

How to Establish ELG Compliance at Your Plant

Recent updates to the U.S. Environmental Protection Agency (EPA) Steam Electric Power Generating Effluent Guidelines (also known as effluent limitation guidelines or ELGs) can mean significant updates for your plant.

After careful evaluation and thorough laboratory testing of flue gas desulfurization wastewater over the course of 10 years, the EPA is placing greater limitations on the level of dissolved toxins a plant can discharge.

Here are a few questions you might be wondering:

Who do these ELG changes affect?

The ELGs affect steam electric power plants in the United States that:

- operate as a utility
- use nuclear or fossil fuels (such as coal, oil, or natural gas) to heat water and generate steam to power turbines
- discharge waste either directly into the environment under a National Pollutant Discharge Elimination System (NPDES) permit or indirectly into a publicly owned treatment works (POTW)

Why is the EPA implementing these new ELG regulations?

According to the EPA, the majority of steam electric power plant wastewaters that result from water treatment, power cycle, ash handling, and air pollution control systems come in the form harmful toxins that include **arsenic, lead, mercury, selenium, chromium, and cadmium**. These toxins can remain in the environment for years and can **contaminate drinking water, cause health problems in humans, and affect fish and wildlife**.

What type of updates to your plant will you be required to make?

The following numerical limits are set within these new standards:

Flue Gas Desulfurization Wastewater (existing sources)		Flue Gas Desulfurization Wastewater (new sources + incentive program)		Coal Combustion Residuals Leachate (new + existing sources)		Integrated Gasification Combined Cycle (new + existing sources)	
Arsenic (ppb)		Arsenic (ppb)		Arsenic (ppb)*		Arsenic (ppb)	
30-day Average	8	30-day Average	NA	30-day Average	8	30-day Average	NA
Daily Maximum	11	Daily Maximum	4	Daily Maximum	11	Daily Maximum	4
Mercury (ppt)		Mercury (ppt)		Mercury (ppt)*		Mercury (ppt)	
30-day Average	356	30-day Average	24	30-day Average	356	30-day Average	1.3
Daily Maximum	788	Daily Maximum	39	Daily Maximum	788	Daily Maximum	1.8
Selenium (ppb)		Selenium (ppb)		Total Suspended Solids (ppm)		Selenium (ppb)	
30-day Average	12	30-day Average	NA	30-day Average	30	30-day Average	227
Daily Maximum	23	Daily Maximum	5	Daily Maximum	100	Daily Maximum	453
Nitrite-Nitrate (ppm as N)		Total Dissolved Solids (ppm)		Oil & Grease (ppm)		Total Dissolved Solids (ppm)	
30-day Average	4.4	30-day Average	24	30-day Average	15	30-day Average	22
Daily Maximum	17	Daily Maximum	50	Daily Maximum	20	Daily Maximum	38

All in all, the changes you'll need to make at your plant in order to comply with the new ELG regulations are **technology-based** and focus on the following six main power plant wastewater streams:

1. Flue gas desulfurization (FGD) wastewater
2. Fly ash transport waters
3. Bottom ash transport waters
4. Coal combustion residual (CCR) leachate from landfills and surface impoundments
5. Wastewater from flue gas mercury control (FGMC) systems
6. Integrated gasification combined-cycle (IGCC) wastewater

ELG COMPLIANCE CHECKLIST

- ✓ Explore cost-effective recycle and reuse technologies for your waste
- ✓ Consider treatability testing for your wastewater
- ✓ Evaluate your plant's current water/wastewater characteristics
- ✓ Develop a plan and start the process of evaluating the different companies and solutions that can help you comply
- ✓ Minimize the amount of water in your facility by going to waterless systems like dry FGD and FGMC process, and use conveyance system that are dry based
- ✓ Carefully consider the implications of a new waste source stream in the facility and the regulatory implications
- ✓ Explore technology selection as part of any treatment for CCR landfills, leachate lagoons, and containment ponds/closures
- ✓ Consider using temporary equipment and/or rental equipment as an option for short-term closures

NOTE: *Applicable to new coal combustion residual sources only. Source: HDR Inc.

