

Steam Electric Power Generating Effluent Guidelines

Protecting Surface Water from Power Plant Discharges

EPA Call with the Institute of Clean Air Companies

June 22, 2016



Effluent Guidelines Definition and Applicability

What are ELGs?

- Clean Water Act directs EPA to establish effluent limitations guidelines & standards (ELGs) to control discharges of pollutants to surface waters
 - ELGs are technology-based requirements, meaning that the effluent limitations/standards are based on the performance of available/demonstrated technologies
 - Although the effluent limitations are based on the performance of specified technologies, facilities are not required to use those technologies and may instead use alternative technologies/approaches to comply.
 - When implemented in NPDES permits for direct dischargers, the ELGs set the minimum level of control. Water quality-based effluent limits (WQBELs) and other requirements may also be included in a facility's permit, depending on site-specific conditions.
 - The ELGs establish pretreatment standards that must be met before wastewater can be discharged to publicly owned treatment works (POTWs)

Which facilities are covered by the ELGs?

- ELGs for the Steam Electric Power Generating Point Source Category are codified at Title 40, Part 423 of the Code of Federal Regulations (40 CFR 423)
 - The ELGs are applicable to discharges from fossil- and nuclear-fueled steam electric generating units at establishments where the generation of electricity is the predominant source of revenue or principal reason for operation

Which facilities will need to change operations to comply with the ELGs revisions published in November 2015?

- Only a small fraction of steam electric power plants discharge the types of wastewater affected by the revised ELGs.
- Examples of power plants that will need to upgrade treatment or change process operations are plants that either:
 - (1) have wet flue gas desulfurization systems (FGDs) and discharge their FGD wastewater; or
 - (2) use water to transport at least a portion of their fly ash or bottom ash away from the boiler and discharge the ash transport water.
- Examples of generating units that are not affected by the revised ELGs:
 - Gas-fired and nuclear-fueled generating units
 - Existing oil-fired generating units
 - Existing generating units of any type with nameplate capacity of 50 MW or smaller
 - Generating units that do not discharge ash transport water (e.g., they use dry handling practices, recycle the ash transport water without discharging it, or use other practices) or FGD wastewater (e.g., they have a dry FGD or no FGD, or they manage the FGD wastewater so there is no discharge)

What has changed?

- New effluent limitations for some types of wastewater discharges
 - FGD wastewater
 - Ash transport water
 - Fly ash
 - Bottom ash
 - Flue gas mercury control (FGMC) wastewater
 - Gasification wastewater
 - Combustion residual leachate

