



SC DEPARTMENT *of* **ENVIRONMENTAL SERVICES**

Bureau of Air Quality Prevention of Significant Deterioration Preliminary Determination Modeling Analysis Review

**DUKE ENERGY CAROLINAS, LLC - ANDERSON COUNTY COMBINED CYCLE
STATION
CORNER OF HWY 81 S AND TRUE TEMPER ROAD
ANDERSON, South Carolina 29624
ANDERSON County**

Permit No. PSD-50000026 v1.0
Agency Air Number: 0200-0310
September 11, 2026

This review was performed by the Bureau of Air Quality of the South Carolina Department of Environmental Services in accordance with South Carolina Regulations for the Prevention of Significant Air Quality Deterioration.

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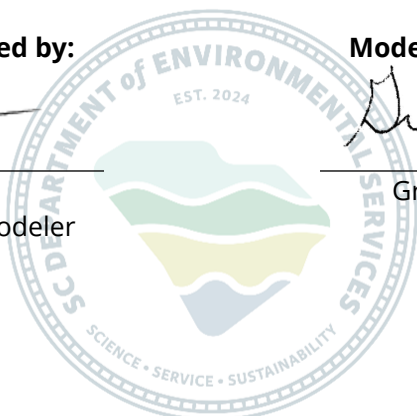


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1.0 Timeline (Modeling Action History)

October 2025	SCDES received a PSD permit application for Duke Energy Caolinas, LLC - Anderson County Combined Cycle Station (Duke Energy)
January 29, 2026	Air Modeling of BAQ submitted a copy of the application and modeling files to the U.S. Environmental Protection Agency (EPA) Region 4 Modeling Team.
February 19, 2026	A Prevention of Significant Deterioration (PSD) pre-application meeting was held with representatives from Duke Energy, ALL4 (consultant), and the South Carolina Department of Environmental Services (SCDES), Bureau of Air Quality (BAQ).
February 27, 2026	Air Modeling of BAQ received comments from Sunday Gotvald, EPA Region 4 Modeling Team.
March 11, 2026	SCDES received a revised PSD permit application from Duke Energy.
March 25, 2026	BAQ determined that the application was incomplete. A modeling correction request was sent to Duke Energy/ALL4 via ePermitting.
April 7, 2026	SCDES received an updated PSD permit application from Duke Energy.
April 13, 2026	Air Modeling of BAQ submitted a copy of the updated application to the EPA Region 4 Modeling Team.
April 14, 2026	Air Modeling of BAQ determined that the modeling portion of the application was complete.
April 16, 2026	Air Modeling of BAQ received email notification from Sunday Gotvald, EPA Region 4 Modeling Team, that EPA had no further comments.
April 23, 2026	Air Modeling of BAQ submitted a copy of the application and modeling files to the Federal Land Managers (FLM) at USDA Forest Service and National Park Service (NPS).
May 14, 2026	Air Modeling of BAQ received email comments from Gisele Majidi-Weese, FLM, USDA Forest Service.
May 27, 2026	Air Modeling of BAQ received email comments from Andrea Stacy, FLM, NPS.
May 29, 2026	SCDES received an updated PSD permit application from Duke Energy.

June 4, 2026	Air Modeling of BAQ sent email correspondence to Andrea Stacy, FLM, NPS.
July 15, 2026	Air Modeling of BAQ sent email correspondence to Andrea Stacy, FLM, NPS.
July 21, 2026	Air Modeling of BAQ received further email comments from Andrea Stacy, FLM, NPS.
July 30, 2026	A TEAMS meeting was held with representatives from Duke Energy, ALL4, and Air Permitting and Modeling of BAQ.
August 13, 2026	A TEAMS meeting was held with representatives from Duke Energy, ALL4, and Air Permitting and Modeling of BAQ,
August 24, 2026	A TEAMS meeting was held with representatives from ALL4, Andrea Stacy (FLM, NPS), and Permitting and Modeling of BAQ.
August 26, 2026	SCDES received updated modeling for CO from Duke Energy/ALL4.
August 26, 2026	Air Modeling of BAQ submitted a copy of the updated CO modeling to the EPA Region 4 Modeling Team.
September 1, 2026	Air Permitting of BAQ submitted the BAQ draft modeling summary and draft Preliminary Determination to the EPA Region 4 Modeling Team.
September 11, 2026	BAQ placed the PSD Preliminary Determination and PSD Construction Permit No. PSD-50000026 v1.0 on public notice for a 30-day comment period. All appropriate Federal and State Officials were notified.

2.0 Air Quality Impact Analysis

For a major facility, PSD regulations require an applicant to analyze the impact from the construction of a proposed new source(s) on the following areas:

1. Compliance with the National Ambient Air Quality Standards (NAAQS);
2. Compliance with the Class II PSD Increments;
3. Significant impact on PSD Class I Areas, including Class I PSD Increments;
4. Impairments to visibility, soil, and vegetation; and
5. Air Quality impact of general growth associated with the source.

All minor and major sources proposing new construction or construction modifications in South Carolina (SC) are also required to demonstrate that their facility will remain in compliance with South Carolina Regulation 61-62.5 Standards 2 (AAQS), and 7 (Increments).

