STATEMENT OF BASIS

Southern Power Company
E. B. Harris Generating Plant
Prattville, Alabama
Autauga County
201-0010

This proposed renewal to the Title V Major Source Operating Permit 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 originally issued on August 3, 2006. 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 on December 4, 2020 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.

Southern Power Company (SPC) was issued its existing Major Source Operating Permit (MSOP) on June 8, 2016, with an expiration date of June 7, 2021. Per ADEM Rule 335-3-16-.12(2), an application for permit renewal shall be submitted at least six (6) months, but not more than eighteen (18) months, before the date of expiration of the permit. Based on this rule, the application for renewal was due to the Department no later than December 7, 2020. The application was received on December 4, 2020, and a request for a permit shield was received on February 8, 2021.

The E.B. Harris Generating Plant is owned and operated by Southern Power Company and is located in Prattville, Alabama. This facility operates two (2) combined-cycle blocks which each consist of two (2) combustion turbines, two (2) heat recovery steam generators each with supplementary firing from a duct burner, and one (1) steam turbine. This arrangement is referred to as a two-on-one configuration. The nominal sizes of the combined-cycle blocks are identical at 640 MW each. The significant sources of air pollutants at this facility are the following:

- Four (4) 178 MW Natural Gas Fired Combustion Turbines (1A, 1B, 2A, 2B) each with 541.7 MMBtu/hr Natural Gas Fired Duct Burners and Heat Recovery Steam Generator with Selective Catalytic Reduction NO_x Control.
- 208 HP Existing Emergency Firewater Pump

Additionally, the applicable requirements of Cross-State Air Pollution Rule (CSAPR) will be included in this renewal.

SPC has requested a permit shield, the specific regulations that SPC has requested a shield from can be found in the submitted application.

Changes being incorporated into the permit during this renewal include an Advanced Gas Path and Mark VI control system upgrade for the combined cycle units. A letter stating no permit was required was issued on February 29, 2016 for the project.

Facility-Wide Emissions

Pollutant	Potentials (TPY)	2019 Actuals (TPY)
NO_x	561.2	154.6
CO	2319.6	100.2
VOC	276.1	51.0
SO_2	24.4	9.1
PM	376.7	15.64
HAPs (total)	13.9	0.08
GHG (CO_{2e})	4,748,795	---

Four (4) 178 MW Combined Cycle Units (1A, 1B, 2A, 2B)

The combined cycle units (combustion turbine and duct burner) fire only pipeline natural gas. Each combustion turbine and each steam generator has the capability to generate electric power of approximately 178 MW and 284 MW, respectively. Each unit's duct burner has a heat input rating of 541.7 MMBtu/hr and provides the capability to produce additional steam from each heat recovery steam generator (HRSG). The NO_x emissions from the combined cycle combustion turbines are controlled by the use of Selective Catalytic Reduction (SCR).

The combined cycle units were subject to a Prevention of Significant Deterioration (PSD) Review in which BACT was established for NO_x, CO, VOC, and PM. The combustion turbines are subject to the Federal New Source Performance Standards (NSPS) contained in 40 CFR Part 60, Subpart GG, and the duct burners are subject to NSPS, Subpart Da. The combined cycle units are also subject to the Acid Rain Program and CSAPR. The combined cycle units' expected emissions and the associated standards are listed below.

Emission Standards

Opacity:

- Visible Emissions from each of the combined cycle/duct burner stacks shall not exceed 10%.

  (ADEM Admin. Code r. 335-3-14-.04(9)(b)) BACT

- Visible Emissions from each of the combined cycle/duct burner stacks shall not exceed 20%, except one 6-minute period per hour of ≤27%.

  (ADEM Admin. Code r. 335-3-10-.02(2)(a), 40 CFR 60.42a(b))

Particulate Matter (PM):

- Particulate emissions from each unit's duct burners shall not exceed 0.03 lb/MMBtu.

  (ADEM Admin. Code r. 335-3-10-.02(2)(a), 40 CFR 60.42a Subpart

Da)

- Particulate emissions from each of the combined cycle/duct burner stacks shall not exceed 0.009 lb/MMBtu and 21.5 lb/hr.

  (ADEM Admin. Code r. 335-3-14-.04(9)(b)) BACT

The PM emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Sulfur Dioxide (SO_2):

- Sulfur Dioxide emissions from each unit's duct burners shall not exceed 0.20 lb/MMBtu.

