

The Clean Water Act (CWA) regulates the discharge of pollutants from point sources through National Pollutant Discharge Elimination System (NPDES) permits. NPDES discharge limitations may be technology-based, which establish a floor of performance for all dischargers within a specific source category, or water-quality-based when technology-based controls are insufficient to meet water quality standards. On September 30, 2015, EPA issued a prepublication version of its final “Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category” (the “ELG Rule”). The rule revises the national technology-based standards that apply to steam electric generating facilities. The revisions include:

- Standards for existing plants discharging directly to waters of the U.S., referred to as “direct dischargers”
- Pretreatment standards for existing sources (PSES) that discharge wastewater indirectly to waters of the U.S. through publicly owned treatment works (POTWs), referred to as “indirect dischargers”
- New source performance standards (NSPS) for direct dischargers
- Pretreatment standards for new sources (PSNS) that are indirect dischargers

The revised standards for existing direct and indirect dischargers are equivalent to one another, and the standards for new direct and indirect dischargers are also equivalent to one another. Therefore, the remainder of this analysis discusses the standards only in terms of “existing-unit” standards and “new-unit” standards and does not distinguish between direct and indirect dischargers.

Although the ELG standards apply to all types of steam electric generating facilities, revisions to the standards included in the ELG Rule will primarily affect coal-fired power plants greater than 50 MW that currently discharge flue gas desulfurization (FGD) wastewater, bottom ash transport water, and/or fly ash transport water. The most significant change from the proposed rule is that EPA selected a more stringent standard for bottom ash transport water, requiring zero-discharge for all units greater than 50 MW (with certain limited exceptions).

### **Applicability**

The ELG standards apply to electric generating units:

- Whose predominant source of revenue or principal reason for operation is the generation of electricity (excluding industrial facilities and including municipally owned facilities)
- AND who utilize fossil fuels (such as coal, oil, or gas), fuels derived from fossil fuels (such as petcoke or syngas), or nuclear fuel
- AND with a thermal cycle using steam as the thermodynamic medium (including combined-cycle facilities)

As previously stated, although these standards apply to many types of power generating units, the standards primarily affect coal-fired power plants.

**Rule Requirements**

The ELG Rule specifically removes FGD wastewater, flue gas mercury control (FGMC) wastewater, coal combustion residual (CCR) leachate, and gasification wastewater from the definition of low-volume waste sources and imposes discharge limitations on these streams. In addition, the rule imposes zero-discharge standards for fly ash and bottom ash transport water. Although the proposed rule requested comment on imposing copper and iron limits on nonchemical metal-cleaning wastewater, EPA concluded it did not have sufficient data to establish standards at this time for this type of wastewater; thus, nonchemical metal-cleaning wastewaters continue to be regulated as a low-volume waste source.

Standards for Existing Units

Requirements in the ELG Rule that apply to existing units > 50 MW are summarized in the following table:

|                              | Existing Unit Standards                                    | Technology Basis                             |
|------------------------------|--|--|
| Fly Ash Transport Water      | Zero-Discharge   | Dry Ash Handling                             |
| FGMC Wastewater              | Zero-Discharge   | Dry Ash Handling                             |
| Bottom Ash Transport Water   | Zero-Discharge   | Dry Ash Handling or 100% Recycle             |
| FGD Wastewater               | As – Daily Max $\leq$ 11 ug/L, 30-day Avg $\leq$ 8 ug/L    | Physical / Chemical and Biological Treatment |
|                              | Hg – Daily Max $\leq$ 788 ng/L, 30-day Avg $\leq$ 356 ng/L |  |
|                              | Se – Daily Max $\leq$ 23 ug/L, 30-day Avg $\leq$ 12 ug/L   |  |
|                              | N – Daily Max $\leq$ 17 mg/L, 30-day Avg $\leq$ 4.4 mg/L   |  |
| Combustion Residual Leachate | Same as current Low-Volume Waste Standards                 | Impoundment                                  |
| Gasification Wastewater      | As – Daily Max $\leq$ 4 ug/L,                              | Evaporation                                  |
|                              | Hg – Daily Max $\leq$ 1.8 ng/L, 30-day Avg $\leq$ 1.3 ng/L |  |
|                              | Se – Daily Max $\leq$ 453 ug/L, 30-day Avg $\leq$ 227 ug/L |  |
|                              | TDS – Daily Max $\leq$ 38 mg/L, 30-day Avg $\leq$ 22 mg/L  |  |

\*FGMC – Flue Gas Mercury Control Wastewater, As – Arsenic, Hg – Mercury, Se – Selenium, N – Nitrate/Nitrite, TDS – Total Dissolved Solids

It should be noted that although EPA based its analysis on the technologies listed in the table, plants are subject only to the effluent standards and can implement any technology that achieves those standards.

