evaluated the distribution of pollutant loadings, estimated human health, and estimated environmental impacts resulting from polluted air, surface water, and drinking water. The EPA examined these distributions under both baseline and the regulatory options to identify where current conditions and future improvements may have a differential impact on communities with EJ concerns. The following sections discuss the EPA's methodology and findings.

1. Air

The EPA evaluated air quality impacts in terms of changes in warm season maximum daily average 8-hour (MDA8) ozone and average annual $PM_{2.5}$ concentrations, as described in the BCA. The EPA used the results of the analysis to further evaluate the distribution of air--quality impacts in the EJA to determine whether communities with EJ concerns experience disproportionately high exposures to MDA8 ozone and average annual $PM_{2.5}$ under the baseline and Option B.

The results of the EPA's distributional analysis of air quality impacts indicates that, under the baseline, average annual $PM_{2.5}$ and MDA8 ozone exposures are higher among certain communities with EJ concerns. The EPA found higher exposures for some populations, such as American Indian and Alaska Native (non-Hispanic), Asian (non-Hispanic), and Hispanic populations, relative to their relevant comparison groups. While the regulatory analysis estimating changes in average annual $PM_{2.5}$ and MDA8 ozone exposures shows increases and decreases in pollutant emissions across regions of the United States under the final rule, these changes overall are small and do not change the distribution of air-quality impacts observed under the baseline. Therefore, the EPA concludes that the air-quality changes resulting from the final rule are not expected to mitigate or exacerbate distributional disparities present under the baseline. See section 4.2 of the EJA for more information.

2. Surface Water

Using results from the EA and BCA, the EPA evaluated the distribution of pollutant loadings and the environmental and human health effects of wastewater discharges from steam electric power plants into surface waters into immediate receiving waters. The following sections provide an overview of the EPA's methodology and the results of the EPA's distributional analysis.

a. Immediate Receiving Waters

Using results from the EA, the EPA evaluated the distribution of pollutant loadings and the environmental and human health effects of wastewater discharges from steam electric power plants into immediate receiving waters across communities with EJ concerns. To evaluate the distribution of water quality impacts, the EPA used the IRW model to evaluate water quality impacts by calculating annual average total and dissolved pollutant concentrations in the water column and sediment of immediate receiving waters. It then compares these concentrations to specific water quality criteria values–National Recommended Water Quality Criteria (NRWQC) and Maximum Contaminant Levels (MCLs)–to assess potential impacts to wildlife and human health. To evaluate potential impacts to wildlife, the EPA used the IRW model to estimate bioaccumulation of pollutants in fish tissue of trophic level 3 (T3) and trophic level 4 (T4) fish using the annual average pollutant concentrations in the immediate receiving water. Those results were then compared to benchmark values–threshold effect concentration (TEC) and no effect hazard concentration (NEHC)-to evaluate potential impacts on exposed sediment biota and piscivorous wildlife that consume T3 and T4 fish, respectively. The EPA also used estimated fish tissue concentrations to assess human health impacts–non-cancer and cancer risks – to human populations from consuming fish that are caught in contaminated receiving waters. For a more detailed discussion of the IRW Model see the EA.

Information on the socioeconomic characteristics of affected communities was gather from the 2017-2021 ACS dataset and was included with the results from the model to evaluate the distribution of impacts (relative to the baseline) under the final rule.

b. Water Quality, Wildlife, and Human Health Impacts

Based on the results of the distributional analyses of water quality, wildlife, and human health impacts, the EPA determined that under the baseline there were distributional disparities among communities with EJ concerns. Disparities were most often observed among populations such as African American (non-Hispanic) or American Indian or Alaska Native (non-Hispanic) populations when comparing the percent of the population affected in communities with immediate receiving waters benchmark exceedances to the national average and to communities with immediate receiving waters without benchmark exceedances. This, along with distributional disparities observed under the baseline for other populations, indicates the presence of potential EJ concerns under the baseline across the three analyses. Analyzing the impacts of final rule across the analyses, the EPA found that the final rule reduced the amount of immediate receiving waters with benchmark exceedances and the population affected by these exceedances. However, in each of the analyses the EPA found that while the final rule mitigated distributional disparities identified under the baseline for communities with EJ concerns, remaining immediate receiving waters with exceedances under the final rule were more concentrated in other communities with EJ concerns. EPA found particular concentration for American Indian or Alaska Native populations relative to the baseline. See section 4.2 of the EJA for more information.

c. Downstream Waters

Using the results from the downstream analysis performed in the BCA, the EPA further evaluated the downstream surface water impacts in the EJA to determine whether communities with EJ concerns experience a differential share of noncancer health effects from exposure mercury through consuming fish in contaminated downstream surface waters.

The results of the EPA's analysis showed potential EJ concerns in the baseline in terms of differential and adverse impacts in communities with EJ concerns. Differential and adverse impacts were concentrated among infants of color (*e.g.*, Hispanic, Asian [non-Hispanic], and Other [non-Hispanic]) and infants below the poverty level of mothers consuming fish at recreational and subsistence rates relative to White children and children not below the poverty line, respectively. For both cohorts, under the final rule, increases in avoided IQ point losses were estimated relative to the baseline across all racial or ethnic groups and income groups. These estimated increases were too small to substantially change the distribution of IQ points relative to the baseline among infants of color and among infants below the poverty level. See section 4.3 of the EJA for more information.

The EPA also evaluated human health endpoints related to lead and arsenic exposures from fish consumption. As shown in the BCA, avoided IQ point losses in children and avoided cardiovascular deaths (CVD) in adults from reductions in fish tissue concentrations of lead, as well as reductions in annual skin cancer cases in adults from reductions in fish tissue concentrations of arsenic estimated under the final rule were negligible (*e.g*. a total avoided IQ point loss of one point across 1,555,558 exposed children). Therefore, the EPA determined that reporting fractional distributional changes by racial or ethnic groups and income groups for the affected population would not be informative. See section 4.3 of the EJA for more information.

3. Drinking Water

Using the results from the drinking water analysis performed in the BCA, the EPA further evaluated downstream drinking water impacts in the EJA to determine whether communities with EJ concerns served by potentially affected drinking water systems experience a differential share of bladder cancer cases from exposure to TTHM. In the BCA, the EPA modeled baseline incremental TTHM concentrations and bladder cancer cases attributable to steam electric discharges.[203] Since the EPA evaluated only the changes in TTHM concentrations and avoided bladder cancer cases and deaths attributable to steam electric discharges in the BCA, in this analysis, the EPA only evaluated whether the distribution of exposures and health effects indicated potential EJ concerns under the incremental changes resulting from the regulatory options.

The results of the EPA's analysis of changes in TTHM concentrations and resulting changes in bladder cancer cases and deaths from consuming drinking water with TTHM shows that the final rule reduces TTHM concentrations and reduces the incidence of bladder cancer cases and excess bladder cancer deaths in states with affected drinking water systems. Across the analyses, under the final rule, the majority of states with

[203] Background TTHM concentrations and bladder cancer cases attributable to sources other than steam electric discharges were not modeled under the baseline but would not impact the analysis of incremental changes as discussed in the BCA.

affected systems serve communities with at least one demographic group (*i.e.*, low-income or person of color) above the national average, with the largest proportion of these states having two demographic groups above the national average. Analyzing the distribution of changes across the analyses and regulatory options, the EPA finds that states with affected systems serving communities with one demographic group above the national average experience the largest median changes in TTHM concentrations and avoided bladder cancer cases and excess bladder cancer deaths than states serving communities with two and three or more demographic groups above the national average, respectively. While the magnitude of the median change observed across the analyses decreases in communities with one, two, or three or more demographic groups above the national average, the EPA finds that this is not due to there being smaller reductions in TTHM concentrations and avoided bladder cancer cases and excess bladder cancer deaths, but rather that these states generally have more systems experiencing smaller changes. See section 4.4. of the EJA for more information.

E. Distribution of Benefits and Costs

The EPA examined the estimated benefits and costs of the final rule for potential differences in how they are distributed across affected communities, in addition to evaluating the distribution of exposures and health impacts discussed above. Office of Management and Budget (OMB) Circular A-4, which implements E.O. 12866, states that regulatory analyses should analyze distributional effects which Circular A-4 defines as "how the benefits and the costs of a regulatory action are ultimately experienced across the population and economy, divided up in various ways (*e.g.*, income groups, race or ethnicity, gender, sexual orientation, disability, occupation, or geography;...).” As discussed below, EPA research demonstrates that climate change impacts associated with GHG reductions that are modeled to occur under this rule are likely to accrue to communities with EJ concerns but other benefits and costs under the final rule may not have substantial impacts.

The EPA began its evaluation of benefits with a screening of the benefits categories. For Option B, at both three percent and seven percent discount rates, approximately 99 percent of monetized benefits accrued from reductions in air pollution due to estimated shifts in electric generation resulting from the incremental costs of the final rule. Furthermore, these air benefits were always comprised of approximately a 3-to-1 ratio of conventional air pollutant health benefits to GHG benefits (see section 8 of the BCA for more information on air emissions and benefits).[204] Thus, while the EPA evaluated a number of exposures and endpoints for disproportionate baseline impacts, the Agency screened these two benefit categories through this initial comparison for further evaluation.

With respect to GHG benefits, scientific assessments and Agency reports produced over the past decade by the U.S. Global Change Research Program,[205,] the

[204] EPA scaled the air benefits to other regulatory options based on total costs.

[205] USGCRP. 2016. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. Crimmins*, Balbus, A., Gamble, J., Beard, C., Bell, J., Dodgen, D., Eisen, R., Fann, N., Hawkins, M., Herring, S., Jantarasami, L., Mills, D., Saha, S., Sarofim, M., Trtanj, J., Ziska, L. Eds. U.S. Global Change Research Program, Washington, DC, 312 pp. Available online at: *https://www.dx.doi.org/10.7930/J0R49NQX*.

Intergovernmental Panel on Climate Change, [206,207,208,209,210] and the National Academies of Science, Engineering, and Medicine[211,212] provide evidence that the impacts of climate change raise potential EJ concerns. These reports conclude that poorer communities or communities of color can be especially vulnerable to climate change impacts because they tend to have limited adaptive capacities, are more dependent on climate-sensitive resources such as local water and food supplies or have less access to social and information resources. Some communities of color, specifically populations defined jointly by ethnic/racial characteristics and geographic location, may be uniquely vulnerable to climate change health impacts in the United States.

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[206] USGCRP. 2018. *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment*. U.S. Global Change Research Program. Available online at: *https://*pp. *doi.org/10.7930/NCA4.2018*.

[207] Porter, J, Xie, L., Challinor, A., Cochrane, K., Howden, S., Iqbal, M., Lobell, D., Travasso, M. 2014. *Food security and food production systems. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change pp. 485–533.

[208] Oppenheimer, M., Campos, M., Warren, R., Birkmann, J., Luber, G., O'Neill, B., Takahashi, K. 2014.. *Emergent risks and key vulnerabilities*. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. pp. 1039-1099.

[209] Smith, K, Woodward, A., Campbell-Lendrum, D., Chadee, D., Honda, Y., Liu, Q., Olwoch, J., Revich, B., Sauerborn, R. 2014. *Human health: impacts, adaptation, and co-benefits.* Climate Change 2014. Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change pp. 709–754.

[210] IPCC (Intergovernmental Panel on Climate Change), 2018. *Global Warming of 1.5°C, An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*

[211] National Research Council. 2011. *America's Climate Choices*. Available online at: *https://www.doi.org/10.17226/12781*.

[212] NASEM. 2017. *Communities in Action: Pathways to Health Equity*. Available online at: *https://www./doi.org/10.17226/24624*.

The EPA recently conducted a peer-reviewed analysis of the distribution of climate change impacts. EPA (2021)[213] evaluated the disproportionate risks to communities with EJ concerns. The EPA looked at factors including age, income, education, race, and ethnicity associated with six impact categories: air quality and health, extreme temperature and health, extreme temperature and labor, coastal flooding and traffic, coastal flooding and property, and inland flooding and property. The EPA calculated risks for each demographic group relative to its "reference population" (all individuals outside of each group) for scenarios with 2°C of global warming or 50 centimeters of sea level rise. The estimated risks were based on current demographic distributions in the contiguous United States. EPA (2021) includes findings that the following groups are more likely than their reference population to currently live in areas with:

- The highest increases in childhood asthma diagnoses from climate-driven changes in $PM_{2.5}$ (low-income, Black and African American, Hispanic and Latino, and Asian populations);
- The highest percentage of land lost to inundation (low-income and American Indian and Alaska Native populations);
- The highest increases in mortality rates due to climate-driven changes in extreme temperatures (low-income and Black and African American populations);
- The highest rates of labor hour losses for weather-exposed workers due to extreme temperatures (low-income, Black and African American, American Indian and Alaska Native, Hispanic and Latino, and Pacific Islander populations);
- The highest increases in traffic delays associated with high-tide flooding (low-income, Hispanic and Latino, Asian, and Pacific Islander populations); and
- The highest damages from inland flooding (Pacific Islander populations).

[213] U.S. EPA (Environmental Protection Agency). 2021. *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts*. EPA 430-R-21-003.

For further discussion of the impacts analyzed in U.S. EPA (2021) and other peer-reviewed evaluations, see section 5.1 of the EJA.

The EPA notes that the changes in GHG emissions attributable to the final rule are relatively small compared to worldwide emissions. Nevertheless, the findings of peer-reviewed evaluations demonstrate that actions that reduce GHG emissions are likely to reduce climate impacts on communities with EJ concerns. Findings demonstrate particular reductions in climate impacts for communities of color and low-income communities.

With respect to conventional air pollutant health benefits, the current EPA modeling methodology results in benefits that are proportional to exposures. In other words, the distributional findings of air pollutant exposures discussed above are the same findings the EPA has for this benefit category: exposure and health benefit improvements and degradations attributable to this final rule will be proportionately experienced by all communities evaluated. However, there are several important nuances and caveats to this conclusion owing to differences in vulnerability and health outcomes across demographic groups. For example, there is some information suggesting that the same $PM_{2.5}$ exposure reduction will reduce the hazard of mortality more so in Black populations than in White populations.[214,215] In addition, demographic-stratified information relating $PM_{2.5}$ and ozone to other health effects and valuation estimates is currently lacking.

With respect to costs, the EPA notes that the impacts on ratepayers will depend on the degree to which compliance costs are passed through to electricity consumers via higher electricity rates. In general, lower-income households spend less, in the absolute, on energy than higher-income households, but energy expenditures represent a larger share of their income. Therefore, electricity price increases tend to have a relatively larger effect on lower-income households. Further discussion of these disparities is provided in section 5.2 of the EJA. The EPA estimated the potential impacts of incremental ELG compliance costs on households' utility bills based on average electricity consumption and assuming a worst-case scenario where all costs are passed through to consumers. The EPA estimated that the final rule (Option B) corresponds to an average increase of $3.14 per household per year, with a range of $0.19 to $5.44 per year

[214] U.S. EPA (Environmental Protection Agency). 2019. *Integrated Science Assessment (ISA) for Particulate Matter (Final Report)*. December. EPA/600/R-19/188. Available at: *https://www.epa.gov/naaqs/particulate-matter-pm-standards-integrated-science-assessments-current-review.*

[215] U.S. EPA (Environmental Protection Agency). 2022. *Supplement to the 2019 Integrated Science Assessment for Particulate Matter (Final Report).* May. EPA/600/R-22/028. Available at: https://www.epa.gov/isa/integrated-science-assessment-isa-particulate-matter.

across NERC regions. These cost increases are too small[216] to indicate the potential for significant direct impacts to household electricity consumers.[217]

XIV. Regulatory Implementation

A. Continued Implementation of Existing Limitations and Standards

The EPA has continually stressed, since the announcement of this supplemental rulemaking, that the existing 40 CFR part 423 limitations and standards in effect continue to apply.[218] In the sections below, the EPA discusses considerations for permitting authorities and regulated entities as they continue to implement existing regulations and look ahead to the regulations finalized.

1. Facilities Must Still Continue to be Permitted for, and Meet, the 2020 Rule Limitations

The EPA reaffirms that permitting authorities must continue to write permits that include existing 2015 and 2020 rule BAT limitations as applicable, whether as part of permit renewals or as part of permit modifications. Similarly, permittees must meet applicable permit limitations as soon as possible. The Agency has not issued a postponement rule for the 2020 rule FGD wastewater and BA transport water BAT limitations as it did in 2017 for the 2015 rule. And as discussed in section VII of this

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[216] While the incremental burden relative to income is not distributionally neutral, *i.e.,* any increase would affect lower-income households to a greater extent than higher-income households, the final rule is expected to have a very small impact in the absolute across all regions analyzed which is also small relatively as the potential price increase is between less than 0.1 percent and 0.2 percent of energy expenditures for all income and race groups, and between less than 0.1 percent and 0.5 percent of just *electricity* expenditures for all but the bottom quintile income group in the most impacted NERC region.

[217] EPA notes that other electricity consumers (*e.g.,* industrial consumers) could also face increased electricity prices.

[218] 86 FR 41801 (August 3, 2021).

preamble, the EPA is retaining the 2020 FGD wastewater and BA transport water limitations and affirms that the technologies on which they are based are available and achievable, as an interim step toward meeting the final zero-discharge requirements in this rule.

Since the EPA did not postpone the earliest compliance dates in the 2020 rule,[219] which have since passed, permitting authorities should not establish an "as soon as possible" date that is anything other than as soon as possible to comply with the 2020 limitations. In some cases, although unlikely at the time of this publication, a facility may still not have a permit incorporating the 2015 or 2020 rule BAT requirements. In such circumstances, a permitting authority must still include these limitations with the appropriate "as soon as possible" date. For example, suppose a permit applicant's permit still has the 1982 limitations; the applicant submits a permit modification request prior to this final rule effective date, but the permitting authority has not yet issued a modified permit. Here, the permitting authority may not simply issue the facility a permit incorporating this final zero-discharge limitations with a "no later than" date of 2029. Instead, the permittee is still obligated to meet the 2020 rule limitations no later than December 31, 2025. Note that, without the 2020 rule limitations in a permit, a facility may not participate in the permanent cessation of coal combustion by 2034 subcategory.

