Further Regulation of BATW Based on Existing BPT Limits and Stringent BMPs

A. Introduction

Regulating bottom ash transport water (BATW) using a combination of existing limits and best management practices (BMPs). This alternative approach would ensure significant changes in power plant BATW management and very large reductions in pollutant loadings, while at the same time providing necessary operational flexibility. This approach is being offered even though it is evident on the record that no further regulation of BATW is justified using EPA's own cost-effectiveness test.

This paper outlines the industry's alternative approach and explains why the approach is environmentally beneficial and yet preserves needed industry flexibility. EPA's proposed rule regarding BATW is flawed for the following reasons:

- EPA's proposed "no discharge" approach to BATW at existing facilities is not feasible. **It would require absolutely no discharge of BATW over the life of the facility, without any exceptions.** That limit is not achievable industry-wide with the two technologies EPA selected as Best Available Technology (BAT) for BATW, Mechanical Drag Systems (MDS) and Remote Mechanical Drag Systems (RMDS). MDS, which is retrofitted under the boiler, is not possible at plants with subsurface boilers or limited space around the boiler. RMDS, which involves sluicing bottom ash from under the boiler to a remote location for dewatering, cannot meet a "no discharge" limit all of the time.

- EPA's proposed anti-circumvention provision subjects any wastewater combined with a "no discharge" wastewater to the no discharge standard. The provision, therefore, essentially prohibits the reuse of BATW in other plant processes that discharge. For instance, plants currently using BATW as scrubber makeup water, boiler makeup water, and/or service water would have to cease these practices and (1) retrofit to a dry or "closed-loop" system for bottom ash handling; (2) identify a new source of scrubber makeup, boiler makeup, or service water; and (3) install new piping to get the new source of water to the scrubber or boiler, or to the service water system.

B. Industry's Alternative Approach

The steam electric industry is undergoing rapid transition, which will result in the closure of many coal-fired units and a significant transformation of the remaining units. Coal-fired plants are already undergoing extensive water balance evaluations associated with implementation of the final Coal Combustion Residual (CCR) rule and associated ash pond closures. In order to close these wastewater treatment systems, wastewater must be directed away from the ponds to other treatment systems. Facilities are in the process of tightening their water balances to withdraw less water so that less water has to be treated prior to discharge.

In addition, the final Clean Power Plan (CPP) will force closure of multiple coal-fired plants in the 2022 to 2029 time period as CO_2 emission reductions are phased in by State Implementation Plans. EPA's IPM model (as adjusted to account for the CPP rule) predicts a large number of

closures in the 2016 to 2022 time period based on the implementation of MATs, CCR, § 316(b), and CSAPR final rules.

This alternative approach for BATW makes practical and economic sense in terms of the future operation of coal-fired power plants. It provides the flexibility needed to continue to operate the remaining coal-fired plants during a transitional period prior to bringing new generation (natural gas, nuclear and renewables) online to service the nation's electricity needs. This flexibility is needed to provide reliable and affordable power to customers of all ranges of income across the country.

The industry proposal consists of the following elements:

- Remove any "no discharge" provisions for BATW (1) for existing facilities (including any associated "anti-circumvention" provisions) and (2) in Pretreatment Standards for Existing Sources (PSES).

- For existing facilities with coal-fired generating capacity greater than 50 MWs and less than or equal to 1,000 MWs, the existing BPT limits should continue to apply (Total Suspended Solids (TSS), oil and grease and pH). See 40 C.F.R. § 423.12 (b)(4).

- For existing facilities with coal-fired generating capacity greater than 1,000 MWs, in addition to the BPT limits for blowdown, maintenance or emergency overflows, the regulation would provide for best management practices (BMPs) to control BATW discharges. As explained below, BMPs can be structured to provide significant environmental benefits.

Best Management Practices

Under the approach offered here, the regulation would require the permittee to conduct a study to determine how to minimize BATW blowdown and to develop, based on the study and other available information, a draft best management practices (BMP) plan, based on site-specific factors. The study would include an evaluation of a variety of practices and technologies, including, but not limited to, recycling of BATW, reuse of BATW in other processes, and available and feasible technologies, such as dewatering bins, MDS, RMDS, and other systems, to determine the BMPs for the facility. The plan could include a combination of these practices and/or technologies, including existing practices and/or technologies already implemented by the plant.

The study and BMP plan would be submitted to the permit writer by the next permit renewal application deadline that is at least 3 years after the effective date of the ELG rule. The study and BMP plan would consider the following factors:

- Age and expected life span of the facility's coal-fired generating units and related equipment.

- Announced retirement date of the facility and/or its capacity factor.