### Standards for New Units

New unit standards included in the ELG Rule for the wastewater streams listed in the above table are identical to the existing unit standards, with two primary exceptions:

- FGD wastewater is subject to more stringent standards than those listed above based on evaporation as the treatment technology.
- CCR leachate is subject to the same arsenic (As) and mercury (Hg) standards as listed above for FGD wastewater based on physical / chemical treatment technology.

### Anti-circumvention Provisions

In the 2013 proposed ELG rule, EPA included three anti-circumvention provisions to eliminate the possibility of “circumventing” the ELG standards, including a requirement that facilities demonstrate compliance with all discharge standards prior to mixing wastewater streams, and a requirement that wastewaters subject to a zero-discharge standard could not be used in any other plant process that would result in discharge. Anti-circumvention standards included in the final ELG Rule are somewhat less stringent than the standards included in the proposed rule.

Anti-circumvention provisions adopted by EPA in the final rule allow facilities to reuse ash transport water if it is used in a process that does not result in a discharge, with one exception. The final rule allows ash transport water to be used in an FGD scrubber even if it results in a discharge, because that discharge would be subject to the FGD wastewater standards.

The less stringent anti-circumvention provisions adopted in the final rule also allow compliance to be demonstrated after mixing two streams. In cases where compliance with a stream subject to an effluent limit is demonstrated after that stream is combined with other streams, concentration-based limits must be lowered to account for the amount of dilution that results from the combination of streams. For example, if an FGD wastewater stream is mixed with a stream of equal flow (50% dilution), then the demonstrated limits included in the NPDES permit must be 50% of the values indicated in the rule. If the regulated wastewater is diluted to an extent that the adjusted concentration limit of any pollutant falls below its detectable limit, demonstrating compliance after mixing the streams is no longer allowed, and will instead need to be demonstrated prior to mixing.

### Legacy Wastewater

Legacy wastewater is defined as FGD wastewater, fly ash transport water, bottom ash transport water, FGMC wastewater, and gasification wastewater generated prior to the compliance date established by the permitting authority. Discharge of legacy wastewater is not subject to the new, more stringent standards, but instead is subject to total suspended solid (TSS) limitation that applies to low-volume waste streams.

This means plants that close surface impoundments as part of their compliance strategy for the CCR Rule, or for other reasons, would be able to discharge their legacy wastewater as part of the dewatering process, provided that the discharge meets the TSS standard.

This also means that plants can continue to route and discharge low-volume waste streams to existing surface impoundments that are planned to remain in operation, as long as the impoundment ceases receiving ash transport water prior to the compliance date indicated in its NPDES permit.

## **Implementation**

ELG standards are implemented via plants' NPDES permits, which are renewed every five years. Implementation of the new standards is required "as soon as possible" after November 1, 2018, but no later than December 31, 2023.

When a plant's NPDES permit renewal date is after the effective date of the ELG Rule (i.e. 60 days after publication in the *Federal Register*), but before November 1, 2018, current permit limits will apply until the date that the permitting authority determines is "as soon as possible" after November 1, 2018. This date will be established by evaluating: 1) time to plan, design, procure, and install required equipment; 2) changes being made at a plant due to other regulations, such as the Clean Power Plan and the CCR rule; 3) for FGD wastewater only, an initial equipment optimization period; and 4) other appropriate factors.

When a plant's NPDES permit renewal date is after November 1, 2018, the permitting authority should determine the earliest possible date that the plant can meet the limits, but in no case can the compliance date be after December 31, 2023. Although not explicitly stated in the rule, Sargent & Lundy interprets EPA's language to mean that permits renewed after November 1, 2018 will include the new standards effective as of the date of the renewed permit unless the permitting authority conducts a similar analysis, as described above, to determine what constitutes "as soon as possible" after the effective date of the permit.

It is important to note that the "as soon as possible" date may differ for each wastewater stream. Plants should not assume that if they need additional time to comply with one standard, they will be allowed to delay compliance for all standards.

