

STATEMENT OF BASIS

Alabama Power Company
Barry Steam Electric Generating Plant
Mobile County
503-1001

This proposed renewal to the Title V Major Source Operating Permit (MSOP) is issued under the provisions of ADEM Admin. Code r. 335-3-16. The above-referenced applicant has applied to renew the existing Title V Permit, which was issued on December 20, 2010, with an effective date of January 1, 2011. The applicant has requested authorization to perform the work or operate the facility shown on the application and drawings, plans and other documents, which were submitted timely on June 25, 2015 and February 16, 2016, and are attached hereto or on file with the Air Division of the Alabama Department of Environmental Management, in accordance with the terms and conditions of this permit. Additional information was received on February 7, 2019, December 18, 2019, March 13, 2020, April 24, 2020, and April 27, 2020.

The permittee has quantified its facility-wide greenhouse gas emissions in the renewal application. There are no greenhouse gas requirements applicable to this facility other than those found in the Greenhouse Gas Reporting Rule, which is implemented by the USEPA.

The significant sources of air pollutants at this facility are as follows:

- Two (2) tangentially fired electric utility steam generating units that burn natural gas
- Two (2) tangentially fired electric utility steam generating units that burn coal with natural gas startup fuel
- Two (2) 2-on-1 natural gas-fired combined cycle electric generating units
- Solid fuel handling systems
- Limestone Handling System
- Natural gas conditioning station heater
- Natural gas Auxiliary Boiler
- RICE units

On August 24, 2015, a Modified Consent Decree (MCD) between EPA and APC was entered in the United States District Court for the Northern District of Alabama, Southern Division. Included in Case No. 2:01-cv-00152-VEH are requirements for Plant Barry. Those requirements are being incorporated as a part of this MSOP renewal.

The existing permit includes coal-fired power boiler Unit 3. Paragraph 60.1 of the MCD required APC to permanently retire Barry Unit 3 no later than 60 days after the entry of the Joint Modification. APC permanently retired Unit 3, effective August 24, 2015. Therefore, other than including the MCD requirement to permanently retire this unit, it is not included in this proposed permit.

Regarding the individual emissions unit discussions: It should be noted that since ambient temperature, humidity, and other factors can have a significant effect on

a unit's efficiency rating, ADEM considers the heat input rating and normal full load as a descriptive moniker only.

Units 1 and 2 Power Boilers

Power Boiler Units 1 and 2 have nominal full load heat inputs of approximately 950 MMBtu/hr each, and each serve a generator with a normal full load (NFL) of approximately 85 MW. Units 1 and 2 are equipped with SNCR for NO_x control that is only operated as necessary, to comply with the requirements of 40 CFR 76.

Historically, Units 1 and 2 were operated as coal-fired electric utility steam generating units (EGUs). As such, they would have been subject to 40 CFR Part 63 Subpart UUUUU, "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units." This rule is also known as the Mercury and Air Toxics Standards (MATS) Rule for power plants. However, APC ceased burning coal in these units and will only burn natural gas going forward. According to 40 CFR 63.9983(b), Units 1 and 2 are not affected sources under the MATS Rule provided they continue to meet the definition of natural gas-fired electric utility steam generating units.

Emission Standards

APC shall combust only natural gas in Units 1 and 2.
[ADEM Admin. Code r. 335-3-16-.05(a) and MCD Paragraph 39.1]

Particulate Matter (PM):

0.12 lb/MMBtu (Shared limit from the common stack if both units are operating.)
[ADEM Admin. Code r. 335-3-4-.03(1)]

Opacity:

The permittee shall not discharge to the atmosphere particulate of an opacity greater than 20%, as determined by a six-minute average, except that during one six-minute period in any sixty (60) minute period, the permittee may discharge into the atmosphere particulate of an opacity not greater than 40%.
[ADEM Admin. Code r. 335-3-4-.01]

Sulfur Dioxide (SO₂):

1.8 lb/MMBtu
[ADEM Admin. Code r. 335-3-5-.01(1)(a)]

Units 1 and 2 are allocated SO₂ allowances under Phase II of the Acid Rain Program.
[ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 73]

These units are also allocated SO₂ allowances under the provisions of the Cross-State Air Pollution Rule (CSAPR).

[ADEM Admin. Code r. 335-3-5-.06 through 335-3-5-.36]

As required by both the Acid Rain and CSAPR programs, APC must hold sufficient allowances in its facility accounts to cover actual SO₂ emissions.

Nitrogen Oxide (NO_x):

Units 1 and 2 participate in a NO_x averaging plan pursuant to 40 CFR Part 76. The current plan is effective on a calendar year basis, beginning January 1, 2020. Under the plan the actual Btu-weighted annual average NO_x emission rate for the units in the plan shall be less than or equal to the Btu-weighted annual average NO_x emission rate for the same units had they each been operated, during the same period of time, in compliance with the applicable emission limitations under 40 CFR 76.5, 76.6, or 76.7.

[ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 76]

These units are allocated NO_x allowances under the provisions of CSAPR.

[ADEM Admin. Code r. 335-3-8-.7 through 335-3-8-.70]

As required by both CSAPR NO_x programs (annual and seasonal), APC must hold sufficient allowances in its facility accounts to cover actual NO_x emissions.

Units 1 and 2 are subject to a 0.200 lb/MMBtu, 30-day rolling average NO_x emission rate.

[ADEM Admin. Code r. 335-3-16-.05(a) and MCD paragraph 39.1(i)]

Expected Emissions

PM and Opacity:

Based on information provided in the MSOP application and using the nominal full load heat input of 950 MMBtu/hr, PM emissions from Unit 1 and Unit 2 at full load are expected to be approximately 1.8 lb/hr each.

Since Units 1 and 2 burn only natural gas, opacity is expected to be negligible.

SO₂:

Based on information provided in the MSOP application and using the nominal full load heat input of 950 MMBtu/hr, SO₂ emissions from Unit 1 and Unit 2 are expected to be approximately 0.57 lb/hr each.

NO_x:

Based on information provided in the MSOP application and using the nominal full load heat input of 950 MMBtu/hr, expected NO_x emissions from Unit 1 and Unit 2 are expected to be approximately 190 lb/hr each.

Periodic monitoring

PM and Opacity:

Units 1 and 2 burn only natural gas, and as such, PM emissions and opacity are expected to be minimal. Based on the low expected levels of emissions as compared to the applicable regulatory allowables, periodic monitoring for PM and opacity was deemed unnecessary.

SO₂:

Units 1 and 2 burn only natural gas, and as such, SO₂ emissions are expected to be minimal. Since these units are subject to the Acid Rain Program and CSAPR, SO₂ emissions from Units 1 and 2 must be monitored and data must be reported per the provisions of 40 CFR Part 75. No further periodic monitoring was deemed necessary.

NO_x:

NO_x emissions are monitored by the Acid Rain Continuous Emissions Monitoring System (CEMS). Data will be reported per the provisions of 40 CFR Part 75 and the MCD requirements. A summary report will be submitted to ADEM quarterly.

Compliance Assurance Monitoring (CAM)

Compliance Assurance Monitoring (CAM) is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);
- The source must use an air pollution control device in order to comply with the limit; and
- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP).

While Units 1 and 2 are subject to several emission standards, there are no control devices utilized in order to maintain compliance with those standards. Therefore, CAM is not applicable to any pollutants emitted by Units 1 and 2.

Unit 4 Power Boiler

Unit 4 is a coal fired boiler that utilizes natural gas for startup fuel. Unit 4 boiler is tangentially fired with a nominal full load heat input of 3571 MMBtu/hr. Unit 4 is equipped with an electrostatic precipitator (ESP) for PM control and SNCR for NO_x control that is only operated as necessary, to comply with the requirements of 40 CFR 76. Unit 4 is equipped with a dry sorbent system where hydrated lime, or other similar alkali, is injected into the flue gas upstream of the air heater and the cold-side ESPs for acid gas control. In addition, Unit 4 is equipped with a powdered activated carbon (PAC) system where PAC is injected into the flue gas downstream of the air heater and upstream of the ESPs for mercury control. Unit 4 emissions vent through its own dedicated stack.

Unit 4 is subject to state regulations and 40 CFR Part 63 Subpart UUUUU, “National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units.” This rule is also known as the Mercury and Air Toxics Standards (MATS) Rule for power plants. Unit 4 is also subject to regulations under both the Acid Rain Program and the Cross-State Air Pollution Rule (CSAPR).