Results of the compliance demonstration for this project indicate the following:

- a) For PSD Class II areas, there will be no exceedance of the NAAQS or Increments, and no adverse effect on growth, soils, vegetation or visibility is indicated.
- b) For PSD Class I areas, there will be no exceedance of Class I Significant impact levels at any of the five Class I areas within 300 km of the facility. A screening analysis indicates there will also be no adverse effects on visibility, vegetation, or soils in any of those same Class I areas.
- c) There will be no exceedance of SC ambient air quality standards.

All minor and major sources proposing new construction are also required to demonstrate compliance with South Carolina Regulation 61-62.5 Standard No. 8 (toxics) unless otherwise exempt. All combustion sources will burn only virgin fuels. Therefore, all emissions from combustion are exempt from a compliance demonstration. Process emissions include five pollutants that will be emitted as fugitives from diesel storage tanks, pigging events and other system leaks. Compliance for those pollutants is shown via a de minimis analysis.

The area surrounding the facility is currently in attainment for all NAAQS pollutants.

2.1 Class II Area Impact Analysis

The PSD Review requires pollutants, which are determined to be “major”, be evaluated by an air quality impact analysis. The air quality impact analysis consists of (1) a preliminary modeling analysis to determine which pollutants from the proposed project exceed their Class II Significant Impact Levels (SIL); and (2) a more comprehensive full impact analysis based on concentrations of pollutants that exceed the SIL for the entire facility and additional ‘facility-wide’ impacts from other facilities that may impact the Significant Impact Area (SIA).

2.1.1 Class II Preliminary Modeling Analysis

Potential emission rates from new sources for each pollutant determined to be significant at the facility were modeled to determine (a) maximum impacts relative to the appropriate SIL; (b) the impact area within which a full impact analysis must be performed (if applicable); and (c) whether or not the

facility may be exempted from the ambient monitoring data requirements. Each of these three preliminary Class II analyses is discussed below.

2.1.1.1 Significant Impact Level (SIL) Analysis

Table 1 provides the results of the SIL analysis for this project for the “major” pollutants. The maximum impact shown is the maximum modeled concentration (plus secondary impact for PM_{2.5} and just secondary impact for ozone). If the maximum impact is less than or equal to the SIL, then no further PSD analysis is required for that pollutant/averaging period.

The analysis shows the SIL was exceeded for PM₁₀, PM_{2.5}, NO₂ and CO for the averaging periods indicated. Therefore, a Full Impact analysis is required for those pollutants. No further PSD analysis is required for SO₂; however, SO₂ must be included in the Standard 2 (facility-only) compliance analysis. Ozone impact is further addressed below the table.

Table 1 - PSD CLASS II SIGNIFICANT IMPACT LEVEL (SIL) ANALYSIS						
Pollutant	Averaging Time	Model Used	Maximum Impact (µg/m³) ⁽¹⁾	SIL (µg/m³)	Exceeds SIL? (Yes/No)	Significant Impact Area (SIA) (km)
PM ₁₀	24-HOUR	AERMOD	18	5	Yes	2
	ANNUAL	AERMOD	1	1	No	N/A
PM _{2.5}	24-HOUR	AERMOD / MERPs	9.9 ⁽²⁾⁽⁴⁾	1.2	Yes	10
	ANNUAL	AERMOD / MERPs	0.45 ⁽³⁾⁽⁴⁾⁽⁸⁾	0.13	Yes	3
SO ₂	1-HOUR	AERMOD	2 ⁽⁵⁾	8	No	N/A
	3-HOUR	AERMOD	2	25	No	N/A
	24-HOUR	AERMOD	1	5	No	N/A
	ANNUAL	AERMOD	0	1	No	N/A
NO ₂	1-HOUR	AERMOD	140 ⁽⁵⁾⁽⁶⁾	8	Yes	23
	ANNUAL	AERMOD	7 ⁽⁶⁾	1	Yes	2
CO	1-HOUR	AERMOD	3152	2000	Yes	1
	8-HOUR	AERMOD	367	500	No	N/A
Ozone	8-HOUR	MERPs	3.6 ppb ⁽⁷⁾	1.0 ppb	Yes	N/A
1) Highest-first-high concentration except as noted otherwise						
2) Five-year average of the first-high concentrations						
3) Five-year average of the maximum annual concentrations						
4) Includes the AERMOD-modeled primary PM _{2.5} project impact and the total secondary PM _{2.5} project impact using the Modeled Emission Rates for Precursors (MERPs) method.						
5) The five-year average of the daily maximum 1-hour concentrations						
6) The OLM option using 2015-19 hourly ozone data from the Big Creek monitoring station was applied.						
7) Ozone is usually not emitted directly to the atmosphere. The maximum impact includes the secondary ozone project impact from NOx and VOC precursors using the MERPs method.						
8) The BAQ modeled concentration was slightly higher than the Facility result and is listed here.						