2. Permitting Site-Specific Technology-Based Effluent Limitations Through BPJ Analysis

[219] Compliance dates for FGD wastewater and BA transport water in the 2020 rule were as soon as possible beginning October 13, 2021.

At proposal, the EPA reaffirmed that BAT limitations were currently required to be developed on a BPJ basis by permitting authorities for discharges of both CRL and legacy wastewater. Some commenters contended that this outcome is improper because it does not constrain the permitting authority from selecting surface impoundments as BAT. The EPA disagrees. In *Southwestern Electric Power Co. v. EPA*, the Fifth Circuit stopped short of prohibiting any future selection of surface impoundments as the commenters stated. Instead, the Court held that the Agency's actions in selecting surface impoundments as BAT for legacy wastewater and CRL was arbitrary and capricious or inconsistent with the statute based on EPA's stated rationale. In particular, the Court faulted the EPA for not offering any rationale as to why surface impoundments were BAT, using the statutory factors. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d at 1018 n.20 ("[T]he record fails to explain why impoundments are BAT, if that term is to have any meaning. Furthermore, if chemical precipitation or biological treatment are technically feasible but simply too costly for treating legacy wastewater, the EPA could have said so."); *id*. at 1025 ("The rule pegs BAT for leachate to the decades-old BPT standard, without offering any explanation for why that prior standard is now BAT. That is flatly inconsistent with the Act's careful distinction between the two standards."). Permitting authorities performing a BPJ analysis are required to consider the statutory factors and determine what technologies are available, are economically achievable, and have acceptable non-water quality environmental impacts. Thus, permitting authorities would also be prohibited from defaulting to surface impoundments without explaining why surface impoundments represent BAT, as that term is used in the CWA. Instead, they must perform a thorough BPJ analysis that considers technologies beyond surface impoundments (including, presumably, the technologies described in this record) to identify the technology that represents BAT. The EPA does not rule out the possibility that circumstances at a facility will lead the permitting authority to select surface impoundments as BAT. However, this would only occur where a permitting authority can demonstrate that surface impoundments meet the BAT statutory factors, a tough hurdle for a treatment technology that has been found not to remove dissolved pollutants. *Id*. at 1026 ("To be sure, we do not say that EPA is precluded by the Act from ever setting BAT equivalent to a prior BPT standard. But given the plain distinction between the two standards market out in the Act, the agency would at least have to offer some explanation for its decision that speaks to the statutory differences between BAT and BPT.").

Furthermore, the EPA received comments that certain state laws prohibit permitting authorities in those states from imposing BAT limitations more stringent than any national regulations. EPA disagrees that this poses an implementation challenge. The EPA has not established BAT based on surface impoundments, but rather, in some cases, reserved BAT limitations to be developed by permitting authorities using their BPJ. And the requirement for BPJ is to perform a thorough analysis to select the technology that represents BAT at a particular site. Thus, to the extent that a permitting authority determines a more stringent technology represents BAT at a particular site, this would not be inconsistent with the state laws cited.

3. Reopening Permits for CRL and Legacy Wastewater

At proposal, the EPA recommended, but did not require, that any permit issued or modified between the proposal and the final rule contain a reopener clause in accordance with 40 CFR 122.62(a)(7) and 124.5. Permitting authorities that included this provision should consider reopening these portions of existing permits as soon as practicable after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

B. Implementation of New Limitations and Standards

The limitations and standards in this final rule apply to discharges from steam electric power plants through incorporation into NPDES permits issued by the EPA and authorized states under CWA section 402, and through pretreatment programs under CWA section 307. NPDES permits and pretreatment control mechanisms issued after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** must incorporate the ELGs, as applicable. Also, under CWA section 510, states can require effluent limitations under state law as long as they are no less stringent than the requirements of any final rule. Finally, as well as requiring application of the technology-based ELGs in any final rule, CWA section 301(b)(1)(C) requires the permitting authority to impose more stringent effluent limitations, as necessary, to meet applicable water quality standards. Relevant water quality-based considerations are discussed in section XIV.D.

1. Availability Timing of Final Rule Requirements

The direct discharge limitations in this rule apply only when implemented in an NPDES permit issued to a discharger. Under the CWA, the permitting authority must incorporate these ELGs into NPDES permits as a minimum level of control. The final rule provides the plant's permitting authority with discretion to determine the date when the new effluent limitations for FGD wastewater, BA transport water, and CRL would apply to a given discharger. For zero discharge requirements for FGD wastewater, BA transport water, and CRL, as well as the chemical precipitation-based requirements for unmanaged CRL, the limitations in this final rule become applicable by a date that is as soon as possible after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, but in no case later than December 31, 2029.

For dischargers subject to less stringent FGD wastewater and BA transport water limitations based on certifications that they qualify for a subcategory based on permanent cessation of coal combustion, the EPA is requiring permitting authorities to put in tiered limitations after the permanent cessation of coal combustion. For the permanent cessation of coal combustion by 2028 subcategory, the final rule contains a tiered set of limitations applicable following December 31, 2028:

- The first tier of these limitations is composed of zero-discharge limitations for FGD wastewater and BA transport water after April 30, 2029. These limitations would apply if the EGU had in fact permanently ceased coal combustion by December 31, 2028, as the plant represented it would. As suggested in public comments, this date is 120 days after the permanent cessation of coal combustion date, allowing for facilities to complete any necessary residual discharges.[220]
- The second tier is composed of zero-discharge limitations for these same wastewaters after December 31, 2028. If a plant fails to cease combustion of coal by 2028, as it represented it would, for any reason other than those specified in section 423.18, these zero-discharge limitations would automatically apply.

For the permanent cessation of coal combustion by 2034 subcategory, the final rule contains a tiered set of limitations applicable following December 31, 2034:

[220] The EPA notes that these do not include discharges of legacy wastewaters from surface impoundments closing under the CCR rule, which are covered by different regulatory provisions.

- The first tier of these limitations is composed of zero-discharge limitations for FGD wastewater and BA transport water after April 30, 2035. These limitations would apply if the EGU had in fact permanently ceased coal combustion as it represented it would.
- The second tier is composed of zero-discharge limitations for the same wastewaters, as well as CRL, after December 31, 2034. If a plant fails to cease combustion of coal by 2034, as it represented it would, for any reason other than those specified in section 423.18, these zero-discharge limitations would automatically apply.

This final rule does not affect dischargers choosing to meet the 2020 VIP effluent limitations for FGD wastewater; the date for meeting those limitations is December 31, 2028. Similarly, where a facility has elected to participate in the subcategory for permanent cessation of coal combustion by December 31, 2028, the final rule allows for the zero-discharge limitations for FGD wastewater and BA transport water to be met as late as December 31, 2029, and is not designed to impose these zero-discharge limitations prior to the tiered zero-discharge limitations established for that subcategory.[221]

Pretreatment standards, unlike effluent limitations, are directly enforceable and must specify a time for compliance not to exceed three years from the date of promulgation under CWA section 307(b)(1). Under the EPA's General Pretreatment Regulations for Existing and New Sources, POTWs with flows in excess of five MGD must develop pretreatment programs meeting prescribed conditions.[222] These POTWs have the legal authority to require compliance with applicable pretreatment standards and control the introduction of pollutants to the POTW through permits, orders, or similar

[221] In contrast, the subcategory for EGUs permanently ceasing coal combustion by December 31, 2028, does not cover discharges of CRL, and thus discharges of CRL would be permitted in accordance with limitations in the subcategory for EGUs permanently ceasing coal combustion by December 31, 2034.

[222] *See, e.g.,* 40 CFR 403.8(a).

means. POTWs with approved pretreatment programs act as the control authorities for their industrial users. Among the responsibilities of the control authority are the development of the specific indirect discharge limitations for the POTW's industrial users. Because pollutant discharge limitations in categorical pretreatment standards may be expressed as concentrations or mass limitations, in many cases, the control authority must convert the concentration- or mass-based limitations applicable to a specific industrial user and then include these in POTW permits or another control instrument.

Regardless of when a plant's NPDES permit is ready for renewal, the EPA recommends that each plant immediately begin evaluating how it intends to comply with the requirements of the final rule. In cases where significant changes in operation are appropriate, the EPA recommends that the plant discuss such changes with its permitting authority and evaluate appropriate steps and a timeline for the changes as soon as possible, even before the permit renewal process begins.

The "as soon as possible" date is the effective date of any final rule, unless the permitting authority determines another date after receiving relevant information submitted by the discharger.[223] The final rule does not revise the specified factors permitting authorities must consider in determining the as soon as possible date under the 2015 and 2020 rules. Based on receiving relevant information from the discharger, the

[223] Information in the record indicates that most facilities should be able to complete all steps to implement changes needed to comply with the BA transport water requirements within 32 to 35 months, the FGD wastewater requirements within 28 months, and the CRL requirements within 22 months (DCN SE08480, SE10289).

NPDES permitting authority may determine a different date is “as soon as possible” within the implementation period, using the factors below:

(1) Time to expeditiously plan (including to raise capital), design, procure, and install equipment to comply with the requirements of the final rule.

(2) Changes being made or planned at the plant in response to GHG regulations for new or existing fossil fuel-fired plants under the CAA, as well as regulations for the disposal of coal combustion residuals under subtitle D of RCRA.

(3) For FGD wastewater requirements only, an initial commissioning period to optimize the installed equipment.

(4) Other factors as appropriate.

The “as soon as possible” date determined by the permitting authority may or may not be different for each wastestream. The NPDES permitting authority should provide a well-documented justification of how it determined the “as soon as possible” date in the fact sheet or administrative record for the permit. If the permitting authority determines a date later than the effective date of the final rule, the justification should explain why allowing more time to meet any final limitations is appropriate, and why the discharger cannot meet the effluent limitations as of the effective date.

2. Conducting BPJ Analyses for Discharges of CRL and Legacy Wastewater

For some CRL and legacy wastewaters, the EPA is reserving BAT limitations to be determined on a case-by-case basis using the permitting authority’s BPJ. The factors considered by the permit writer in a BPJ analysis are the same as those that EPA considers in establishing technology-based effluent limitations. *See* 40 CFR 125.3(d)(1)-(3). Thus, a permitting authority may not default to any technology (for example, surface impoundments) in selecting BAT, nor may a permitting authority fail to develop technology-based effluent limitations and instead simply calculate water quality-based effluent limitations. Instead, a permitting authority is required to determine limitations based on the BAT.[224]

Consideration of Leasing. Leasing is an option offered by commercial vendors. In some cases, it may be possible to lease various pollution treatment technologies for a timeframe shorter than the timeframes considered in this rule's primary evaluation. In some cases, shorter duration leases might be more costly; however, where the record precluded the EPA from establishing a nationwide BAT, it is possible that site-specific considerations may make leased equipment economically achievable for a given facility, and thus a relevant consideration in a BPJ analysis.

Consideration of Closure Deadlines Pursuant to the CCR Rule. For certain legacy wastewater, the EPA declined to establish a nationwide BAT, in part, due to the tight closure timeframes for CCR surface impoundments under the CCR rule. The EPA cannot evaluate the precise stage of closure each CCR surface impoundment would be in at the time of its permit issuance or renewal and whether continuation with that stage of closure would be compatible with the operation of any specific technology. In contrast, permitting authorities can do this through the BPJ process after gathering relevant

[224] In doing so, permitting authorities may consider relevant information such pollution treatment technologies already in operation at the facility and the information contained in this record on the performance and costs of various technologies.

information through the permit application or permit modification. This may require examination of the site-specific closure plan required under the CCR rule and any additional details regarding the ongoing closure process that are not contained in the closure plan itself.

3. Conforming Changes to section 423.18

The EPA is making two changes to section 423.18. First, the EPA is including the new permanent cessation of coal combustion by 2034 subcategory in the permit conditions of 423.18. When an EGU proceeds towards permanent cessation of coal combustion under the new subcategory, if that EGU is involuntarily forced to burn coal beyond December 31, 2034, it may qualify for the same protections as an EGU in the permanent cessation of coal combustion by 2028 subcategory.

Second, the EPA is clarifying that an Energy Emergency Alert (EEA) is a valid order under section 423.18(a)(3) to qualify for this provision. The purpose of an EEA is to provide real-time indication of potential and actual energy emergencies within an interconnection.[225] The EPA received comment about these alerts specifically in the context of the CAA section 111 proposed rule. These are short-duration reliability events similar to the types explicitly listed in section 423.18, and this clarification is not meant

[225] An EEA-Level 1 occurs when the ISO/RTO has enough power to meet demand but not enough backup resources. An EEA-Level 2 occurs when the ISO/RTO anticipates interruption of service and takes steps to avoid power outages by requesting outside help to meet requirements including consumers being asked to conserve energy. An EEA-Level 3 occurs when an ISO/RTO is energy deficient and operating with reserves below the required minimum. At level 3, utilities curtail energy use through controlled service interruptions.

to limit the use of section 423.18, but rather to ensure that it operates as intended: to allow an EGU to operate for reliability purposes without violating its CWA permit.

4. Information to Assist in Permitting Discharges of Unmanaged CRL

At proposal, the EPA provided a recommended list of information that could be provided to a permitting authority to determine whether a discharge of CRL through groundwater constituted the FEDD from a point source into a WOTUS. The EPA also solicited comment on including provision of this information as a regulatory requirement or otherwise obtaining the data (*e.g.*, through a CWA section 308 request). The EPA received a wide range of comment on this solicitation, but on November 20, 2023, the Agency published a draft guidance titled, *Applying the Supreme Court's County of Maui v. Hawaii Wildlife Fund Decision in the Clean Water Act section 402 National Pollutant Discharge Elimination System Permit Program to Discharges through Groundwater*. The draft guidance describes the *Maui* decision's functional equivalent analysis and explains the types of information that may be relevant to determining which discharges through groundwater require coverage under an NPDES permit. This guidance will assist permitting authorities, the regulated community, and other stakeholders in appropriately applying the "functional equivalent" standard in the NPDES permits program and is a more appropriate instrument for addressing this particular implementation issue. The EPA intends to issue revised guidance on this topic soon. For further information visit: *https://www.epa.gov/npdes/releases-point-source-groundwate*r.

C. Reporting and Recordkeeping Requirements

The EPA is finalizing several new or modified reporting and recordkeeping requirements in section 423.19, pursuant to authority under CWA sections 304(i) and 308. First, the EPA is including additional provisions for the annual progress reports required for EGUs permanently ceasing coal combustion by 2028. Second, the EPA is including reporting and recordkeeping requirements for the new subcategory of EGUs permanently ceasing coal combustion by 2034. Third, the EPA is including reporting and recordkeeping requirements for the subcategory for EGUs with certain discharges of unmanaged CRL. Fourth, the EPA is including reporting and recordkeeping requirements for facilities making use of the definitional changes with respect to necessary discharges of FGD wastewater, BA transport water or CRL during high intensity, infrequent storm events. Fifth, the EPA is including a one-year flexibility for EGUs that have installed zero-discharge systems to support their transition to zero discharge by allowing necessary discharges of permeate or distillate subject to reporting and recordkeeping requirements. Finally, the EPA is requiring this and all other reporting to be posted to a publicly available website.

1. Summary of Changes to the Annual Progress Reports for EGUs Permanently Ceasing Coal Combustion by 2028

The EPA is modifying the annual progress reports for the subcategory of EGUs permanently ceasing coal combustion by 2028, as it proposed it would. Specifically, the EPA is adding a requirement that the annual progress reports include either the official filing to the facility's reliability authority or a certification providing an estimate of when such a filing will be made. Furthermore, the EPA is requiring that the final annual progress report prior to permanent cessation of coal combustion must include the official filing. While facilities may already include these filings in the NOPP or annual progress reports, these filings were not explicitly required in the 2020 rule and provide the strongest assurance that a facility will not voluntarily change its plans and continue discharging beyond 2028.

2. Summary of the Reporting and Recordkeeping Requirements for EGUs Permanently Ceasing Coal Combustion by 2034

The EPA is including new reporting and recordkeeping requirements for EGUs permanently ceasing coal combustion by 2034, including an initial NOPP and annual progress reports, as it proposed it would. Consistent with the requirements for EGUs permanently ceasing coal combustion by 2028, the EPA is requiring that the initial NOPP contain several items. A NOPP shall include the expected date that each EGU is projected to achieve permanent cessation of coal combustion, whether each date represents a retirement or a fuel conversion, whether each retirement or fuel conversion has been approved by a regulatory body, and what the relevant regulatory body is. In addition, the NOPP shall include the most recent integrated resource plan for which the applicable state agency approved the retirement or repowering of the unit subject to the ELGs, or other documentation supporting that the electric generating unit will permanently cease the combustion of coal by December 31, 2034. The NOPP shall also include, for each such EGU, a timeline to achieve the permanent cessation of coal combustion. Each timeline shall include interim milestones and the projected dates of completion. Finally, the NOPP shall include, for each such EGU, a certification statement that the facility is in compliance with the FGD wastewater and BA transport water limitations of the 2020 rule. Because the NOPP requires a certification statement that the facility is in compliance with the FGD wastewater and BA transport water limitations of the 2020 rule, which could have applicability dates as late as December 31, 2025, EPA has finalized that date as the date for submitting the NOPP.

