

November 5, 2019

David Triplett
Manager, Arkansas Environmental Support
Power Generation
Entergy Services, LLC

Sent Via Electronic Mail

RE: Information Request Regarding Candidate Technologies

Dear Mr. Triplett:

On July 8, 2019, the Environmental Protection Agency (EPA) finalized “Emissions Guidelines for Greenhouse Gas Emissions from Existing Electric Generating Units” (ACE). The Arkansas Department of Energy and Environment, Division of Environmental Quality (DEQ) must develop a state plan that includes unit-specific standards of performance for existing coal-fired steam electric utility generating units. Based on our evaluation of the rule, DEQ has identified the following units owned by Entergy Arkansas as designated facilities under ACE:

- White Bluff Unit 1
- White Bluff Unit 2
- Independence Unit 1
- Independence Unit 2

DEQ hereby requests that Entergy Arkansas submit the information described below no later than 120 days from the date of this letter.

For each item that requires information about the cost of implementing a technology or practice, please use the Electric Power Research Institute (EPRI) Cost Manual Estimator or the EPA Pollution Control Cost Control Cost Manual¹ to quantify costs. You may seek DEQ approval of an alternative control cost methodology. If approved, you may use the alternative methodology. Please report total allowed annualized costs (amortized capital expenditures and operation and maintenance costs). You

¹ https://www.epa.gov/sites/production/files/2017-12/documents/epacmcostestimationmethodchapter_7thedition_2017.pdf

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may factor in the remaining useful life of a designated facility into your cost calculation if the unit is under an enforceable requirement to cease coal-fired operations by a date certain. You may also provide information on fuel savings that you wish for us to consider in analysis of cost.

For each item that requires information about the degree of heat rate improvement, please indicate with the greatest degree of accuracy possible the percentage of heat rate improvement potential achievable through application of the technology or practice applied to each unit. If the achievable heat rate improvement falls outside the guidance range provided by EPA under Table 1 to 40 CFR § 60.5140a(a)(2)(i) and provided in Appendix B, provide a detailed explanation for the difference.

1) Neural Network/Intelligent Sootblower System Information:

a) Please indicate whether each unit listed above is tied in to a neural network system to optimize the unit's operations and minimize emissions.

i. If a unit is tied in to a neural network system,

1. When was the neural network first operated?

2. What impact did this have on your heat rate?

ii. If a unit is not tied in to a neural network system and the technology is feasible:

1. Please quantify the cost to implement a neural network system for your unit.

2. Please quantify the expected heat-rate impact of implementation of a neural network system.

iii. If the technology is not technically feasible or is limited, then please provide a detailed explanation of why the technology is not technically feasible or is limited due to the unique characteristics of each unit.

b) Is an intelligent soot blower system operated for any of the units listed above?

i. If an intelligent soot blower system is operated for the unit, then please respond to the following questions:

1. Is the intelligent soot blower system incorporated into the neural network software? If so, does the impact you specified for 1)a)i)2 include the impact of the intelligent soot blower system?

2. If the intelligent soot blower system is not incorporated into a neural network software package, the please respond to the following:

a. When was the intelligent soot blower system first operated?

b. What impact did this have on your heat rate?

ii. If an intelligent soot blower system is not operated for the unit and is technically feasible, then please respond to the following:

1. Please quantify the cost to install an intelligent soot blower for your unit.

2. Please quantify the expected heat rate impact of the intelligent soot blower system.

- iii. If the technology is not technically feasible or is limited, then please provide a detailed explanation of why the technology is not technically feasible or is limited due to the unique characteristics of each unit.
- c) Please provide any other information relevant to DEQ's analysis of this candidate technology.

2) Boiler Feed Pumps:

- a) Over the past year, how does the performance of the boiler feed pumps for each unit compare to the manufacturer specifications?
- b) When was the last time the boiler feed pump(s) for each unit was overhauled or upgraded?
- c) If the boiler feed pumps have not been overhauled or upgraded in the period or at the performance characteristics recommended by the manufacturer specifications,
 - i. Please quantify the cost to overhaul or upgrade the boiler feed pump(s) for your unit.
 - ii. Please quantify the expected heat rate impact of overhauling or upgrading the boiler feed pump(s).
 - iii. Please provide any other information relevant to the DEQ's analysis of this candidate technology.
- d) Please provide a detailed explanation if the technology is not technically feasible or limited due to the unique characteristics of the unit.