Table 1 - PSD CLASS II SIGNIFICANT IMPACT LEVEL (SIL) ANALYSIS						
Pollutant	Averaging Time	Model Used	Maximum Impact ($\mu\text{g}/\text{m}^3$) ⁽¹⁾	SIL ($\mu\text{g}/\text{m}^3$)	Exceeds SIL? (Yes/No)	Significant Impact Area (SIA) (km)
TSP is not considered a criteria pollutant for this analysis.						

Ozone:

The project impact calculated from secondary formation (from VOC and NO_x precursors) is greater than the ozone SIL (Table 1). Thus, the project may have a significant impact on ozone formation, and a cumulative analysis is necessary to demonstrate that the added secondary impact will not violate the ozone NAAQS. See Section 2.1.2.1 for the NAAQS ozone analysis.

2.1.1.2 Significant Impact Area (SIA) Analysis

The preliminary SIL modeling analysis (results shown in Table 1) was used to determine the Significant Impact Areas (SIA). Each SIA is a circular area with a radius extending from the source to the lesser of the following: 1) the most distant point where the Preliminary Modeling Analysis predicts a significant ambient impact will occur (greater than the SIL), or 2) a modeling receptor distance of 50 km.

The SIA is established for each pollutant and averaging period. The SIA is the area in which the NAAQS and PSD increments are evaluated using a cumulative (Full Impact) modeling analysis. All sources within the SIA and all receptors within the SIA where the project predicts a significant impact (where receptor concentrations exceed the applicable SIL) were included in the Full Impact Analyses. Other sources within the Screening Area (SA) were also included in the Full Impact Analyses, as appropriate.

2.1.1.3 Significant Monitoring Concentration (SMC) Analysis

Modeling significance results (impacts, from Table 1) for PM₁₀, SO₂, NO₂, and CO are shown in Table 2 below along with significant monitoring concentrations (SMC) for those pollutants. The impacts are the maximum modeled concentrations as noted in the table. The significant monitoring concentrations are from SC Regulation 61-62.5, Standard 7.

Table 2 – Significant Monitoring Concentrations (SMC)				
Pollutant	Averaging Period	Max. Impact ($\mu\text{g}/\text{m}^3$) ⁽¹⁾	SMC ($\mu\text{g}/\text{m}^3$)	Exceeds? (Yes/No)
PM₁₀	24-Hour	18	10	Yes
SO₂	24-Hour	1	13	No
NO₂	Annual	7 ⁽²⁾	14	No
CO	8-Hour	368	575	No
1) Highest-first-high concentration				

Table 2 – Significant Monitoring Concentrations (SMC)				
Pollutant	Averaging Period	Max. Impact ($\mu\text{g}/\text{m}^3$) ⁽¹⁾	SMC ($\mu\text{g}/\text{m}^3$)	Exceeds? (Yes/No)
2) The OLM option using 2015-2019 ozone data from the Big Creek monitoring station was applied.				

The maximum impacts for SO₂, NO₂ and CO are below the significant monitoring concentration (SMC) levels; therefore, no pre-construction monitoring is required for those pollutants. On the other hand, the PM₁₀ concentration exceeds the SMC. Section 2.4 of EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA-450/4-87-007) permits the use of existing representative air quality data in place of preconstruction monitoring data, provided monitor location, quality of data, and currentness of data are acceptable. Existing representative monitor data for PM₁₀, as well as PM_{2.5}, SO₂, NO₂ and CO are discussed below.

Monitor Data

The area near the proposed facility is generally free from the impact of other point sources and area sources associated with human activities. Additionally, this area is free of complex terrain. Thus, according to the EPA document listed above, monitoring data from regional monitor sites may be used as representative background data in this case. Design value background data is summarized in Section 2.4.

PM₁₀ - The facility has demonstrated that there is existing representative monitoring data in lieu of preconstruction monitoring for PM₁₀. The Greenville ESC monitoring site was selected to represent background concentrations for this pollutant. The most recent data available (at the time the application was submitted) is for 2022 through 2024. The monitor is located approximately 32 miles (52 km) to the north-northeast of the facility in a developed area in Greenville. The predominant wind directions at the facility (represented by wind data from the Anderson Regional Airport) are (from the) southwest and northeast. The monitor site is in a more developed area compared to the facility. Thus, data from the Greenville ESC monitor are likely conservative for this project.

PM_{2.5} – The Hillcrest Middle School monitor, located approximately 32 miles (52 km) to the northeast of the project site, was selected as the most representative monitor. This monitor was chosen over the Greenville ESC monitor, which is roughly the same distance from the project site. This is because the Hillcrest monitor is in an area that is less developed than the area around the Greenville ESC monitor, and more similarly developed to the area around the project site. Thus, the Hillcrest monitor data should be representative of PM_{2.5} background concentrations for this project.

SO₂ and NO₂ – The Greenville ESC monitor is the closest monitor to the project site for both pollutants (the other monitors in SC for these pollutants are in the Charleston and Columbia areas). As mentioned above, the Greenville ESC monitor site is located about 32 miles (52 km) to the north-northeast of the project site in a developed area of Greenville. Since the project site is in a comparatively less developed area, the data from the Greenville ESC monitor is likely conservative for this project for both SO₂ and NO₂.