Emission Standards

PM:

0.030 lb/MMBtu

[ADEM Admin. Code r. 335-3-11-.06(124)]

[40 CFR 63.9991(a)(1)]

Note that this limit applies as long as the permittee chooses the option to limit PM emissions as a surrogate of the total non-mercury (Hg) hazardous air pollutant (HAP) metals regulated under the MATS Rule. Should the permittee not choose this option, the permittee must meet either the total non-Hg HAP metals OR the individual HAP metals emission limits under the MATS Rule. If APC chooses to comply with either the total non-Hg HAP metals or the individual HAP metals emission limits in lieu of the PM limit under the MATS rule in the future, the applicable PM emission limit would then be:

0.12 lb/MMBtu

[ADEM Admin Code r. 335-3-4-.03]

APC is currently utilizing the option to limit PM emissions to 0.030 lb/MMBtu.

Opacity:

The permittee shall not discharge into the atmosphere from the stack

utilized by Unit 4, particulate of an opacity greater than 20%, as determined by a six minute average, except that during each calendar quarter, the permittee may discharge into the atmosphere from the stack particulate with an opacity exceeding 20% for not more than 24 6-minute periods in any calendar day, if such periods do not exceed 2.0% of the source calendar quarter operating hours for which the opacity numerical limitation is applicable and for which the COMS is indicating valid data.

The permittee shall not discharge into the atmosphere from the stack particulate of a daily opacity greater than 22% averaged over each calendar day.

[ADEM Admin. Code r. 335-3-4-.01]

SO₂:

1.8 lb/MMBtu

[ADEM Admin. Code r. 335-3-5-.01(1)(a)]

Unit 4 is allocated SO₂ allowances under Phase II of the Acid Rain Program.

[ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 73]

This unit is also allocated SO₂ allowances under the provisions of the Cross-State Air Pollution Rule (CSAPR).

[ADEM Admin. Code r. 335-3-5-.06 through 335-3-5-.36]

As required by both the Acid Rain and CSAPR programs, APC must hold sufficient allowances in its facility accounts to cover actual SO₂ emissions.

NO_x:

Unit 4 participates in a NO_x averaging plan pursuant to 40 CFR Part 76. The current plan is effective on a calendar year basis, beginning January 1, 2020. Under the plan the actual Btu-weighted annual average NO_x emission rate for the units in the plan shall be less than or equal to the Btu-weighted annual average NO_x emission rate for the same units had they each been operated, during the same period of time, in compliance with the applicable emission limitations under 40 CFR 76.5, 76.6, or 76.7.

[ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 76]

This unit is allocated NO_x allowances under the provisions of CSAPR.

[ADEM Admin. Code r. 335-3-8-.07 through 335-3-8-70]

As required by both CSAPR NO_x programs (annual and seasonal), APC must hold sufficient allowances in its facility accounts to cover actual NO_x emissions.

Hg:

1.2 lb/TBtu
[ADEM Admin. Code r. 335-3-11-.06(124)]
[40 CFR 63.9991(a)(1)]

Hydrogen Chloride (HCl):

0.0020 lb/MMBtu
[ADEM Admin. Code r. 335-3-11-.06(124)]
[40 CFR 63.9991(a)(1)]

Expected Emissions

PM and Opacity:

Quarterly testing from 2019 has yielded an average PM emission rate of 0.015 lb/MMBtu.

COMS data and visual inspections have shown that minimal opacity is expected from Unit 4 during normal operation.

SO₂:

Annual data from CEMS indicates an average SO₂ emission rate of 1.0243 lb/MMBtu for Unit 4 in 2019.

NO_x:

Annual data from CEMS indicates an average NO_x emission rate of 0.246 lb/MMBtu for Unit 4 in 2019.

Hg:

Annual data from CEMS indicates an average Hg emission rate of 0.569 lb/TBtu for Unit 4 in 2019.

HCl:

Quarterly testing from 2019 has yielded an average HCl emission rate of approximately 0.0015 lb/MMBtu.

Periodic monitoring

PM:

Per 40 CFR 63.10021(d), the permittee will conduct quarterly PM tests in lieu of continuous monitoring via PM CEMS. The permittee may choose at any time to alter its monitoring approach as long as the

requirements of the MATS rule are met. As stated earlier, should the permittee choose to limit non-Hg HAP metals rather than PM, the applicable PM limit would be the State standard of 0.12 lb/MMBtu. If that option is chosen, the MATS PM testing would not be required. In that case, the Permittee will be required to test PM emissions from Unit 4 at least once per calendar year.

Opacity:

A Continuous Opacity Monitoring System (COMS) will be used to determine compliance with the applicable opacity standard. Summary opacity data will be submitted quarterly to ADEM for review. Upon ADEM's assessment of these data, additional stack testing for particulate matter could be required.

The permittee will be required to take corrective measures to reduce the opacity, as necessary, if the COMS indicates a six-minute average opacity of greater than 20%.

SO₂:

SO₂ emissions will be monitored by the Acid Rain CEMS. The data acquisition system will be used to compute a rolling 24-hour emission rate in lb/MMBtu as an indication of compliance with the state SO₂ limit. A summary report will be submitted to ADEM quarterly.

NO_x:

NO_x emissions are monitored by the Acid Rain CEMS. Data will be reported per the provisions of 40 CFR Part 75.

Hg:

Hg emissions shall be monitored with CEMS or another method allowed under 40 CFR Part 63 Subpart UUUUU.

HCl:

The permittee shall conduct a test for HCl emissions quarterly. Alternate monitoring is allowed under the MATS Rule.

Compliance Assurance Monitoring (CAM)

Compliance Assurance Monitoring (CAM) is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);
- The source must use an air pollution control device in order to comply with the limit; and

- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP).

For Barry Unit 4, the only emission limitation subject to the requirements of CAM is the State PM limit of 0.12 lb/MMBtu since Unit 4 utilizes a control device to achieve compliance with the PM limit, the pre-controlled potential emissions are greater than 100 TPY, and the emission limit is not exempt under 40 CFR 64.2(b)(1). APC will continuously monitor precipitator power levels to ensure proper PM control device operation and to satisfy the requirements of CAM. The CAM Plan for Unit 4 PM is attached to this document.

While Unit 4 does utilize control devices to limit emissions of NO_x, Hg and HCl, CAM does not apply for these pollutants per the exemptions under 40 CFR 64.2(b)(1).

Additional MATS Requirements

The permittee shall conduct a tune-up of the unit's burner and combustion controls at least once every 36 calendar months unless the unit employs neural network combustion optimization during normal operations, in which case the inspection of the burner and combustion controls must be performed at least once every 48 calendar months.

The permittee must comply with all applicable MATS emission limits at all times except during startup periods and shutdown periods. During startup and shutdown periods, the permittee must comply with the Work Practice Standards outlined in Table 3 of 40 CFR Part 63, Subpart UUUUU. Among other requirements in Table 3, the permittee must use clean fuels as defined in 40 CFR §63.10042 for ignition. Once the permittee converts to firing coal, the permittee must engage all applicable control technologies. During shutdown periods, the permittee must continue to operate the applicable air pollution control equipment after the cessation of coal firing and for as long as possible thereafter, considering operational and safety concerns.

The permittee shall submit compliance reports at least semiannually and in accordance with MATS requirements. These reports may be included in the quarterly monitoring reports that the permittee is otherwise required by the MSOP to submit.

Unit 5 Power Boiler

Boiler 5 has a nominal full load heat input of 7,585 MMBtu/hr and serves a generator with a normal full load (NFL) of approximately 785 MW.

Unit 5 is equipped with a calcium bromide (CaBr₂) fuel additive application system where raw coal is conditioned, as necessary, with a liquid CaBr₂ solution which

allows for the oxidation of gaseous Hg when combusted in the boiler. Once in an oxidized state, gaseous mercury can be effectively removed in a downstream control device. Exhaust flue gases from Unit 5 pass through an ESP for PM control, a selective catalytic reduction (SCR) system for NOx control, and a flue gas desulfurization system (e.g. FGD or scrubber) for the control of SO₂, mercury and additional PM control before being emitted from an individual 600-foot wet stack.