The EPA is also requiring an annual progress report for facilities in this subcategory. An annual progress report shall detail the completion of any interim milestones listed in the NOPP since the previous progress report, provide a narrative discussion of any completed, missed, or delayed milestones, and provide updated milestones. An annual progress report shall also include one of the following:

- A copy of the official suspension filing (or equivalent filing) made to the facility’s reliability authority detailing the conversion to a fuel source other than coal;
- A copy of the official retirement filing (or equivalent filing) made to the facility’s reliability authority which must include a waiver of recission rights; or
- An initial certification, or recertification for subsequent annual progress reports, containing a statement that the facility will make one of the other filings.

The certification or recertification must include the estimated date that such a filing will be made. Furthermore, the EPA is requiring that the final annual progress report must include the actual filing to the reliability authority. Thus, the final annual progress report cannot include a certification statement.

3. Summary of Reporting and Recordkeeping Requirements for Certain Discharges of Unmanaged CRL

As discussed in section VII of this preamble, CRL can be discharged not only through end-of-pipe discharges, but also through groundwater, and the EPA is establishing BAT limitations for a subcategory of EGUs that includes EGUs with discharges of CRL that a permitting authority determines are the FEDD of CRL to a WOTUS. The EPA is including annual reporting and recordkeeping requirements to facilitate the permitting authorities' review of such discharges. These requirements also facilitate compliance monitoring and make compliance information available to the public.

As it proposed it would, the EPA is requiring that facilities with discharges of CRL that a permitting authority determines are the FEDD of CRL to a WOTUS file an annual combustion residual leachate monitoring report with the permitting authority. This annual reporting requirement would be implemented via NPDES permits that cover one or more FEDD of CRL to a WOTUS through groundwater. The EPA is requiring that this report provide a comprehensive set of monitoring data. The EPA is including this requirement to facilitate permitting authorities' ability to determine compliance with CRL limitations and to increase transparency to local communities. Thus, in addition to the data provided under 40 CFR part 127, where an EGU is determined to have a FEDD of CRL, the EPA is requiring groundwater monitoring data on the CRL leaving each landfill or surface impoundment and where it enters surface waterbodies. The EPA is also requiring the report to include monitoring data on all the pollutants treated by chemical precipitation, not just mercury and arsenic, the two indicator pollutants.

4. Certification for Necessary Discharges of FGD Wastewater, BA Transport Water, or CRL During High Intensity, Infrequent Storm Events

At proposal, the EPA solicited comment on a number of topics concerning stormwater mixed with regulated process wastewaters, as well as comment on any necessary, related reporting and recordkeeping requirements. As discussed in section VII.B.5 of this preamble, the EPA is finalizing a definitional change for wastewater resulting from certain high intensity, infrequent storm events. As part of this change, the EPA is requiring a certification that includes several pieces of information that will assure the permitting authority and the public that the discharge is necessary and does not violate any other permit requirements. First, the certification shall include a statement that the facility experienced a storm event exceeding a 10-year, 24-hour or longer duration, including specifics of the actual storm event that are sufficient for a third party to verify the accuracy of the statement. Second, the certification shall include a statement that the discharge of low volume wastewater that would otherwise meet the definition of FGD wastewater, BA transport water, or CRL was necessary, including a list of the best management practices at the site and a narrative discussion of the ability of on-site equipment and practices to manage the wastewater. Third, the certification statement shall include the duration and volume of any such discharge. Finally, the certification statement shall include a statement that the discharge does not otherwise violate any other limitation or permit condition.

5. One-Year Flexibility for Any Necessary Discharges of Permeate or Distillate from Newly Operational FGD Wastewater or CRL Treatment Systems

The EPA anticipates that some plants seeking to meet the final zero-discharge limitations for FGD wastewater or CRL may install one or more technologies that produce a distillate or permeate following treatment. The EPA's technology basis incorporates a process by which the plant will recycle such distillate or permeate within the plant to achieve zero discharge. At proposal, however, the EPA solicited comment on the propriety of a limited flexibility that would allow some time for a plant to optimize its zero-discharge system to fully achieve zero discharge, subject to a reporting requirement. Importantly, for plants seeking this flexibility, a permitting authority would not include this optimization period in the calculation of the plant's "as soon as possible" date for meeting the FGD wastewater or CRL limitations. A plant given this flexibility would monitor and report any necessary discharges of permeate or distillate over the first year of attempted zero discharge, while the system was being optimized, and these discharges would not be a violation of the otherwise applicable zero-discharge requirements. For subsequent years, the flexibility would be discontinued.

The EPA received few comments on this solicitation, but those that were received favored the additional flexibility. On the timeframe, the EPA received comments suggesting that one or two years might be appropriate for such a flexibility. One commenter specifically discussed steps for optimizing an initial stage chemical precipitation system that could take up to two years.

The EPA agrees with commenters that the flexibility is warranted, but disagrees that two years is appropriate. In discussions with technology vendors, the EPA learned that new pollution control technology operators at a facility are most likely to seek vendor support during the first year of operations. Even the comment suggesting a two-year timeframe conceded, "Commercially proven technology designs generally take a full year to optimize." During this optimization process, even with the flexibility to discharge permeate or distillate when necessary, the zero-discharge treatment technology will still result in significant additional pollutant removals which will only be improved upon once the optimization is complete and the permeate or distillate may no longer be discharged. The NSPS limitations established in the 2015 rule and the BAT limitations in the 2020 rule's VIP (which were developed using data from thermal evaporation systems' distillate and membrane filtration systems' permeate, respectively) result in more pollutant removals than either chemical precipitation alone or chemical precipitation plus biological treatment. By expressly allowing plants a period for optimization, and removing this optimization consideration that would otherwise allow for delayed availability timing under section 423.11(t)(3), this flexibility will also facilitate the transition to zero discharge by reducing the amount of time it would take for plants to begin full-scale use of their pollutant treatment systems. Therefore, the EPA is finalizing a flexibility in section 423.18 to allow discharges of distillate or permeate from a newly operational FGD wastewater or CRL treatment system, where necessary, in the first year of operations.

The necessary discharges included in this flexibility are subject to additional reporting and recordkeeping requirements. Specifically, the facility shall include a letter requesting this flexibility from the permitting authority. This initial request letter will detail the expected type, frequency, and duration of discharge. The letter will also include a certification that the facility has not considered the zero-discharge system optimization period in its availability timing request under section 423.11(t). After including flexibility for necessary discharges of the permeate or distillate in the permit, the permitting authority shall also extend any existing monitoring and reporting requirements to ensure that any necessary discharges of the distillate or permeate do not violate other applicable conditions of the permit such as water quality-based effluent limitations.

6. Requirement to Post Information to a Publicly Available Website

The reporting and recordkeeping requirements of the CCR rule included a novel approach for posting information to a publicly available website. This was done because, at the time the CCR rule was signed, the EPA did not have enforcement authority over the CCR rule. Thus, given the self-implementing nature of the regulations, EPA sought to make information more readily available to states, as well as members of the public, who could enforce the CCR rule through citizen suits.[226]

In contrast to the CCR rule, ELGs are implemented largely through authorized state permitting programs with EPA oversight. Nevertheless, one message that EPA received in initial outreach to communities was that there is a lack of trust of utilities (and in some cases, the states that regulate them). Another message was that there is an interest in more accessible information. At proposal, the EPA included a website posting requirement for all documentation included in section 423.19.

[226] While the Water Infrastructure Improvements for the Nation Act later provided the EPA with permitting and oversight authority, the CCR rule continues to require posting to publicly available websites.

The EPA received comments both supporting and opposing the inclusion of a website requirement. Comments supporting the requirement desired additional transparency and suggested the EPA expand the requirement to all permitting documentation. Comments opposing the requirement expressed the opinion that these requirements would be a duplicative and unnecessary burden. One comment also pointed out that there was no provision for using a combined CCR rule/ELG rule website where a facility became subject to requirements after the effective date of the rule.

At the outset, the EPA agrees with commenters supporting a website reporting requirement. Given the success CCR rule websites have achieved in disseminating information to a variety of stakeholders, the EPA is finalizing a comparable posting requirement for the ELG rule. These websites will ensure transparency and ease of access to information. The EPA disagrees with these commenters that more is necessary. The existing reporting and recordkeeping requirements for general permitting provisions (*e.g.*, documentation during the permit application and permit modification processes, effluent reporting, etc.) are outside the scope of this rulemaking. Furthermore, even if the EPA were to consider broader changes to the reporting and recordkeeping requirements for all industrial categories, the Agency would do so through a rulemaking not specific to the steam electric power generating industry. Thus, the EPA is finalizing a website posting requirement only with respect to information contained in section 423.19.

Specifically, the EPA is requiring that all reporting and recordkeeping information not only be retained by the regulated entity and provided to the permitting authority, but that it also be posted to a public website for 10 years, or the length of the permit plus five years, whichever is longer. This posting requirement includes NOPPs and other filings that have occurred since the 2020 rule. The EPA is also allowing facilities to post on existing CCR rule compliance websites to reduce paperwork burden and make it easier for communities to access. One commenter correctly pointed out that, where facilities were not immediately subject to the reporting and recordkeeping requirements of section 423.19, it would have not been able to make the proper notification of combined CCR rule/ELG rule website usage within the proposed 60-day timeframe. Therefore, the EPA is finalizing a date for notification of this combined website that is **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** or the date which the facility becomes subject to section 423.19 reporting requirements, whichever is later.

D. Site-Specific Water Quality-Based Effluent Limitations

The EPA regulations at 40 CFR 122.44(d)(1), implementing section 301(b)(1)(C) of the CWA, require each NPDES permit to include any requirements, in addition to or more stringent than ELGs or standards promulgated pursuant to sections 301, 304, 306, 307, 318, and 405 of the CWA, necessary to achieve water quality standards established under section 303 of the CWA, including state narrative criteria for water quality. Those same regulations require that limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) that the Director determines are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality. 40 CFR 122.44(d)(1)(i). In the sections below, the EPA describes the potential need to develop monitoring requirements and or limitations relating to bromide, per- and polyfluoroalkyl substances (PFAS), and Tribal rights.

1. Bromide

The preamble to the 2015 rule discussed bromide as a parameter for which water quality-based effluent limitations may be appropriate. The EPA stated its recommendation that permitting authorities carefully consider whether water quality-based effluent limitations for bromide or TDS would be appropriate for FGD wastewater discharged from steam electric power plants upstream of drinking water intakes. The EPA also stated its recommendation that the permitting authority notify any downstream drinking water treatment plants of the discharge of bromide.

The final rule requires zero discharge of FGD wastewater, BA transport water, and CRL. Nevertheless, the EPA is finalizing subcategories for these wastewaters that will allow some discharge of these wastewaters, and all three have been shown to have measurable levels of bromide.[227] Therefore, the records for the 2015 rule, the 2020 rule, and this action continue to suggest that permitting authorities should consider establishing water quality-based effluent limitations where necessary to meet applicable water quality standards to protect of populations served by downstream drinking water treatment plants.

[227] The record also includes iodide in these discharges, another pollutant which should be considered alongside bromide for water quality-based effluent limitations.

In consultations conducted with state and local government entities, the EPA received comments from the American Water Works Association (AWWA) and the Association of Metropolitan Water Agencies. These comments requested that the EPA consider technologies that could treat upstream pollutants at the point of discharge, but also suggested that the EPA empower states to address the issue as well. The latter discussion referenced the approaches discussed in *Methods to Assess Anthropogenic Bromide Loads from Coal-Fired Power Plants and Their Potential Effect on Downstream Drinking Water Utilities*.[228] This document, provided in comments during the 2020 rulemaking and again during consultations on the current rulemaking, describes methodologies, data sources, and considerations for constructing an approach to bromide issues on a site-specific basis. This document presents additional data sources that NPDES permitting authorities could use to establish site-specific, water quality-based effluent limitations (*see*, *e.g.*, Figure 29 in AWWA's document). The document also provides examples of where states have already taken similar action. For example, AWWA cites California's 0.05 mg/L standard for in-river bromide to protect public health for specific waterways and drinking water treatment systems.

2. PFAS

In addition to considering water quality-based effluent limitations for parameters present in these wastestreams, the EPA also calls attention to the need to address

[228] Available online at: *https://www.awwa.org/Portals/0/AWWA/ETS/Resources/17861ManagingBromideREPORT.pdf?ver=2020-01-09-151706-107*.

potential for PFAS discharges. In the EPA's *PFAS Strategic Roadmap*,[229] the Agency laid out actions that would prevent PFAS from entering the environment. Specifically, the EPA stated it would "proactively use existing NPDES authorities to reduce discharges of PFAS at the source and obtain more comprehensive information through monitoring on the sources of PFAS and quantity of PFAS discharged by these sources." The EPA's Office of Water issued a memorandum in 2022, covering facilities where the EPA is the permitting authority,[230] as well as guidance to state permitting authorities to address PFAS in NPDES permits.[231] While the steam electric power sector was not identified as one of the top PFAS dischargers, the EPA notes that PFAS may nevertheless be present in steam electric discharges. For example, the Wisconsin Department of Natural Resources has found PFAS at eight power plants.[232] In addition, firefighting foam used in exercises or actual fires at steam electric power plants could contain PFAS. Therefore, permitting or control authorities may appropriately consider whether PFAS monitoring and any further restrictions (*e.g.*, BMPs) would be appropriate at a given facility.

3. Tribal Reserved Rights

[229] U.S. EPA (Environmental Protection Agency). 2021. *PFAS Strategic Roadmap: EPA's Commitments to Action 2021–2024*. October 18. Available online at: *https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf*.

[230] Fox, R. 2022. *Addressing PFAS Discharges in EPA-Issued NPDES Permits and Expectations Where EPA is the Pretreatment Control Authority*. April 28. Available online at: *https://www.epa.gov/system/files/documents/2022-04/npdes_pfas-memo.pdf*.

[231] Fox, R. 2022. *Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs.* December 5. Available online at: *https://www.epa.gov/system/files/documents/2022-*12/NPDES_PFAS_State%20Memo_December_2022.pdf.

[232] The maximum sampled concentrations in discharge from eight steam electric power plants were 28 ng/L for perfluorooctane sulfonic acid (PFOS) and 35 ng/L for perfluorooctanoic acid (PFOA), which the Wisconsin Department of Natural Resources theorized was due to concentration in cooling tower effluent.

A third water-quality based consideration for steam electric power plants is Tribal reserved rights. Many Tribes hold reserved rights to resources on lands and waters where states establish water quality standards, through treaties, statutes, or other sources of Federal law. The U.S. Constitution defines treaties as the supreme law of the land. On December 5, 2022, the EPA proposed revisions to the Federal water quality standards (WQS) regulation at 40 CFR Part 131. *See* 87 FR 74361 (Dec. 5, 2022) ("Tribal Reserved Rights proposed rule"). The proposed revisions, if finalized, would create a regulatory framework that would be applied case-specifically to protect aquatic and aquatic-dependent resources – such as fish – reserved to tribes through treaties, statutes, and executive orders, in WOTUS. The Tribal Reserved Rights proposed rule aims to improve protection of resources reserved to Tribes and the health of Tribal members exercising their reserved rights, as well as transparency and predictability for tribes, states, regulated community, and the public. The EPA is working to expeditiously finalize the proposed rule, taking into account public comments. During Tribal outreach on the Steam Electric ELG rulemaking, Tribes raised concerns about potential impacts to their Tribal reserved rights. For further discussion of EPA's outreach to tribes, see section XV.F.

E. Severability

The purpose of this section is to clarify the Agency's intent with respect to the severability of provisions of this rule in the event of litigation. In the event of a stay or invalidation of any part of this rule, the Agency's intent is to preserve the remaining portions of the rule to the fullest possible extent. To dispel any doubt regarding the EPA's intent and to inform how the regulation would operate if severed, the EPA has added the following regulatory text at § 423.10(b): "The provisions of this part are separate and severable from one another. If any provision is stayed or determined to be invalid, the remaining provisions shall continue in effect." This rule serves in many respects to further the goals of the CWA, and the Agency would have adopted each portion of this rule independent of the other portions. As explained below, the Agency carefully crafted this rule so that each provision or element of the rule can operate independently. Moreover, the Agency has organized the rule so that if any provision or element of this rule is determined by judicial review or operation of law to be invalid, that partial invalidation will not render the remainder of this rule invalid.

This rule primarily regulates discharges associated with four steam electric wastestreams. The rule provides limitations and standards associated with each wastestream in separate sections that do not rely on one another. The decision to regulate each wastestream was made independently of the decisions to regulate the other wastestreams. This is because the EPA applied the BAT statutory factors in its decision for each wastestream. This is consistent with the Fifth Circuit's decision in *Southwestern Elec. Power Co. v. EPA*, in which the Court held that the EPA must apply the BAT factors with respect to each wastestream, in that case CRL. *Southwestern Elec. Power Co. v. EPA,* 920 F.3d at 1027. Indeed, the Court ultimately vacated only those portions of the 2015 rule regulating legacy wastewater and CRL, without disturbing any further aspects of the rule. *Id*. at 1033.

This rule also contains several subcategories. The rule provides limitations and standards associated with each subcategory in separate sections, which are not relied on by other aspects of the rule. The decision to subcategorize particular discharges, for example, certain discharges of unmanaged CRL or certain discharges of legacy wastewater, had no bearing on the BAT decisions made with respect to the rest of the industry, for which the EPA finds the rule is technologically available and economically achievable after a consideration of the CWA section 304(b) factors. And each subcategory is supported by its own, independent BAT determination. Moreover, the rest of the industry's requirements are not tied in the regulatory text to the requirements of the subcategories. Similarly, the decision to subcategorize certain discharges from EGUs expected to cease combustion of coal had no bearing on the EPA's BAT decisions made with respect to the rest of the industry, for which the EPA finds the rule is technologically available and economically achievable after a consideration of the CWA section 304(b) factors. And the cease combustion of coal subcategories are supported by their own, independent BAT determinations. Moreover, the rest of the industry's requirements are not tied in the regulatory text to the requirements of the subcategories. Were the EPA to receive an adverse decision on any of the subcategories established in this rule, the EPA would expect to potentially address any remand and/or vacatur of the limitations applicable to the subcategory by considering the Court's opinion and the requisite statutory factors in re-promulgating any appropriate limitations for such subcategory. The EPA would, for example, have to demonstrate that any new limitations for the subcategory are technologically available and economically achievable for the subcategory, after a consideration of the CWA section 304(b) factors. These examples are illustrative, rather than exhaustive, and the EPA intends each portion of the rule to be independent and severable. Furthermore, if the application of any portion of this rule to a particular circumstance is determined to be invalid, the Agency intends that the rule remain applicable to all other circumstances.