CO - The only CO monitor in South Carolina is located at the Parklane station in the suburbs of Columbia. This monitor site is located about 100 miles (161 km) to the southeast of the project site,

in a major urban area with significant CO emissions. Thus, the data from the Parklane monitor is likely conservative for this project.

Ozone - Since the facility is significant for VOC, ozone monitoring data also needs to be reviewed. The nearest ozone monitor is located at Garrison Arena, about 16 miles (26 km) to the northwest of the project site. Development in the monitor area is similar to that near the project site, and the monitor data should be representative of background ozone for this project. The 2022-2024 design value for the Garrison Arena monitor is 63 ppb, below the 70 ppb standard. It should be noted that 2015-2019 hourly ozone data from the Big Creek monitor, in Anderson County, was used as input for the OLM (ozone limiting method) for NO₂ modeling. The Big Creek monitor ceased operation in 2020 but was the nearest ozone monitor to the project site covering the period of the meteorological data (2015-2019) used in the modeling (the Garrison Arena site was not active over that period).

The monitors discussed above are operated by SCDES in support of NAAQS attainment activities and meet the quality assurance requirements for this work. These activities require the data to be quality assured, and the level of quality assurance for these monitors meets the requirements for PSD modeling.

Therefore, it has been determined that the data SCDES obtained for background concentrations are representative of, or more conservative than, the ambient pollutant concentrations in the area of the proposed facility. In accordance with Chapter C, Section III of the New Source Review Manual (Draft document, dated October 1990), SCDES approves the use of this data to fulfill pre-construction monitoring requirements.

2.1.2 Class II Area Full Impact Analysis

A Full Impact Analysis is required for any pollutant for which the proposed source's estimated (modeled) ambient pollutant concentrations exceed the SIL (determined in Table 1). Separate analyses are performed for determining compliance with the NAAQS and PSD increments. The NAAQS analysis must also include background pollutant concentrations. The Full Impact Analysis consists of modeling all facilities within the SIA, and those in the SA which are not excluded by the screening protocol ("20D Rule," defined below) or via EPA's latest guidance in Appendix W and 11/20/2024 memo, *"Guidance on Developing Background Concentrations for Use in Modeling Demonstrations."* The SA is usually an area extending beyond the SIA to a distance of 50 km from the proposed source. The SIA determined for each pollutant is shown in Table 1.

The "Screening Threshold Method for PSD Modeling" or "20D Rule" was used to determine which sources within the SA to include. To exclude a source, the emissions (tpy) of a pollutant must be less than 20 times the distance (km) from the project site. Multiple emission points at a source were grouped together, and sources within 2 km of each other were summed prior to applying the 20D Rule. Those sources with emissions greater than or equal to 20D were retained and considered in the Full Impact modeling for both the Class II NAAQS and PSD Increment analyses (unless they could be excluded based on EPA guidance as mentioned in the paragraph above).

2.1.2.1 National Ambient Air Quality Standards (NAAQS) Analysis

Table 3 below shows a list of facilities (in the SIA, plus those in the SA that could not be excluded using the 20D Rule) that are included in the full impact analysis for NAAQS modeling.

Table 3 – SIA and 20D Sources Included for CLASS II NAAQS Analyses				
PM₁₀	PM_{2.5}	NO₂		CO
24-hour	24-hr & Annual	1-hour	Annual	1-hour
Duke - Anderson	Duke - Anderson	Duke - Anderson	Duke - Anderson	Duke - Anderson
First Quality Tissue	First Quality Tissue	Duke Energy - Lee	Duke Energy - Lee	Duke Energy - Lee
Owens Corning	Owens Corning	First Quality Tissue	First Quality Tissue	Santee Cooper - Rainey
		Hartwell Energy (GA)	Hartwell Energy (GA)	
		Honea Path Gen. Facility	Honea Path Gen. Facility	
		Owens Corning	Owens Corning	
		Santee Cooper - Rainey	Santee Cooper - Rainey	
		Transcontinental Gas Pipeline (Moore, SC)		
		Transcontinental Gas Pipeline (Comer, GA)		

Table 4 below shows that when proposed facility emissions are modeled with offsite sources in the SIA and SA (as appropriate), and background values are added (along with secondary impacts for PM_{2.5} and Ozone), the NAAQS are not exceeded and compliance has been demonstrated.

Table 4 – Class II NAAQS Full Impact Analysis							
Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³) ⁽¹⁾	Secondary Impact Concentration (µg/m³) ⁽²⁾	Background Concentration (µg/m³) ⁽³⁾	Total (µg/m³)	Standard (µg/m³)	% of Standard
PM₁₀	24-Hour	9.0 ⁽⁴⁾	N/A	35	44	150	29
PM_{2.5}	24-Hour	4.8 ⁽⁵⁾	0.1	13.1	18	35	51
	Annual	0.9 ⁽⁶⁾	0.0	7.1	8.0	9.0	89
NO₂	1-Hour	179.1 ⁽⁷⁾⁽⁸⁾⁽⁹⁾	N/A	⁽¹¹⁾	179	188	95
	Annual	8.3 ⁽⁸⁾⁽¹⁰⁾	N/A	12.8	21	100	21
CO	1-Hour	3055	N/A	1105	4160	40,000	10
Ozone	8-Hour	N/A	3.6 ppb	63 ppb	67 ⁽¹²⁾	70 ppb	96

1) AERMOD was used to determine primary maximum impacts. The highest-first-high modeled concentration was used for annual averaging periods and the highest-second-high was used for all other averaging periods, except as noted otherwise.