Unit 5 is subject to state regulations and 40 CFR Part 63 Subpart UUUUU, "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units." This rule is also known as the Mercury and Air Toxics Standards (MATS) Rule for power plants. Unit 5 is also subject to regulations under both the Acid Rain Program and the Cross-State Air Pollution Rule (CSAPR).

Emission Standards

PM:

0.030 lb/MMBtu
[ADEM Admin. Code r. 335-3-11-.06(124)]
[40 CFR 63.9991(a)(1)]

Note that this limit applies as long as the permittee chooses the option to limit PM emissions as a surrogate of the non-mercury HAP metals regulated under the MATS Rule. Should the permittee not choose this option, the permittee must comply with either the total non-Hg HAP metals limitation OR the individual HAP metals emission limitation under the MATS Rule. If APC chooses to comply with either the total non-Hg HAP metals or the individual HAP metals emission limits in lieu of the PM limit under the MATS rule in the future, the applicable PM emission limit would then be:

0.12 lb/MMBtu
[ADEM Admin Code r. 335-3-4-.03]

APC is currently utilizing the option to limit PM emissions to 0.030 lb/MMBtu.

Opacity:

The permittee shall not discharge to the atmosphere particulate of an opacity greater than 20%, as determined by a six-minute average, except that during one six-minute period in any sixty (60) minute period, the permittee may discharge into the atmosphere particulate of an opacity not greater than 40%.

[ADEM Admin. Code r. 335-3-4-.01]

SO₂:

0.20 lb/MMBtu
[ADEM Admin. Code r. 335-3-11-.06(124)]
[40 CFR 63.9991(c)]

Note that this limit applies as long as the permittee chooses this option to limit and monitor SO₂ emissions as a surrogate of HCl under the MATS Rule. Should the permittee choose to do so, HCl may be monitored directly as provided in 40 CFR 63.9991(a). If that option is chosen, the SO₂ emission limit would be:

1.8 lb/MMBtu
[ADEM Admin. Code r. 335-3-5-.01(1)(a)]

Unit 5 is allocated SO₂ allowances under Phase II of the Acid Rain Program.
[ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 73]

This unit is also allocated SO₂ allowances under the provisions of the Cross-State Air Pollution Rule (CSAPR).
[ADEM Admin. Code r. 335-3-5-.06 through 335-3-5-.36]

As required by both the Acid Rain and CSAPR programs, APC must hold sufficient allowances in its facility accounts to cover actual SO₂ emissions.

NO_x:

Unit 5 participates in a NO_x averaging plan pursuant to 40 CFR Part 76. The current plan is effective on a calendar year basis, beginning January 1, 2020. Under the plan, the actual Btu-weighted annual average NO_x emission rate for the units in the plan shall be less than or equal to the Btu-weighted annual average NO_x emission rate for the same units had they each been operated, during the same period of time, in compliance with the applicable emission limitations under 40 CFR 76.5, 76.6, or 76.7.
[ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 76]

This unit is allocated NO_x allowances under the provisions of CSAPR.
[ADEM Admin. Code r. 335-3-8-.07 through 335-3-8-.70]

As required by both CSAPR NO_x programs (annual and seasonal), APC must hold sufficient allowances in its facility accounts to cover actual NO_x emissions.

Hg:

1.2 lb/TBtu
[ADEM Admin. Code r. 335-3-11-.06(124)]
[40 CFR 63.9991(a)(1)]

Expected Emissions

PM:

The 2019 Quarterly PM tests yield an average PM emission rate of 0.013 lb/MMBtu.

Opacity:

With the ESP and FGD operating in succession, opacity is expected to be negligible during normal boiler operation.

SO₂:

Annual data from CEMS indicates an average SO₂ emission rate of 0.016 lb/MMBtu for Unit 5 in 2019.

NO_x:

Annual data from CEMS indicates an average NO_x emission rate of 0.073 lb/MMBtu for Unit 5 in 2019.

Hg:

Annual data from CEMS indicates an average Hg emission rate of 0.463 lb/TBtu for Unit 5 in 2019.

Periodic monitoring

PM:

Per 40 CFR 63.10021(d), the permittee has chosen to conduct quarterly PM tests in lieu of continuous monitoring via PM CEMS. The permittee may choose at any time to alter its monitoring approach as long as the requirements of the MATS Rule are met. As stated earlier, should the permittee choose to limit either non-Hg metals or individual HAP metals rather than PM, the applicable PM limit would be the State standard of 0.12 lb/MMBtu. If that option is chosen, the MATS PM testing would not be required. In that case, the permittee will be required to test PM emissions from Unit 5 at least once per calendar year.

Opacity:

With the operation of the FGD control, the presence of heavy moisture has created stack conditions that preclude the use of COMS in the Unit 5 stack. As an alternative to continuous opacity monitoring, the permittee shall continuously monitor the ESP power level and the sparger tube submergence level in the FGD to indicate compliance with the opacity standard. During FGD operation, the facility must either maintain the ESP power level at 30 kW or greater with no channeling or

maintain the sparger tube submergence level at 5.0 inches or greater. Channeling occurs when power supplies (PS) are out of service in succession such that flue gas passes through the ESP without contacting any PS in service.

During unit operation with the FGD bypassed, the facility must maintain the ESP power level at 30 kW or greater with no channeling.

Monitoring of ESP power level, channeling, and the sparger tube submergence level will be continuous and recorded/reported in 6-minute averages.

COMS was previously required to be located and operated in the ductwork prior to the FGD as a state-only enforceable indicator of PM control device performance. The use of COMS prior to the FGD is no longer necessary as ESP power levels and sparger tube submergence levels are sufficient indicators of PM control device performance. Also, the more stringent MATS PM limitation has become applicable and the FGD provides an additional level of PM and opacity control that is not taken into account by COMS located upstream of the FGD.

SO₂:

SO₂ emissions will be monitored by the Acid Rain CEMS. The data acquisition system will be used to compute a rolling 24-hour SO₂ emission rate (lb/MMBtu) as an indication of compliance with the State SO₂ emission standard. The permittee has indicated that SO₂ will be monitored as a surrogate of HCl as a requirement of the MATS Rule. Data will be used to compute a 30-boiler operating day (BOD) SO₂ rolling average (lb/MMBtu) in order to determine compliance with the MATS SO₂ emission standard. CEMS data will continue to be reported to the Department on a quarterly basis.

NO_x:

NO_x emissions will be monitored by the Acid Rain CEMS. Data will be reported per the provisions of 40 CFR Part 75.

Hg:

Mercury emissions shall be monitored with CEMS or another method allowed under 40 CFR Part 63 Subpart UUUUU.

Compliance Assurance Monitoring (CAM)

Compliance Assurance Monitoring (CAM) is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);

- The source must use an air pollution control device in order to comply with the limit; and
- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP;).

For Barry 5, the only emission limitation subject to the requirements of CAM is the State PM limit of 0.12 lb/MMBtu since Unit 5 utilizes a control device to achieve compliance with the state PM limit, the pre-controlled potential emissions are greater than 100 TPY, and the emission limit is not exempt under 40 CFR 64.2(b)(1).

APC will continuously monitor precipitator power level to ensure proper PM control device operation and to satisfy the requirements of CAM for PM. The CAM Plan for Unit 5 PM is attached to this document.

While Unit 5 does utilize control devices to limit emissions of NO_x, Hg and SO₂, CAM does not apply for these pollutants per the exemptions under 40 CFR 64.2(b)(1), with the exception of the state SO₂ limit. However, while unit 5's FGD is used to control SO₂ emissions and the unit is subject to the state SO₂ emissions limit, the FGD is not necessary for this unit to achieve compliance with the state limit. Therefore, CAM is not applicable to this limit.

Additional MATS Requirements

The permittee shall conduct a tune-up of the unit's burner and combustion controls at least once every 36 calendar months unless the unit's employ neural network combustion optimization during normal operations, in which case the inspection of the burner and combustion controls must be performed at least once every 48 calendar months.

The permittee must comply with all applicable MATS emission limits at all times except during startup periods and shutdown periods. During startup and shutdown periods, the permittee must comply with the Work Practice Standards outlined in Table 3 of 40 CFR Part 63, Subpart UUUUU. Among other requirements in Table 3, the permittee must use clean fuels as defined in 40 CFR §63.10042 for ignition. Once the permittee converts to firing coal, the permittee must engage all applicable control technologies with the exception of SCR. During shutdown periods, the permittee must continue to operate the applicable air pollution control equipment after the cessation of coal firing and for as long as possible thereafter, considering operational and safety concerns.

