Document Type: EA-Administrative Record
Index Field: Finding of No Significant Impact (FONSI)
Project Name: Operating SCR systems at Five TVA Fossil Plants
Project Number: 2007-32

FINDING OF NO SIGNIFICANT IMPACT
TENNESSEE VALLEY AUTHORITY

OPERATIONAL IMPROVEMENTS TO OPTIMIZE SELECTIVE CATALYTIC REDUCTION SYSTEMS AT FIVE FOSSIL PLANTS IN TENNESSEE, ALABAMA, AND KENTUCKY
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

Proposed Action and Need

Tennessee Valley Authority (TVA) is proposing improvements to optimize operation of 17 selective catalytic reduction (SCR) systems installed at five fossil plants (Colbert [COF], Cumberland [CUF], Kingston [KIF], Paradise [PAF], and Widows Creek [WCF]). The proposed improvements would enable TVA to sustain high nitrogen oxide (NOx) removal rates while extending the SCR catalyst life until the next scheduled outage.

The original SCR catalyst design assumptions were that the initial catalyst charge would achieve a 90 percent NOx reduction at a maximum 2 parts per million by volume (ppmv) ammonia slip for a given time period. The catalyst manufacturer also made assumptions concerning the longevity, removal efficiency, and final disposition of the slip, and it appears that the assumptions were conservative. The catalyst is lasting longer, and there is less ammonia on the ash byproduct than anticipated. The generalized 2-ppmv slip was conservatively approximated to ensure compliance with applicable wastewater discharge requirements and was based on ammonia on ash concentrations that would eventually end up in ash ponds and storm water runoff pond discharges. If the slip limit were to be relaxed or removed so that ammonia slip could go higher than 2 ppmv, a given SCR would be able to achieve design NOx reduction performance for a longer time, assuming all other operating conditions remained the same. This approach would prolong the time when catalyst addition or replacement would be needed. Raising the slip limit would also allow higher NOx reduction to be sustained throughout the catalyst life.

Alternatives

Two primary alternatives, the No Action Alternative and an Action Alternative, were developed. Under the No Action Alternative, most plants would not be able to maintain NOx reduction at the design level, and a catalyst might have to be replaced before the end of its useful life in order to maintain removal levels for NOx emissions and continue TVA's ability to meet requirements of the *Clean Air Act*. Under the Action Alternative, catalyst life would be extended by increasing slip up to values that do not violate opacity standards, water quality criteria, National Pollutant Discharge Elimination System (NPDES) action levels, or toxicity reference values as appropriate based on constraints at individual facilities. This approach would allow some SCR units to optimize operations, both by extending catalyst life and by allowing NOx reduction to be sustained at the design level. TVA's proposed action is the preferred alternative.

Impacts Assessment

TVA has assessed the environmental impacts of the proposed and no action in a supplemental environmental assessment (SEA), which is attached and incorporated by reference. With the exception of those related to Allen (ALF) and Bull Run (BRF) Fossil Plants, this SEA supplements the EAs listed below. The EA for ALF was previously supplemented and BRF will be evaluated in a separate EA due to a need for additional data.

- *Paradise Fossil Plant Units 1, 2, and 3, Selective Catalytic Reduction Systems for Nitrogen Oxide Control Environmental Assessment* (TVA 1999), Index Number 434
- *Cumberland Fossil Plant Units 1 and 2, Selective Catalytic Reduction Systems for Nitrogen Oxide Control Environmental Assessment* (TVA 2000), Index Number 630
- *Allen Fossil Plant Units 1, 2, and 3, Selective Catalytic Reduction Systems for Nitrogen Oxide Control Environmental Assessment* (TVA 2001a), Index Number 652
- *Widow Creek Fossil Plant Units 7 and 8, Selective Catalytic Reduction Systems for Nitrogen Oxide Control Environmental Assessment* (TVA 2001b), Index Number 690
- *Kingston Fossil Plant Units 1 Through 9, Reduction Systems for Nitrogen Oxide Control Final Environmental Assessment* (TVA 2002a), Index Number 768
- *Bull Run Fossil Plant Unit 1, Selective Catalytic Reduction Systems for Nitrogen Oxide Control Final Environmental Assessment* (TVA 2002b), Index Number 743
- *Colbert Fossil Plant Units 1 Through 5, Reduction Systems for Control of Nitrogen Oxides Final Environmental Assessment* (TVA 2003), Index Number 816
- *Replacement or Rejuvenation of Catalyst for Selective Catalytic Reduction of Nitrogen Oxides at Seven TVA Fossil Plants in the Tennessee Valley Final Environmental Assessment and Finding of No Significant Impact* (TVA 2005), Project Number 2004-115

Impacts to air quality, coal combustion by-products, groundwater, surface water, and transportation were further evaluated in the SEA. With implementation of the monitoring for ammonia, compliance with the limitations in NPDES permits or as identified below, and adherence to commitments listed below, impacts would be insignificant. By operating under the conditions of the Action Alternative, no effects would occur to federally listed mussel species in the Tennessee River.