2) Secondary pollutant impacts for PM_{2.5} and Ozone were computed using MERPs. Note: Secondary impacts

Table 4 – Class II NAAQS Full Impact Analysis							
Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³) ⁽¹⁾	Secondary Impact Concentration (µg/m³) ⁽²⁾	Background Concentration (µg/m³) ⁽³⁾	Total (µg/m³)	Standard (µg/m³)	% of Standard
from existing off-site sources are accounted for within applied background concentrations.							
3) See Section 2.4 for more details.							
4) The sixth-high over five years of met data.							
5) The five-year average of the eighth-high concentrations.							
6) The five-year average of the maximum annual concentrations.							
7) The five-year average of the eighth-high 1-hour daily maximum concentrations.							
8) The OLM option using 2015-2019 hourly ozone data from the Big Creek monitoring station was applied.							
9) The Facility modeled concentration was slightly higher than the BAQ result and is listed here.							
10) The BAQ modeled concentration was slightly higher than the Facility result and is listed here.							
11) Background concentrations (season-by-hour-of-day as shown in Table 12) were added within the model.							
12) Ozone is usually not emitted directly to the atmosphere. The ozone maximum impact includes the secondary ozone project impacts using MERPs for NO _x and VOC precursors. The total combined (current background design value + secondary) ozone impact is shown to compare against the appropriate ozone standard. The background design value accounts for all existing source contributions.							

The dispersion parameters and modeled emission rates for all offsite sources included in the Class II NAAQS Full Impact Analysis are not included in this preliminary determination. They are shown in the facility's application (dated April 2026) and corresponding electronic modeling files.

2.1.2.2 Class II PSD Increment Analysis

The full impact analysis for PSD increment consuming sources was performed in the same manner as the full impact analysis for the NAAQS shown above. As a conservative measure, the same offsite sources included in the NAAQS analyses, except for PM_{2.5}, were included here. Since this project will set the PM_{2.5} minor source baseline date for Anderson County, no offsite sources in Anderson County were included. And no offsite sources outside Anderson County were included since all eligible sources were screened out using the “20D” rule. The facilities included for each of the pollutants are shown in Table 5 below.

Table 5 – SIA and 20D PSD Increment Consuming Sources			
PM₁₀	PM_{2.5}		NO₂
24-hour	24-hour	Annual	Annual
Duke - Anderson	Duke - Anderson	Duke - Anderson	Duke - Anderson
First Quality Tissue			Duke Energy - Lee
Owens Corning			First Quality Tissue
			Hartwell Energy (GA)
			Honea Path Gen. Facility
			Owens Corning
			Santee Cooper - Rainey

Table 6 below indicates that the maximum impact for each pollutant and averaging period does not exceed the respective PSD increment standard.

Table 6 – Class II PSD Increment Analysis						
Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³) ⁽¹⁾	Secondary Impact Concentration (µg/m³) ⁽²⁾	Total Impact Concentration (µg/m³)	Standard (µg/m³)	% of Standard
PM₁₀	24-Hour	12.8	N/A	13	30	43
PM_{2.5}	24-Hour	8.2	0.1	8	9	89
	Annual	0.5	0.0	1	4	25
NO₂	Annual	8.2 ⁽³⁾	N/A	8	25	32
1) AERMOD was used to determine primary maximum impacts. The highest-first-high modeled concentrations for the 5 years of meteorological data are listed for annual averaging periods and the highest second-high is shown for 24-hour averaging periods.						
2) The secondary PM _{2.5} project impacts, using the MERPs method, are shown in this column. There are no increment consuming emissions for offsite sources since this project sets the MSBD for PM _{2.5} . Thus, the same secondary impacts used in the NAAQS analysis were used here.						
3) The OLM option using 2015-2019 hourly ozone data from the Big Creek monitoring station was used.						

The dispersion parameters and modeled emission rates for all offsite sources included in the Class II Increment Analysis are not included in this preliminary determination. They are shown in the facility's application (dated April 2026) and corresponding electronic modeling files.

2.2 Additional Impacts Analysis

PSD review requires an analysis of any potential impairment to visibility, soils, and vegetation that may occur as a result of the proposed or modified facility/sources. The review also requires an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the new facility.

2.2.1 Growth

The SC PSD rules require the applicant to provide information relating to the nature and extent of air quality impacts from all commercial, residential, industrial and other growth in the area that the facility, or modification, would affect. For the purposes of this report, the area the facility would affect is defined as the significant impact area (SIA). The greatest SIA was determined to be 23 km (14 miles; Table 1).