The permittee shall submit compliance reports at least semiannually and in accordance with MATS requirements. These reports may be included in the quarterly monitoring reports that the permittee is otherwise required by the MSOP to submit.

Combined Cycle Units (Units 6A & 6B and 7A & 7B)

APC currently owns and operates two 2-on-1 natural gas-fired combined cycle electric generating units at Plant Barry. Each 2-on-1 combined cycle unit consists of two CT/HRSBs (w/supplemental firing, i.e. duct burner), two stacks, and a common steam turbine. The NO_x emissions from each CT/duct burner (6A, 6B, 7A & 7B) are controlled by a SCR before exiting out the stack. The combined cycle units were subject to Prevention of Significant Deterioration (PSD) Review in which BACT was established for NO_x, SO₂, CO, VOC, and PM. The CTs are also subject to the Federal New Source Performance Standards (NSPS) contained in 40 CFR Part 60, Subpart GG, "Standards of Performance for Stationary Gas Turbines." The duct burners are subject to 40 CFR Part 60, Subpart Db, "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units." The CTs are affected sources under 40 CFR Part 63, Subpart Yyyy, "National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines;" however, there are no applicable requirements for these units under this subpart.

Emission Standards

PM:

Per CT/duct burner stack

0.011 lb/MMBtu

22.4 lb/hr

[ADEM Admin. Code r. 335-3-14-.04 (BACT)]

Opacity:

10%, six-minute average

[ADEM Admin. Code r. 335-3-14-.04 (BACT)]

SO₂:

APC shall combust only natural gas in Units 6A, 6B, 7A, & 7B

[ADEM Admin. Code r. 335-3-14-.04 (BACT)]

1.8 lb/MMBtu

[ADEM Admin. Code r. 335-3-5-.01(1)(a)]

These units are not allocated SO₂ allowances under the Acid Rain Program but are allocated SO₂ allowances under the provisions of the Cross-State Air Pollution Rule (CSAPR).

[ADEM Admin. Code r. 335-3-5-.06 through 335-3-5-.36]

As required by both the Acid Rain and CSAPR programs, APC must hold sufficient allowances in its facility accounts to cover actual SO₂

emissions.

NO_x:

Per CT/duct burner stack

0.013 lb/MMBtu &
27.7 lb/hr

[ADEM Admin. Code r. 335-3-14-.04 (BACT)]

These units are allocated NO_x allowances under the provisions of CSAPR.

[ADEM Admin. Code r. 335-3-8-.07 through 335-3-8-.70]

As required by both CSAPR NO_x programs (annual and seasonal), APC must hold sufficient allowances in its facility accounts to cover actual NO_x emissions.

Volatile Organic Compounds (VOC):

Per CT/duct burner stack

0.015 lb/MMBtu &
31.8 lb/hr

[ADEM Admin. Code r. 335-3-14-.04 (BACT)]

Carbon Monoxide (CO):

Per CT/duct burner stack

0.06 lb/MMBtu &
127.0 lb/hr

[ADEM Admin. Code r. 335-3-14-.04 (BACT)]

Expected Emissions

PM and Opacity:

During initial compliance testing, the highest PM emission rate result from the units was below the permitted allowable emissions limits. Among these units, the highest PM emission rate result from initial compliance testing was 0.0079 lb/MMBtu and 17.20 lb/hr.

As these units fire only natural gas, opacity is expected to be negligible from any of the units' stack exits.

SO₂:

Natural gas is the only fuel for these units, resulting in an expected emission rate of approximately 0.0006 lb/MMBtu.

NO_x:

During initial compliance testing, the highest NO_x emission rate result from the units was below the permitted allowable emissions limits. Subsequent CEMS data has shown that the units, with few exceptions, operate well within the permitted allowable limits. Among these units, the highest NO_x emission rate result from initial compliance testing was 0.010 lb/MMBtu and 17.74 lb/hr.

VOC:

During initial compliance testing, the highest VOC emission rate result from the units was below the permitted allowable emissions limits. Among these units, the highest VOC emission rate result from initial compliance testing was 0.003 lb/MMBtu and 4.74 lb/hr.

CO:

During initial compliance testing, the highest CO emission rate result from the units was below the permitted allowable emissions limits. Among these units, the highest CO emission rate result indicated by the initial performance testing was 0.018 lb/MMBtu and 35.71 lb/hr.

Periodic monitoring

PM and Opacity:

These units burn natural gas only, and as such, PM emissions and opacity are expected to be minimal. Based on the low expected levels of emissions as compared to the regulatory allowables, periodic monitoring of opacity and PM was deemed unnecessary.

SO₂:

These units burn only natural gas, and as such, SO₂ emissions are expected to be minimal. Since these units are subject to the Acid Rain Program and CSAPR, SO₂ emissions from each unit must be monitored and data must be reported per the provisions of 40 CFR Part 75. No further periodic monitoring was deemed necessary.

NO_x:

NO_x emissions are monitored by the Acid Rain CEMS. Data will be reported per the provisions of 40 CFR Part 75.

VOC and CO:

Based on the results of the initial compliance testing and the low expected levels of emissions as compared to the regulatory allowable

emission limits, no periodic monitoring of VOC and CO emissions is considered necessary.

Compliance Assurance Monitoring (CAM)

Compliance Assurance Monitoring (CAM) is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);
- The source must use an air pollution control device in order to comply with the limit; and
- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP).

While the combined cycle combustion turbines are subject to several emission standards, there are no control devices utilized in order to maintain compliance with those standards (with the exception of NO_x). Each CT/duct burner is subject to a NO_x BACT limit, use a SCR to meet the applicable limit, and have a pre-controlled PTE of over 100 TPY. Therefore, CAM is applicable to NO_x emitted by each CT/duct burner.

Solid Fuel Handling Systems

Coal is brought to the plant by coal barges. Coal is unloaded from the barges and is either conveyed to the plant to be fired in the coal-fired boilers or to the coal pile for storage. Coal is reclaimed from the coal pile by being pushed into grated reclaim bins at the coal pile and conveyed to coal bunkers. Each boiler unit is fed coal conveyed from a coal bunker to coal scale/feeders and into the pulverizers. The resulting powder-sized material is forced to the units by fans for firing in the boilers. The emissions from these systems are considered fugitive emissions.

Emission Standards

There are no emissions standards associated with these systems. The particulate matter emitted from the units associated with these systems are discharged as fugitive emissions

Expected Emissions

Based on the calculations presented in the application, PM emissions are expected to be approximately 45.9 TPY.

Periodic Monitoring/Compliance Assurance Monitoring

Since there are no emission standards which would be applicable to these systems, no periodic monitoring or CAM is required.

Limestone Handling System

Emission Standards

PM and Opacity:

0.09 lb/ton limestone
300,000 TPY limestone handled
[ADEM Admin. Code r. 335-3-14-.04 (Anti-PSD)]

The permittee shall not discharge to the atmosphere particulate of an opacity greater than 20%, as determined by a six-minute average, except that during one six-minute period in any sixty (60) minute period, the permittee may discharge into the atmosphere particulate of an opacity not greater than 40%.

[ADEM Admin. Code r. 335-3-4-.01]

Expected Emissions

No visible emissions are expected during normal operation of this source. PM is expected to be negligible with proper dust collector operation and maintenance.

Periodic Monitoring

The permittee will conduct a maintenance inspection of silo dust collector at least once per calendar quarter. Repairs will be made, as necessary, prior to further source operation. At any time within the quarter, if visible emissions are noted during operation, the permittee will perform corrective action to alleviate said visible emissions.

Compliance Assurance Monitoring (CAM)

Compliance Assurance Monitoring (CAM) is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);
- The source must use an air pollution control device in order to comply with the limit; and
- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP).

This system is subject to PM limits and utilize dust collectors to achieve those emissions limits. However, none of the units in the system has the pre-controlled potential to emit PM greater than 100 TPY. Therefore, CAM does not apply to any unit within this system.