- Reuses of BATW (both existing and potential) within facility processes, including use as FGD makeup, boiler water makeup, cooling tower makeup and for service water. Reuse of BATW for other plant processes is environmentally beneficial. It reduces the amount of water facilities must withdraw from source waterbodies.

- Operation and maintenance of BATW systems, including any anticipated need to discharge BATW as part of routine maintenance, or to allow for repair or upgrade of any portion of the BATW system.

- Emergency overflows and handling of same to reduce BATW discharges.

- Costs and cost-effectiveness of any potential equipment or operational measures to reduce BATW discharges.

- Engineering feasibility of approaches to minimize BATW blowdown, including, but not limited to, space limitations.

The permit writer, on the basis of the study and BMP plan and any other available information, will evaluate and establish BMPs for minimizing BATW blowdown from the facility.

C. Justification for Industry Alternative Approach

1. EPA's "No Discharge" BATW Limit is Not Feasible

EPA assumed an array of model technologies for compliance with a "no discharge" standard, including remote mechanical drag chain systems (RMDS). During the proposal stage, EPA assumed that 149 plants would comply with the standard by installing RMDS. **However, it is erroneous to assume that an RMDS can operate for years and never discharge.** The RMDS systems in place in the industry do discharge. They may discharge for maintenance activities, or after major storm events, or to prevent build-up of corrosive fines within the system.

For example, TVA's Bull Run Station, a single unit with an average generating capacity of 881 MW, installed an RMDS for handling bottom ash in 2012. Two trains, consisting of two submerged flight conveyors, two clarifiers, silos for dewatering, and a flow equalization tank, were installed to dewater and ultimately landfill bottom ash on-site. Redundant trains were built to ensure continuous operation for reliable generation. Significant boiler bottom modifications had to be made to retrofit the system even though it is a remote system. While the plant recycles a significant quantity of BATW, it has not been designed for a "no discharge" requirement. A significant upgrade to more corrosive-resistant materials of construction and a treatment system to address fines, corrosive anions (chlorides, sulfates) and scale forming constituents (e.g., calcium, iron, and sodium) would be required, and this upgrade would be extremely expensive.

In its short period of operation, Bull Run has already experienced several unanticipated problems which have required the discharge of BATW from the system. While operating in the recycle mode, a system blowdown was required to address excess polymer used in treating solids. Also, the system had to be drained after a rake failure in the clarifier. There was also an unanticipated low pH excursion that necessitated a discharge to prevent potential corrosion even

though the system has a pH control system in place. Several leaks have occurred due to pipe ruptures that could have been problematic with a "no discharge" limit.

To build an RMDS that would never discharge would be a significant challenge, and may be infeasible at some plants. Also, it would require equipment far beyond the technology EPA evaluated and costed out. EPA only included a pH control system in its costs. At a minimum, the system would require softening, fines removal equipment, and corrosion control. EPA did not account for these necessary steps in its model technologies.

An MDS system – because it must be installed directly under the boiler – is infeasible for many existing units. There are numerous boilers that are partially subsurface and constructing an MDS underneath these boilers would be cost-prohibitive. Also, some units do not have adequate space around the boiler for this type of construction.

2. A 1,000 MW Threshold For BATW is Justified by the Record

Under Option 4a, EPA proposed a threshold that would require dry handling/closed loop for all units greater than 400 MWs and existing BPT limits for units equal to or less than 400 MWs.

EPA recognized that "the potential costs associated with compliance with a zero discharge standard for discharges of bottom ash transport water would be substantial if applied to all facilities" and thus chose to develop the 400 MW option. 78 Fed. Reg. at 34,470. EPA said its analysis showed that units less than or equal to 400 MWs were "more likely to incur compliance costs that are disproportionately higher per MW than those incurred by larger units." *Id.* EPA specifically invited comments on *all* potential thresholds for BATW:

> EPA solicits comment on the proposed 400 MW threshold applicable to discharges of bottom ash transport water under Option 4a, *including whether this or another threshold may be more appropriate.*

78 Fed. Reg. at 34,471 (emphasis added).

Therefore, all commenters were on notice that EPA would consider other potential BATW thresholds, and had an equal opportunity to comment on other thresholds.

The industry recommends a 1,000 MW plant-level threshold because it is more appropriate than a 400 MW unit-level threshold for the following reasons:

- Since release of the proposed rule in June 2013, companies have retired, converted to gas, or announced retirements for 248 units less than or equal to 400 MWs. Many, if not all, small units will be retired or converted to gas due to the Clean Power Plan. A 400 MW threshold would apply only to a small number of remaining units.