3) Please specify whether the air pre-heater for each unit listed above is regenerative (rotary) or recuperative (tubular or plate).

- a) If your unit has a regenerative air pre-heater, when were the seals last replaced?
- b) If the seals have not been replaced in the period or at the performance characteristics recommended by the manufacturer specifications,
 - i. Please quantify the cost to replace the seals for the regenerative air pre-eater for your unit.
 - ii. Please quantify the expected heat-rate impact of from replacing the seals.
- c) Please provide any other information relevant to DEQ's analysis of this candidate technology.
- d) Please provide a detailed explanation if the technology or practice is not technically feasible or limited due to the unique characteristics of the unit.

4) Variable Frequency Drives (VFD) information for each listed unit:

- a) Does your unit have VFD controls for the induced draft (ID) fans?
 - i. If so,
 - 1. When was the VFD first operated?

2. What impact did this have on your heat rate during base-load and cycling operating scenarios?
 - ii. If not,
 1. Please quantify the cost to install and operate a VFD for the ID fans for your unit.
 2. Please quantify the expected heat-rate impact of the installation and operation of VFD for ID fans for both base-load and cycling operating scenarios.
 - b) Does your unit have VFD controls for the boiler feed pumps?
 - i. If so,
 1. When was the VFD first operated?
 2. What impact did this have on your heat rate during base-load and cycling operating scenarios?
 - ii. If not,
 1. Please quantify the cost to install and operate a VFD for the boiler feed pump(s) for your unit.
 2. Please quantify the expected heat rate impact of the installation and operation of VFD for the boiler feed pump(s) for both base-load and cycling operating scenarios.
 - iii. Please provide any other information relevant to DEQ's analysis of this candidate technology.
 - c) Please provide a detailed explanation if the technology is not technically feasible or limited due to the unique characteristics of the unit.
- 5) Blade Path Upgrade (Steam Turbine) for each listed unit:
 Has the steam turbine for the unit been upgraded/overhauled in the past ten years?
- a) If so,
 - i. When was the turbine upgraded or overhauled?
 - ii. Describe how the turbine was upgraded or overhauled.
 - iii. How did the upgrade or overhaul impact the unit's heat rate?
 - iv. Are there further upgrades available that would improve the efficiency of the turbine?
 - b) If not,
 - i. Please quantify the cost to upgrade or overhaul the steam turbine for your unit. (You may factor the costs associated with new source review, if it would be triggered by the upgrade, into your cost calculations)
 - ii. Please quantify the expected heat rate impact of upgrading or overhauling the steam turbine.

- c) Please provide any other information relevant to DEQ's analysis of this candidate technology.
 - d) Please provide a detailed explanation if the technology is not technically feasible or limited due to the unique characteristics of the unit.
- 6) Economizer for each listed unit
- a) When was the economizer last replaced?
 - b) Throughout the past year, how does the performance of the economizer for each unit compare to the manufacturer specifications for a new unit?
 - c) If the performance of the economizer for a unit has degraded outside the performance range of the manufacturer's specifications:
 - i. Please quantify the cost to redesign/replace the economizer for your unit.
 - ii. Please quantify the expected heat-rate impact of redesigning/replacing the economizer.
 - d) Please provide any other information relevant to DEQ's analysis of this candidate technology.
 - e) Please provide a detailed explanation if the technology is not technically feasible or limited due to the unique characteristics of the unit.
- 7) Heat Rate Improvement Practices:
- a) Do the staff at the plant where the unit is located undergo routine training that would positively affect the heat rate of the unit or units? (Such training may include any training related to efficiency or any other training on practices that result in heat rate improvements.)
 - i. If so, describe the training program including frequency of training and practices taught.
 - ii. If not,
 - 1. Please provide to DEQ a plan for instituting such a program.
 - 2. Quantify the annual costs of implementing a program.
 - 3. Quantify the expected heat-rate impacts of implementing a program.
 - b) EPA requires DEQ to consider an "on-site appraisal" of heat-rate improvement opportunities at a specific unit.² Please submit a report detailing the results of an on-site appraisal of heat-rate improvement opportunities. This appraisal may be conducted by an internal group or a third-party. Include a summary of the most recent inspection and recommendations for equipment maintenance or replacement to minimize heat-rate deviations, and include actions taken in response to the recommendations.
 - c) Does your plant have a routine steam surface condenser cleaning program?
 - i. If so, describe the impact that this program has on the heat rate of each unit.