Natural Gas Conditioning Station Heater

APC operates a natural gas conditioning station heater with a nominal rated heat input of 10.6 MMBtu/hr. This station is used to enhance the natural gas quality by eliminating condensate, regulating pressure and controlling the temperature. The heater is subject to 40 CFR Part 63, Subpart DDDDD, "National Emission Standards for Hazardous Air Pollutants for Major Source: Industrial, Commercial, and Institutional Boilers and Process Heaters." There are no specific emission standards that are applicable to the heater under Subpart DDDDD; however, there are applicable work practice standards and associated recordkeeping and reporting requirements. The heater is also subject to 40 CFR Part 60, Subpart Dc, "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units;" however, since the heater is fired with only natural gas, it is only subject to the fuel use recordkeeping requirements of this rule.

Emission Standards

PM:

PM shall not exceed that which is set by the following equation:
 $E = 1.38H^{0.44}$, where $10 \text{ MMBtu/hr} \leq H \leq 250 \text{ MMBtu/hr}$
[ADEM Admin. Code r. 335-3-4-.03(1)]

Opacity:

The permittee shall not discharge to the atmosphere particulate of an opacity greater than 20%, as determined by a six-minute average, except that during one six-minute period in any sixty (60) minute period, the permittee may discharge into the atmosphere particulate of an opacity not greater than 40%.
[ADEM Admin. Code r. 335-3-4-.01]

Sulfur Dioxide (SO₂):

1.8 lb/MMBtu
[ADEM Admin. Code r. 335-3-5-.01(1)(a)]

Expected Emissions

PM:

Since this source is fired with only natural gas, PM emissions are expected to be negligible.

Opacity:

Since the natural gas conditioning station heater is fired with only

natural gas, opacity is expected to be negligible during operation of this unit.

SO₂:

Since this source is fired with only natural gas, SO₂ emissions are expected to be negligible.

Periodic Monitoring

PM, Opacity, SO₂:

As mentioned above, this source utilizes natural gas for its only fuel, and doing so inherently minimizes emissions of PM and SO₂. Therefore, periodic monitoring for PM, opacity, and SO₂ was deemed unnecessary.

Compliance Assurance Monitoring

CAM is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);
- The source must use an air pollution control device in order to comply with the limit; and
- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP).

While the Natural Gas Conditioning Station Heater is subject to PM and SO₂ limits, it does not utilize any control device to meet those limits; therefore, CAM does not apply.

Natural Gas-Fired Auxiliary Boiler

APC operates a natural gas-fired auxiliary boiler with a nominal heat input capacity of 275 MMBtu/hr to assist with the startup of Unit 5. The boiler is subject to 40 CFR Part 63, Subpart DDDDD, "National Emission Standards for Hazardous Air Pollutants for Major Source: Industrial, Commercial, and Institutional Boilers and Process Heaters." There are no specific emission standards that are applicable to the heater under Subpart DDDDD; however, there are applicable work practice standards and associated recordkeeping and reporting requirements. The boiler is also subject to 40 CFR Part 60, Subpart Db, "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units."

Emission Standards

PM:

0.12 lb/MMBtu
[ADEM Admin Code r. 335-3-4-.03]

Opacity:

The permittee shall not discharge to the atmosphere particulate of an opacity greater than 20%, as determined by a six-minute average, except that during one six-minute period in any sixty (60) minute period, the permittee may discharge into the atmosphere particulate of an opacity not greater than 40%.

[ADEM Admin. Code r. 335-3-4-.01]

SO₂:

1.8 lb/MMBtu
[ADEM Admin. Code r. 335-3-5-.01(1)(a)]

NO_x:

0.20 lb/MMBtu
[ADEM Admin. Code r. 335-3-10-.02(2)(b)]
[40 CFR 60.44b(a)]

This standard applies at all times including startup, shutdown, and malfunction. Compliance is determined on a 30-day rolling average.

Expected Emissions

PM:

Since this source is fired with only natural gas, PM emissions are expected to be negligible.

Opacity:

Since the auxiliary boiler is fired with only natural gas, opacity is expected to be negligible during operation of this unit.

SO₂:

Since this source is fired with only natural gas, SO₂ emissions are expected to be negligible.

NO_x:

Annual data from CEMS indicates an average NO_x emission rate of 0.066 for the Aux Boiler in 2019.

Periodic Monitoring

PM, Opacity, SO₂:

As mentioned above, this source utilizes natural gas for its only fuel, and doing so inherently minimizes emissions of PM and SO₂. Therefore, periodic monitoring for PM, opacity, and SO₂ was deemed unnecessary.

NO_x:

The permittee shall utilize a CEMS to monitor NO_x emissions. Data from the CEMS will be used to determine compliance with the applicable NSPS limit. Excess emission reports will be submitted to ADEM at least once every 6 months. The permittee may submit these reports with the quarterly reports that it is otherwise required to submit.

Compliance Assurance Monitoring

CAM is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);
- The source must use an air pollution control device in order to comply with the limit; and
- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP).

While the auxiliary boiler is subject to PM, SO₂, and NO_x limits, it does not utilize any control device to meet those limits; therefore, CAM does not apply.

Stationary Reciprocating Internal Combustion Engines

There are twenty (20) stationary reciprocating internal combustion engines (RICE) located at Plant Barry. The following engines are utilized for emergency purposes only:

- Units 1 & 2 Emergency Generator (402 hp)
- Unit 4 Emergency Generator (402 hp)
- Unit 5 Emergency Generator (896 hp)
- Main Security Gate Emergency Generator (145 hp)
- Contractor Guard Gate Emergency Generator (145 hp)
- Fire Pump #1 (282 hp)
- Fire Pump #2 (282 hp)
- Unit 3 Pump Room Engine (115 hp)
- Unit 6 Emergency Generator (1073 hp)
- Unit 7 Emergency Generator (805 hp)

The following engines are utilized for non-emergency purposes:

- Air Compressor Engine #1 (350 hp)
- Air Compressor Engine #2 (350 hp)
- Security Camera Engines 1-8 (19 hp/each)

There are three federal rules that are potentially applicable to sources such as these. They are as follows:

- 40 CFR Part 63, Subpart ZZZZ, “National Emission Standards for Hazardous Air Pollutant Emissions from Stationary Reciprocating Internal Combustion Engines”
- 40 CFR Part 60, Subpart IIII, “New Source Performance Standards for Stationary Compression Ignition Internal Combustion Engines”
- 40 CFR Part 60, Subpart JJJJ, “New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines”

The following chart shows the applicability status of these rules to each of the RICE at Plant Barry:

Source	40 CFR Part 63, Subpart ZZZZ	40 CFR Part 60, Subpart IIII	40 CFR Part 60, Subpart JJJJ
Units 1 & 2 Emergency Generator	Yes	Yes	No
Unit 4 Emergency Generator	Yes	Yes	No
Unit 5 Emergency Generator	Yes	No	No
Main Security Gate Emergency Generator	Yes	Yes	No
Contractor Guard Gate Emergency Generator	Yes	Yes	No
Fire Pump #1	Yes	Yes	No
Fire Pump #2	Yes	Yes	No
Unit 3 Pump Room Sump Pump Engine	Yes	Yes	No
Unit 6 Emergency Generator	Yes	Yes	No
Unit 7 Emergency Engine	Yes	Yes	No
Security Camera Engines 1-8	Yes	Yes	No
Air Compressor Engine #1	Yes	Yes	No
Air Compressor Engine #2	Yes	Yes	No

Emission Standards (Limits are for each unit.)

Opacity:

The permittee shall not discharge to the atmosphere particulate of an opacity greater than 20%, as determined by a six-minute average, except that during one six-minute period in any sixty (60) minute period, the permittee may discharge into the atmosphere particulate of an opacity not greater than 40%.

[ADEM Admin. Code r. 335-3-4-.01]

Expected Emissions

Emissions are expected to be negligible from each of the RICE units during normal operation.

Periodic Monitoring/Compliance Assurance Monitoring

CAM is applicable to sources on a per-pollutant basis only if all the following criteria are met:

- The source must be subject to an emission limitation for the applicable regulated air pollutant, other than an emission limitation that is exempt under 40 CFR 64.2(b)(1);
- The source must use an air pollution control device in order to comply with the limit; and
- The source must have a pre-controlled potential-to-emit greater than the major source classification threshold (100 TPY for criteria pollutants; 10 TPY for any individual HAP).

None of the units have the pre-controlled potential to emit any pollutant in quantities greater than the pollutants' respective major source threshold. Therefore, the above-listed criteria are not met for any pollutant emitted by the any of the RICE units, and CAM does not apply.