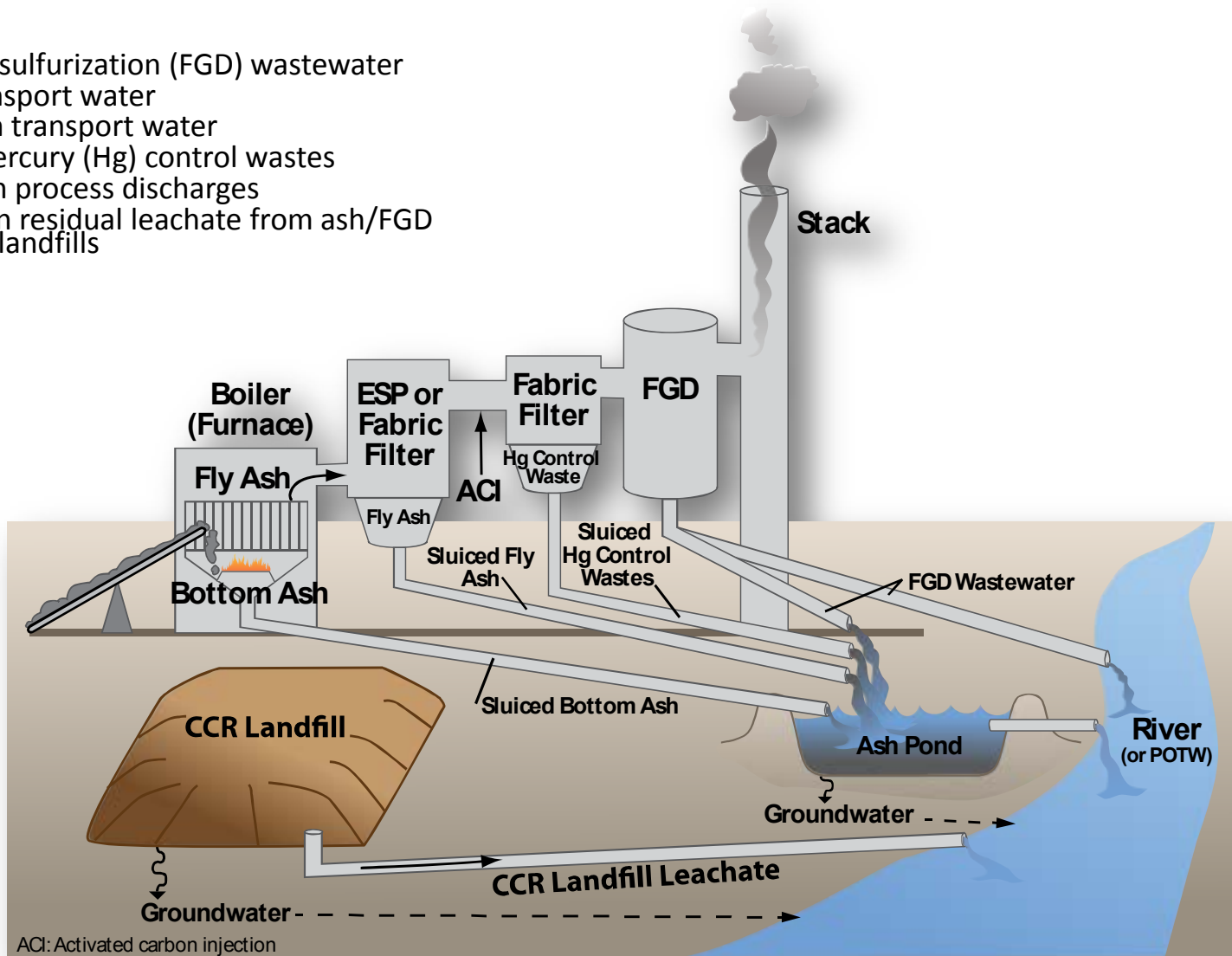
- Changed the “Applicability” provision to improve clarity (40 CFR 423.10)
 - “...generation of electricity is the predominant source of revenue or principal reason for operation...” replaces the phrase “...primarily engaged in the generation of electricity for distribution and sale...”
 - Combined cycle generating units are subject to Part 423

- Removed the following types of wastewater from the definition of “low volume waste sources”
 - FGD wastewater, FGMC wastewater, gasification wastewater, combustion residual leachate

- Added new definitions to 40 CFR 423.11

Types of Wastewater Addressed by the ELG Revisions

- Flue gas desulfurization (FGD) wastewater
- Fly ash transport water
- Bottom ash transport water
- Flue gas mercury (Hg) control wastes
- Gasification process discharges
- Combustion residual leachate from ash/FGD ponds and landfills



When must plants comply with the revised ELGs?

- Implemented by incorporation into NPDES permits and through local pretreatment programs (PSES & PSNS are self-implementing)
- Existing sources
 - Direct discharges to surface water (BAT): On the date that the permitting authority determines BAT is available for the plant, which is “as soon as possible” beginning Nov 1, 2018, but in no case later than Dec 31, 2023
 - Permit writers have some discretion (taking into account other changes at the plant, grid reliability issues, time for technology installation and optimization, etc.) to determine for any given plant what is “as soon as possible”
 - Establishment of a date later than Nov 1, 2018 is to be based on information from the discharger, and consideration of factors specified in §423.11(t)
 - Note that different dates may be established for different wastestreams (e.g., bottom ash vs FGD wastewater)
 - Indirect discharges to POTWs (PSES): November 1, 2018
- New sources
 - Direct discharges to surface water (NSPS): Immediately, for any generating unit that is a new source as of Nov 17, 2015
 - Indirect discharges to POTWs (PSNS): Immediately, for any generating unit that is a new source as of June 7, 2013