Once the facility is operational, it will employ 30-35 full-time employees. Thus, significant workforce-associated residential and commercial growth is not expected to cause or contribute to a quantifiable adverse impact on local ambient air quality.

2.2.2 Soils and Vegetation

Maximum predicted offsite impacts were compared to EPA screening levels or secondary NAAQS (Table 7). Modeling of all the proposed (facility-only) emissions indicates there will be no adverse impacts expected on soils or vegetation caused by those emissions.

Table 7 – Soils and Vegetation Analysis								
Pollutant	Averaging Time	Model Used	Max. Impact (µg/m ³) ⁽¹⁾	Back-ground (µg/m ³)	Facility / Regional Impact (µg/m ³) ⁽⁹⁾	EPA Screening Concentration (µg/m ³)	AAQS Standard (µg/m ³) ^(11a)	Exceeds? (Y or N)
PM ₁₀	24-Hour	AERMOD	18.2	35	53	N/A	150	No
PM _{2.5}	24-Hour	AERMOD/MERPs	9.9 ⁽³⁾⁽⁵⁾	13.1	23	N/A	35	No
	Annual	AERMOD/MERPs	0.5 ⁽⁴⁾⁽⁵⁾	7.1	8	579 ^(11b)	15	No
SO ₂	1-Hour	AERMOD	1.8	5.0	7	917 ^(11d)	196	No
	3-Hour	AERMOD	2.0	4.5	7	786 ^(11d)	1300	No
	Annual	AERMOD	0.1	N/A	0	18 ^(11d)	80	No
NO ₂	1-Hour	AERMOD	140.3 ⁽⁶⁾⁽⁷⁾	74.0	214	66,000 ^(11c)	N/A	No
	4-Hour	AERMOD	140.3 ⁽⁶⁾⁽⁷⁾	74.0	214	3760 ^(11d)	N/A	No
	8-Hour	AERMOD	140.3 ⁽⁶⁾⁽⁷⁾	74.0	214	3760 ^(11d)	N/A	No
	1-Month	AERMOD	140.3 ⁽⁶⁾⁽⁷⁾	74.0	214	564 ^(11d)	N/A	No
	Annual	AERMOD	7.3 ⁽⁶⁾	12.8	20	94 ^(11d)	100	No
CO	1-Week	AERMOD	366.8 ⁽⁸⁾	687	1055	1,800,000 ^(11d)	N/A	No
Ozone ⁽⁹⁾	8-Hour	MERPs	4 ⁽¹⁰⁾	63	67	--	70	No
1) The highest-first-high modeled concentration unless noted otherwise.								
2) Results include background values when available (see Section 2.4 for background details).								
3) Five-year average of the first-high concentrations								
4) Five-year average of the maximum annual concentrations								
5) Includes the primary PM _{2.5} impact (from the cumulative modeling analysis) and the secondary PM _{2.5} project impacts using MERPs methodology. Note: Secondary component impacts from existing sources are accounted for within applied background concentrations.								
6) The OLM option using 2015-2019 hourly ozone data from the Big Creek monitoring station was applied.								
7) The five-year average of the eighth-high 1-hour daily maximum concentrations (also conservatively used for the 4-hour, 8-hour and 1-month averaging periods).								
8) The 8-hour average modeled concentration was conservatively used here to compare to the weekly standard. Background is also an 8-hour average value.								
9) Units for all values are ppb.								
10) The ozone maximum modeled concentration is based on the secondary ozone project impacts using the MERPs methodology.								
11) References:								
a) Secondary National Ambient Air Quality Standard								
b) "Responses of Plants to Air Pollution" Lerman, S.L., and E.F. Darley. 1975. "Particulates," pp. 141-158 (Chap. 7). In J.B. Mudd and T.T. Kozlowski (eds.)								

Table 7 – Soils and Vegetation Analysis								
Pollutant	Averaging Time	Model Used	Max. Impact ($\mu\text{g}/\text{m}^3$) (1)	Back-ground ($\mu\text{g}/\text{m}^3$)	Facility / Regional Impact ($\mu\text{g}/\text{m}^3$) (9)	EPA Screening Concentration ($\mu\text{g}/\text{m}^3$)	AAQS Standard ($\mu\text{g}/\text{m}^3$) (11a)	Exceeds? (Y or N)
c) "Diagnosing Injury Caused by Air Pollution" (EPA-68-02-1344)								
d) "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals" (EPA-450/2-81-018, 1980)								

2.2.3 Visibility

The largest SIA for a 24-hour or annual averaging period is 10 km (Table 1), which pertains to $\text{PM}_{2.5}/24\text{-hour}$ (other SIAs for 24-hour and annual averaging periods are 3 km or less). The only visibility-sensitive area within 10 km of the facility is the Anderson Regional Airport. The airport is located approximately 6.5 km northwest of the facility. However, the $\text{PM}_{2.5}/24\text{-hour}$ SIL analysis indicated there are no modeled concentrations exceeding the SIL at or near the airport (the nearest receptor where the modeled concentration exceeded the SIL is about 3 km from [southeast of] the airport). Thus, a visibility analysis for Class II areas is not necessary for this project.