As mentioned above, emissions expected to be negligible from each of the engines during normal operation. The three federal rules listed above include work practice standards and recordkeeping; therefore, additional periodic monitoring was deemed unnecessary.

Recommendation

Based on the above analysis and pending the resolution of any comments received during the 30-day public comment period and 45-day EPA review, I recommend issuing the attached renewal MSOP for Alabama Power Company's Plant Barry.



Tyler Phillips
Industrial Minerals Section
Energy Branch
Air Division

June 22, 2020
Date

COMPLIANCE ASSURANCE MONITORING PLANS

PLANT BARRY
Unit 4
Compliance Assurance Monitoring Plan
Electrostatic Precipitators for Particulate Matter Control

A. Compliance Approach: Precipitator Power

A minimum electrostatic precipitator (ESP) power level, as determined by previous testing, is set for the unit at the power level which correlates to an emission rate that is less than the permitted State SIP particulate matter (PM) limit. If a condition occurs in which the parameters are not being met, corrective action will be taken to avoid a CAM excursion. An exceedance of the corrective action trigger level does not create a reporting requirement unless the three-hour block average precipitator power on the unit is less than the established minimum power level. Also, if a complete gas passage of Power Supplies (PS) is out of service (i.e. channeling) for a three-hour block period then a CAM excursion will occur. Any excursions that meet these criteria will be reported on the quarterly or semi-annual compliance report as a CAM excursion.

In the presumptively acceptable CAM protocol for precipitators, EPA allows extrapolation of the curve by up to 25% of the highest PM emissions level tested. While these protocols are not the same, the testing required is identical. In order to avoid exceeding State SIP PM emission limit during CAM testing, Alabama Power also used this approach.

B. Background

1. Emission Unit:

Description:	Unit 4 Coal-fired Power Boiler
Permit Number:	503-1001
Pollution Control Device:	ESP 4
Facility:	Plant Barry
	Box 70
	Bucks, AL 36512

2. Applicable Regulation, Emission Limit, and Monitoring Requirements:

Regulation:	Title V Permit, ADEM Admin. Code r. 335-3-4-.03
PM Emission Limit:	0.12 lbs/MMBtu
CAM ESP Power	
Minimum Limit:	30 kW or channeling (3-hour block average)
Monitoring Requirements:	Continuous precipitator power monitoring

3. Control Technology: Electrostatic precipitator (ESP)

C. Monitoring Approach

The key elements of the monitoring approach, including the CAM indicators to be monitored, indicator ranges, excursion criteria, and data handling and recording procedures are presented in Table 1. The CAM performance indicator is the Unit 4 ESP power level as measured by the ESP control software. The indicator parameters are recorded by the plant distributed control system (DCS). The CAM excursion level was established based on ESP performance test data collected at varying operating conditions.

The operating conditions tested were normal baseline and a “detuned” condition. The detuned condition was established by turning off or limiting PS sections in the ESP. The ESP was detuned to simulate conditions that might occur during ESP malfunctions. The ESP PM emissions at each condition were measured using EPA Method 17.

D. Justification

1. Background

The emission unit is a coal-fired electric generating unit with a nominal heat input capacity of 3571 MMBtu/hr. The current unit normal full load generating capacity is approximately 376 MW. Exhaust flue gases from Unit 4 pass through the ESP for PM control and through an outlet duct before being emitted through an individual 600 ft. stack.

The Unit 4 boiler was placed into service in 1969 and burns bituminous coal. Two of the ESP boxes are 27 feet long by 30 feet high with a total nominal gross specific collection area of 249 ft²/1000 ACFM and the other two ESP boxes are 36 feet long by 30 feet high with a total nominal gross specific collection area of 367 ft²/1000 ACFM.

2. Rationale for Selection of Performance Indicators

The selected CAM indicator is the Unit 4 precipitator power level. Precipitator power was selected as a performance indicator because generally as power levels decrease, it can be reasonably assumed that PM emissions will increase. Although the correlation between the precipitator power and specific unit PM emissions are not exact, testing at worst case conditions showed precipitator power does provide an indication of emissions approaching the applicable State SIP PM emission limit.

3. Rationale for Selection of Precipitator Power Level

The CAM precipitator power excursion level was established by measuring the PM emissions at different power levels in the ESP exhaust. The measured PM emissions were plotted against the observed unit precipitator power levels and the best fit curve was applied. The projected PM emission rate at 30 kw using the equation generated by the best-fit curve is 0.102 lbs/MMBtu. This is below the State SIP PM permit limit of 0.12 lbs/MMBtu,

so the CAM precipitator power excursion level is set at 30 kW. The test results are summarized in Table 2 and Figure 1.

The stated intent of the CAM rule is to ensure that control devices are properly operated and maintained to assure compliance with the applicable established emission standards. Proper operation of the PM control device, the electrostatic precipitator, cannot be assessed during unit start-up and shutdown periods. During these times, low temperatures and varying fuels cause precipitators to be unstable. In addition, the CAM testing performed to develop the precipitator power excursion levels was done only under maximum stable loads, without start-up fuel. Therefore, if exceedances of the CAM excursion level occur during these times, corrective actions are not required

4. Corrective Actions

Corrective actions to be taken when the ESP CAM indicators are not being met may include the following:

- i. Verify all ESP power supplies are in service and working properly.
- ii. Verify ESP discharge and collecting rappers are working properly.
- iii. Verify ash removal equipment is running properly.

5. Rationale for Selection of CAM Averaging Periods

Compliance with the PM limit is demonstrated from a reference method test that requires a minimum of three hours to perform (e.g. the average of three 1-hour test runs). Therefore, a 3-hour block averaging period was chosen for determination of a CAM excursion.

Table 1 - Monitoring Approach

Indicator	ESP Power Level (kW)
Measurement Approach	ESP Power level from precipitator control computer.
Indicator Range	A CAM excursion occurs if Unit 4 has a 3-hour block average precipitator power less than 30 kW or if all of the PS in a gas passage are out of service for a 3-hour block period (i.e. channeling).
Data Representativeness	The precipitator power level is measured as an indicator of particulate matter collection and equipment performance.
QA/QC Practices and Criteria	The precipitator controls are calibrated per manufacturer's recommendations.
Monitoring Frequency	The precipitator power level is monitored continuously by the precipitator control software.
Data Collection Procedures	The DAS retains all 6-minute and hourly average precipitator power data.
Averaging Period	The 6-minute precipitator power data is used to calculate 3-hour block averages.

Barry 4
CAM Test Data Summary

	Baseline		Condition 1	
	ESP Power	Particulate	ESP Power	Particulate
Run 1	232	0.031	40	0.078
Run 2	230	0.021	41	0.087
Run 3	224	0.026	42	0.084
Average	229	0.026	41	0.083

