# Steam Electric Generation Effluent Limitation Guidelines

**REGFORM Water Seminar**

July 31, 2024

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# Agenda

1. Background
2. What's New
3. Technical Summary by Discharge Stream
4. Compliance
5. Legal Update/Implications

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# Why should you care?

**Consumer costs** may increase directly and indirectly due to increased compliance costs for power generators.

- ***Direct costs*** include increased user rates.
- ***Indirect costs*** include costs passed down by manufacturers to consumers.

**Economic impacts** are likely to be seen in multiple ways:

- ***Stranding assets*** before end of useful life.
- Impacts to ***workforce, supply chains,*** etc.

**Scientific basis** for rules should be thorough and accurate to uphold quality of the environment.

**Ripple Effect** for other industries

# Background – Origin of ELGs

- Clean Water Act of 1972 envisioned technology at point of discharge as the primary means for protecting water quality.
- The development of Technology-Based Effluent Limitations (**TBELs**) was to be the primary enforcement mechanism and EPA was to develop ELGs for existing industries using Best Practicable Control Technology (**BPT**) and Best Available Technology Economically Achievable (**BAT**)
- How did that go for EPA? Not well – in 5 years, EPA had only developed standards for 6 pollutants and missed 14 deadlines.
- The adequacy of EPA's regulation for dischargers was challenged, resulting in the Flannery Decision (Toxics Consent Decree of 1976).
  - Expanded list of toxic pollutants.
  - Required EPA to regulate pollutants on an industry specific basis for 21 "Primary Industries".
  - Required development and implementation of pretreatment standards.

# Background – ELGs by the Numbers Today

- **59** industrial categories regulated.
- Up to **45,000** direct dischargers are subject.
- **129,000** indirect dischargers to publicly owned treatment works are subject.
- Over **700 billion** pounds per year of removed pollutants.

# Background – Steam Electric ELG Development

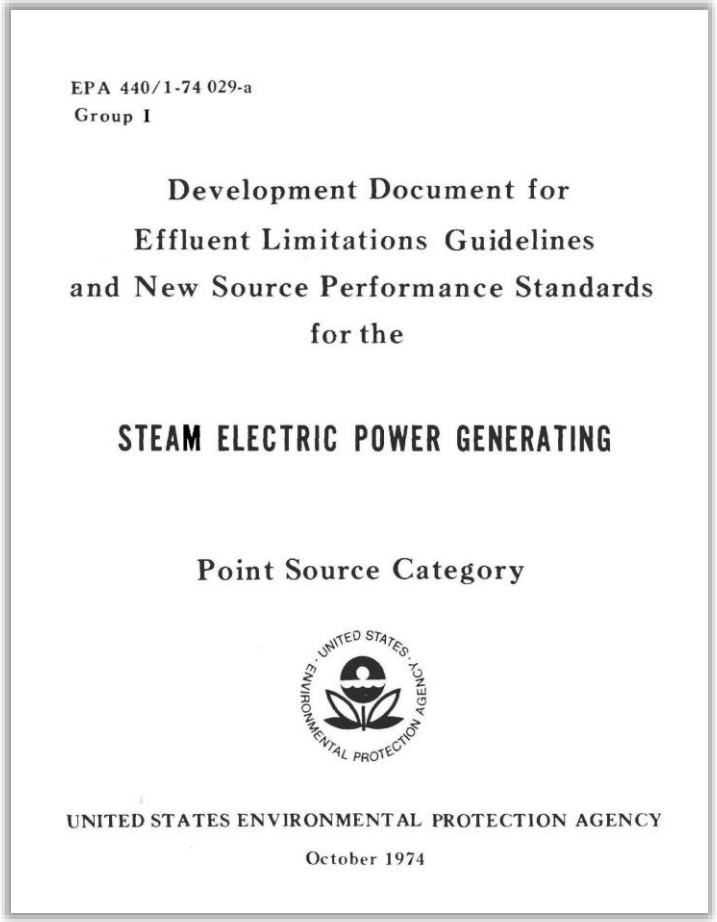
Development document finalized in 1974 and based on 1,000 plants in US in 1970.