XV. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders*.

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 14094: Modernizing Regulatory Review

This action is a "significant regulatory action," as defined under section 3(f)(1) of Executive Order 12866, as amended by Executive Order 14094. Accordingly, the EPA submitted this action to the Office of Management and Budget (OMB) for Executive Order 12866 review. The EPA has included redline strikeout versions showing changes made in response to the Executive Order 12866 review available in the docket. The EPA prepared an analysis of the estimated costs and benefits associated with this action. This analysis is contained in section 12 of the BCA and is also available in the docket.

B. Paperwork Reduction Act (PRA)

The information collection activities in this rule have been submitted for approval to the OMB under the PRA. The Information Collection Request (ICR) document that the EPA prepared has been assigned EPA ICR number 2752.02 and OMB Control Number 2040-0310. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here. The information collection requirements are not enforceable until OMB approves them.

As described in section XIV.C, the EPA is finalizing several changes to the individual reporting and recordkeeping requirements of section 423.19 for specific subcategories of plants and/or plants that have certain types of discharges. The EPA is adding reporting and recordkeeping requirements for plants in the permanent cessation of coal combustion by 2034 subcategory and for plants that discharge unmanaged CRL. EPA is also removing reporting and recordkeeping requirements for LUEGUs and finalizing a new requirement for plants to post reports to a publicly available website.

Respondents/affected entities: The respondents affected by this ICR are steam electric power plants. The North American Industry Classification System (NAICS) identification number applicable to respondents is 221112: Electric Power Generation Plants—Fossil Fuel Electric Power Generation. The U.S. Census Bureau describes this U.S. industry as establishments primarily engaged in operating fossil-fuel-powered electric power generation facilities. These facilities use fossil fuels, such as coal, oil, or gas, in an internal combustion or a combustion turbine conventional steam process to produce electric energy. The electric energy produced in these establishments is provided to electric power transmission systems or to electric power distribution systems.

Respondent's obligation to respond: Mandatory (40 CFR 423, 40 CFR 122).

Estimated number of respondents: The EPA estimates that 236 steam electric facilities would be subject to this final rule.

Frequency of response: The EPA made the following assumptions for estimating frequency:

- NOPPs, notices, and the Combustion Residual Leachate Monitoring Report (CRLMR) would be submitted one time (in the first year of the requirements).
- Progress reports and the annual CRLMR would be submitted once a year following the submittal of the official NOPP (*i.e.*, twice over a three-year period).
- Progress reports associated with EPA's VIP program or NOPPs that have already been submitted would be submitted once a year following the publication of the final rule.

Total estimated burden: For facilities, the estimated facility universe for any reporting, for the purpose of this estimate is 236 facilities. The EPA estimates the total one-time labor hours associated with this ICR to facilities is 6,520 and total annual labor hours of 22,000 hours for a total annual average of 24,300 hours. Similarly, the EPA estimates the total one-time labor costs to facilities to be $650,000 and total annual labor costs of about $2,300,000 for a total annual average of $2,540,000. For permitting/control authorities, the estimated universe is 41. The EPA estimates the total one-time labor hours associated with this ICR to permitting/control authorities is 416 and total annual labor hours ranging from 3,050 to 3,160 for a total annual average of 3,230 hours. Similarly, the EPA estimates the total one-time labor costs to permitting/control authorities to be $33,300 and total annual labor costs range from $256,000 to $265,000 for a total annual average of $273,000.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for the EPA's regulations in 40 CFR are listed in 40 CFR part 9. When OMB approves this ICR, the Agency will announce that approval in the *Federal Register* and publish a technical amendment to 40 CFR part 9 to display the OMB control number for the approved information collection activities contained in this final rule.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. The small entities subject to the requirements of this action include small businesses and small governmental jurisdictions that own steam electric plants. The EPA has determined that 220 to 391 entities own steam electric power plants subject to the ELGs, of which 117 to 202 entities are small. These small entities own a total of 267 steam electric power plants (out of the total of 858 plants), including 33 to 39 plants estimated to incur costs under the final rule under the lower and upper cost scenarios, respectively. The EPA considered the impacts of the final rule on small businesses using a cost-to-revenue test. The analysis compares the cost of implementing wastewater controls under the final rule to those under baseline (which reflects the 2020 rule, as explained in section V of this preamble). Small entities estimated to incur compliance costs exceeding one or more of the one percent and three percent impact thresholds were identified as potentially incurring a significant impact. For the final rule under the lower bound cost scenario, the EPA's analysis shows 10 small entities (4 non-utilities, 3 cooperatives, and 3 municipalities) expected to incur incremental costs equal to or greater than one percent of revenue. For 5 of these small entities (2 non-utilities, 2 cooperatives, and 1 municipality), the incremental cost of the final rule exceeds three percent of revenue. For the upper bound cost scenario, an additional 2 small entities (both non-utilities) have costs equal to or greater than one percent of revenue for a total of 12 entities. For 2 non-utilities, 3 cooperatives, and 2 municipalities, these costs exceed three percent of revenue. Details of this analysis are presented in section 8 of the RIA, included in the docket.

These results support the EPA's finding of no significant impact on a substantial number of small entities.

D. Unfunded Mandates Reform Act (UMRA)

This action contains a Federal mandate under the UMRA, 2 U.S.C. 1531–1538 that may result in expenditures of $100 million (adjusted annually for inflation) or more for state, local, and Tribal governments, in the aggregate, or the private sector in any one year ($198 million in 2023 dollars). Accordingly, the EPA has prepared a written statement required under section 202 of UMRA. The statement is included in the docket for this action (see section 9 in the RIA) and briefly summarized below.

Consistent with the intergovernmental consultation provisions of section 204 of the UMRA, the EPA consulted with government entities potentially affected by this rule. The EPA described the government-to-government dialogue leading to the proposed rule in its preamble to the proposed rulemaking. The EPA received comments from state and local government representatives in response to the proposed rule and considered this input in developing the final rule.

Consistent with section 205, the EPA has identified and considered a reasonable number of regulatory alternatives to develop BAT. The main regulatory options are described in section VII of this preamble. These options included a range of technology-based approaches. As discussed in detail in section VII.B of this preamble, the EPA is selecting Option B as the BAT after considering the factors required under CWA section 304(b)(2)(B). The technologies are available, are economically achievable, and have acceptable non-water quality environmental impacts.

This final rule is not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. To assess the impact of compliance requirements on small governments (*i.e.*, governments with a population of less than 50,000), the EPA compared total costs and costs per plant estimated to be incurred by small governments with the costs estimated to be incurred by large governments. The EPA also compared costs for small government-owned plants with those of non-government-owned facilities. The Agency evaluated both the average and maximum annualized costs per plant under both the lower and upper bound cost scenarios. section 9 of the RIA provides details of these analyses. In all these comparisons, both for the cost totals and, in particular, for the average and maximum cost per plant, the costs for small government-owned facilities were less than those for small non-government-owned facilities. This was true for both the lower and upper bound cost scenarios. The maximum cost per plant was also smaller for the small government-owned plants vs. the large government-owned plants under the lower bound cost scenario. The average annualized costs per plant were larger for small government-owned plants vs. large government-owned plants under the upper bound cost scenario, but not markedly so. On this basis, the EPA concludes that the compliance cost requirements of the steam electric ELGs would not significantly or uniquely affect small governments.

E. Executive Order 13132: Federalism

The EPA has concluded that this action has federalism implications because it imposes direct compliance costs on state or local governments, and the Federal Government will not provide the funds necessary to pay those costs.

As discussed in section XV.B, the EPA anticipates that this final rule does not impose incremental administrative burden on states from issuing, reviewing, and overseeing compliance with discharge requirements. The EPA has identified 148 steam electric power plants owned by 63 state or local government entities. Under the final rule, the EPA projects that 15 government-owned plants would incur compliance costs. The EPA estimates the maximum compliance cost in any one year to governments (excluding the Federal Government) for the final rule range from $155 million and $220 million, whereas the annualized costs range between $40 million and $67 million (see section 9 of the RIA for details).

The EPA provides the following federalism summary impact statement.

The EPA consulted with state and local officials early in the process of developing the rule to permit them to have meaningful and timely input into its development. The preamble to the proposed rule described these consultations, which included a meeting held on January 27, 2022, attended by representatives from 15 state and local government organizations and outreach with several intergovernmental associations representing elected officials and encouraged their members to participate in the meeting, including the National Governors Association, the National Conference of State Legislatures, the Council of State Governments, the National Association of

Counties, the National League of Cities, the U.S. Conference of Mayors, the County Executives of America, and the National Associations of Towns and Townships.

The EPA received five sets of unique written comments after the meeting and considered these comments in the development of the proposed rule. For further information regarding the consultation process and supplemental materials provided to state and local government representatives, please go to the steam electric power generating effluent guidelines website at: *https://www.epa.gov/eg/2021-supplemental-steam-electric-rulemaking*.

The EPA received comment on the proposed ELGs from three state and local officials or their representatives. Some state and local officials expressed concerns the EPA had underestimated the costs and overstated the pollutant removals of the technology options. Commenters stated that the ELGs would impose significant costs on small entities and would result in electricity rate increases that are unaffordable for households. Commenters also expressed concern about coordination of the various rules affecting the power sector. The EPA considered these comments in developing the final rule.

A list of the state and local government commenters has been provided to OMB and has been placed in the docket for this rulemaking. In addition, the detailed response to comments from these entities is contained in the EPA's response to comments document on this final rulemaking, which has also been placed in the docket for this rulemaking.

As explained in section VII of this preamble, the EPA is establishing more stringent limitations on several wastestreams that would alleviate concerns raised by the public water systems. At the same time, the EPA's final rule includes subcategories for units certifying to the permanent cessation of coal combustion. The EPA believes these differentiated requirements alleviate some of the concerns raised by publicly owned utilities. Further, as explained in section VIII of this preamble, the EPA's analysis demonstrates that the final requirements are economically achievable for the steam electric power generating industry as a whole and for plants owned by state or local government entities.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This action has Tribal implications; however, it will neither impose substantial direct compliance costs on federally recognized Tribal governments, nor preempt Tribal law, as specified in Executive Order 13175. *See* 65 FR 67249 (November 9, 2000). It does not have substantial direct effects on Tribal governments, on the relationship between the Federal Government and the Indian Tribes, or the distribution of power and responsibilities between the Federal Government and Indian Tribes as specified in Executive Order 13175. The EPA's analyses show that no facility subject to the final ELGs is owned by Tribal governments. Thus, Executive Order 13175 does not apply to this action. The EPA acknowledges this action has Tribal implications, not prescribed in Executive Order 13175, because during Tribal Consultation, the EPA received written comments from 3 Tribal nations that conveyed the importance of historical Tribal waters and rights (*e.g.*, fishing, trapping), recommended more stringent technological controls to protect those rights, or encouraged retirement or fuel conversion of old coal-fired EGUs.

Although Executive Order 13175 does not apply to this action, the EPA consulted with Tribal officials early in the process of developing this rule to enable them to have meaningful and timely input into its development. The EPA initiated consultation and coordination with federally recognized Tribal governments in January 2022, sharing information about the steam electric effluent guidelines rulemaking with the National Tribal Caucus, the National Tribal Water Council, and several individual tribes. The EPA continued this government-to-government dialogue and, on February 1 and February 9, 2022, invited Tribal representatives to participate in further discussions about the rulemaking process and objectives, with a focus on identifying specific ways the rulemaking may affect Tribes.[233] The consultation process ended on March 29, 2022. The EPA is including in the docket for this action a memorandum that provides a response to the comments it received through this consultation and the consultations described in sections XVI.D and XVI.E of this preamble. For further information regarding the consultation process and supplemental materials provided to Tribal representatives, please go to the steam electric power generating effluent guidelines website at: *https://www.epa.gov/eg/2021-supplemental-steam-electric-rulemaking.*

Representatives from several Tribes provided input to the rule. The EPA considered input from Tribal representatives in developing this final rule.

[233] As discussed in **Sections XIII** and **XVI.J**, the EPA also did targeted outreach to communities in the top tier of its EJ screening analysis which included two tribal communities.

G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks

Executive Order 13045 directs Federal agencies to include an evaluation of the health and safety effects of the planned regulation on children in Federal health and safety standards and explain why the regulation is preferable to potentially effective and reasonably feasible alternatives. This action is not subject to Executive Order 13045 because the EPA does not believe the environmental health risks or safety risks addressed by this action present a disproportionate risk to children. This action's health and risk assessments are discussed in sections 4 and 5 of the BCA and are summarized below.

The EPA identified several ways in which the final rule will benefit children, including by potentially reducing health risks from exposure to pollutants present in steam electric power plant discharges, or through impacts of the discharges on the quality of source water used by public water systems. This reduction arises from more stringent pollutant limitations as compared to baseline. The EPA quantified the changes in IQ losses from lead exposure among preschool children and from mercury exposure *in utero* resulting from maternal fish consumption under the final rule as compared to baseline. The EPA also estimated changes in the lifetime risk of developing bladder cancer due to exposure to TTHM in drinking water, or of cardiovascular premature mortality from exposure to lead. For these analyses, the EPA did not estimate children-specific risks because these adverse health effects normally follow long-term exposure. Finally, the EPA estimated changes in air-related adverse health effects resulting from changes in the profile of electricity generation under the final rule as compared to baseline. The analysis found that the resulting reductions in $PM_{2.5}$ and ozone will benefit children by reducing asthma onset and symptoms, allergy symptoms, emergency room visits and hospital visits for respiratory conditions, and school absences.

However, the EPA's Policy on Children's Health applies to this action. Information on how the Policy was applied is available under "Children's Environmental Health" in the Supplementary Information section of this preamble.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This final action is not a "significant energy action" because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The EPA analyzed the potential energy effects of the final rule relative to baseline and found minimal or no impacts on electricity generation, generating capacity, cost of energy production, or dependence on a foreign supply of energy. Specifically, the Agency's analysis found that the final rule would not reduce electricity production by more than 1 billion kWhs per year or by 500 MW of installed capacity, nor would the final rule increase U.S. dependence on foreign energy supplies. For more detail on the potential energy effects of this action, see section 10.7 in the RIA, available in the docket.

I. National Technology Transfer and Advancement Act

This rulemaking does not involve technical standards.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations and Executive Order 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All

The EPA believes that the human health or environmental conditions existing prior to this action result in or have the potential to result in disproportionate and adverse human health or environmental effects on communities with EJ concerns. Current research suggests that coal-fired power plants tend to be in low-income communities, Indigenous communities, and communities of color. Toomey (2013) reported that 78 percent of African Americans in the United States live within a 30-mile radius of a coal-fired power plant.[234] Impacts discussed in the reports included adverse health impacts resulting from air pollutants (*e.g.*, SO_2, NO_X, $PM_{2.5}$) for those living in proximity to coal-fired power plants, climate justice issues resulting from GHG emissions, and risk of impoundment failures for populations living in proximity to coal waste surface impoundments where coal is mined.[235, 236, 237] All these impacts were found in one or more papers to disproportionately impact low-income, minority, and Indigenous communities. The EPA also conducted a proximity analysis to characterize the

[234] Toomey, D. 2013. *Coal Pollution and the Fight for Environmental Justice*. Yale Environment 360. June 19. Available online at: *https://www.e360.yale.edu/features/naacp_jacqueline_patterson_coal_pollution_and_fight_for_environmental_justice.*

[235] Liévanos, R., Greenberg, P., Wishart,P. 2018. *In the Shadow of Production: Coal Waste Accumulation and Environmental Inequality Formation in Eastern Kentucky,* pp. 37–55.

[236] Israel, B. 2012. *Coal Plants Smother Communities of Color. https://www.scientificamerican.com/article/coal-plants-smother-communities-of-color/#:~:text=People%20living%20near%20coal%20plants,percent%20are%20people%20of%20color*.

[237] NAACP (National Association for the Advancement of Colored People). 2012. *Coal Blooded: Putting Profits Before People*. *www.naacp.org/resources/coal-blooded-putting-profits-people*.

demographics of communities potentially exposed to pollution from steam electric power plant wastewater discharges through proximity to plants, proximity to downstream surface waters receiving, or being served by a PWS using impacted downstream receiving waters as source water for drinking water. The results of the EPA's analysis showed that these communities have higher proportions of low-income individuals and people of color compared to the national average, national rural average, and respective state averages suggesting potential EJ concerns under the baseline in terms of disproportionate exposures. The EPA believes that this action is likely to reduce existing disproportionate and adverse effects on communities with EJ concerns. The EPA's EJ analysis showed the final rule will reduce differential baseline exposures for low-income communities and communities of color to pollutants in wastewater and resulting human impacts. Improvements to water quality, wildlife, and human health resulting from reductions in pollutants in surface water will be distributed more among communities with EJ concerns under some or all of the regulatory options due to their disproportionate exposures under the baseline. Drinking water improvements will also be distributed more among communities with EJ concerns under the final rule due to their disproportionate exposures under the baseline. Remaining exposures, impacts, and benefits analyzed are small enough that EPA could not conclude whether changes in disproportionate impacts under the baseline would occur. While the changes in GHGs attributable to the final rule are small compared to worldwide emissions, findings from peer-reviewed evaluations demonstrate that actions that reduce GHG emissions are also likely to reduce climate-related impacts on vulnerable communities, including communities with EJ concerns. Costs of the final rule in terms of electricity price increases among residential households may impact low-income households and households of color more relative to all households as low-income households and households of color tend to spend a greater proportion of their income on energy expenditures. Despite this, the potential price increases under the upper bound cost scenario represent between less than 0.1 percent and 0.2 percent of energy expenditures for all income, race groups, and income quintiles, and therefore the EPA does not expect costs to have a substantial impact on low-income households and households of color.