BAT: Best available technology economically achievable
NSPS: New source performance standards

PSES: Pretreatment standards for existing sources
PSNS: Pretreatment standards for new sources

FGD Wastewater

FGD wastewater: Includes scrubber blowdown and wastewater from the solids separation and dewatering processes.

See the full definition at 40 CFR 423.11(n).

1982 Rule	2015 Rule
<p>Regulated as “low volume waste”</p> <p>Existing and New Sources</p> <ul style="list-style-type: none">• Effluent limits: TSS and Oil&Grease• Technology basis: Impoundment	<p>Established as a wastestream separate from “low volume waste”</p> <p>Existing Sources</p> <ul style="list-style-type: none">• Effluent limits: As, Hg, Se, NO₂+NO₃• Technology basis: Chemical precipitation plus biological treatment <p>New Sources</p> <ul style="list-style-type: none">• Effluent limits: As, Hg, Se, TDS• Technology basis: Chemical precipitation plus evaporation



Voluntary Incentives Program for FGD Wastewater from Existing Sources

- Applies only to discharges of FGD wastewater from existing generating units
- Provides additional time to comply for those plants that voluntarily adopt more stringent effluent limitations
- Plants opting into the program:
 - Agree to comply with limitations based on the combination of chemical precipitation and evaporation treatment technologies (arsenic, mercury, selenium & TDS)
 - *i.e.*, the same limitations established for new sources under NSPS/PSNS
 - Plants may use alternative approaches to comply with the effluent limits (e.g., using a combination of wet and dry FGD scrubbers to completely eliminate the FGD wastewater discharge)
 - New BAT limits do not apply until December 31, 2023



Effluent Limits for FGD Wastewater

Existing Sources	New Sources & Voluntary Program for Existing Sources
<p>Arsenic, <i>ug/L (ppb)</i></p> <ul style="list-style-type: none">• 30-day average: 8• Daily maximum: 11	<p>Arsenic, <i>ug/L (ppb)</i></p> <ul style="list-style-type: none">• 30-day average: --• Daily maximum: 4
<p>Mercury, <i>ng/L (ppt)</i></p> <ul style="list-style-type: none">• 30-day average: 356• Daily maximum: 788	<p>Mercury, <i>ng/L (ppt)</i></p> <ul style="list-style-type: none">• 30-day average: 24• Daily maximum: 39
<p>Selenium, <i>ug/L (ppb)</i></p> <ul style="list-style-type: none">• 30-day average: 12• Daily maximum: 23	<p>Selenium, <i>ug/L (ppb)</i></p> <ul style="list-style-type: none">• 30-day average: --• Daily maximum: 5
<p>Nitrate-nitrite as N, <i>mg/L (ppm)</i></p> <ul style="list-style-type: none">• 30-day average: 4.4• Daily maximum: 17	<p>Total dissolved solids, <i>mg/L (ppm)</i></p> <ul style="list-style-type: none">• 30-day average: 24• Daily maximum: 50

Considerations for FGD Wastewater

- 💧 Bromine addition to coal or in the FGD absorber has the potential to cause water quality problems and trigger the need for additional water quality-based effluent limitations in the NPDES permit
 - 💧 Exceedances of water quality criteria in the receiving stream/river
 - 💧 Contributes to elevated levels of bromides at downstream drinking water plants, which promote formation of carcinogenic disinfection byproducts (e.g., trihalomethanes)
- 💧 Certain compliance approaches can eliminate discharge of FGD wastewater obviating the need to permit and monitor pollutant concentrations for compliance with effluent limitations
 - 💧 Opportunity to use a combination of dry and wet FGD systems to completely consume/eliminate the FGD wastewater stream
 - 💧 Plants opting into the voluntary incentive program (if using evaporation or similar treatment technology) can use the treatment system effluent as FGD makeup water, rather than discharging the wastewater

What is Ash Transport Water?