### *Generating capacity then vs. now*

1,280 billion kWh in 1970 → 3,280 billion kWh in 2023

### *Who must comply?*

- Those who operate a generating unit ***and***
- Electric generation is their main source of revenue or reason for operating ***and***
- Primarily uses 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.


EPA 440/1-74 029-a
Group I

Development Document for
Effluent Limitations Guidelines
and New Source Performance Standards
for the

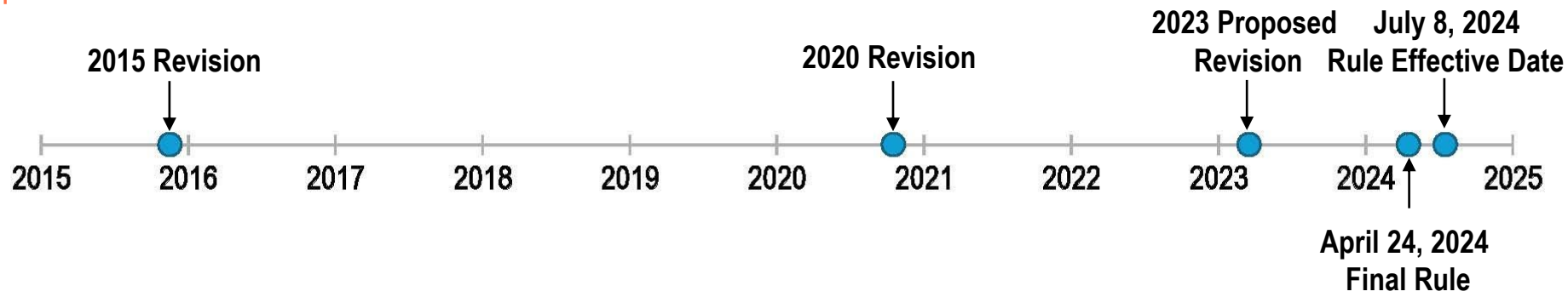
STEAM ELECTRIC POWER GENERATING

Point Source Category

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

October 1974

# Background (Continued)




**2015 Revision** established discharge limits for toxic metals and introduced subcategories for electric generating units (EGUs) less than or equal to 50 MW (small EGUs) and oil-fired EGUs

**2020 Revision** revised flue gas desulfurization (FGD) wastewater and bottom ash (BA) transport water requirements. The 2020 rule retained both 2015 rule subcategories and introduced three new subcategories: low utilization electric generating units (LUEGUs), high FGD flow facilities, and EGUs permanently ceasing coal combustion by December 31st, 2028

**2023 Proposed Revision** received approximately 22,000 comments, and were finalized in the 2024 rule

**2024 Final Rule** passed April 24th and effective on July 8th.

# What's New – High-level Summary

- **Zero discharge** limits by the end of **2029** for direct discharges of:
  - FGD wastewater
  - Bottom ash transport water
  - Combustion residual leachate* *(discharge permitted following closure)*
- New "permanent cessation of coal combustion" deadline of **2034** (notification by 12/31/25).
- New definition of "unmanaged combustion residual leachate" incorporates *Maui* case (2020).
- Permittee authority "best professional judgment" (BPJ) for discharges of "legacy wastewater".