K. Congressional Review Act (CRA)

This action is subject to the CRA, and the EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action meets the criteria set forth in 5 U.S.C. 804(2).

Appendix A to the Preamble: Definitions, Acronyms, and Abbreviations Used in This Preamble

The following acronyms, abbreviations, and terms are used in this preamble. These terms are provided the reader's for convenience; they are not regulatory definitions with the force or effect of law, nor are they to be used as guidance for implementation of this rule.

Administrator. The Administrator of the U.S. Environmental Protection Agency.

Agency. U.S. Environmental Protection Agency.

BAT. Best available technology economically achievable, as defined by CWA sections 301(b)(2)(A) and 304(b)(2)(B).

BA transport water. Wastewater that is used to convey bottom ash from the ash collection or storage equipment, or boiler, and has direct contact with the ash.

BCA. Abbreviation used for the *Benefit and Cost Analysis for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* report.

Bioaccumulation. A general term describing a process by which chemicals are taken up by an organism either directly from exposure to a contaminated medium or by consumption of food containing the chemicals, resulting in a net accumulation of the chemical over time by the organism.

BMP. Best management practice.

BA. Bottom ash. The ash, including EGU slag, that settles in a furnace or is dislodged from furnace walls. Economizer ash is included when it is collected with BA.

BA purge water. The water discharged from a wet BA handling system that recycles some, but not all, of its BA transport water.

BPT. The best practicable control technology currently available, as defined by CWA sections 301(b)(1) and 304(b)(1).

CBI. Confidential business information.

CCR. Coal combustion residuals.

CWA. Clean Water Act; The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 *et seq.*), as amended, *e.g.,* by the Clean Water Act of 1977 (Pub. L. 95–217) and the Water Quality Act of 1987 (Pub. L. 100–4).

Combustion residuals. Solid wastes associated with combustion-related steam electric power plant processes, including fly ash and BA from coal-, petroleum coke-, or oil-fired units; FGD solids; FGMC wastes; and other wastewater treatment solids associated with steam electric power plant wastewater. In addition to the residuals associated with coal combustion, this also includes residuals associated with the combustion of other fossil fuels.

CRL. Combustion residual leachate. Leachate from landfills or surface impoundments that contains combustion residuals. Leachate is composed of liquid, including any suspended or dissolved constituents in the liquid, that has percolated through waste or other materials emplaced in a landfill, or that passes through the surface impoundment's containment structure (*e.g.,* bottom, dikes, berms). Combustion residual leachate includes seepage and/or leakage from a combustion residual landfill or impoundment unit. It also includes wastewater from landfills and surface impoundments located on non-adjoining property when under the operational control of the permitted facility.

CWA. Clean Water Act.

Direct discharge. (1) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source" or (2) any addition of any pollutant or combination of pollutant to waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft that is being used as a means of transportation. This definition includes additions of pollutants into waters of the United States from surface runoff that is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person that do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances that lead into privately owned treatment works. This term does not include addition of pollutants by any "indirect discharger."

Direct discharger. A plant that discharges treated or untreated wastewaters into waters of the United States.

DOE. Department of Energy.

Dry BA handling system. A system that does not use water as the transport medium to convey BA away from the EGU. Dry-handling systems include systems that collect and convey the BA without using any water, as well as systems in which BA is quenched in a water bath and then mechanically or pneumatically conveyed away from the EGU. Dry BA handling systems do not include wet sluicing systems (such as remote MDS or complete recycle systems).

Effluent limitation. Under CWA section 502(11), any restriction, including schedules of compliance, established by a state or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents that are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean.

EGU. Electric generating unit.

EIA. Energy Information Administration.

EJA. Abbreviation used for the *Environmental Justice Analysis for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* report.

ELGs. Effluent limitations guidelines and standards.

E.O. Executive Order.

EPA. U.S. Environmental Protection Agency.

FA. Fly ash. The ash that is carried out of the furnace by a gas stream and collected by a capture device such as a mechanical precipitator, electrostatic precipitator, and/or fabric filter. Economizer ash is included in this definition when it is collected with FA. Ash is not included in this definition when it is collected in wet scrubber air pollution control systems whose primary purpose is particulate removal.

Facility. Any NPDES "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

FA transport water. Wastewater that is used to convey fly ash from the ash collection or storage equipment, or boiler, and has direct contact with the ash.

FGD. Flue gas desulfurization.

FGMC. Flue gas mercury control.

FGD wastewater. Wastewater generated specifically from the wet FGD scrubber system that contacts the flue gas or the FGD solids, including, but not limited to, the blowdown or purge from the FGD scrubber system, overflow or underflow from the solids separation process, FGD solids wash water, and the filtrate from the solids dewatering process. Wastewater generated from cleaning the FGD scrubber, cleaning FGD solids separation equipment, cleaning FGD solids dewatering equipment, or that is collected in floor drains in the FGD process area is not considered FGD wastewater.

FGMC wastewater. Any wastewater generated from an air pollution control system installed or operated for the purpose of removing mercury from flue gas. This includes wastewater from fly ash collection systems when the particulate control system follows sorbent injection or other controls to remove mercury from flue gas. FGD wastewater generated at plants using oxidizing agents to remove mercury in the FGD system and not in a separate FGMC system is not considered FGMC wastewater.

Gasification wastewater. Any wastewater generated at an integrated gasification combined cycle operation from the gasifier or the syngas cleaning, combustion, and cooling processes. Gasification wastewater includes, but is not limited to, the following: sour/grey water; CO_2/steam stripper wastewater; sulfur recovery unit blowdown; and wastewater resulting from slag handling or fly ash handling, particulate removal, halogen removal, or trace organic removal. Air separation unit blowdown, noncontact cooling water, and runoff from fuel and/or byproduct piles are not considered gasification wastewater. Wastewater that is collected intermittently in floor drains in the gasification process area from leaks, spills, and cleaning occurring during normal operation of the gasification operation is not considered gasification wastewater.

Groundwater. Water that is found in the saturated part of the ground underneath the land surface.

Indirect discharge. Wastewater discharged or otherwise introduced to a POTW.

IPM. Integrated Planning Model.

Landfill. A disposal facility or part of a facility or plant where solid waste, sludges, or other process residuals are placed in or on any natural or manmade formation in the earth for disposal and which is not a storage pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome or salt bed formation, an underground mine, a cave, or a corrective action management unit.

Legacy wastewater. FGD wastewater, BA transport water, FA transport water, CRL, gasification wastewater and/or FGMC wastewater generated before the “as soon as possible” date that more stringent effluent limitations from the 2015 or 2020 rules would apply.

MDS. Mechanical drag system.BA handling system that collects BA from the bottom of an EGU in a water-filled trough. The water bath in the trough quenches the hot BA as it falls from the EGU and seals the EGU gases. A drag chain operates in a continuous loop to drag BA from the water trough up an incline, which dewaters the BA by gravity, draining the water back to the trough as the BA moves upward. The dewatered BA is often conveyed to a nearby collection area, such as a small bunker outside the EGU building, from which it is loaded onto trucks and either sold or transported to a landfill. The MDS is considered a dry BA handling system because the ash transport mechanism is mechanical removal by the drag chain, not the water.

Mortality. Death rate or proportion of deaths in a population.

NAICS. North American Industry Classification System.

NPDES. National Pollutant Discharge Elimination System.

NSPS. New Source Performance Standards.

ORP. Oxidation-reduction potential.

Paste. A substance containing solids in a fluid which behaves as a solid until a force is applied that causes it to behave like a fluid.

Paste landfill. A landfill that receives any paste designed to set into a solid after the passage of a reasonable amount of time.

Point source. Any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft from which pollutants are or may be discharged. The term does not include agricultural stormwater discharges or return flows from irrigated agriculture. *See* CWA section 502(14), 33 U.S.C. 1362(14); 40 CFR 122.2.

POTW. Publicly owned treatment works. *See* CWA section 212, 33 U.S.C. 1292; 40 CFR 122.2, 403.3.

PSES. Pretreatment Standards for Existing Sources.

PSC. Public service commission.

PUC. Public utility commission.

RCRA. The Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901 *et seq*.

Remote MDS. BA handling system that collects BA at the bottom of the EGU, then uses transport water to sluice the ash to a remote MDS that dewaters BA using a configuration similar to MDS. The remote MDS is considered a wet BA handling system because the ash transport mechanism is water.

RO. Reverse osmosis.

RFA. Regulatory Flexibility Act.

SBA. Small Business Administration.

Sediment. Particulate matter lying below water.

Surface water. All waters of the United States, including rivers, streams, lakes, reservoirs, and seas.

TDD. Abbreviation used for the *Technical Development Document for the Final Supplemental Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* report.

Toxic pollutants. As identified under the CWA, 65 pollutants and classes of pollutants, of which 126 specific substances have been designated priority toxic pollutants. *See* Appendix A to 40 CFR part 423.

Transport water. Wastewater that is used to convey FA, BA, or economizer ash from the ash collection or storage equipment or EGU and that has direct contact with the ash. Transport water does not include low-volume, short-duration discharges of wastewater from minor leaks (*e.g.,* leaks from valve packing, pipe flanges, or piping) or minor maintenance events (*e.g.,* replacement of valves or pipe sections).

UMRA. Unfunded Mandates Reform Act.

Wet BA handling system. A system in which BA is conveyed away from the EGU using water as a transport medium. Wet BA systems typically send the ash slurry to dewatering bins or a surface impoundment. Wet BA handling systems include systems that operate in conjunction with a traditional wet sluicing system to recycle all BA transport water (*e.g.*, remote MDS or complete recycle systems).

Wet FGD system. Wet FGD systems capture sulfur dioxide from the flue gas using a sorbent that has mixed with water to form a wet slurry, and that generates a water stream that exits the FGD scrubber absorber.

List of Subjects

40 CFR Part 423

Environmental protection, Electric power generation, Power facilities, Waste treatment and disposal, Water pollution control.

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Michael S. Regan,
Administrator.

For the reasons stated in the preamble, the Environmental Protection Agency amends 40 CFR part 423 as follows:

PART 423— STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY

1. The authority citation for part 423 is revised to read as follows:

Authority: Secs. 101; 301; 304(b), (c), (e), (g), and (i)(A) and (B); 306; 307; 308 and 501, Clean Water Act (Federal Water Pollution Control Act Amendments of 1972, as amended; 33 U.S.C. 1251 et seq.; 1311; 1314(b), (c), (e), (g), and (i)(A) and (B); 1316; 1317; 1318 and 1361).

2. Revise § 423.10 to read as follows:

§ 423.10 Applicability and severability.

(a) Applicability. The provisions of this part apply to discharges resulting from the operation of a generating unit by an establishment whose generation of electricity is the predominant source of revenue or principal reason for operation, and whose generation of electricity results primarily from a process utilizing fossil-type fuel (coal, oil, or gas), fuel derived from fossil fuel (*e.g.*, petroleum coke, synthesis gas), or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium. This part applies to discharges associated with both the combustion turbine and steam turbine portions of a combined cycle generating unit.

(b) Severability. The provisions of this part are separate and severable from one another. If any provision is stayed or determined to be invalid, the remaining provisions shall continue in effect.

3. Amend § 423.11 by revising paragraphs (n), (p), (r), (w), (z), and (bb) and adding paragraphs (ee) and (ff) to read as follows:

§ 423.11 Specialized definitions.

* * * * *

(n) The term *flue gas desulfurization (FGD) wastewater* means any wastewater generated specifically from the wet flue gas desulfurization scrubber system that comes into contact with the flue gas or the FGD solids, including but not limited to, the blowdown from the FGD scrubber system, overflow or underflow from the solids separation process, FGD solids wash water, and the filtrate from the solids dewatering process. Wastewater generated from cleaning the FGD scrubber, cleaning FGD solids separation equipment, cleaning FGD solids dewatering equipment; FGD paste equipment cleaning water; treated FGD wastewater permeate or distillate used as boiler makeup water; water that is collected in floor drains in the FGD process area; wastewater removed from FGD wastewater treatment equipment within the first 120 days of decommissioning the equipment, or wastewater generated by a 10-year, 24-hour or longer duration storm event when meeting the certification requirements in § 423.19(o) is not considered FGD wastewater.

* * * * *

(p) The term *transport water* means any wastewater that is used to convey fly ash, bottom ash, or economizer ash from the ash collection or storage equipment, or boiler, and has direct contact with the ash. Transport water does not include low volume, short duration discharges of wastewater from minor leaks (*e.g.*, leaks from valve packing, pipe flanges, or piping), minor maintenance events (*e.g.*, replacement of valves or pipe sections), FGD paste equipment cleaning water, bottom ash purge water, wastewater removed from ash handling equipment within the first 120 days of decommissioning the equipment, or wastewater generated by a 10-year, 24-hour or longer duration storm event when meeting the certification requirements in § 423.19(o).

*   *   *   *   *

(r) The term *combustion residual leachate* means leachate from landfills or surface impoundments containing combustion residuals. Leachate is composed of liquid, including any suspended or dissolved constituents in the liquid, that has percolated through waste or other materials emplaced in a landfill, or that passes through the surface impoundment's containment structure (*e.g.*, bottom, dikes, berms). Combustion residual leachate includes seepage and/or leakage from a combustion residual landfill or impoundment unit. Combustion residual leachate includes wastewater from landfills and surface impoundments located on non-adjoining property when under the operational control of the permitted facility. Combustion residual leachate does not include wastewater generated by a 10-year, 24-hour or longer duration storm event when meeting the certification requirements in § 423.19(o).

*   *   *   *   *

(w) The term *permanent cessation of coal combustion* means the owner or operator certifies under § 423.19(g) or § 423.19(h) that an electric generating unit will cease combustion of coal no later than December 31, 2028, or December 31, 2034.

* * * * *

(z) The term *low utilization electric generating unit* means any electric generating unit for which the facility owner certifies, and annually recertifies, under § 423.19(f) that the two-year average annual capacity utilization rating is less than 10 percent.

* * * * *

(bb) The term *tank* means a stationary device, designed to contain an accumulation of wastewater which is constructed primarily of non-earthen materials (*e.g.*, wood, concrete, steel, plastic) which provide structural support and which is not a coal combustion residual surface impoundment.

* * * * *

(ee) The term *coal combustion residual surface impoundment* means a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of coal combustion residuals and liquids, and the unit treats, stores, or disposes of coal combustion residuals.

(ff) The term *unmanaged combustion residual leachate* means combustion residual leachate which either:

(1) Is determined by the permitting authority to be the functional equivalent of a direct discharge to a WOTUS through groundwater, or

(2) Has leached from a waste management unit into the subsurface and mixed with groundwater prior to being captured and pumped to the surface for discharge directly to a WOTUS.

4. Amend § 423.13 by revising paragraphs (g), (h)(1)(ii), (i)(1)(ii), (k), (l), and (o) to read as follows:

§ 423.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

*   *   *   *   *

(g) FGD wastewater.

(1) 2020 BAT.

(i) Except for those discharges to which paragraph (g)(2) or (g)(3) of this section applies, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in table 5 following this paragraph (g)(1)(i). Dischargers must meet the effluent limitations for FGD wastewater in this paragraph by a date determined by the permitting authority that is as soon as possible beginning October 13, 2021, but no later than December 31, 2025. These effluent limitations apply to the discharge of FGD wastewater generated on and after the date determined by the permitting authority for meeting the effluent limitations, as specified in this paragraph, until the date determined by the permitting authority for meeting the effluent limitations in paragraph (g)(4).

Table 5 to Paragraph (g)(1)(i)

Pollutant or pollutant property	BAT Effluent Limitations	
	Maximum for any 1 day	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	18	8
Mercury, total (ng/L)	103	34
Selenium, total (µg/L)	70	29
Nitrate/nitrite as N (mg/L)	4	3

(ii) FGD wastewater generated before the date determined by the permitting authority, as specified in paragraph (g)(1)(i) of this section. [RESERVED].

(2) 2020 BAT subcategories.

(i) For any electric generating unit with a total nameplate capacity of less than or equal to 50 megawatts, that is an oil-fired unit, or for which the owner has submitted a certification pursuant to § 423.19(g), the quantity of pollutants discharged in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed for TSS in § 423.12(b)(11).

(A) For any electric generating unit for which the owner has submitted a certification pursuant to § 423.19(g), where such unit has permanently ceased coal combustion by December 31, 2028, there shall be no discharge of pollutants in FGD wastewater after April 30, 2029.

(B) For any electric generating unit for which the owner has submitted a certification pursuant to § 423.19(g), where such unit has failed to permanently cease coal combustion by December 31, 2028, there shall be no discharge of pollutants in FGD wastewater after December 31, 2028.

(ii) For FGD wastewater discharges from a high FGD flow facility, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in table 6 following this paragraph (g)(2)(ii). Dischargers must meet the effluent limitations for FGD wastewater in this paragraph by a date determined by the permitting authority that is as soon as possible beginning October 13, 2021, but no later than December 31, 2023. These effluent limitations apply to the discharge of FGD wastewater generated on and after the date determined by the permitting authority for meeting the effluent limitations, as specified in this paragraph, until the date determined by the permitting authority for meeting the effluent limitations in paragraph (g)(4) of this section.