  (ADEM Admin. Code r. 335-3-10-.02(2)(a), 40 CFR 60.43a)

- Sulfur Dioxide emissions from each of the combined cycle unit stacks shall not exceed 0.015% by volume at 15% O_2 and on a dry basis or sulfur content of fuels burned in the combustion turbines shall not exceed 0.8% by weight.

  (ADEM Admin. Code r. 335-3-10-.02(33), 40 CFR 60.333)

- The combined cycle units are subject to the Acid Rain Regulations. These units are not allocated SO_2 allowances under Phase II of the Acid Rain Program. These units shall hold sufficient allowances in the unit account to cover annual SO_2 emissions.

  (ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 73)

Nitrogen Oxides (NO_x):

- Nitrogen Oxides emissions from each of the combined cycle/duct burner stacks shall not exceed 0.013 lb/MMBtu and 32.0 lbs/hr (3-hr rolling average).

  (ADEM Admin. Code r. 335-3-14-.04(9)(b)) BACT

- Nitrogen Oxides emissions from each of the combined cycle/duct burner stacks shall not exceed 107 ppmv (4-hr rolling average), 75 ppmv adjusted for heat rate and fuel bound nitrogen.

  (ADEM Admin. Code r. 335-3-10-.02(33), 40 CFR 60.332)

- Nitrogen Oxides emissions from each of the duct burners shall not exceed 1.6 lb/MWh (30-day rolling average).

(ADEM Admin. Code r. 335-3-10-.02(2)(a), 40 CFR 60.44a)

The NO_x emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Carbon Monoxide (CO):

- Carbon Monoxide emissions from each of the combined cycle/duct burner stack shall not exceed 0.075 lb/MMBtu and 184.2 lbs/hr during power augmentation and 0.052 lb/MMBtu & 125.7 lbs/hr during non-power augmentation.

(ADEM Admin. Code r. 335-3-14-04(9)(b) BACT

The CO emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Volatile Organic Compounds (VOC):

- Volatile Organic Compounds emissions from each of the combined cycle/duct burner stack shall not exceed 0.011 lb/MMBtu and 25.2 lbs/hr during power augmentation and 0.006 lb/MMBtu & 14.5 lbs/hr during non-power augmentation.

(ADEM Admin. Code r. 335-3-14-04(9)(b) BACT

The VOC emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Expected Emissions

Particulate Matter (PM) and Opacity:

- The particulate emission rate from each of the combined combustion turbine/duct burner stacks during initial performance testing was as noted below. Testing was conducted at the expected most emissive conditions, i.e., while operating at 100% load, operating the duct burners, and operating in power augmentation mode.

Unit	PM (lb/MMBtu)	PM (lb/hr)	PM (lbs/MMBTU) Duct Burners*
1A	0.0004	1.05	0.0018
1B	0.0004	1.01	0.0016
2A	0.002	4.35	0.0079
2B	0.0012	2.79	0.0061

** Evaluated by taking total PM emissions (CT & DB) and dividing by the heat input for the DB*

only

Method 9 observations yielded no opacity from any of the units during initial compliance testing.

Sulfur Dioxide (SO_2):

- Natural gas is the primary fuel for this unit, resulting in an emission rate of approximately 0.0006 lb/MMBtu (0.6 lb/10^6 scf for duct burner firing/indirect firing). The sulfur content of natural gas should also be much lower than the NSPS, Subpart GG, limit of 0.8% by weight.

Nitrogen Oxides (NO_x):

- Initial NO_x performance testing was conducted while operating at 50% load, at 100% load, at 100% load while firing the duct burners, and at 100% load while firing the duct burners and operating in power augmentation mode. Worst case NO_x emission rates during the initial performance testing were as follows:

Unit	NO_x (lb/MMBtu)	NO_x (lb/hr)
1A	0.0085	20.27
1B	0.006	14.88
2A	0.0118	20.17
2B	0.0079	18.71

- The unit is required to monitor NO_x with a Continuous Emissions Monitoring System (CEMS). CEMS data indicates that NO_x emissions from the combined cycle/duct burner are below the permitted emission limits.