Wastewater that has direct contact with ash and is used to convey fly ash, bottom ash, or economizer ash from the ash collection/storage equipment or boiler.

See the full definition at 40 CFR 423.11(p).



Fly Ash Transport Water

1982 Rule

2015 Rule

Existing Sources

- Effluent limits: TSS and Oil&Grease
- Technology basis: Impoundment

New Sources

- Effluent limits: Zero discharge
- Technology basis: Dry ash handling

Almost identical requirements for new and existing sources

Existing Sources

- Effluent limits: Zero discharge (except when used in the FGD scrubber)
- Technology basis: Dry ash handling

New Sources

- Effluent limits: Zero discharge (no allowance for discharge via FGD scrubber)
- Technology basis: Dry ash handling



Bottom Ash Transport Water

1982 Rule

Same requirements for new and existing sources

- Effluent limits: TSS and Oil&Grease
- Technology basis: Impoundment



2015 Rule

Almost identical requirements for new and existing sources

Existing Sources

- Effluent limits: Zero discharge (except when used in the FGD scrubber)
- Technology basis: Dry ash handling or closed-loop sluicing system

New Sources

- Effluent limits: Zero discharge (no allowance for discharge via FGD scrubber)
- Technology basis: Dry ash handling



Considerations for Ash Transport Water

- Anticipate some plants may start using ash transport water as a source of makeup water for the FGD system

Flue Gas Mercury Control (FGMC) Wastewater

FGMC wastewater: Generated from the operation of air pollution control equipment installed/operated to remove mercury from flue gas.

See the full definition at 40 CFR 423.11(o).

1982 Rule	2015 Rule
<p data-bbox="195 568 707 601">Regulated as “low volume waste”</p> <p data-bbox="195 748 595 781">Existing and New Sources</p> <ul data-bbox="195 791 788 868" style="list-style-type: none"><li data-bbox="195 791 788 823">• Effluent limits: TSS and Oil&Grease<li data-bbox="195 833 788 868">• Technology basis: Impoundment	<p data-bbox="987 568 1734 645">Established as a wastestream separate from “low volume waste”</p> <p data-bbox="987 705 1727 738">Same requirements for new and existing sources</p> <ul data-bbox="987 791 1514 868" style="list-style-type: none"><li data-bbox="987 791 1514 823">• Effluent limits: Zero discharge<li data-bbox="987 833 1514 868">• Technology basis: Dry handling

Considerations for FGMC Wastes

- Certain compliance approaches would avoid creating FGMC wastewater – i.e., use dry handling system to handle ACI waste rather than sluicing it to a CCR surface impoundment obviating the need to permit and monitor pollutant concentrations for compliance with effluent limitations

Gasification Wastewater

Gasification wastewater: Wastewater at an integrated gasification combined cycle (IGCC) facility generated by the operation of the gasifier or the syngas cleaning, combustion, and cooling processes.

See the full definition at 40 CFR 423.11(q).

1982 Rule	2015 Rule
<p>Regulated as “low volume waste”</p> <p>Existing and New Sources</p> <ul style="list-style-type: none">• Effluent limits: TSS and Oil&Grease• Technology basis: Impoundment	<p>Established as a wastestream separate from “low volume waste”</p> <p>Same requirements for new and existing sources</p> <ul style="list-style-type: none">• Effluent limits: As, Hg, Se, TDS• Technology basis: Evaporation



Effluent Limits for Gasification Wastewater

Existing & New Sources

Arsenic, *ug/L (ppb)*

- 30-day average: --
- Daily maximum: 4

Mercury, *ng/L (ppt)*

- 30-day average: 1.3
- Daily maximum: 1.8

Selenium, *ug/L (ppb)*

- 30-day average: 227
- Daily maximum: 453

Total dissolved solids, *mg/L (ppm)*

- 30-day average: 22
- Daily maximum: 38

Combustion Residual Leachate

Combustion residual leachate: Leachate from landfills and surface impoundments containing residuals from combustion of fossil fuels, including coal, petroleum coke, and oil.