Table 6 to Paragraph (g)(2)(ii)

	BAT Effluent Limitations	
Pollutant or pollutant property	**Maximum for any 1 day**	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	11	8
Mercury, total (ng/L)	788	356

(iii) For FGD wastewater discharges from a low utilization electric generating unit, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in table 6 following paragraph (g)(2)(ii). Dischargers must meet the effluent limitations for FGD wastewater in this paragraph by a date determined by the permitting authority that is as soon as possible beginning October 13, 2021, but no later than December 31, 2023. These effluent limitations apply to the discharge of FGD wastewater generated on and after the date determined by the permitting authority for meeting the effluent limitations, as specified in this paragraph, until the date determined by the permitting authority for meeting the effluent limitations in paragraph (g)(4).

(3) Voluntary incentives plan.

(i) For dischargers who voluntarily choose to meet the effluent limitations for FGD wastewater in this paragraph, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in table 7 following this paragraph (g)(3)(i). Dischargers who choose to meet the effluent limitations for FGD wastewater in this paragraph must meet such limitations by December 31, 2028. These effluent limitations apply to the discharge of FGD wastewater generated on and after December 31, 2028.

Table 7 of Paragraph (g)(3)(i)

	BAT Effluent Limitations	
Pollutant or pollutant property	**Maximum for any 1 day**	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (ug/L)	5	NA
Mercury, total (ng/L)	23	10
Selenium, total (ug/L)	10	NA
Nitrate/Nitrite (mg/L)	2.0	1.2
Bromide (mg/L)	0.2	NA
TDS (mg/L)	306	149

(ii) For discharges of FGD wastewater generated before December 31, 2023, the quantity of pollutants discharged in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed for TSS in § 423.12(b)(11).

(4) 2024 BAT.

(i) Except for those discharges to which paragraph (g)(3), (g)(4)(ii) through (iv) of this section applies, there shall be no discharge of pollutants in FGD wastewater.

(A) Dischargers must meet the effluent limitations for FGD wastewater in this paragraph by a date determined by the permitting authority that is as soon as possible beginning **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, but no later than December 31, 2029. These effluent limitations apply to the discharge of FGD wastewater generated on and after the date determined by the permitting authority for meeting the effluent limitations, as specified in this paragraph.

(B) A facility which submits a request under § 423.19(n) may discharge permeate or distillate from an FGD wastewater treatment system designed to achieve the limitations in paragraph (g)(4)(i) of this section for an additional period of up to one year from the date determined in subparagraph (g)(4)(i)(A) of this section.

(ii) For any electric generating unit with a total nameplate capacity of less than or equal to 50 megawatts or that is an oil-fired unit, the quantity of pollutants discharged in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed for TSS in § 423.12(b)(11).

(iii) For any electric generating unit for which the owner has submitted a certification pursuant to § 423.19(h), the quantity of pollutants discharged in FGD wastewater shall continue to be subject to limitations specified in paragraph (g)(1) or (g)(2)(ii) or (iii) of this section as incorporated into the existing permit.

(A) Where such unit has permanently ceased coal combustion by December 31, 2034, there shall be no discharge of pollutants in FGD wastewater after April 30, 2035.

(B) Where such unit has failed to permanently cease coal combustion by December 31, 2034, there shall be no discharge of pollutants in FGD wastewater after December 31, 2034.

(iv) For FGD wastewater discharged from any coal combustion residual surface impoundment which commences closure pursuant to 40 CFR 257.102(e) after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in table 8 following this paragraph (g)(4)(iv).

Table 8 to Paragraph (g)(4)(iv)

	BAT Effluent Limitations	
Pollutant or pollutant property	**Maximum for any 1 day**	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	11	8
Mercury, total (ng/L)	788	356

* * * * *

(h) * * *

(1) * * *

(ii) Fly ash transport water generated before the date determined by the permitting authority, as specified in paragraph (h)(1)(i) of this section. [RESERVED]

* * * * *

(i) * * *

(1) * * *

(ii) Flue gas mercury control wastewater generated before the date determined by the permitting authority, as specified in paragraph (i)(1)(i) of this section. [RESERVED.

* * * * *

(i)(1)(ii) Flue gas mercury control wastewater generated before the date determined by the permitting authority, as specified in paragraph (i)(1)(i). [RESERVED].

* * * * *

(k) Bottom Ash Transport Water

(1) 2020 BAT

(i) Except for those discharges to which paragraph (k)(2) of this section applies, or when the bottom ash transport water is used in the FGD scrubber, there shall be no discharge of pollutants in bottom ash transport water. Dischargers must meet the discharge limitation in this paragraph by a date determined by the permitting authority that is as soon as possible beginning October 13, 2021, but no later than December 31, 2025. This limitation applies to the discharge of bottom ash transport water generated on and after the date determined by the permitting authority for meeting the discharge limitation, as specified in this paragraph, until the date determined by the permitting authority for meeting the effluent limitations in paragraph (k)(4) of this section. Except for those discharges to which paragraph (k)(2) of this section applies, whenever bottom ash transport water is used in any other plant process or is sent to a treatment system at the plant (except when it is used in the FGD scrubber), the resulting effluent must comply with the discharge limitation in this paragraph. When the bottom ash transport water is used in the FGD scrubber, it ceases to be bottom ash transport water, and instead is FGD wastewater, which must meet the requirements in paragraph (g) of this section.

(ii) Bottom ash transport water generated before the date determined by the permitting authority, as specified in paragraph (k)(1)(i) of this section. [RESERVED]

(2) 2020 BAT subcategories

(i)(A) The discharge of pollutants in bottom ash transport water from a properly installed, operated, and maintained bottom ash system is authorized under the following conditions:

(*1*) To maintain system water balance when precipitation-related inflows are generated from storm events exceeding a 10-year storm event of 24-hour or longer duration (*e.g.*, 30-day storm event) and cannot be managed by installed spares, redundancies, maintenance tanks, and other secondary bottom ash system equipment; or

(*2*) To maintain system water balance when regular inflows from wastestreams other than bottom ash transport water exceed the ability of the bottom ash system to accept recycled water and segregating these other wastestreams is not feasible; or

(*3*) To maintain system water chemistry where installed equipment at the facility is unable to manage pH, corrosive substances, substances or conditions causing scaling, or fine particulates to below levels which impact system operation or maintenance; or

(*4*) To conduct maintenance not otherwise included in paragraphs (k)(2)(i)(A) (*1*), (*2*), or (*3*) of this section and not exempted from the definition of transport water in § 423.11(p), and when water volumes cannot be managed by installed spares, redundancies, maintenance tanks, and other secondary bottom ash system equipment.

(B) The total volume that may be discharged for the above activities in paragraph (k)(2)(i)(A) of this section shall be reduced or eliminated to the extent achievable using control measures (including best management practices) that are technologically available and economically achievable in light of best industry practice. The total volume of the discharge authorized in this paragraph shall be determined on a case-by-case basis by the permitting authority and in no event shall such discharge exceed a 30-day rolling average of ten percent of the primary active wetted bottom ash system volume. The volume of daily discharges used to calculate the 30-day rolling average shall be calculated using measurements from flow monitors.

(ii) For any electric generating unit with a total nameplate generating capacity of less than or equal to 50 megawatts, that is an oil-fired unit, or for which the owner has certified to the permitting authority that it will cease combustion of coal pursuant to § 423.19(g), the quantity of pollutants discharged in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of the applicable wastewater times the concentration for TSS listed in § 423.12(b)(4).

(A) Where a unit has certified that it will cease combustion of coal pursuant to § 423.19(g) and such unit has permanently ceased coal combustion by December 31, 2028, there shall be no discharge of pollutants in bottom ash transport water after April 30, 2029.

(B) Where a unit has certified that it will cease combustion of coal pursuant to § 423.19(g) and such unit has failed to permanently cease coal combustion by December 31, 2028, there shall be no discharge of pollutants in bottom ash transport water after December 31, 2028.

(iii) For bottom ash transport water generated by a low utilization electric generating unit, the quantity of pollutants discharged in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of the applicable wastewater times the concentration for TSS listed in § 423.12(b)(4), until the date determined by the permitting authority for meeting the effluent limitations in paragraph (k)(4) of this section, and shall incorporate the elements of a best management practices plan as described in paragraph (k)(3) of this section.

(3) Best management practices plan. Where required in paragraph (k)(2)(iii) of this section, the discharger shall prepare, implement, review, and update a best management practices plan for the recycle of bottom ash transport water, and must include:

(i) Identification of the low utilization coal-fired generating units that contribute bottom ash to the bottom ash transport system.

(ii) A description of the existing bottom ash handling system and a list of system components (*e.g.*, remote mechanical drag system, tanks, impoundments, chemical addition). Where multiple generating units share a bottom ash transport system, the plan shall specify which components are associated with low utilization generating units.

(iii) A detailed water balance, based on measurements, or estimates where measurements are not feasible, specifying the volume and frequency of water additions and removals from the bottom ash transport system, including:

(A) Water removed from the BA transport system:

(*1*) To the discharge outfall;

(*2*) To the FGD scrubber system;

(*3*) Through evaporation;

(*4*) Entrained with any removed ash; and

(*5*) To any other mechanisms not specified paragraph (k)(3)(iii)(*1*) through (*4*) above.

(B) Water entering or recycled to the BA transport system:

(1) Makeup water added to the BA transport water system.

(2) Bottom ash transport water recycled back to the system in lieu of makeup water.

(3) Any other mechanisms not specified above.

(iv) Measures to be employed by all facilities:

(A) Implementation of a comprehensive preventive maintenance program to identify, repair and replace equipment prior to failures that result in the release of bottom ash transport water.

(B) Daily or more frequent inspections of the entire bottom ash transport water system, including valves, pipe flanges and piping, to identify leaks, spills and other unintended bottom ash transport water escaping from the system, and timely repair of such conditions.

(C) Documentation of preventive and corrective maintenance performed.

(v) Evaluation of options and feasibility, accounting for the associated costs, for eliminating or minimizing discharges of bottom ash transport water, including:

(A) Segregation of bottom ash transport water from other process water.

(B) Minimization of the introduction of stormwater by diverting (*e.g.*, curbing, using covers) storm water to a segregated collection system.

(C) Recycling bottom ash transport water back to the bottom ash transport water system.

(D) Recycling bottom ash transport water for use in the FGD scrubber.

(E) Optimization of existing equipment (*e.g.*, pumps, pipes, tanks) and installing new equipment where practicable to achieve the maximum amount of recycle.

(F) Utilization of "in-line" treatment of transport water (*e.g.*, pH control, fines removal) where needed to facilitate recycle.

(vi) Description of the bottom ash recycle system, including all technologies, measures, and practices that will be used to minimize discharge.

(vii) A schedule showing the sequence of implementing any changes necessary to achieve the minimized discharge of bottom ash transport water, including the following:

(A) The anticipated initiation and completion dates of construction and installation associated with the technology components or process modifications specified in the plan.

(B) The anticipated dates that the discharger expects the technologies and process modifications to be fully implemented on a full-scale basis, which in no case shall be later than December 31, 2023.

(C) The anticipated change in discharge volume and effluent quality associated with implementation of the plan.

(viii) Description establishing a method for documenting and demonstrating to the permitting/control authority that the recycle system is well operated and maintained.

(ix) Performance of weekly flow monitoring for the following:

(A) Make up water to the bottom ash transport water system.

(B) Bottom ash transport water sluice flow rate (*e.g.*, to the surface impoundment(s), dewatering bins(s), tank(s), remote mechanical drag system).

(C) Bottom ash transport water discharge to surface water or POTW.

(D) Bottom ash transport water recycle back to the bottom ash system or FGD scrubber.

(4) 2024 BAT.

(i) Except for those discharges to which paragraphs (k)(4)(ii) through (iv) of this section applies, or when the bottom ash transport water is used in the FGD scrubber, there shall be no discharge of pollutants in bottom ash transport water. Dischargers must meet the discharge limitation in this paragraph by a date determined by the permitting authority that is as soon as possible beginning **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, but no later than December 31, 2029. This limitation applies to the discharge of bottom ash transport water generated on and after the date determined by the permitting authority for meeting the discharge limitation, as specified in this paragraph.

(ii) For any electric generating unit with a total nameplate generating capacity of less than or equal to 50 megawatts or that is an oil-fired unit, the quantity of pollutants discharged in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of the applicable wastewater times the concentration for TSS listed in § 423.12(b)(4).

(iii) For any electric generating unit for which the owner has submitted a certification pursuant to § 423.19(h), the quantity of pollutants discharged in bottom ash transport water shall continue to be subject to limitations specified in paragraph (k)(1) or (k)(2)(i) or (k)(2)(iii) as incorporated into the existing permit.

(A) Where such unit has permanently ceased coal combustion by December 31, 2034, there shall be no discharge of pollutants in bottom ash transport water after April 30, 2035.

(B) Where such unit has failed to permanently cease coal combustion by December 31, 2034, there shall be no discharge of pollutants in bottom ash transport water after December 31, 2034.

(iv) For bottom ash transport water discharged from any coal combustion residual surface impoundment which commences closure pursuant to 40 CFR 257.102(e) after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the quantity of pollutants in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of bottom ash transport water times the concentration listed in table 9 following this paragraph (k)(4)(iv).

Table 9 to Paragraph (k)(4)(iv)

Pollutant or pollutant property	**BAT Effluent Limitations**	
	Maximum for any 1 day	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	11	8
Mercury, total (ng/L)	788	356

*   *   *   *   *

(l) Combustion residual leachate.

(1) 2024 BAT.

(i) Except for those discharges to which paragraph (l)(1)(i)(B) or (C) or (1)(2) of this section applies, there shall be no discharge of pollutants in combustion residual leachate.

(A) Dischargers must meet the effluent limitations for combustion residual leachate in this paragraph by a date determined by the permitting authority that is as soon as possible beginning **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, but no later than December 31, 2029. These effluent limitations apply to the discharge of combustion residual leachate generated on and after the date determined by the permitting authority for meeting the effluent limitations, as specified in this paragraph.

(B) A facility which submits a request under § 423.19(n) may discharge permeate or distillate from a combustion residual leachate treatment system designed to achieve the limitations in paragraph (l)(1)(i) of this section for an additional period of up to one year from the date determined in subparagraph (l)(1)(i)(A) of this section.

(C) After the retirement of all units at a facility, the quantity of pollutants in CRL shall not exceed the quantity determined by multiplying the flow of CRL permeate times the concentrations listed in the table following paragraph (g)(3)(i) of this section or the flow of CRL distillate times the concentrations listed in the table following § 423.15(b)(13).

(ii) Combustion residual leachate generated before the date determined by the permitting authority, as specified in paragraph (l)(1)(i) of this section. [RESERVED].

(2) 2024 BAT subcategories.

(i) Discharges of combustion residual leachate for which the owner has submitted a certification pursuant to § 423.19(h). [RESERVED]

(A) Where such unit has permanently ceased coal combustion by December 31, 2034, the quantity of pollutants in combustion residual leachate shall not exceed the quantity determined by multiplying the flow of combustion residual leachate times the concentration listed in table 10 following this paragraph (l)(2)(i)(A) by a date determined by the permitting authority that is as soon as possible beginning 120 days after the facility permanently ceases coal combustion, but no later than April 30, 2035.

Table 10 to paragraph (l)(2)(i)(A)

	BAT Effluent Limitations	
Pollutant or pollutant property	**Maximum for any 1 day**	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (ug/L)	11	8
Mercury, total (ng/L)	788	356

(B) Where such unit has failed to permanently cease coal combustion by December 31, 2034, there shall be no discharge of pollutants in combustion residual leachate after December 31, 2034 of this section.

(ii) For discharges of unmanaged combustion residual leachate, the quantity of pollutants in unmanaged combustion residual leachate shall not exceed the quantity determined by multiplying the flow of unmanaged combustion residual leachate times the concentration listed in the Table 10 following paragraph (l)(2)(i)(A) of this section.

(A) Dischargers must meet the effluent limitations for unmanaged combustion residual leachate in this paragraph by a date determined by the permitting authority that is as soon as possible beginning **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, but no later than December 31, 2029. These effluent limitations apply to the discharge of unmanaged combustion residual leachate generated on and after the date determined by the permitting authority for meeting the effluent limitations, as specified in this paragraph.

(B) Discharges of unmanaged combustion residual leachate before the date determined in paragraph (l)(2)(ii)(A). [RESERVED]

(iii) For combustion residual leachate discharged from any coal combustion residual surface impoundment which commences closure pursuant to 40 CFR 257.102(e) after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the quantity of pollutants in combustion residual leachate shall not exceed the quantity determined by multiplying the flow of combustion residual leachate times the concentration listed in table 11 following this paragraph (l)(2)(iii).

Table 11 to Paragraph (l)(2)(iii)

	BAT Effluent Limitations	
Pollutant or pollutant property	**Maximum for any 1 day**	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	11	8
Mercury, total (ng/L)	788	356

*   *   *   *   *

(o)(1) Transfer between applicable limitations in a permit. Where, in the permit, the permitting authority has included alternative limits subject to eligibility requirements, upon timely notification to the permitting authority under § 423.19(l), a facility can become subject to the alternative limits under the following circumstances:

(i) On or before December 31, 2023, a facility may convert:

(A) From limitations for electric generating units permanently ceasing coal combustion under paragraphs (g)(2)(i) or (k)(2)(ii) of this section to limitations for low utilization electric generating units under paragraphs (g)(2)(iii) or (k)(2)(iii) of this section; or

(B) From voluntary incentives program limitations under paragraph (g)(3)(i) of this section or generally applicable limitations under paragraph (k)(1)(i) of this section to limitations for low utilization electric generating units under paragraphs (g)(2)(iii) or (k)(2)(iii) of this section.