Carbon Monoxide (CO):

- During initial compliance testing, the maximum CO emission rates from the units were as indicated below:

Unit	CO (lb/MMBtu)[1]	CO (lb/MMBtu)[2]	CO (lb/hr)[1]	CO (lb/hr)[2]
1A	0.0063	0.0036	15.01	8.66
1B	0.0056	0.001	13.52	2.79
2A	0.006	0.002	13.68	4.07
2B	0.008	0.002	19.18	5.45

1: Power augmentation
2: Non-power augmentation

Volatile Organic Compounds (VOC):

- During initial compliance testing, the maximum VOC emission rates from the units were as indicated below:

Unit	VOC (lb/MMBtu)[1]	VOC (lb/MMBtu)[2]	VOC (lb/hr)[1]	VOC (lb/hr)[2]
1A	0.003	0.002	8.04	4.18
1B	0.001	0.005	3.22	13.70
2A	0.002	0.000	4.38	0.00
2B	0.007	0.006	15.62	12.87

1: Power augmentation
2: Non-power augmentation

Green House Gases (GHG):

- The facility reported potential emissions of 4,748,795 tons of GHG. This total is based on EPA's Global Warming Potentials (GWP).

Periodic Monitoring and CAM

Particulate Matter (PM) and Opacity:

- Based on the low expected levels of emissions as compared to the regulatory allowable emission limits, periodic monitoring of opacity and particulate matter emissions is not considered necessary. Additionally, the only control device for the CT is an SCR that is only used to control NOx emissions; therefore, CAM is not applicable to PM and Opacity.

Sulfur Dioxide (SO_2):

- This unit is not allocated annual SO_2 allowances through the Acid Rain Program. However, they must hold enough allowances to cover their annual SO_2 emissions. The provisions in 40 CFR 75 are utilized to track annual SO_2 emissions. Additionally, the only control device for the CT is an SCR that is only used to control NO_x emissions; therefore, CAM is not applicable to SO_2.

Nitrogen Oxides (NO_x):

- This unit is required by 40 CFR Part 75 to maintain and operate a NO_x Continuous Emissions Monitoring System (CEMS). The NOx CEMS will be utilized for periodic monitoring of NO_x emissions.

- The only pollutant subject to Compliance Assurance Monitoring (CAM) is NO_x since the unit is utilizing a control device, SCR, to meet an applicable limit, and the pre-controlled potential NO_x emissions from the units are greater than 100 TPY. Even though other pollutants' potential emissions are greater than the respective major source threshold, no control devices are used to meet any applicable limitations; therefore, CAM does not apply to those pollutants.

- This unit is required by 40 CFR Part 75 to maintain and operate a NO_x

Continuous Emissions Monitoring System (CEMS). The CEMS will also serve as the compliance assurance monitoring for NOx. Details of the CAM Plan are attached to this document.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC):

- Based on the low expected levels of emissions as compared to the regulatory allowable emission limits, periodic monitoring of CO and VOC emissions is not considered necessary. Additionally, the only control device for the CT is an SCR that is only used to control NO_x emissions; therefore, CAM is not applicable to VOC and CO.

Record Keeping and Reporting

- Records of operation of each combined cycle unit while in power augmentation mode shall be kept in a form suitable for inspection for a period of at least five years following said recording.

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

- Records documenting the load at which the turbines operate shall be maintained in a form suitable for inspection for a period of at least five years following said recording.

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

- Records of startup and shutdown periods shall be maintained in a form suitable for inspection for a period of at least five years following said recording.

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

- An emission report as defined by 40 CFR 60.7(c) shall be submitted to the Department within 30 days of the end of the calendar quarter.

  (ADEM Admin. Code r. 335-3-16-.05(c) and 335-3-1-.04)

Cross-State Air Pollution Rule

- These units are subject to the applicable provisions of Cross-State Air Pollution Rule (CSAPR) to include all applicable provisions of the SO_2 Group 2 Trading Program requirements.

  (ADEM Admin. Code r. 335-3-5-.06 through 335-3-5-.36)

- These units are subject to the applicable provisions of Cross-State Air Pollution Rule (CSAPR) to include all applicable provisions of the NOx Annual Trading Program requirements.