EPA's final ELG Rule offers an incentive to delay implementation if plants choose to implement evaporation technology as their compliance technology for FGD wastewater (i.e., they agree to adopt the more stringent FGD wastewater standards that apply to new sources). In this case, FGD wastewater compliance will be required by December 31, 2023, with no requirements to comply "as soon as possible" after November 1, 2018. This incentive applies only to the FGD wastewater stream and does not allow plants to delay compliance for other stream standards. This incentive also applies only to direct dischargers. Plants opting to participate in this incentive program are expected to notify the permitting authority prior to issuance of their next NPDES permit, provided issuance is after the effective date of the rule.

**Industry Impacts**

Revised discharge standards included in the ELG Rule primarily affect coal-fired power plants greater than 50MW that currently discharge FGD wastewater, bottom ash transport water, and/or fly ash transport water. Although the CCR Rule, published as a final rule in April 2015, provided facilities with some flexibility to allow continued operation of surface impoundments to manage ash waste, the final ELG Rule eliminates the possibility of discharging ash transport water for most coal-fired power plants.

The following table summarizes some of the alternatives available to facilities to comply with the new ELG standards:

| Regulated Stream                  | Selected Compliance Options  | Comments   |
|-----------------------------------|--|--|
| <b>FGD Wastewater</b>             | <ul style="list-style-type: none"> <li>Physical / chemical and biological treatment</li> <li>Zero-valent iron treatment</li> <li>Waste fixation and stabilization</li> <li>Alternate FGD absorber lining</li> <li>Dry sorbent injection for HCl control</li> <li>Spray dryer absorber evaporator</li> <li>Evaporation / crystallization</li> <li>Developing treatment systems</li> </ul> | Multiple compliance approaches can be evaluated; water treatment is not the only solution. |
| <b>Bottom Ash Transport Water</b> | <ul style="list-style-type: none"> <li>Recycling water from existing non-discharging impoundments</li> <li>Recycling transport water from new concrete basins used for ash collection</li> <li>Dewatering bins with recycle</li> <li>Under-boiler submerged flight conveyors</li> <li>Remote submerged flight conveyors with recycle</li> <li>Dry belt conveyors</li> </ul>              | The zero discharge standards apply to all coal-fired power plants > 50 MW.                 |
| <b>Fly Ash Transport Water</b>    | <ul style="list-style-type: none"> <li>Pneumatic fly ash handling systems</li> </ul>   | Most plants have already converted to dry fly ash handling systems.                        |



### Sargent & Lundy Support for ELG and CCR Compliance

Sargent & Lundy has extensive experience evaluating, specifying, and implementing the technologies to comply with both the ELG and CCR Rules.

- Dry ash handling systems – We have evaluated and supported the installation of over 35 dry ash handling systems, including under-boiler submerged flight conveyors (SFCs), remote SFCs, and dry belt systems.
- CCR impoundments – Our civil design group has extensive experience designing many types of impoundments, including concrete settling basins, ponds, and landfills that satisfy CCR Rule and state requirements.
- Water management – We have developed unique and innovative water management strategies that minimize water usage and operating costs, and have developed water balances for over 60 projects.
- FGD wastewater – Sargent & Lundy has provided engineering services for the implementation of over 40 wet FGD projects (11 of which included FGD wastewater treatment systems). We understand the process variables that influence FGD wastewater production and its chemistry.

| Selected Sargent & Lundy Services to Support Compliance Planning through Implementation  |   |
|--|---|
| Water Balance Preparation  | ✓ |
| Wastewater Flow and Characterization   | ✓ |
| Compliance Planning and Economic Modeling  | ✓ |
| Equipment Design Basis, Specification Preparation, and Procurement Support               | ✓ |
| Detailed Design for Balance-of-Plant Integration   | ✓ |
| Project Management and Oversight   | ✓ |
| Permit Application Preparation and Support (NPDES, Section 401/404, State Permits, etc.) | ✓ |
| CCR Fugitive Dust Plan Preparation   | ✓ |
| Impoundment Safety Hazard Analyses   | ✓ |
| Groundwater Monitoring Plans and Well Installation Support                               | ✓ |
| CCR Impoundment Location Assessments   | ✓ |
| CCR Impoundment Safety and Hazard Potential Assessments                                  | ✓ |
| CCR Impoundment Inspection Plans   | ✓ |
| CCR Closure and Post-Closure Plans   | ✓ |

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