



FINAL EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS FOR THE STEAM ELECTRIC POWER GENERATING INDUSTRY

SUMMARY OF EPA'S 30 SEPTEMBER 2015 FINAL RULE

On 30 September 2015, the United States Environmental Protection Agency (EPA) signed the Final Rule for technology-based effluent limitations guidelines and standards (ELGs) to strengthen controls on water discharges from steam electric power plants. The Final Rule is expected to be published in the Federal Register by the end of 2015. The Final Rule is similar to Preferred Option 4a and Option 4 in the 2013 Draft Rule, but with significant differences related to numerical limits, bottom ash handling requirements, implementation dates, a Voluntary Incentives Program for flue gas desulfurization (FGD) wastewater, and factors to consider in setting “as soon as possible” compliance dates.

OVERVIEW OF FINAL ELG RULE: SOME KEY POINTS FOR OWNERS

Waste Streams Covered. The rule establishes new or additional requirements for wastewater streams from steam electric power plants utilizing coal or other fossil-type fuel. The rule applies to waste streams at coal fired electrical power plants associated with: FGD, fly ash transport, bottom ash transport, combustion residual leachate, and flue gas mercury controls (FGMC). The rule also applies to waste streams associated with gasification of coal and petroleum coke. New, more stringent treatment limits apply to all coal fired steam electric generating units (except those with capacity less than or equal to 50 MW) for the metals mercury (Hg), arsenic (As), and selenium (Se), and other pollutants. Zero liquid discharge is required for fly ash transport water, bottom ash transport water, and FGMC wastewater.

Waste Streams and Control Technology Limits. Tables 1 and 2 present the applicable performance standards and effluent limitations for direct discharges and indirect discharges.

Performance Standards

BAT - Best Available Technology Economically Achievable
BPT - Best Practicable Control Technology
BADCT - Best Available Demonstrated Control Technology
NSPS – New Source Performance Standards
PSES – Pretreatment Standards for Existing Sources
PSNS – Pretreatment Standards for New Sources

The technology basis for BAT limits for FGD wastewater is a well-designed, well-operated chemical precipitation and biological treatment system while the technology basis for BADCT limits for FGD wastewater is evaporation. EPA provided significant relief in the Final Rule on the mercury and nitrate/nitrite limits for FGD wastewater. The final mercury limits are approximately three times greater than the draft limits and the final nitrate/nitrite (NO₃/NO₂) limits

are two orders of magnitude greater than the draft limits.

Timing. New limits will not apply until a date determined by the permitting authority that is “as soon as possible beginning November 1, 2018, but that is also no later than December 31, 2023”. The permitting authority must consider time to expeditiously plan, design, procure, and install equipment; changes being made or planned at a plant in response to new Clean Air Act requirements and/or the CCR Rule; an initial commissioning period to optimize equipment in FGD treatment systems; and other factors as appropriate.

Voluntary Incentives Program (VIP) for FGD Wastewater Treatment. The Final Rule establishes a VIP that provides more time (until December 31, 2023) for plants that voluntarily opt to install additional process changes and controls to achieve BADCT limitations for mercury, arsenic, selenium, and total dissolved solids (TDS), based on evaporation technology. Such power plant discharges can cause increases in brominated disinfection by-products (DBPs) in drinking water supplies. The Preamble states “it may be appropriate for permitting authorities to establish water quality-based effluent limitations on bromide, especially where steam electric power plants are located upstream from drinking water intakes.” Plants located upstream of a drinking water intake with more stringent TDS limitations may opt to participate in the VIP to benefit from the time extension.

Legacy Wastewater. EPA is setting BAT limitations for legacy wastewater equal to the previously promulgated BPT limitations on total suspended solids (daily max = 100 mg/L and 30 day average = 30 mg/L). Because legacy wastewater already exists in wet form, dry handling could not be used to eliminate its discharge and EPA did not have data to show that legacy wastewater could be reliably incorporated into a closed-loop process that eliminates discharges. However, State permitting authorities can set more stringent limits for legacy wastewater. Some states have already set limits for metals and nutrients in legacy wastewater.

Table 1. Technology Performance Standards for Numerical Limits for Various Types of Sources and Waste Streams

Waste Stream	Source Type			
	Discharges to Surface Waters		Discharges to Publicly Owned Treatment Works	
	Existing Sources	New Source Performance Standards (NSPS)	Pretreatment Standards for Existing Sources (PSES)	Pretreatment Standards for New Sources (PSNS)
FGD Wastewater	BAT	BADCT	BAT	BADCT
Fly Ash Transport Water	BAT	BAT= BADCT	BAT	BAT= BADCT
Bottom Ash Transport Water	BAT	BAT= BADCT	BAT	BAT= BADCT
Combustion Residual Leachate	BAT = BPT	BADCT	None	BADCT
FGMC Wastewater	BAT	BAT= BADCT	BAT	BAT= BADCT
Gasification Wastewater	BAT	BAT= BADCT	BAT	BAT= BADCT

Table 2. BPT, BAT, and BADCT Numerical/Discharge Limits and Associated Technology Basis