(ii) On or before December 31, 2025, a facility may convert

(A) From voluntary incentives program limitations under paragraph (g)(3)(i) of this section to limitations for electric generating units permanently ceasing coal combustion under paragraph (g)(2)(i) of this section; or

(B) From limitations for electric generating units permanently ceasing coal combustion under paragraphs (g)(2)(i) or (k)(2)(ii) of this section to voluntary incentives program limitations under paragraphs (g)(3)(i) of this section or generally applicable limitations under (k)(1)(i) of this section; or

(C) From limitations for low utilization electric generating units under paragraphs (g)(2)(iii) or (k)(2)(iii) of this section to generally applicable limitations under paragraphs (g)(1)(i) or (k)(1)(i) of this section; or

(D) From limitations for low utilization electric generating units under paragraphs (g)(2)(iii) or (k)(2)(iii) of this section to voluntary incentives program limitations under paragraphs (g)(3)(i) of this section or generally applicable limitations under paragraph (k)(1)(i) of this section; or

(E) From limitations for low utilization electric generating units under paragraphs (g)(2)(iii) or (k)(2)(iii) of this section to limitations for electric generating units permanently ceasing coal combustion under paragraphs (g)(2)(i) and (k)(2)(ii) of this section.

(2) A facility must be in compliance with all of its currently applicable requirements to be eligible to file a notice under § 423.19(l) and to become subject to a different set of applicable requirements under paragraph (o)(1) of this section.

(3) Where a facility seeking a transfer under paragraph (o)(1)(ii) of this section is currently subject to more stringent limitations than the limitations being sought, the facility must continue to meet those more stringent limitations.

5. Amend § 423.15 by adding paragraph (c) as follows:

§ 423.15 New source performance standards (NSPS).

*   *   *   *   *

(c) 2024 NSPS. Combustion Residual Leachate.

(1) Except as provided in paragraph (c)(2) of this section, there shall be no discharge of pollutants in combustion residual leachate. Whenever combustion residual leachate is used in any other plant process or is sent to a treatment system at the plant, the resulting effluent must comply with the discharge standard in this paragraph.

(2) After the retirement of all units at a facility, the quantity of pollutants in CRL shall not exceed the quantity determined by multiplying the flow of CRL permeate times the concentrations listed in § 423.13 in the table following paragraph (g)(3)(i) or the flow of CRL distillate times the concentrations listed in the table following paragraph 423.15(b)(13).

6. Amend § 423.16 by revising paragraphs (e) and (g), and adding paragraph (j) to read as follows:

§ 423.16 Pretreatment standards for existing sources (PSES).

* * * * *

(e) FGD wastewater.

(1) 2020 PSES. Except as provided for in paragraph (e)(2) of this section, for any electric generating unit with a total nameplate generating capacity of more than 50 megawatts, that is not an oil-fired unit, and that the owner has not certified that it will cease coal combustion pursuant to § 423.19(g), the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in table 4 to this paragraph (e)(1). Dischargers must meet the standards in this paragraph by October 13, 2023, except as provided for in

paragraph (e)(2) of this section. These standards apply to the discharge of FGD wastewater generated on and after October 13, 2023.

Table 4 to Paragraph (e)(1)

Pollutant or pollutant property	PSES	
	Maximum for any 1 day	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (ug/L)	18	8
Mercury, total (ng/L)	103	34
Selenium, total (ug/L)	70	29
Nitrate/nitrite as N (mg/L)	4	3

(2) 2020 PSES subcategories.

(i) For FGD wastewater discharges from a low utilization electric generating unit, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in the Table 5 to paragraph (e)(2)(ii) of this section. Dischargers must meet the standards in this paragraph by October 13, 2023.

(ii) If any low utilization electric generating unit fails to timely recertify that the two year average capacity utilization rating of such an electric generating unit is below 10 percent per year as specified in § 423.19(f), regardless of the reason, within two years from the date such a recertification was required, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in the table 4 to paragraph (e)(1) of this section

Table 5 to Paragraph (e)(2)(ii)

	PSES	
Pollutant or pollutant property	**Maximum for any 1 day**	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (ug/L)	11	8
Mercury, total (ng/L)	788	356

(3) 2024 PSES. Except as provided for in paragraph (e)(4) of this section, for any electric generating unit with a total nameplate generating capacity of more than 50 megawatts and that is not an oil-fired unit, there shall be no discharge of pollutants in FGD wastewater. Dischargers must meet the standards in this paragraph by **[INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, except as provided for in paragraph (e)(4) of this section. These standards apply to the discharge of FGD wastewater generated on and after **[INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

(4) 2024 PSES subcategories.

(i) For any electric generating unit for which the owner has submitted a certification pursuant to § 423.19(h), the quantity of pollutants discharged in FGD wastewater shall continue to be subject to standards specified in paragraphs (e)(1) or (e)(2) of this section as incorporated into the existing control mechanism.

(A) Where such unit has permanently ceased coal combustion by December 31, 2034, there shall be no discharge of pollutants in FGD wastewater after April 30, 2035.

(B) Where such unit has failed to permanently cease coal combustion by December 31, 2034, there shall be no discharge of pollutants in FGD wastewater after December 31, 2034.

(ii) For FGD wastewater discharged from any coal combustion residual surface impoundment which commences closure pursuant to 40 CFR 257.102(e) after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the quantity of pollutants in FGD wastewater shall not exceed the quantity determined by multiplying the flow of FGD wastewater times the concentration listed in the table 6 following this paragraph (e)(4)(ii).

Table 6 to Paragraph (e)(4)(ii)

Pollutant or pollutant property	**PSES**	
	Maximum for any 1 day	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	11	8
Mercury, total (ng/L)	788	356

* * * * *

(g) Bottom ash transport water.

(1) 2020 PSES. Except for those discharges to which paragraph (g)(2) of this section applies, or when the bottom ash transport water is used in the FGD scrubber, for any electric generating unit with a total nameplate generating capacity of more than 50 megawatts, that is not an oil-fired unit, that is not a low utilization electric generating unit, and that the owner has not certified that the electric generating unit will cease coal combustion pursuant to § 423.19(g), there shall be no discharge of pollutants in bottom ash transport water. This standard applies to the discharge of bottom ash transport water generated on and after October 13, 2023. Except for those discharges to which paragraph (g)(2) of this section applies, whenever bottom ash transport water is used in any other

plant process or is sent to a treatment system at the plant (except when it is used in the FGD scrubber), the resulting effluent must comply with the discharge standard in this paragraph. When the bottom ash transport water is used in the FGD scrubber, the quantity of pollutants in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of bottom ash transport water times the concentration listed in table 4 in paragraph (e)(1) of this section.

(2) 2020 PSES subcategories.

(i) The discharge of pollutants in bottom ash transport water from a properly installed, operated, and maintained bottom ash system is authorized under the following conditions:

(A) To maintain system water balance when precipitation-related inflows are generated from a 10-year storm event of 24-hour or longer duration (*e.g.*, 30-day storm event) and cannot be managed by installed spares, redundancies, maintenance tanks, and other secondary bottom ash system equipment; or

(B) To maintain system water balance when regular inflows from wastestreams other than bottom ash transport water exceed the ability of the bottom ash system to accept recycled water and segregating these other wastestreams is feasible; or

(C) To maintain system water chemistry where current operations at the facility are unable to currently manage pH, corrosive substances, substances or conditions causing scaling, or fine particulates to below levels which impact system operation or maintenance; or

(D) To conduct maintenance not otherwise included in paragraphs (g)(2)(i)(A)(*1*), (*2*), or (*3*) of this section and not exempted from the definition of transport water in § 423.11(p), and when water volumes cannot be managed by installed spares, redundancies, maintenance tanks, and other secondary bottom ash system equipment.

(ii) The total volume that may be discharged to a POTW for the above activities shall be reduced or eliminated to the extent achievable as determined by the control authority. The control authority may also include control measures (including best management practices) that are technologically available and economically achievable in light of best industry practice. In no event shall the total volume of the discharge exceed a 30-day rolling average of ten percent of the primary active wetted bottom ash system volume. The volume of daily discharges used to calculate the 30-day rolling average shall be calculated using measurements from flow monitors.

(iii) For bottom ash transport water generated by a low utilization electric generating unit, the quantity of pollutants discharged in bottom ash transport water shall incorporate the elements of a best management practices plan as described in § 423.13(k)(3).

(3) 2024 PSES. Except for those discharges to which paragraph (g)(4) of this section applies, for any electric generating unit with a total nameplate generating capacity of more than 50 megawatts, that is not an oil-fired unit, there shall be no discharge of pollutants in bottom ash transport water. This standard applies to the discharge of bottom ash transport water generated on and after **[INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Except for those discharges to

which paragraph (g)(4) of this section applies, whenever bottom ash transport water is used in any other plant process or is sent to a treatment system at the plant, the resulting effluent must comply with the discharge standard in this paragraph.

(4) 2024 PSES subcategories.

(i) For any electric generating unit for which the owner has submitted a certification pursuant to § 423.19(h), the quantity of pollutants discharged in bottom ash transport water shall continue to be subject to standards specified in paragraphs (g)(1) or (g)(2) as incorporated into the existing control mechanism.

(A) Where such unit has permanently ceased coal combustion by December 31, 2034, there shall be no discharge of pollutants in bottom ash transport water after April 30, 2035.

(B) Where such unit has failed to permanently cease coal combustion by December 31, 2034, there shall be no discharge of pollutants in bottom ash transport water after December 31, 2034.

(ii) For bottom ash transport water discharged from any coal combustion residual surface impoundment which commences closure pursuant to 40 CFR 257.102(e) after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the quantity of pollutants in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of bottom ash transport water times the concentration listed in table 7 following this paragraph (g)(4)(ii).

Table 7 to Paragraph (g)(4)(ii)

Pollutant or pollutant property	PSES	
	Maximum for any 1 day	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	11	8
Mercury, total (ng/L)	788	356

*   *   *   *   *

(j) Combustion residual leachate

(1) 2024 PSES.

(i) Except for those discharges to which paragraph (j)(2) or (j)(1)(ii) of this section applies, there shall be no discharge of pollutants in combustion residual leachate. This standard applies to the discharge of combustion residual leachate generated on and after **[INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Except for those discharges to which paragraph (j)(2) of this section applies, whenever combustion residual leachate is used in any other plant process or is sent to a treatment system at the plant, the resulting effluent must comply with the discharge standard in this paragraph.

(ii) After the retirement of all units at a facility, the quantity of pollutants in CRL shall not exceed the quantity determined by multiplying the flow of CRL permeate times the concentrations listed in the table following paragraph (g)(3)(i) or the flow of CRL distillate times the concentrations listed in the table following paragraph 423.15(b)(13).

(2) 2024 PSES subcategories.

(i) Electric generating units for which the owner has submitted a certification pursuant to § 423.19(h). [RESERVED].

(A) Where such unit has permanently ceased coal combustion by December 31, 2034, the quantity of pollutants in combustion residual leachate shall not exceed the quantity determined by multiplying the flow of combustion residual leachate times the concentration listed in the Table 8 following paragraph (j)(2)(i)(A) no later than April 30, 2035.

Table 8 to paragraph (j)(2)(i)

Pollutant or pollutant property	PSES	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Arsenic, total (ug/L)	11	8
Mercury, total (ng/L)	788	356

(B) Where such unit has failed to permanently cease coal combustion by December 31, 2034, there shall be no discharge of pollutants in FGD wastewater after December 31, 2034.

(ii) For combustion residual leachate discharged from any coal combustion residual surface impoundment which commences closure pursuant to 40 CFR 257.102(e) after **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEEERAL REGISTER]**, the quantity of pollutants in combustion residual leachate shall not exceed the quantity determined by multiplying the flow of combustion residual leachate times the concentration listed in table 9 following this paragraph (j)(2)(ii).

Table 9 to Paragraph (j)(2)(ii)

Pollutant or pollutant property	PSES

	Maximum for any 1 day	**Average of daily values for 30 consecutive days shall not exceed**
Arsenic, total (µg/L)	11	8
Mercury, total (ng/L)	788	356

7. Amend § 423.17 by adding new paragraph (c) as follows:

§ 423.17 Pretreatment standards for new sources (PSNS).

* * * * *

(c) 2024 PSNS. Combustion Residual Leachate.

(1) Except as provided in paragraph (c)(2) of this section, there shall be no discharge of pollutants in combustion residual leachate. Whenever combustion residual leachate is used in any other plant process or is sent to a treatment system at the plant, the resulting effluent must comply with the discharge standard in this paragraph.

(2) After the retirement of all units at a facility, the quantity of pollutants in CRL shall not exceed the quantity determined by multiplying the flow of CRL permeate times the concentrations listed § 423.13 in the table following paragraph (g)(3)(i) or the flow of CRL distillate times the concentrations listed in the table following paragraph 423.15(b)(13).

8. Revise § 423.18 to read as follows::

§ 423.18 Permit conditions.

All permits subject to this part shall include the following permit conditions:

(a) An electric generating unit shall qualify as a low utilization electric generating unit, permanently ceasing the combustion of coal by December 31, 2028, or permanently ceasing the combustion of coal by December 31, 2034, if such qualification would have been demonstrated absent the following qualifying event:

(1) An emergency order issued by the Department of Energy under section 202(c) of the Federal Power Act;

(2) A reliability must run agreement issued by a Public Utility Commission; or

(3) Any other reliability-related order, energy emergency alert, or agreement issued by a competent electricity regulator (*e.g.*, an independent system operator) which results in that electric generating unit operating in a way not contemplated when the certification was made; or

(4) The operation of the electric generating unit was necessary for load balancing in an area subject to a declaration under 42 U.S.C. 5121 et seq., that there exists:

(i) An “Emergency”; or

(ii) A “Major Disaster”; and

(iii) That load balancing was due to the event that caused the “Emergency” or “Major Disaster” in paragraph (a)(4) of this section to be declared,

(b) Any facility providing the required documentation pursuant to § 423.19(i) may avail itself of the protections of the permit condition in paragraph (a) of this section.

(c) A facility discharging permeate or distillate from an FGD wastewater or combustion residual leachate treatment system and satisfying paragraph (d) of this section shall be deemed to meet the following requirements:

(1) The FGD wastewater requirements of § 423.13(g)(4) for up to one year after the date determined pursuant to § 423.11(t);

(2) The combustion residual leachate requirements of § 423.13(l)(1) for up to one year after the date determined pursuant to § 423.11(t);

9. Revised and republish § 423.19 to read as follows:

§ 423.19 Reporting and recordkeeping requirements.

(a) Discharges subject to this part must comply with the following additional reporting requirements.

(b) Signature and certification. Unless otherwise provided below, all certifications and recertifications required in this part must be signed and certified pursuant to 40 CFR 122.22 for direct dischargers or 40 CFR 403.12(l) for indirect dischargers.

(c) Publicly accessible Internet site requirements.

(1) Except as provided in paragraph (c)(2) of this section, each facility subject to one or more of the reporting requirements in paragraphs (d) through (o) of this section must maintain a publicly accessible internet site (ELG website) containing the information specified in paragraphs (d) through (o), if applicable. This website shall be titled "ELG Rule Compliance Data and Information." The facility must ensure that all information required to be posted is immediately available to anyone visiting the site,

without requiring any prerequisite, such as registration or a requirement to submit a document request. All required information must be clearly identifiable and must be able to be immediately downloaded by anyone accessing the site in a format that enables additional analysis (*e.g.*, comma-separated values text file format). When the facility initially creates, or later changes, the web address (*i.e.*, Uniform Resource Locator (URL)) at any point, they must notify EPA via the "contact us" form on EPA's Effluent Guidelines website and the permitting authority or control authority within 14 days of creating the website or making the change. The facility's ELG website must also have a "contact us" form or a specific email address posted on the website for the public to use to submit questions and issues relating to the availability of information on the website.

(2) Combined websites.

(i) When an owner or operator subject to this section already maintains a "CCR Rule Compliance Data and Information" website pursuant to 40 CFR 257.107, the postings required under this section may be made to the existing "CCR Rule Compliance Data and Information" website and shall be delineated under a separate heading that shall state "ELG Rule Compliance Data and Information." When electing to use an existing website pursuant to this paragraph, the facility shall notify EPA via the "contact us" form on EPA's Effluent Guidelines website and the permitting authority or control authority no later than **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION DATE IN THE FEDERAL REGISTER]** or upon first becoming subject to paragraphs (d) through (o) of this section, whichever is later.

(ii) When the same owner or operator is subject to the provisions of this part for multiple facilities, the owner or operator may comply with the requirements of this section by using the same Internet site for multiple facilities provided the ELG website clearly delineates information by the name of each facility.

(3) Unless otherwise required in this section, the information required to be posted to the ELG website must be made available to the public for at least 10 years following the date on which the information was first posted to the ELG website, or the length of the permit plus five years, whichever is longer. All required information must be clearly identifiable and must be able to be immediately downloaded by anyone accessing the site in a format that enables additional analysis (*e.g.*, comma-separated values text file format).

(4) Unless otherwise required in this section, the information must be posted to the ELG website:

(i) Within 30 days of submitting the information to the permitting authority or control authority; or

(ii) Where information was submitted to the permitting authority or control authority prior to **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

(d) Requirements for facilities discharging bottom ash transport water pursuant to § 423.13(k)(2)(i) or 423.16(g)(2)(i).

Certification Statement. For sources seeking to discharge bottom ash transport water pursuant to § 423.13(k)(2)(i) or 423.16(g)(2)(i), an initial certification shall be submitted to the permitting authority by the as soon as possible date determined under § 423.11(t), or the control authority by October 13, 2023 in the case of an indirect discharger.