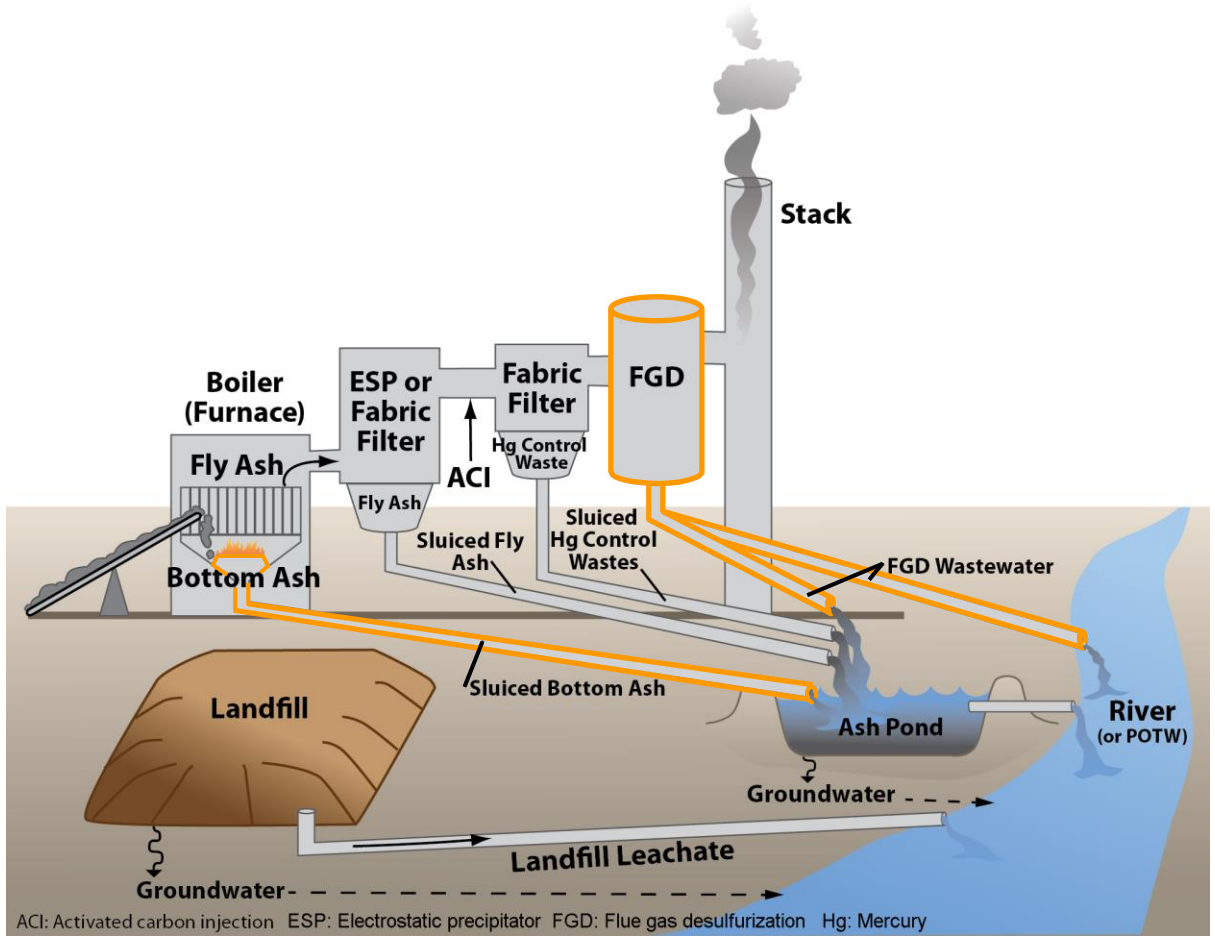
# Flue Gas Desulfurization (FGD) Wastewater & Bottom Ash Transport Water - Definitions

## 40 CFR 423.11 – *Not expected to be readable*

***(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.*

***(f) The term bottom ash means*** *the ash, including boiler slag, which settles in the furnace or is dislodged from furnace walls. Economizer ash is included in this definition when it is collected with bottom ash.*

***(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).*

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# FGD Wastewater & Bottom Ash Transport Water - Highlights

**Zero discharge** by **December 31, 2029,** for direct dischargers or **May 9, 2027,** for indirect dischargers.

There are a few exceptions:

- The discharger is enrolled in the Voluntary Incentives Plan (VIP) (available to direct dischargers only).
- Water is sourced from a small EGU or is an oil-fired EGU.
- Water is sourced from an EGU that will permanently cease coal combustion by 2034.
- Water is stored in an impoundment that commences closure after July 8, 2024.

**Technological basis** for zero discharge:

- **FGD wastewater** – chemical precipitation plus membrane filtration technology and 100% recycle of the permeate.
- **Bottom ash transport water** - dry handling or closed-loop technology.