2.3 Class I Area Impact Analysis

Air quality impacts must be addressed for all Class I areas within 300 km of a PSD facility. Those Class I areas for this project (and distance from the facility) include the following: Shining Rock National Wilderness Area (101 km); Great Smoky Mountains National Park (150 km); Joyce Kilmer National Wilderness Area (153 km); Linville Gorge National Wilderness Area (170 km); and Cohutta National Wilderness Area (195 km). Thus, Class I impacts must be addressed for these five Class I areas.

A Class I analysis typically consists of the following:

- 1) SIL (Significant Impact Level) analysis;
- 2) PSD increment analysis (if required per the SIL analysis); and
- 3) AQRV (Air Quality Related Values) analysis, if requested by the FLM.

For this project, only the SIL analysis was conducted and is addressed in Section 2.3.1 below. The facility screened out (using "Q/D") of the requirement to conduct an AQRV analysis, the details of which are shown in Section 2.3.3.

2.3.1 Class I Significant Impact Level Analysis

The facility initially modeled the project emissions using AERMOD with receptors placed in a circle at a range of 50 km from the facility. Since the closest Class I area is 101 km from the facility, this modeling is a conservative screening of the significant impact at each of the five Class I areas. The maximum impacts from that analysis (plus secondary impact as appropriate) were less than the SIL for all pollutants and averaging periods except for $\text{PM}_{10}/24\text{-hour}$ and $\text{PM}_{2.5}/24\text{-hour}$. For those pollutants/averaging periods, a CALPUFF analysis was then conducted using receptors in each of the five Class I areas (i.e., receptor fields developed by the Federal Land Manager for use in regional

haze modeling). The maximum impacts from that analysis (plus secondary impact for PM_{2.5}/24-hour) were below the respective SILs. All Class I SIL analysis results are shown in Table 8 below.

Table 8 – Class I Significant Impact Level (SIL) Analysis						
Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³)	Secondary Impact Concentration (µg/m³) ⁽⁴⁾	Total Project Impact Concentration (µg/m³)	SIL (µg/m³)	Significant Impact? (Y or N)
PM₁₀	24-Hour	0.15 ⁽¹⁾	N/A	0.2	0.3	No
	Annual	0.03 ⁽²⁾	N/A	0.0	0.2	No
PM_{2.5}	24-Hour	0.15 ⁽¹⁾	0.04	0.19	0.27	No
	Annual	0.03 ⁽²⁾	0.001	0.03	0.05	No
SO₂	3-Hour	0.40 ⁽²⁾	N/A	0.4	1.0	No
	24-Hour	0.07 ⁽²⁾	N/A	0.1	0.2	No
	Annual	0.005 ⁽²⁾	N/A	0.0	0.1	No
NO₂	Annual	0.03 ⁽²⁾⁽³⁾	N/A	0.0	0.1	No
1) The maximum CALPUFF result from all receptors at the five pertinent Class I areas.						
2) The first high AERMOD result for a ring of receptors at a range of 50 km from the facility (except PM _{2.5} /Annual, which is the first-high averaged over 5 years).						
3) The OLM option using 2015-2019 hourly ozone data from the Big Creek monitoring station was applied.						
4) Secondary pollutant impacts via MERPs were used for PM _{2.5} .						

2.3.2 Class I Increment Consumption Impact Analysis

This analysis is not required since no significant impacts were indicated by the Class I SIL analysis (Table 88).

2.3.3 Class I AQRV Analysis

The FLAG 2010 document allows sources that are > 50 km from the Class I area to potentially be screened out of the requirement to conduct an AQRV analysis. The screening is based on total emissions of certain pollutants and distance from the source to the Class I area. If $Q/D \leq 10$ (where D = distance (km) from the source to the Class I area; Q = emissions (TPY) of SO₂ + NO_x + PM₁₀ + H₂SO₄), the facility is not required to do an AQRV analysis. Note that only emission increases associated with the proposed project modification need to be considered (per additional information provided in public comment responses to the FLAG 2010 document).

The Q/D results for each Class I area are shown in Table 9 (below). These results show that an AQRV analysis is not required for this project.

Table 9 – AQRV Screening Analysis								
Class I Area	Q (TPY) ⁽¹⁾					D (km) ⁽²⁾	Q/D ⁽³⁾	Analysis Req'd?
	SO ₂	NOx	PM ₁₀	H ₂ SO ₄	Total			
Shining Rock NWA	60.0	421.9	350.9	4.6	837.4	101	8.3	No
Great Smoky Mtns NP						150	5.6	No
Joyce Kilmer NWA						153	5.5	No
Linville Gorge NWA						170	4.9	No
Cohutta NWA						195	4.3	No
1) Based on typical 24-hour emissions extrapolated to TPY. For the CTs, the design load scenario was assumed, i.e., firing natural gas at 100% load using duct burners (note that fuel oil usage will be limited to 500 hrs/year in the permit). Since the emergency engines will be tested ≤1 hour on a given day, and the auxiliary boiler will be limited to a 10% capacity factor, emissions from those sources were annualized.								
2) Distance from facility to Class I area								
3) If Q/D ≤ 10, an AQRV analysis is not required.								