When do affected power plants need to finalize these updates?

The EPA requires all plants to comply with the new ELG regulations with NPDES permit renewals **starting November 1, 2018, and no later than December 31, 2023.**

Your plant's compliance timeline will depend on whether or not you discharge your wastewater to a surface water or POTW and **will be set by your plant's permitting authority** who will determine the appropriate timeline for planning, designing, engineering, and installing the new equipment, among other factors as needed.

There is a time extension or voluntary incentive program for plants that agree to use vapor compression evaporation systems for FGD wastewater treatment. This option might be particularly beneficial for **power plants upstream of drinking water sources with stringent TDS limitations.** More information about the treatment options/discharge limitations is outlined below:

TYPE	CURRENT RULE	NEW RULE BAT/PSES (existing sources)	NEW RULE NSPS/PSNS (new sources)
FGD Wastewater	Impoundment	Chemical precipitation + biological treatment	Evaporation
	Included as low-volume waste	Hg, As, Se, NO ₂ + NO ₃ limits	Hg, As, Se, TDS limits
Fly Ash Transport Water	Impoundment	Dry handling	Dry handling
	Total suspended solids (TSS), oil and grease (O&G) limits	Zero discharge	Zero discharge
Bottom Ash Transport Water	Impoundment	Dry handling/closed loop	Dry handling/closed loop
	TSS, O&G limits	Zero discharge	Zero discharge
CCR Leachate	Impoundment	Impoundment	Chemical precipitation
	Included as low-volume waste	TSS, O&G limits (no change from current)	Additional Hg, As limits
FGMC Wastewater	Impoundment	Dry handling	Dry handling
	Included as low-volume waste	Zero discharge	Zero discharge
IGCC Wastewater	Impoundment	Evaporation	Evaporation
	Included as low-volume waste	Hg, As, Se, TDS limits	Hg, As, Se, TDS limits
Non-Chemical Metal Cleaning Waste	Reserved for future consideration	Reserved for future consideration	Reserved for future consideration

*Summary of technology basis and limitations for new effluent limitation guidelines (ELGs). Source: HDR Inc.

**NOTE: BAT (best available technology); PSES (pretreatment standards for existing sources); CCR (coal combustion residuals); FGD (flue gas desulfurization); FGMC (flue gas mercury control system); IGCC (integrated gasification combined cycle); NSPS (new source performance standards); PSNS (pretreatment standards for new sources).

How Middough and SAMCO Can Help

Although operating as individual companies, choosing to work with Middough and SAMCO together can result in some of **the most integrated and cost-effective ELG compliance solutions in the industry.** With over 100 years' combined experience, you can expect:

- Clear guidance on how to meet ELG compliance regulations
- Efficient point-source treatment
- Reliable project management
- Thorough effluent characterization and treatability studies
- An assortment of customized treatment options for your facility
- Some of the most talented and experienced engineers in the industry

Making changes to your facility in order to meet the new ELG compliance regulations can seem daunting, but choosing to work with the right engineering and technology companies can make all the difference. Contact us today to see if our solutions are right for you.

MIDDOUGH & SAMCO AT A GLANCE

MIDDOUGH

Over 65 years' experience providing clients with:

- Engineering, architectural, and management services
- The development of high-performance teams
- Power system analysis and modeling
- Energy studies, usage, and efficiency
- Due diligence reports
- Energy efficiency and sustainable design
- Power plant systems design

SAMCO

Over 40 years' experience working with customers to attain:

- Full laboratory for testing, treatability, and process simulations
- Higher efficiency ion exchange for boiler feed water
- Increased boiler water pretreatment efficiency
- Cost-effective waste reduction/recycling
- Better process automation technology
- Zero liquid discharge (ZLD)
- Superior purification with ADVANCED AMBERPACK™ and UPCORE™ technology
- Effective custom solutions