Waste Stream	Technology Basis and Numerical/Discharge Limits								
		BPT		BAT			BADCT		
		Daily Max	30 Day Avg						
Fly Ash Transport Water	TSS	100.0 mg/L	30.0 mg/L	Dry handling: Zero Discharge			Dry handling: Zero Discharge		
Bottom Ash Transport Water	TSS	100.0 mg/L	30.0 mg/L	Dry handling: Zero Discharge			Dry handling: Zero Discharge		
FGD Wastewater		Daily Max	30 Day Avg	Chemical precipitation + biological treatment:			Evaporation:		
				Daily Max	30 Day Avg	Daily Max	30 Day Avg		
	TSS	100.0 mg/L	30.0 mg/L	As	11 µg/L	8 µg/L	As	4 µg/L	- -
				Hg	788 ng/L	356 ng/L	Hg	39 ng/L	24 ng/L
	Oil & Grease	20.0 mg/L	15.0 mg/L	Se	23 µg/L	12 µg/L	Se	5 µg/L	- -
			NO ₃ /NO ₂ as N	17.0 mg/L	4.4 mg/L	TDS	50 mg/L	24 mg/L	
Combustion Residual Leachate	Same as above for FGD Wastewater	Impoundment:			Chemical precipitation:				
					Daily Max	30 Day Avg	As	11 µg/L	8 µg/L
		TSS	100.0 mg/L	30.0 mg/L	Hg	788 ng/L	356 ng/L		
FGMC Wastewater	Same as above for FGD Wastewater	Dry handling: Zero Discharge			Dry handling: Zero Discharge				
Gasification Wastewater	Same as above for FGD Wastewater	Evaporation:			Evaporation:				
		Daily Max	30 Day Avg	Daily Max	30 Day Avg				
		As	4 µg/L		As	4 µg/L	- -		
		Hg	1.8 ng/L	1.3 ng/L	Hg	1.8 ng/L	1.3 ng/L		
		Se	453 µg/L	227 µg/L	Se	453 µg/L	227 µg/L		
TDS	38 mg/L	22 mg/L	TDS	38 mg/L	22 mg/L				

ACTIONS TO CONSIDER NOW

The Final Rule imposes many new effluent limits on utilities that will require paradigm shifts in the way waste and wastewaters are handled and treated. Utility managers should consider the following early-stage activities to comply with the ELG Rule:

- Quantify water usage and water/wastewater quality in power generation and ancillary processes
- Identify and implement recycle and reuse opportunities for wastewater, particularly for FGD and low volume wastewater
- Holistically evaluate FGD process operation to optimize recycling, purge triggers, aeration rates, and air pollution control additives (if utilized)
- Evaluate options for bottom ash handling (wet or dry handling) in light of site specific opportunities such as increasing boiler efficiency and constraints such as space available below boilers
- Consider bench/pilot testing for treatment of FGD, wet bottom ash, and low volume wastewater systems
- Evaluate and identify feasible FGD treatment technologies and prepare a cost-benefit analysis

HOW GEOSYNTEC CAN HELP

Electric power-generating utilities are working through the details of the Final Rule and its implications. Geosyntec professionals can assist with implementation of the items listed above, as well as:

- Compliance strategy development and implementation
- Process sampling and flow measurement plan development and execution
- Engineering feasibility evaluation and completion of detailed engineering studies/designs
- Cost and long-term cash-flow estimate projections for ELG-related capital and O&M obligations
- Treatment system commissioning support and trouble-shooting services to achieve compliance with the Final Rule

GEOSYNTEC'S REPRESENTATIVE ELECTRIC POWER INDUSTRY CLIENTS

American Electric Power
 Consumers Energy
 DTE Energy
 Duke Energy
 Electric Power Research Institute (EPRI)
 Exelon
 FirstEnergy
 Georgia Power Company
 Jacksonville Electric Authority
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 Lower Colorado River Authority
 NRG Energy
 Puget Sound Energy
 San Diego Gas & Electric
 Santee Cooper Power Authority
 South Carolina Electric & Gas
 Talen
 Tampa Electric Company
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GEOSYNTEC'S ELG RELATED SERVICES

Water Balances | Waste Stream Characterization | Technology Option Evaluations and Cost Estimates | Process Flow Mapping | Regulatory Interface Strategy Development | FGD Pilot System Design and Operation Support | FGD Process Evaluation and Optimization | Design and Implementation for Recycle/Reuse Opportunities | Design and Operation of FGD Treatment Systems | Design of Alternative Closed Loop Remote Bottom Ash Handling Basin Systems | Leachate Collection System Design and Permitting | Site Civil Design | Foundation Design



GEOSYNTEC'S ELG EXPERTISE

Geosyntec's science and engineering practice directly support ELG strategic planning, permitting, water management, and treatment system design for coal-fired electric utilities. Over the past two years, we have helped clients prepare for the Final ELG Rule. We have also helped clients plan for systematic, programmatic transfer of operations from pre-ELG to post-ELG Rule standards. We solve problems at the most challenging sites, with experience that includes:

- Evaluating water use, water quality, and water reuse/recycle options at coal fired electrical power plants and designing recycle systems
- Designing wastewater treatment processes required to meet the ELGs, including experience with physical/chemical treatment and the operation of biological treatment systems for nitrate and selenium removal
- Designing remote bottom ash handling basins with recycle loops and low volume wastewater treatment basins

For assistance in meeting your planning, compliance, permitting, and design/construction needs resulting from the ELGs, please contact us.



USEFUL LINKS

EPA prepublication:

http://www2.epa.gov/sites/production/files/2014-12/documents/ccr_finalrule_prepub.pdf

Utility Solid Waste Group Resources:

<http://www.uswag.org/About/Pages/Resources.aspx>

EPA's Steam Electric Power Generating Effluent Guidelines:

<http://water.epa.gov/scitech/wastetech/guide/steam-electric/proposed.cfm>

General Information from USEPA on Coal Ash Surface Impoundment Assessments, Beneficial Reuse, and cleanups.

<http://www2.epa.gov/coalash%20>

COME TALK WITH US

International Water Conference

Orlando, FL | 15-19 November 2015

EUEC 19th Annual Energy Utility Conference

San Diego, CA | 3-5 February 2016

USWAG Policy Meetings

Pensacola, FL | 17-18 March 2016

Los Angeles, CA | 28-29 July 2016

Minneapolis, MN | 27-28 October 2016



CONTACT INFORMATION

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