See the full definition at 40 CFR 423.11(r).

1982 Rule	2015 Rule
<p>Regulated as “low volume waste”</p> <p>Existing and New Sources</p> <ul style="list-style-type: none">• Effluent limits: TSS and Oil&Grease• Technology basis: Impoundment	<p>Established as a wastestream separate from “low volume waste”</p> <p>Existing Sources</p> <ul style="list-style-type: none">• Effluent limits: TSS• Technology basis: Impoundment <p>New Sources</p> <ul style="list-style-type: none">• Effluent limits: As, Hg• Technology basis: Chemical precipitation



Effluent Limits for Combustion Residual Leachate

Existing Sources	New Sources
<p>Total suspended solids, <i>mg/L (ppm)</i></p> <ul style="list-style-type: none">• 30-day average: 30• Daily maximum: 100	<p>Arsenic, <i>ug/L (ppb)</i></p> <ul style="list-style-type: none">• 30-day average: 8• Daily maximum: 11 <p>Mercury, <i>ng/L (ppt)</i></p> <ul style="list-style-type: none">• 30-day average: 356• Daily maximum: 788

Different Effluent Limitations Apply to Existing Small (≤ 50 MW) and Oil-fired Generating Units

- BAT effluent limits for discharges from existing small generating units (50 MW or smaller) and existing oil-fired generating units of any size remain equal to the current BPT limit for TSS (30 mg/L monthly average; 100 mg/L daily maximum)
- Small and oil-fired generating units that are new sources under the 2015 rule must comply with the new NSPS/PSNS effluent limits

What Are “Legacy Wastes”?

- 💧 Wastewater that is generated prior to the date that BAT/PSES apply to an individual power plant
- 💧 BAT for legacy wastes at direct dischargers is set equal to the existing BPT limits for TSS (30 mg/L monthly average; 100 mg/L daily maximum)
- 💧 No PSES for legacy waste at indirect dischargers because POTWs effectively remove TSS

Anti-circumvention provision

- Prohibits moving wastewater produced by a process operation for which there is a zero discharge limitation to another plant process operation for subsequent discharge
 - Applies to fly ash transport water, bottom ash transport water, & FGMC wastewater
 - The zero discharge limitation follows the wastewater even when used in another plant process (for example, fly ash or bottom ash transport water used as makeup water for a cooling tower would remain subject to the zero discharge limitation)
- Reuse of wastewater is encouraged where appropriate, but not when it undermines the zero discharge effluent limitations established by the ELGs. Plants are free to reuse their wastewater as long as it ultimately complies with the ELG effluent limitations.
- *NOTE* – special exception for fly ash and bottom ash transport water from an existing generating unit. When reused as makeup for an FGD scrubber, the wastewater may be discharged as long as it meets the effluent limitations for FGD wastewater.

For More Information . . .

- EPA's effluent guidelines website: <http://www.epa.gov/eg>
 - *Federal Register* notice for the final rule (80 FR 67838; Nov. 3, 2015)
 - *Federal Register* notice for the proposed rule provides additional information regarding power plant operations and treatment technologies (78 FR 34432; June 7, 2013)
 - *Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category* (821-R-15-007; Sept. 2015)
 - Other rulemaking support documents; guidance for laboratory analysis of FGD wastewater
 - Weblink to the on-line docket at www.regulations.gov

- Contact State or EPA Regional NPDES permitting or pretreatment staff

- Contact EPA effluent guidelines staff:
 - Technical information: Ron Jordan
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