Engineering Analysis
Alabama Power Company – Plant Barry
Facility Number: 503-1001
Bucks, Mobile County, Alabama

Introduction:

On March 3, 2022, the Department received an application from Alabama Power Company (APC) – Plant Barry located in Bucks, Alabama. APC - Barry proposes to convert existing Plant Barry Unit 4 coal-fired steam electric generating unit to natural gas.

Project Description:

APC proposes to convert Unit 4 from coal to gas by removing existing coal handling and coal burning equipment and infrastructure from Unit 4 and replacing the coal burners with sixteen (16) new gas burners. Piping and valving to support the conversion and an oxidation catalyst to control CO and VOC emissions would be included as a part of the project. The post-project nominal full-load rating of the unit is expected be 376 MW, and the heat input rating of the unit is expected to be 3,571 MMBtu/hr.

Emissions/PSD:

Because this facility is a major source for PSD, pollutant emission increases from the proposed project were compared to the PSD major source pollutant specific significance thresholds. The Actual-to-projected-actual applicability test was used in determining the net emissions increase resulting from the proposed project. Due to disruptions in normal operating conditions as a result of the COVID-19 pandemic, the determination was made that the 5-year period immediately preceding the pandemic was more representative of normal source operation instead of the 5-year period preceding commencement of construction for this unit. As such, baseline actual emissions were determined from operations between March 2015 and February 2017 and based on stack test data for PM; stack test and AP-42 factors for PM10 and PM2.5, CEMS data for SO_2, NO_X, and GHG; Title V emissions for CO and VOC; and toxic release inventory and Title V emissions for Lead and Fluorides. Future projected actual emissions were based on AP-42 emission factors for PM, SO_2, Lead, and fluorides; vendor supplied emission factors for PM10, PM2.5, NO_X, CO, and VOC; 2018 EPRI paper factors for H_2SO_4; 40 CFR 98 factors for GHG (CO_{2e}); and a projected capacity factor of 50%. VOC and CO vendor supplied emission factors account for the control efficiency of the proposed new oxidation catalyst.

The following chart shows the potential emissions increases associated with the project.

Regulated NSR Pollutant	Emission Significance Threshold (TPY)	Net Emissions Increase (TPY)	Significant Net Emissions Increase
SO_2	40	-5,918.4	NO
NO_x	40	-1,154.9	NO
CO	100	-42.3	NO
VOC	40	14.9	NO
PM	25	-121.7	NO

PM_{10}	15	-81.7	NO
$PM_{2.5}$	10	-29.8	NO
GHGs (CO_{2e})	75,000	-443,133	NO

No pollutants from the proposed project are expected to exceed their respective significance threshold; therefore, a PSD review is not necessary. APC will be required to calculate, record, and submit a report of annual CO and VOC emissions for 10 years following completion the proposed change in accordance with ADEM Admin. Code r. 335-3-14-.04(17)(e)4. Additionally, APC will be required to monitor the performance of the oxidation catalyst per the following: the oxidation catalyst shall be inspected for structural integrity, buildup on the catalyst, and clogging of catalyst medium at least every 9000 hours of unit operation or three years, whichever comes first; and sampling of the catalyst to determine control efficiency shall be performed every 9000 hours of unit operation or three years, whichever comes first. The monitoring and the annual report will ensure no PSD significance thresholds are exceeded.

NSPS:

There are no applicable NSPS regulations for the affected source, and the proposed project would not result in any changes of applicability of any NSPS regulations.

NESHAPS/ MACT:

This unit is currently 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 applies to coal and oil fired EGUs. Unit 4 would no longer be considered a coal or oil fired EGU after the proposed project. As a result, this rule would not apply after the conversion to natural gas.

There are no other applicable NESHAP/MACT regulation for this source, and the proposed project would not result in the applicability of any other NESHAP/MACT regulations.

Cross-State Air Pollution Rule (CSAPR)/40 CFR Part 98:

This unit is currently subject to requirements for NO_X and SO_2 under CSAPR. The facility is also subject to mandatory greenhouse gas reporting requirements under 40 CFR Part 98 for this unit. The facility is required to continuously monitor NO_X, SO_2, and CO_2 and to comply with the recordkeeping and reporting requirements of CSAPR and 40 CFR Part 98. These requirements will remain unchanged in the permit after the conversion to natural gas.

Alabama SIP:

The only applicable SIP regulations that would change as a result of the proposed project would be opacity regulations. After the project is complete, this unit would no longer be subject to the opacity requirements of ADEM Admin. Code r. 335-3-4-.01(3)-(5), but the unit would be subject to the opacity requirements of ADEM Admin. Code r. 335-3-4-.01(1). No other SIP regulation changes would occur as a result of the proposed project. Applicable SIP regulations once the conversion is complete are listed below.

Opacity:
This unit would be subject to the visible emissions standards in ADEM Admin. Code r. 335-3-4-.01(1). This unit shall not discharge particulate of an opacity greater than 20% in any 60-minute period, as determined

by a 6-minute average. At no time shall the source discharge particulate of an opacity greater than 40%, as determined by a 6-minute average.

Particulate Matter (PM):
This unit would be subject to a PM emission limit according to Table 4-1 of ADEM Admin. Code r. 335-3-4-.03. Emissions from the boiler would be expected to be well below the allowable emission rate since natural gas would be the only fuel source.

Sulfur Dioxide (SO_2):
ADEM Admin. Code r. 335-3-5-.01(1)(a) assigns the proposed boiler an allowable sulfur dioxide emission rate of 1.8 lb/MMBtu since the unit would be located in a Category I county. Emissions from the boiler would be expected to be well below the allowable emission rate since natural gas would be the only fuel source.

112(g)/Class I Areas:

This facility is a major source for HAP emissions; however, no increase in HAP emissions would be expected as a result of the project. Therefore, a 112(g) review would not be necessary. The closest ***Class 1 Area (Breton Wildlife Refuge)*** is not within 100 KM from the plant site, and the emissions from the proposed project are not expected to have a significant impact on this area.

Title V:

The facility is a major source for Title V. The permittee shall submit an update to the Title V application within one year of start-up after completion of the proposed project.

Recommendations:

Based on the above analysis, I recommend issuing Air Permit No. 503-1001-X020 for the proposed project.

Tyler Phillips

Tyler Phillips
Industrial Mineral Section
Energy Branch
Air Division

Draft
Date