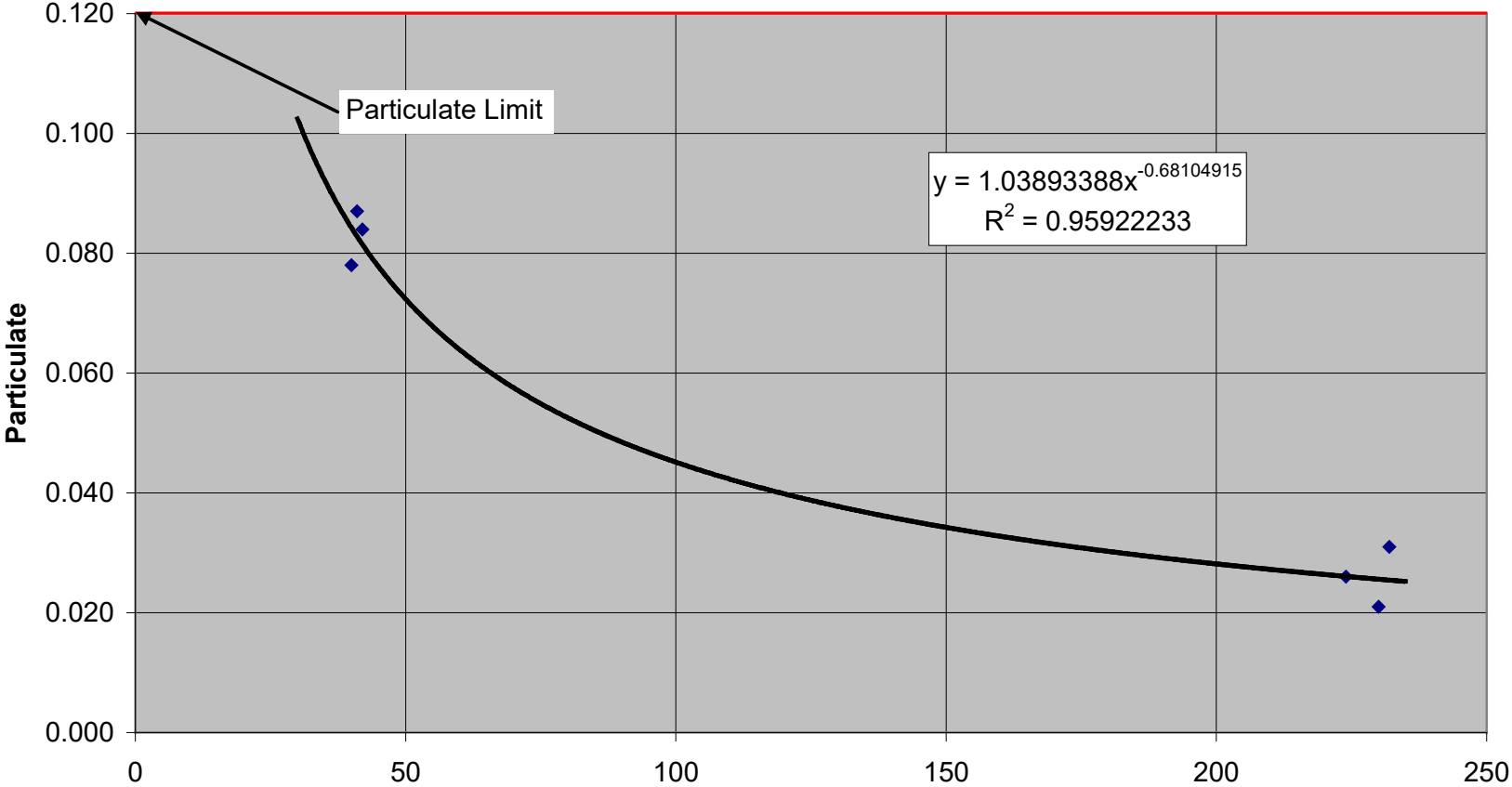
Table 2

- Best fit equation for precipitator power versus particulate is
 $y = 1.03893388x^{-0.68104915}$
 $y = \text{particulate emissions, } x = \text{precipitator power}$
- $R^2 = 0.9592$, R^2 is the Coefficient of Determination. It is the percent of variance of one variable explained by the other. The value of 0.9592 shows that 95.92% of the variability in particulate matter is explained by precipitator power.
- Extrapolate measured particulate by 25%. $0.083 * 1.25 = 0.104$
- Projected particulate at 30 kw precipitator power $y = 1.03893388(30)^{-0.68104915} = 0.102$

Projected particulate is less than the State SIP PM permit limit of 0.12, so the CAM excursion level is set at 30 kW precipitator power.

Barry 4

Particulate vs Precipitator Power



Precipitator Power
Figure 1

PLANT BARRY
Unit 5
Compliance Assurance Monitoring Plan
Electrostatic Precipitators for Particulate Matter Control

E. Compliance Approach: Precipitator Power

A minimum electrostatic precipitator (ESP) power level, as determined by previous testing, is set for the unit at the power level which correlates to an emission rate that is less than the permitted State SIP particulate matter (PM) emission limit. If a condition occurs in which the parameters are not being met, corrective action will be taken to avoid a CAM excursion. An exceedance of the corrective action trigger level does not create a reporting requirement unless the three-hour block average precipitator power on the unit is less than the established minimum power level. Also, if a complete gas passage of Power Supplies (PS) is out of service (i.e. channeling) for a three-hour block period then a CAM excursion will occur. Any excursions that meet these criteria will be reported on the quarterly or semi-annual compliance report as a CAM excursion.

In the presumptively acceptable CAM protocol for precipitators, EPA allows extrapolation of the curve by up to 25% of the highest particulate emissions level tested. While these protocols are not the same, the testing required is identical. In order to avoid exceeding the applicable PM emission limit during CAM testing, Alabama Power also used this approach.

F. Background

1. Emission Unit:

Description:	Unit 5 Coal-fired Power Boiler
Permit Number:	503-1001
Pollution Control Device:	ESP 5
Facility:	Plant Barry Box 70 Bucks, AL 36512

2. Applicable Regulation, Emission Limit, and Monitoring Requirements:

Regulation:	Title V Permit, ADEM Admin. Code r. 335-3-4-.03
PM Emission Limit:	0.12 lbs/MMBtu
CAM ESP Power	
Minimum Limit:	30 kW or channeling (3-hour block average)
Monitoring Requirements:	Continuous precipitator power monitoring

3. Control Technology: Electrostatic precipitator (ESP)

G. Monitoring Approach

The key elements of the monitoring approach, including the CAM indicators to be monitored, indicator ranges, excursion criteria, and data handling and recording procedures are presented in Table 1. The CAM performance indicator is the Unit 5 ESP power level as measured by the ESP control software. The indicator parameters are recorded by the plant distributed control system (DCS). The CAM excursion level was established based on ESP performance test data collected at varying operating conditions.

The operating conditions tested were normal baseline and a “detuned” condition. The detuned condition was established by turning off or limiting Power Supply sections in the ESP. The ESP was detuned to simulate conditions that might occur during ESP malfunctions. The ESP PM emissions at each condition were measured using EPA Method 17.

H. Justification

1. Background

The emission unit is a coal-fired electric generating unit with a nominal heat input capacity 7,585 MMBtu/hr. The current unit normal full load generating capacity is approximately 785 MW. Exhaust flue gases from Unit 5 pass through the ESP for PM control before passing through a selective catalytic reduction (SCR) system for NO_x control, and a flue gas desulfurization system (e.g. FGD or scrubber) for the control of SO₂, mercury and additional PM control before being emitted from an individual 600-foot wet stack.

The Unit 5 boiler was placed into service in 1971 and burns bituminous coal. Two of the ESP boxes are 18 feet long by 30 feet high with a total nominal gross specific collection area of 101.0 ft²/1000 ACFM and the other two ESP boxes are 18 feet long by 30 feet high with a total nominal gross specific collection area of 101.0 ft²/1000 ACFM.

2. Rationale for Selection of Performance Indicators

The selected CAM indicator is the Unit 5 ESP power level. Precipitator power was selected as a performance indicator because generally as power levels decrease, it can be reasonably assumed that PM emissions will increase. Although the correlation between the precipitator power and specific unit PM emissions are not exact, testing at worst case conditions showed precipitator power does provide an indication of PM emissions approaching the applicable State SIP PM emission limit upstream of the FGD.

3. Rationale for Selection of Precipitator Power Level

The CAM precipitator power excursion level was established by measuring the PM emissions at different power levels in the ESP exhaust. The

measured PM emissions were plotted against the observed unit precipitator power levels and the best fit curve was applied. The projected PM emission rate upstream of the FGD, at 30 kW using the equation generated by the best-fit curve is 0.050 lbs/MMBtu. This is below the State SIP PM permit limit of 0.12 lbs/MMBtu, so the CAM precipitator power excursion level is set at 30 kW. The test results are summarized in Table 2 and Figure 1.

The stated intent of the CAM rule is to ensure that control devices are properly operated and maintained to assure compliance with the applicable established emission standards. Proper operation of the PM control device, the electrostatic precipitator, cannot be assessed during unit start-up and shutdown periods. During these times, low temperatures and varying fuels cause precipitators to be unstable. In addition, the CAM testing performed to develop the precipitator power excursion levels was done only under maximum stable loads, without start-up fuel. Therefore, if exceedances of the CAM excursion level occur during these times, corrective actions are not required

4. Corrective Actions

Corrective actions to be taken when the ESP CAM indicators are not being met may include the following:

- i. Verify all ESP power supplies are in service and working properly.
- ii. Verify ESP discharge and collecting rappers are working properly.
- iii. Verify ash removal equipment is running properly.

5. Rationale for Selection of CAM Averaging Periods

Compliance with the State SIP PM limit is demonstrated from a reference method test that requires a minimum of three hours to perform (e.g. the average of three 1-hour test runs). Therefore, a 3-hour block averaging period was chosen for determination of a CAM excursion.