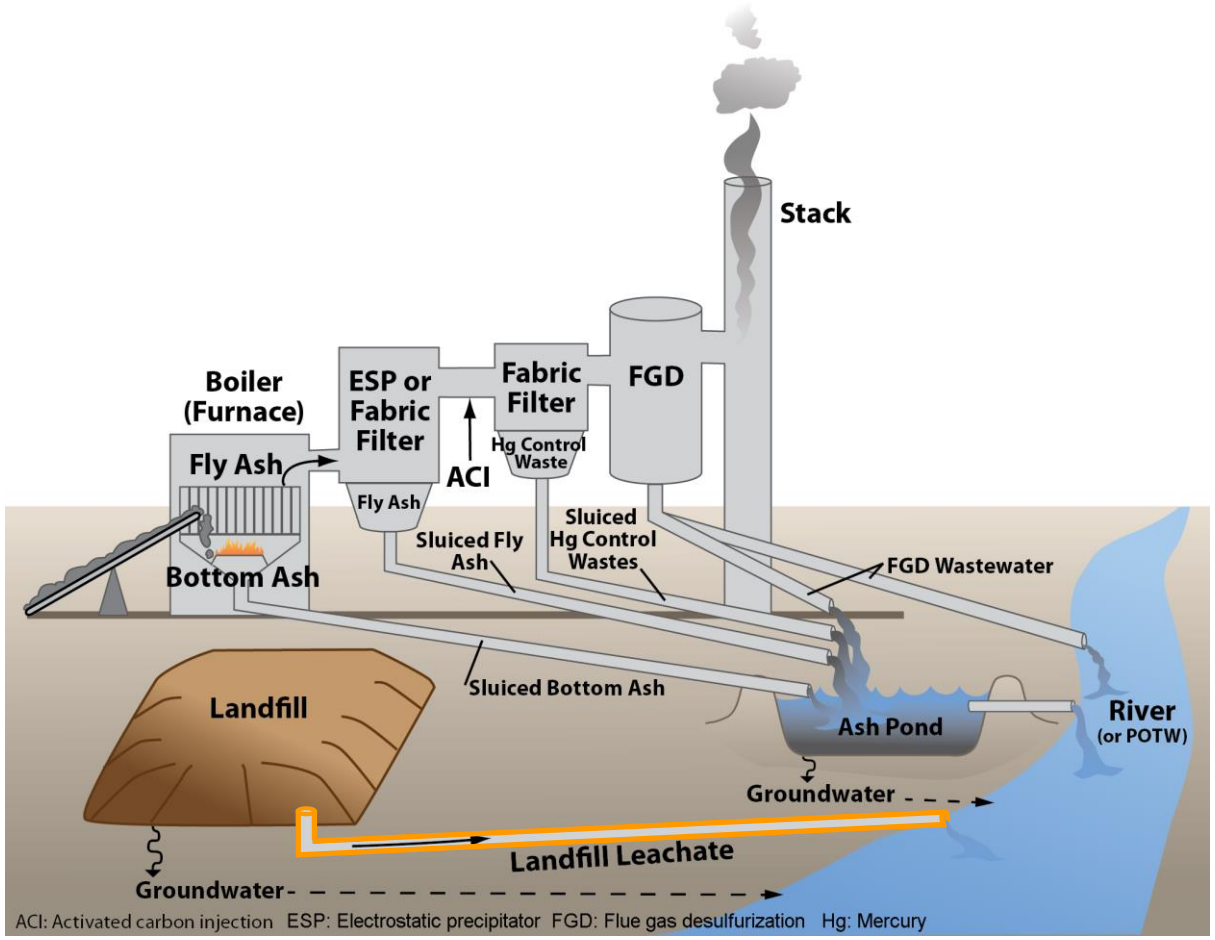
# Combustion Residual Leachate (CRL)

**Active Facilities** must achieve zero discharge by **December 31, 2029,** for direct dischargers or **May 9, 2027,** for indirect dischargers.