² 84 FR 32520

- ii. If not,
 - 1. Please provide to DEQ a plan for instituting such a program.
 - 2. Quantify the annual costs of implementing a program.
 - 3. Quantify the expected heat-rate impacts of implementing a program.
 - d) Please provide a detailed explanation if a practice is not technically feasible or limited due to the unique characteristics of the unit.
 - e) Please provide any other information relevant to the State's analysis of these practices.
- 8) Gross vs net generation standards:
- a) Would you recommend the standards of performance for each affected unit be established in pounds of carbon dioxide emitted per net megawatt hour or per gross megawatt hour? Explain your recommendation.
 - b) If your recommendation is for a gross generation-based standard, then do you have any recommendations for accounting for emissions reductions attributable to technologies affecting only net efficiency?

Thank you for your timely response to this information request. This information is necessary for DEQ to prepare a technically and legally robust state plan consistent with the ACE Rule. Please respond with the requested information by March 4, 2020. If you have any questions about this request, then please contact Tricia Treece (treecep@adeq.state.ar.us) of my staff. As always, feel free to reach out to me directly if I can be of any assistance on any matter.

Sincerely,



Mitch Rouse
Associate Director
Office of Air Quality
Division of Environmental Quality
Arkansas Department of Energy and Environment

November 5, 2019

David Triplett
Manager, Arkansas Environmental Support
Power Generation
Entergy Services, LLC

Sent Via Electronic Mail

RE: Information Request to Entergy Arkansas Regarding Anticipated Future Operating Characteristics

Dear Mr. Triplett:

On July 8, 2019, the Environmental Protection Agency (EPA) finalized “Emissions Guidelines for Greenhouse Gas Emissions from Existing Electric Generating Units” (ACE). In ACE, EPA is requiring the Arkansas Department of Energy and Environment, Division of Environmental Quality (DEQ) to develop a state plan that includes unit-specific standards of performance for existing coal-fired steam electric utility generating units. Based on our evaluation of the rule, DEQ has identified the following units owned by Entergy Arkansas as designated facilities under ACE:

- White Bluff Unit 1
- White Bluff Unit 2
- Independence Unit 1
- Independence Unit 2

DEQ hereby requests that Entergy Arkansas submit the information described below no later than 160 days from the date of this letter.

In ACE, EPA requires that DEQ submit to EPA certain projections for each designated unit’s anticipated future operating characteristics through at least 2035, including:

1. Annual generation.
2. CO₂ emissions.
3. Fuel use, fuel prices, and fuel carbon content.
4. Fixed and variable operations and maintenance costs.

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5. Heat rates.
6. Electric generation capacity and capacity factors.

Please provide to DEQ either this required information, sources for obtaining this required information, or feedback on best methods to collect this required information.

DEQ would like to thank you for your timely response to this information request. This information is necessary for DEQ to make a technically and legally sound plan for compliance with the ACE Rule. Please respond with the requested information by April 13, 2020. If you have any questions about this information request, then please contact Tricia Treece (treecep@adeq.state.ar.us) of my staff. As always, feel free to reach out to me directly if I can be of assistance on any matter.

Sincerely,



Mitch Rouse
Associate Director
Office of Air Quality
Division of Environmental Quality
Arkansas Department of Energy and Environment

Division of Environmental Quality

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