Table 1 - Monitoring Approach

Indicator	ESP Power Level (kW)
Measurement Approach	ESP Power level from precipitator control computer.
Indicator Range	A CAM excursion occurs if Unit 5 has a 3-hour block average precipitator power less than 30 kW or if all of the PS in a gas passage are out of service for a 3-hour block period (i.e. channeling).
Data Representativeness	The precipitator power is measured as an indicator of particulate matter collection and equipment performance.
QA/QC Practices and Criteria	The precipitator controls are calibrated per manufacturer's recommendations.
Monitoring Frequency	The precipitator power is monitored continuously by the precipitator control software.
Data Collection Procedures	The DAS retains all 6-minute and hourly average precipitator power data.
Averaging Period	The 6-minute precipitator power data is used to calculate 3-hour block averages.

Barry 5
CAM Test Data Summary

	Baseline		Condition 1	
	ESP Power	Particulate	ESP Power	Particulate
Run 1	210	0.013	39	0.037
Run 2	211	0.012	46	0.038
Run 3	210	0.011	46	0.039
Average	210	0.012	44	0.038

Table 2

- Best fit equation for precipitator power versus particulate is
 $y=0.59134220x^{-0.72841788}$
 y =particulate emissions, x =precipitator power
- $R^2=0.9844$, R^2 is the Coefficient of Determination. It is the percent of variance of one variable explained by the other. The value of 0.9844 shows that 98.44% of the variability in particulate matter is explained by precipitator power.
- Extrapolate measured particulate by 25%. $0.038 * 1.25 = 0.048$
- Projected particulate at 30 kW precipitator power $y=0.59134220(30)^{-0.72841788}$
 $= 0.050$

Projected particulate is less than the applicable PM permit limit of 0.12, so the CAM excursion level is set at 30 kW precipitator power.

Barry 5

Particulate vs Precipitator Power

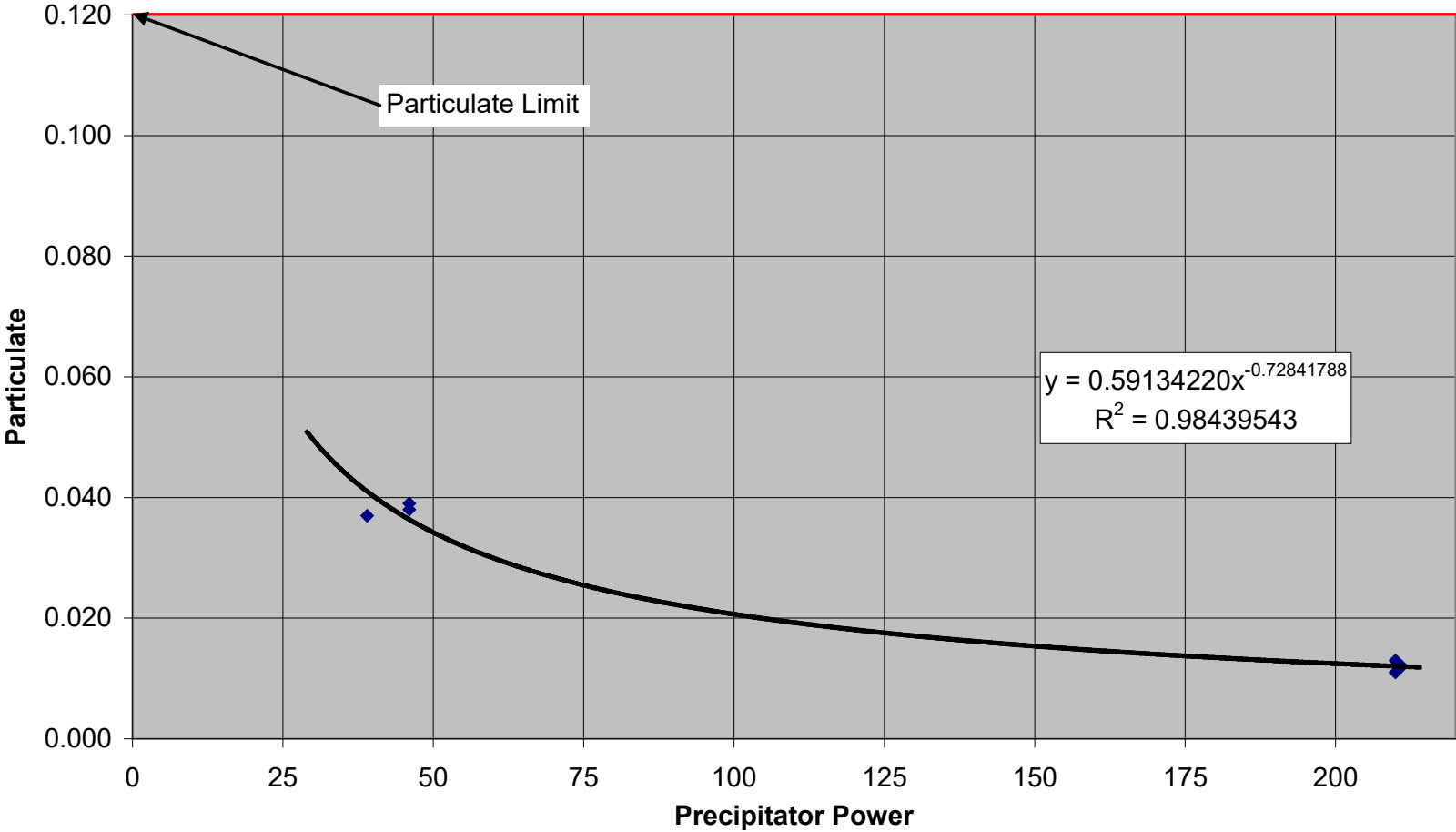


Figure 1

**Plant Barry
Compliance Assurance Monitoring
Units 6A, 6B, 7A & 7B
SCR for NOx Emission Control**

Submittal Reference	Monitoring Design Criteria Reference	Monitoring Design Requirement	Monitoring Approach
64.4 (a)(1)	64.3 (a)(1)	Indicator of Emission Control Performance	NOx emission rate in lbs/MMBtu is the indicator of SCR performance.
64.4 (a)(2)	64.3 (a)(2)	Designated Indicator Condition that provides reasonable assurance of ongoing compliance	A NOx emission rate of 0.013 lb/MMBtu monitored using a rolling 3-hour average computed by CEMS is the designated indicator condition that provides reasonable assurance of ongoing compliance.
64.4 (a)(3)	64.3 (b)	Performance Criteria: (1) Obtain Representative Data (2) Verify Operational Status (3) Establish QA/QC Practices (4) Set Frequency of Data Collection and the Exceedance Averaging Period	(1) The exhaust gas is continuously sampled by a probe located in the stack of each unit in accordance with 40 CFR 60, Appendix A. The NOx concentration of the exhaust gas sample is measured by the NOx CEMS analyzer in ppmv. The NOx concentration is converted to lb/MMBtu and recorded by the CEMS DAHS. (2) The initial testing and certification procedures in 40 CFR 75, Appendix A and the performance protocol (PS2) in 40 CFR 60, Appendix B were used to verify the CEMS operational status. (3) The QA/QC practices that ensure continuing validity of the data are included in the plant's Quality Assurance Plan (QAP) in accordance with 40 CFR 75. (4) Data is collected continuously, and a rolling 3-hour average is computed by the CEMS DAHS to determine whether an exceedance has occurred.
64.4 (a)(4)	64.3 (d)	Special Criteria for the use of CEMS	Air Permit No. 503-1001-X006 required monitoring of the NOx emission rate on a 3-hour rolling average by CEMS and reporting of exceedances.
64.4 (b)	64.3 (d)	Justification of Monitoring Approach/ Explanation of Monitoring Applicability	By stating that the NOx emission rate shall not exceed 0.013 lb/MMBtu and by requiring monitoring using a 3-hour rolling average as computed by CEMS, Air Permit No. 503-1001-X006, justifies designating the NOx emission rate of 0.013 lb/MMBtu monitored using a rolling 3-hour average computed by the CEMS as the monitoring approach that provides reasonable assurance of ongoing compliance.
64.4 (c)		Control Device Performance Testing	Performance testing was conducted in accordance with 40 CFR 60. No changes that could result in a significant change in unit or SCR performance have been made since conducting the performance testing.