**Retired Facilities** will have limits for arsenic and mercury but will not be zero discharge.

**Technological basis** for limits:

- **Zero Discharge Limits** - multiple zero-discharge system technologies (membrane filtration systems, spray dry evaporators, and thermal evaporation systems) and any necessary pretreatment (e.g., pretreatment) or post-treatment (crystallization).
- **Nonzero Limits** - membrane filtration for CRL permeate and thermal evaporation for CRL distillate.

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# Unmanaged CRL

***New Subcategory*** with nonzero arsenic and mercury limits for unmanaged CRL using the same technology basis for nonzero CRL limitations.

## What is unmanaged CRL?

- Water determined by the permitting authority to be the ***functional equivalent of a direct discharge to a WOTUS through groundwater***, or
- Water 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.

# Legacy Wastewater

"BAT" TBELs may be established by permitting authorities for some legacy wastewaters on a case-by-case basis using **best professional judgement**.

## What is legacy wastewater?

No specific reference to "legacy wastewater" in updated 40 CFR 423.19, but defined in Appendix A to the rule's preamble:

- 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.

# Issues with 2024 ELG Rule

- Multiple lawsuits consolidated in the U.S. Court of Appeals for the Eighth Circuit (*Southwester Electric Power Co. et. al. v. EPA et. al.*)
  - Technological Possibility
  - Financial Feasibility
  - Reliability Concerns
  - Policy Considerations
  - Legal Defensibility

# Pending Challenges

- Agency must base its effluent limitation guidelines on limits that can be achieved through use of the “best” technology that is **both** “available” and “economically achievable.” – **33 U.S.C. § 1311(b)(2)(A)**
- Factors
  - Age of equipment and facilities involved
  - Processes employed
  - Engineering aspects
  - Cost of achieving such effluent reduction
  - Non-water quality environmental impact (including energy requirements)
  - Such other factors as the Administrator deems appropriate

# Pending Challenges (cont.)

"Available"

- “Available” means “present or ready for immediate use,” “accessible,” or “obtainable.” *Merriam-Webster*
- Membranes and evaporators are not available to actually (and if so reliably) achieve zero discharge limits.
  - No data pertaining to use in full scale power operations.
  - Agency has not examined the impediments to applying these technologies at power plants (especially considering the exorbitant cost and change in position).

# Pending Challenges (cont.)

- "Economically achievable." EPA must consider economic achievability/ cost of achieving such effluent reduction." – **33 U.S.C. §§ 1311(b), 1314(b)(2)(B)**
  - Must reconcile model with real data.
  - EPA has industry data from responses to prior information requests.
- Costs incurred by industry in reliance on 2020 Rule.
  - Precedent requiring agency to assess whether there were reliance interests, determine whether they were significant, and weigh any such interests against competing policy concerns. If significant, EPA must provide a "more detailed justification" for its action. *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009).
  - Agency must understand how those reliance costs from 2020 rule might affect the economic achievability of zero-discharge technology.

# Additional Issues

## *Maui* Implemented for Unmanaged CRL

- Discharges into GW to be the ***functional equivalent of a direct discharge to a WOTUS***.
- Water leached from a waste management unit mixed with groundwater prior to being captured and pumped to the surface for discharge directly to a WOTUS.
- No uniform structure for determining "functional equivalency".

## Best Professional Judgment for Legacy Wastewater

- Applies where not ELG. LW subject to BAT limitations to be determined on a case-by-case basis by the permit writer's ***best professional judgment (BPJ)***.
- BPJ is defined as the highest quality technical opinion developed by a permit writer after consideration of all reasonably available and pertinent data or information that forms the basis for the terms and conditions of a NPDES permit.

# Options for Future Compliance

**Assess closure plans to prepare for new rule changes that may affect planned discharges.**

- Most commonly done by considering various scenarios with cost modeling to evaluate needed changes in NDPES permit.

**Legal and scientific evaluation of whether a functional equivalent discharge to a WOTUS is present or likely**.

- Recommend considering the hydrogeology of the site before engaging local regulatory authorities to establish a shared understanding of the actual groundwater flow conditions.

# Questions?


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