  (ADEM Admin. Code r. 335-3-8-.07 through 335-3-8-.70)

Existing Emergency Firewater Pump

This emergency firewater pump is subject to 40 CFR 63, Subpart ZZZZ, because it was manufactured before the applicability dates in 40 CFR Part 60, Subpart IIII.This emergency generator is not subject to 40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) because this generator was manufactured before the applicability date of April 1, 2006. This emergency generator is subject to the applicable requirements in 40 CFR Part 63, Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE)). The following emergency firewater pump is considered Subpart ZZZZ:

Source #	HP	Fuel
003	208	Diesel

NSPS Subpart IIII

Subpart IIII applies to owners and operators of engines that commence construction after July 11, 2005, where the engines are manufactured on or after July 1, 2006. This compression ignition firewater pump was manufactured before April 1, 2006 therefore Subpart IIII does not apply.

(40 CFR Part 60 Subpart IIII, §60.4200(a)(3))

MACT Subpart ZZZZ

Emission Standards

- This unit is subject to the applicable requirements listed in Table 2d of 40 CFR 63 Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

  (40 CFR Part 63 Subpart ZZZZ, §63.6602)

- The Permittee must operate and maintain this unit according to the manufacturer's emission-related written instructions or develop a maintenance plan which must provide to the extent practicable for the

maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.

(40 CFR Part 63 Subpart ZZZZ, §63.6625(e)(3))

- The Permittee must install a non-resettable hour meter for each unit if one is not already installed.

  (40 CFR Part 63 Subpart ZZZZ, §63.6625(f))

- This unit may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of this unit is limited to 100 hours per year. There is no time limit on the use of this unit in emergency situations. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. This unit may operate up to 50 hours per year in non-emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing. The 50 hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply non-emergency power as part of a financial arrangement with another entity. Any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as permitted in 40 CFR 63 Subpart ZZZZ, is prohibited.

  (40 CFR Part 63 Subpart ZZZZ, §63.6640(f))

Expected Emissions

The expected emissions are based on AP-42 emission factors, manufacturer's certifications, and a maximum operation of 500 hours per year. The expected emissions of the firewater pump engine subject to Subpart ZZZZ – Existing Firewater Pump Emergency Engines are shown below:

Pollutant	**208 HP Firewater Pump**	
	lb/hr	**TPY**
PM_{10}/ $PM_{2.5}$	0.1	0.029

SO_2	0.4	0.1
NO_X	2.1	0.5
CO	1.2	0.3
VOC	0.5	0.1
CO_2e	--	58.7

MACT Monitoring

The Permittee shall perform the following activities:

(a) Change oil and filter every 500 hours of operation or annually, whichever comes first;
(b) Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first;
(c) Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.

Or utilize an oil analysis program as describe in §63.6625(i) or §636625(j).

(40 CFR Part 63 Subpart ZZZZ, Table 2d & §63.6625(i))

If an oil analysis program is utilized for a stationary compression ignition engine, the Permittee must perform the oil analysis at the same frequency specified above for changing the oil. The Permittee must at a minimum analyze the following parameters: Total Base Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Base Number is less than 30 percent of the Total Base Number of the oil when new, viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new, or percent water content (by volume) is greater than 0.5. If any of the limits are exceed, the Permittee must change the oil within 2 business days of receiving the results of the analysis or before commencing operation, whichever is later.

(40 CFR Part 63 Subpart ZZZZ, §63.6625(i))

CAM

This source is uncontrolled; therefore, CAM does not apply.

Recordkeeping and Reporting

The Permittee must keep records of the parameters that are analyzed as part of the oil analysis program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine. These records shall be maintained in a manner suitable for inspection for a period of 5 years from record generation.

(40 CFR Part 63 Subpart ZZZZ, §63.6625(i))

The Permittee must keep records of the maintenance conducted on these units in order to demonstrate that you operated and maintained these units and after-treatment control device (if any) according to your own maintenance plan or according to manufacturer's written instructions. These records shall be maintained in a manner suitable for inspection for a period of 5 years from record generation.

(40 CFR Part 63 Subpart ZZZZ, §63.6655(e))

The Permittee must keep records of the hours of operation of each engine that is recorded through the non-resettable hour meter. The facility must document how many hours are spent for emergency operation; including what classified the operation as emergency and how many hours are spent for non-emergency operation. These records shall be maintained in a manner suitable for inspection for a period of 5 years from record generation.

(40 CFR Part 63 Subpart ZZZZ, §63.6655(f))

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 Southern Power-E.B. Harris Generating Plant.

Tyler Phillips

February 19, 2021

Tyler Phillips
Industrial Minerals Section
Energy Branch
Air Division

Date