Mitigation Measures and Commitments

The following commitments would be implemented as part of the proposed action in order to avoid and minimize the potential for environmental impacts.

Ammoniated Discharge Management

To ensure compliance, TVA would commit to analyzing the COF Ash Pond 5 Outfall Discharge Serial Number (DSN) 010, CUF Ash Pond Outfall Internal Monitoring Point 001, KIF Ash Pond Outfall 001, PAF Jacobs Creek Ash Pond (JCAP) Outfall DSN 001, and WCF Ash Pond Outfall 001 and Flue Gas Desulfurization (FGD) Settling Pond Outfall 008 discharge for ammonia-nitrogen (NH_3-N) (a) as required by the NPDES permit for these outfalls; (b) as required by the NPDES permit for other outfalls at these plants (e.g., apply COF DSN 001 ammonia monitoring to COF DSN 010; apply WCF Outfall 001 requirements for ammonia monitoring to WCF Outfall 008; or (c) if (a) or (b) is not applicable, once per month. In addition, TVA would utilize one of the following measures as needed:

1. Utilize a pH control system at the ash pond and/or FGD (WCF) pond to decrease the pH of the discharge.

2. Ensure APH washes do not coincide with rainfall/runoff events for dry stacking operations (COF and CUF).

3. During wet sluicing of fly ash at CUF, ensure as much of the dry stack active area is covered as is practicable.

4. At PAF, route bottom ash pond discharges (DSN 002) to the JCAP—DSN 002 discharges typically have lower ammonia concentrations, lower pH levels, and higher temperatures than DSN 001.

5. At WCF, route ammoniated fly ash wastewater through the ash pond.

6. Increase pond retention time and mixing by use of baffles or other mechanical devices.

7. Phase catalyst management so that the maximum slip does not occur for more than one unit at a time (plants with SCRs on more than one unit).

8. Replace or rejuvenate used SCR catalyst to limit ammonia slip.

9. Reduce the amount of ammonia being injected into the SCR systems, thereby reducing the ammonia slip.

10. Utilize other treatment systems to control ammonia concentrations such as biological degradation, air stripping, recirculating sand filters, etc.

11. Employ a combination of these measures.

Site-specific commitments for PAF and WCF regarding ammoniated discharge management would be as follows:

Paradise Fossil Plant

TVA would begin monitoring every other week for ammonia in the inflow from the FGD pond and outflow of the JCAP. Monitoring would continue until seasonal trends can be established for the higher ammonia injection levels. Frequency and location of sampling could be modified as results warrant. Any unacceptable ammonia concentrations (toxicity and/or nutrient additions) would be mitigated by one or a combination of the measures listed above under “Ammoniated Discharge Management.”

Widows Creek Fossil Plant

TVA would begin monitoring every other week for ammonia in the inflow and outflow of the FGD Settling Pond Outfall 008. Monitoring would continue until seasonal trends can be established for the higher ammonia injection levels. (At 92 mg NH_3-N/kg, the discharge concentration is estimated to be 3.2 mg N/L, which is equal to the criteria maximum concentration [CMC] at the maximum pH [8.5] measured at DSN 008.) Frequency and location of sampling could be modified as results warrant. Any unacceptable ammonia concentrations (toxicity and/or nutrient additions) would be mitigated by one or a combination of the measures listed above under “Ammoniated Discharge Management.”

<u>APH Wastewater Management</u>

TVA would commit to containing the APH wash water in a pond or other containment and analyzing the wastewater for NH_3-N concentration and pH prior to discharging the wash water to an ash pond. Upon evaluation of the data, the wastewater would be managed in

one of the following ways so as not to exceed the "trigger point" for the listed mussels at COF, the NPDES permit action levels for ammonia at CUF and KIF, the CMC/criteria continuous concentration (CCC), and/or other future NPDES permit requirements:

1. If no treatment is warranted, release to the ash pond and discharge without treatment.

2. Stage release by slowly releasing the wastewater from the holding pond or containment to the ash pond over a number of days.

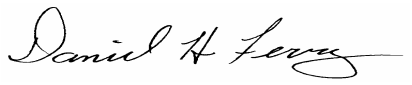
3. Reduce the pH of the wastewater to meet CMC/CCC limits.

4. Employ other treatment measures such as biological degradation, air stripping, recirculating sand filters, etc.

5. Employ a combination of these measures.

Conclusion and Findings

Based on the analysis in the attached TVA-prepared SEA and the identified commitments listed in the section titled "Mitigation Measures" of the SEA, we conclude that implementation of the proposed Action Alternative of increasing the ammonia slip meets the pertinent criteria of the SEA, and would not be a major federal action significantly affecting the environment. Accordingly, an environmental impact statement is not required.



April 30, 2008

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Date Signed