- Based on EPA's IPM final modeling results for the CPP, on a national level, 87 Gigawatts of coal-fired generation will be retired by 2025. This projection is based on implementation of MATS, CSPAR, CCR, and 316(b) rules (70

Gigawatts) and the CPP rule (an additional 17 Gigawatts based on mass-based compliance). This is approximately 30 percent of the coal-fired generation in the country. The coal-fired steam electric plants that survive these rulemakings will be the cleanest, most expensively controlled, most efficient, and most essential coal-fired generating facilities in history. Any further limits EPA imposes on them must be both achievable and cost-effective.

- Larger facilities are better able to manage the costs associated with additional regulatory requirements. They will be better positioned to absorb the costs of implementing BMPs. Plants with less than 1000 MW of coal-fired generation will incur compliance costs that are disproportionately higher per MW than those incurred by larger plants.

3. EPA's Anti-Circumvention Provision Would Prohibit Reuse of BATW

EPA proposed three types of provisions it terms "anti-circumvention" measures. One of the provisions is of great importance to BATW. It requires that a wastestream subject to a "no discharge" limit cannot be combined with any other process wastewater without subjecting the entire combined stream to a "no discharge" requirement. See proposed § 423.13(k)(1).

The anti-circumvention measure means that current reuses of BATW in other processes would be completely impractical, as it would increase the amount of wastewater subject to the no discharge restriction. Plants currently reusing BATW would have to cease that reuse and segregate the BATW from all other wastestreams.[1]

In addition, the anti-circumvention provision is contrary to EPA's traditional goal of encouraging centralized treatment. The 1974 Preamble to the steam electric guidelines said:

> It is also recognized by EPA that, due to the economies of scale, combining similar waste streams for treatment to remove the same pollutants is generally less costly than separate treatment of these waste streams. The employment of cost-saving alternatives in meeting the effluent limitations should not be discouraged.

39 Fed. Reg. 36,186, 36,196, col. 3 (Oct. 8, 1974).

Likewise, EPA's 1980 Proposed Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Point Source Category said "[c]onsolidation of waste streams to a centralized treatment system is permitted and encouraged." 1980 Development Document at 470.

The anti-circumvention provision also makes no sense from a water conservation perspective. If a plant cannot reuse BATW in other processes, it will have to withdraw more water from the

[1] It is not clear that EPA accounted for costs of segregating BATW from all other flows. For instance, for plants that reuse BATW as FGD makeup water, it is not clear that EPA allotted costs of rerouting the BATW and providing for a new source of makeup water to the scrubber.

source waterbody. This is contrary to EPA's policies supporting use of grey water for industrial purposes.

For example, EPA's *2012 Guidelines for Water Reuse* (EPA/600/R-12/618) encourage the industrial reuse of reclaimed water, by which the Agency means treated municipal wastewater. The Guidelines specifically encourage use of reclaimed water in cooling towers and as boiler feed water. Guidelines, pp. 3-20 through 3-22. ***If EPA is encouraging use of reclaimed water for these functions at industrial sites such as power plants, it should also encourage the reuse of BATW for all plant functions for which it may be suited, either with or without treatment.*** For this reason, EPA should refrain from setting a "no discharge" prohibition for BATW, and it should allow BATW to be used in other processes within the facility, even if those processes eventually discharge.

D. BATW Reuse Within the Industry

BATW can be reused in many plant processes, including FGD makeup, boiler feed water and service water. It reduces the amount of water facilities must withdraw from source waterbodies. EPA encourages the use of reclaimed municipal water for power plant uses such as cooling water and boiler feed water. If EPA seeks to encourage reuse, then it makes no sense to prohibit the reuse of BATW in other plant processes. In particular, any BATW used as scrubber makeup water will be subject to stringent new FGD wastewater limits prior to discharge.

It is also feasible to use BATW as boiler feed water. In this type of reuse, BATW must be treated before it is reused, and the treatment process results in a very significant reduction in pollutant load. For example, in a drought-prone area of the country, a facility draws off BATW pond water for use as boiler makeup water. The pond receives a mix of wastewaters, including BATW, stormwater and scrubber wastewater. The combined pond water must be treated before use in the boiler. The plant uses ultrafiltration, reverse osmosis, and a demineralizer to treat the pond water down to 5 micromoles. The treated water is then used as boiler makeup water and eventually discharged as low volume waste.

Similarly, BATW may be used as cooling tower make-up or service water if treatment is feasible or the water chemistry is acceptable. In some cases, service water and cooling tower blowdown may be treated prior to discharge to meet water quality standards. In these cases, it would be acceptable to reuse BATW in these processes.

In summary, acceptable reuses of BATW should not be limited to FGD scrubber makeup water only. At a minimum, BATW reuse should be encouraged in systems where it is treated either before or after its reuse.