(2) Signature and certification. The certification statement must be signed and certified by a professional engineer.

(3) Contents. An initial certification shall include the following:

(A) A statement that the professional engineer is a licensed professional engineer.

(B) A statement that the professional engineer is familiar with the regulation requirements.

(C) A statement that the professional engineer is familiar with the facility.

(D) The primary active wetted bottom ash system volume in § 423.11(aa).

(E) Material assumptions, information, and calculations used by the certifying professional engineer to determine the primary active wetted bottom ash system volume.

(F) A list of all potential discharges under § 423.13(k)(2)(i)(A)(1) through (4) or § 423.16(g)(2)(i)(A) through (D), the expected volume of each discharge, and the expected frequency of each discharge.

(G) Material assumptions, information, and calculations used by the certifying professional engineer to determine the expected volume and frequency of each discharge including a narrative discussion of why such water cannot be managed within the system and must be discharged.

(H) A list of all wastewater treatment systems at the facility currently, or otherwise required by a date certain under this section.

(I) A narrative discussion of each treatment system including the system type, design capacity, and current or expected operation.

(e) Requirements for a bottom ash best management practices plan.

(1) Initial and annual certification statement. For sources required to develop and implement a best management practices plan pursuant to § 423.13(k)(3), an initial certification shall be made to the permitting authority with a permit application or within two years of October 13, 2021, whichever is later, or to the control authority no later than October 13, 2023 in the case of an indirect discharger, and an annual recertification shall be made to the permitting authority, or control authority in the case of an indirect discharger, within 60 days of the anniversary of the original plan.

(2) Signature and certification. The certification statement must be signed and certified by a professional engineer.

(3) Contents for initial certification. An initial certification shall include the following:

(i) A statement that the professional engineer is a licensed professional engineer.

(ii) A statement that the professional engineer is familiar with the regulation requirements.

(iii) A statement that the professional engineer is familiar with the facility.

(iv) The best management practices plan.

(v) A statement that the best management practices plan is being implemented.

(4) Additional contents for annual certification. In addition to the required contents of the initial certification in paragraph (e)(3) of this section an annual certification shall include the following:

(i) Any updates to the best management practices plan.

(ii) An attachment of weekly flow measurements from the previous year.

(iii) The average amount of recycled bottom ash transport water in gallons per day.

(iv) Copies of inspection reports and a summary of preventative maintenance performed on the system.

(v) A statement that the plan and corresponding flow records are being maintained at the office of the plant.

(f) Requirements for low utilization electric generating units.

(1) ***Notice of Planned Participation.*** For sources seeking to qualify as a low utilization electric generating units, a Notice of Planned Participation shall be submitted to the permitting authority or control authority no later than October 13, 2021.

(2) ***Contents.*** A Notice of Planned Participation shall identify the potential low utilization electric generating unit. The notice shall also include a statement of at least

two years' capacity utilization rating data for the most recent two years of operation of each low utilization electric generating unit and a statement that the facility has a good faith belief that each low utilization electric generating unit will continue to operate at the required capacity utilization rating. Where the most recent capacity utilization rating does not meet the low utilization electric generating unit requirement, a discussion of the projected future utilization shall be provided, including material data and assumptions used to make that projection.

(3) ***Initial and annual certification statement.*** For sources seeking to qualify as a low utilization electric generating unit under this part, an initial certification shall be made to the permitting authority, or to the control authority in the case of an indirect discharger, no later than December 31, 2023, and an annual recertification shall be made to the permitting authority, or control authority in the case of an indirect discharger, within 60 days of submitting annual electricity production data to the Energy Information Administration.

(4) ***Contents.*** A certification or annual recertification shall be based on the information submitted to the Energy Information Administration and shall include copies of the underlying forms submitted to the Energy Information Administration, as well as any supplemental information and calculations used to determine the two year average annual capacity utilization rating.

(g) Requirements for units that will achieve permanent cessation of coal combustion by December 31, 2028.

(1) Notice of Planned Participation. For sources seeking to qualify as an electric generating unit that will achieve permanent cessation of coal combustion by December 31, 2028, under this part, a Notice of Planned Participation shall be made to the permitting authority, or to the control authority in the case of an indirect discharger, no later than June 27, 2023.

(2) Contents. A Notice of Planned Participation shall identify the electric generating units intended to achieve the permanent cessation of coal combustion. A Notice of Planned Participation shall include the expected date that each electric generating unit is projected to achieve permanent cessation of coal combustion, whether each date represents a retirement or a fuel conversion, whether each retirement or fuel conversion has been approved by a regulatory body, and what the relevant regulatory body is. The Notice of Planned Participation shall also include a copy of the most recent integrated resource plan for which the applicable state agency approved the retirement or repowering of the unit subject to the ELGs, certification of electric generating unit cessation under 40 CFR 257.103(b), or other documentation supporting that the electric generating unit will permanently cease the combustion of coal by December 31, 2028. The Notice of Planned Participation shall also include, for each such electric generating unit, a timeline to achieve the permanent cessation of coal combustion. Each timeline shall include interim milestones and the projected dates of completion.

(3) Annual Progress Report. Annually after submission of the Notice of Planned Participation in paragraph (g)(1) of this section, a progress report shall be filed with the permitting authority, or control authority in the case of an indirect discharger.

(4) Contents. An Annual Progress Report shall detail the completion of any interim milestones listed in the Notice of Planned Participation since the previous progress report, provide a narrative discussion of any completed, missed, or delayed milestones, and provide updated milestones. An annual progress report shall also include one of the following:

(i) A copy of the official suspension filing (or equivalent filing) made to the facility's reliability authority detailing the conversion to a fuel source other than coal;

(ii) A copy of the official retirement filing (or equivalent filing) made to the facility's reliability authority which must include a waiver of recission rights; or

(iii) An initial certification, or recertification for subsequent annual progress reports, containing either a statement that the facility will make the filing required in paragraph (g)(4)(i) of this section or a statement that the facility will make the filing required in paragraph (g)(4)(ii) of this section. The certification or recertification must include the estimated date that such a filing will be made.

(iv) A facility shall not include a certification or recertification under paragraph (g)(4)(iii) of this section in the final annual progress report submitted prior to permanent cessation of coal combustion. Rather, this final annual progress report must include the filing under paragraph (g)(4)(i) or (ii) of this section.

(h) Requirements for units that will achieve permanent cessation of coal combustion by December 31, 2034.

(1) Notice of Planned Participation. For sources seeking to qualify as an electric generating unit that will achieve permanent cessation of coal combustion by December 31, 2034, under this part, a Notice of Planned Participation shall be made to the permitting authority, or to the control authority in the case of an indirect discharger, no later than December 31, 2025.

(2) Contents. A Notice of Planned Participation shall identify the electric generating units intended to achieve the permanent cessation of coal combustion. A Notice of Planned Participation shall include the expected date that each electric generating unit is projected to achieve permanent cessation of coal combustion, whether each date represents a retirement or a fuel conversion, whether each retirement or fuel conversion has been approved by a regulatory body, and what the relevant regulatory body is. The Notice of Planned Participation shall also include a copy of the most recent integrated resource plan for which the applicable state agency approved the retirement or repowering of the unit subject to the ELGs, or other documentation supporting that the electric generating unit will permanently cease the combustion of coal by December 31, 2034. The Notice of Planned Participation shall also include, for each such electric generating unit, a timeline to achieve the permanent cessation of coal combustion. Each timeline shall include interim milestones and the projected dates of completion. Finally, the Notice of Planned Participation shall also include, for each such electric generating unit, a certification statement that the facility is in compliance with the following limitations or standards:

(i) The applicable limitations or standards for FGD wastewater in paragraphs 423.13(g)(1), 423.13(g)(2)(ii), 423.13(g)(2)(iii), 423.16(e)(1), or 423.16(e)(2); and

(ii) The applicable limitations or standards for bottom ash transport water in paragraphs 423.13(k)(1), 423.13(k)(2)(i), 423.13(k)(2)(iii), 423.16(g)(1), or 423.16(g)(2).

(3) Annual Progress Report. Annually after submission of the Notice of Planned Participation in paragraph (h)(1) of this section, a progress report shall be filed with the permitting authority, or control authority in the case of an indirect discharger.

(4) Contents. An Annual Progress Report shall detail the completion of any interim milestones listed in the Notice of Planned Participation since the previous progress report, provide a narrative discussion of any completed, missed, or delayed milestones, and provide updated milestones. An annual progress report shall also include one of the following:

(i) A copy of the official suspension filing (or equivalent filing) made to the facility's reliability authority detailing the conversion to a fuel source other than coal;

(ii) A copy of the official retirement filing (or equivalent filing) made to the facility's reliability authority which must include a waiver of recission rights; or

(iii) An initial certification, or recertification for subsequent annual progress reports, containing either a statement that the facility will make the filing required in paragraph (h)(4)(i) of this section or a statement that the facility will make the filing required in paragraph (h)(4)(ii) of this section. The certification or recertification must include the estimated date that such a filing will be made.

(iv) A facility shall not include a certification or recertification under paragraph (h)(4)(iii) of this section in the final annual progress report submitted prior to permanent cessation of coal combustion. Rather, this final annual progress report must include the filing under paragraph (h)(4)(i) or (ii) of this section.

(i) Requirements for facilities seeking the protections of § 423.18(a) and (b).

(1) Certification statement. For sources seeking to apply the protections of the permit conditions in paragraph § 423.18(a), and for each instance that § 423.18(a) is applied, a one-time certification shall be submitted to the permitting authority, or control authority in the case of an indirect discharger, no later than:

(i) In the case of an order or agreement under § 423.18(a)(1), 30 days from receipt of the order or agreement attached pursuant to paragraph (i)(2)(ii) of this section; or

(ii) In the case of an “Emergency” or “Major Disaster” under § 423.18(a)(2), 30 days from the date that a load balancing need arose.

(2) Contents. A certification statement must include the following:

(i) The qualifying event from the list in § 423.18(a), the individual or entity that issued or triggered the event, and the date that such an event was issued or triggered.

(ii) A copy of any documentation of the qualifying event from the individual or entity listed under paragraph (i)(2)(i) of this section, or, where such documentation does not exist, other documentation with indicia of reliability for the permitting authority to confirm the qualifying event.

(iii) An analysis and accompanying narrative discussion which demonstrates that an electric generating unit would have qualified for the subcategory at issue absent the event detailed in paragraph (i)(2)(i) of this section, including the material data, assumptions, and methods used.

(3) Termination of need statement. For sources filing a certification statement under paragraph (i)(1) of this section, and for each such certification statement, a one-time termination of need statement shall be submitted to the permitting authority, or control authority in the case of an indirect discharger, no later than 30 days from when the source is no longer subject to increased production from the qualifying event.

(4) Contents. A termination of need statement must include a narrative discussion including the date the qualifying event terminated, or if it has not terminated, why the source believes the capacity utilization will no longer be elevated to a level requiring the protection of § 423.18.

(j) Requirements for facilities voluntarily meeting the limits in § 423.13(g)(3)(i).

(1) Notice of Planned Participation. For sources opting to comply with the Voluntary Incentives Program requirements of § 423.13(g)(3)(i) by December 31, 2028, a Notice of Planned Participation shall be made to the permitting authority no later than October 13, 2021.

(2) Contents. A Notice of Planned Participation shall identify the facility opting to comply with the Voluntary Incentives Program requirements of § 423.13(g)(3)(i), specify what technology or technologies are projected to be used to comply with those

requirements, and provide a detailed engineering dependency chart and accompanying narrative demonstrating when and how the system(s) and any accompanying disposal requirements will be achieved by December 31, 2028.

(3) Annual progress report. After submission of the Notice of Planned Participation in paragraph (j)(1) of this section, a progress report shall be filed with the permitting authority, or control authority in the case of an indirect discharger.

(4) Contents. An Annual Progress Report shall detail the completion of interim milestones presented in the engineering dependency chart from the Notice of Planned Participation since the previous progress report, provide a narrative discussion of completed, missed, or delayed milestones, and provide updated milestones.

(5) Rollover certification. Where, prior to the effective date, a discharger has already provided a notice to the permitting authority of opting to comply with the Voluntary Incentives Program requirements of § 423.13(g)(3)(i), such notice will satisfy paragraph (j)(1) of this section. However, where details required by (j)(2) of this section were missing from the previously provided notice, those details must be provided in the first Annual Progress Report, no later than October 13, 2021.

(k) Requirements for facilities with discharges of unmanaged combustion residual leachate as defined in § 423.11(ff)(1).

(1) Annual Combustion Residual Leachate Monitoring Report. In addition to reporting pursuant to 40 CFR part 127, each facility with discharges of unmanaged combustion residual leachate meeting the definition in § 423.11(ff)(1) shall file an annual combustion residual leachate monitoring report each calendar year to the permitting authority.

(2) Contents. The annual combustion residual leachate monitoring report shall provide the following monitoring data for each pollutant listed in table 4 following paragraph (k)(v) of this section. For paragraphs (k)(2)(ii) and (k)(2)(iii) of this section the report shall also describe the location of monitoring wells, screening depth, and frequency of sampling. The report shall include summary statistics including monthly minimum, maximum, and average concentrations for each pollutant. The report shall be supported by an appendix of all samples.

(i) A list of coal combustion residual landfills and surface impoundments which the permitting authority has determined are point sources with functional equivalent direct discharges.

(ii) Groundwater monitoring data as the combustion residual leachate leaves each of the landfills or surface impoundment listed in paragraph (k)(2)(i) of this section.

(iii) Groundwater monitoring at the point the combustion residual leachate enters a surface waterbody.

(iv) Effluent monitoring data reported pursuant to 40 CFR part 127.

(v) Summary statistics for the data described in paragraphs (k)(2)(ii) through (iv) of this section including the monthly average and daily maximum of each pollutant in the table following this paragraph and a comparison to any limitation in § 423.13(l)(2)(ii).

BAT Treated Pollutants in Combustion Residual Leachate	
Antimony	Magnesium
Arsenic	Manganese
Barium	Mercury
Beryllium	Molybdenum

Cadmium	Nickel
Chromium	Thallium
Cobalt	Titanium
Copper	Vanadium
Lead	Zinc

(l) Requirements for facilities seeking to transfer between applicable limitations in a permit under § 423.13(o).

(1) Notice of Planned Participation. For sources which have filed a Notice of Planned Participation under paragraphs (f)(1), (g)(1), or (j)(1) of this section and intend to make changes that would qualify them for a different set of requirements under § 423.13(o), a Notice of Planned Participation shall be made to the permitting authority, or to the control authority in the case of an indirect discharger, no later than the dates stated in § 423.13(o)(1).

(2) Contents. A Notice of Planned Participation shall include a list of the electric generating units for which the source intends to change compliance alternatives. For each such electric generating unit, the notice shall list the specific provision under which this transfer will occur, the reason such a transfer is warranted, and a narrative discussion demonstrating that each electric generating unit will be able to maintain compliance with the relevant provisions.

(m) Notice of material delay.

(1) Notice. Within 30 days of experiencing a material delay in the milestones set forth in paragraphs (g)(2), (h)(2), or (j)(2) of this section and where such a delay may preclude permanent cessation of coal combustion or compliance with the voluntary

incentives program limitations by December 31, 2028, a facility shall file a notice of material delay with the permitting authority, or control authority in the case of an indirect discharger.

(2) Contents. The contents of such a notice shall include the reason for the delay, the projected length of the delay, and a proposed resolution to maintain compliance.

(n) Requirements for facilities seeking a one-year flexibility to discharge permeate or distillate from an FGD wastewater or combustion residual leachate treatment system designed to achieve the limitations in § 423.13(g)(4)(i) or (l)(1)(i).

(1) Initial Request Letter. When filing a permit application or permit modification request, a facility seeking to discharge permeate or distillate during the first year of operations after the date determined in § 423.13(g)(4)(i)(A) or (l)(1)(i)(A) shall include a letter requesting this flexibility from the permitting authority. The initial request letter shall detail the expected type, frequency, duration, and necessity of discharge. The initial request letter shall also state that this period of discharge was not included for consideration in establishing the applicability timing under paragraph 423.11(t)(3).

(2) Discharge Monitoring and Reporting. Upon inclusion in the permit of the flexibility to discharge the permeate or distillate as requested in paragraph (n)(1) of this section, the permitting authority shall also extend any existing monitoring and reporting requirements (*e.g.*, arsenic monitoring).

(o) Certification for wastewater generated by a 10-year, 24-hour or longer duration storm event

(1) Storm Event Discharge Certification Statement. For sources seeking to discharge low volume wastewater which would otherwise be considered FGD wastewater, bottom ash transport water, or combustion residual leachate but for a storm event exceeding a 10-year, 24-hour or longer duration storm event, a Storm Event Discharge Certification Statement shall be submitted to the permitting authority, or control authority in the case of an indirect discharger, no later than five business days from the last discharge.

(2) Signature and certification. The certification statement must be signed and certified by a professional engineer.

(3) Contents. A Storm Event Discharge Certification shall include the following:

(i) A statement that the professional engineer is a licensed professional engineer.

(ii) A statement that the professional engineer is familiar with the regulation requirements.

(iii) A statement that the professional engineer is familiar with the facility.

(iv) A statement that the facility experienced a storm event exceeding a 10-year, 24-hour or longer duration, including specifics of the actual storm event that are sufficient for a third party to verify the accuracy of the statement.

(v) A statement that a discharge of low volume wastewater that would otherwise meet the definition of FGD wastewater, bottom ash transport water, or combustion residual leachate was necessary, including a list of the best management practices at the site and a narrative discussion of the ability of on-site equipment and practices to manage the wastewater.

(vi) The duration and volume of any such discharge.

(vii) A statement that the discharge does not otherwise violate any other limitation or permit condition.