2.4 South Carolina Facility-Wide Compliance Demonstration

All major sources proposing new construction or construction modifications in South Carolina are required to demonstrate compliance with SC Regulation No. 62.5 Standards 2 (NAAQS), 7 (Class II PSD Increment), and 8 (Air Toxics). Compliance with each state standard is addressed below:

Standard 2: Compliance for PM₁₀, PM_{2.5}, NO₂ and CO (1-hour) is shown using results from the PSD Class II full impact AERMOD analysis. Compliance for SO₂ and CO (8-hour) is shown using results from the PSD Class II SIL AERMOD analysis (SO₂ and CO/8-hour were not included in the full impact analysis). A compliance demonstration for lead is not required since the facility-wide emissions are below the exemption emission rate.

Standard 7: Standard 7 (PSD) Part k - "Source Impact Analysis" and Part p - "Sources Impacting Federal Class I Areas - Additional Requirements" were addressed in Sections 2.1 and 2.3 above, as appropriate. Standard 7 increments were discussed and modeled as full impact (including all facility sources) in Section 2.1 (Table 6). In addition, Class I Area impacts were shown to be below respective significant impact levels for all applicable pollutants and averaging periods in Section 2.3 (Table 8). Thus, no further analysis is needed for this standard.

Standard 8:

All combustion sources will burn only virgin fuels. Therefore, all emissions from combustion are exempt from a compliance demonstration. Process emissions include five pollutants that will be emitted as fugitives from diesel storage tanks, pigging events and other system leaks. Compliance for those pollutants is shown via a de minimis analysis.

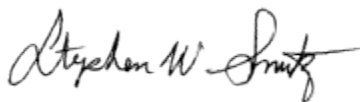


Table 10 – Standard No. 2 - Ambient Air Quality Standards Modeling Analysis							
Pollutant	Averaging Time	Basis	Maximum Concentration (µg/m³) ⁽¹⁾	Background Concentration (µg/m³)	Total (µg/m³)	Standard (µg/m³)	% of Standard
PM₁₀	24-Hour	AERMOD	9.0 ⁽²⁾	35	44	150	29
PM_{2.5}	24-Hour	AERMOD	4.8 ⁽³⁾	13.1	18	35	51
	Annual	AERMOD	0.9 ⁽⁴⁾	7.1	8	12	67
SO₂	1-Hour	AERMOD	1.8 ⁽⁵⁾	5.0	7	196	4
	3-Hour	AERMOD	2.0 ⁽⁶⁾	4.5	7	1300	1
NO₂	1-Hour	AERMOD	179.1 ⁽⁷⁾⁽⁸⁾	⁽⁹⁾	179	188	95
	Annual	AERMOD	8.4 ⁽⁶⁾⁽⁸⁾	12.8	21	100	21
CO	1-Hour	AERMOD	3055	1105	4160	40,000	10
	8-Hour	AERMOD	368	687	1055	10,000	11
1) From the PSD Class II full impact NAAQS analysis, except for SO ₂ and CO/8-hr which are from the Class II SIL analysis.							
2) The sixth-high over five years of met data.							
3) The five-year average of the eighth-high concentrations.							
4) The five-year average of the maximum annual concentrations.							
5) The five-year average of the daily maximum 1-hr concentrations.							
6) The highest-first-high							
7) The five-year average of the eighth-high 1-hour daily maximum concentrations.							
8) The OLM option using 2015-2019 hourly ozone data from the Big Creek monitor was applied.							
9) Temporal season-by-hour-of-day background data from the Greenville ESC monitor was added within the model.							

Tables 11 and 12 below show details of the background data used in the SC Standard No. 2 and PSD Class II NAAQS compliance demonstrations (in Tables 10 and 4, respectively).

Table 11 – Background Monitoring Data (µg/m³)									
Pollutant	Site Name	County	Year	1-Hr	3-Hr	8-Hr	24-Hr	3-Mo	Annual
PM₁₀	Greenville ESC	Greenville	22-24				35		
PM_{2.5}	Hillcrest Middle School	Greenville	22-24				13.1		7.1
SO₂	Greenville ESC	Greenville	22-24	5.0	4.5				
NO₂	Greenville ESC	Greenville	22-24	74.0 ⁽¹⁾					12.8
CO	Parklane	Richland	22-24	1105		687			
Ozone	Garrison Arena	Anderson	22-24			63 ⁽²⁾			
PM ₁₀ 24-hr is the fourth-high over three-year period.									
The concentration listed for all other pollutants and averaging periods is the 3-year design value.									
1) Temporal season-by-hour-of-day data was used for the 1-hour standard. See Table 12 for details.									
2) Units are ppb.									

Table 12 - NO₂ Season-by-hour Background Monitor Data (µg/m³) Greenville ESC - 2022-2024				
Hour	Winter	Spring	Summer	Fall
1	62.1	51.4	32.6	45.2
2	57.7	49.5	27.6	42.6
3	55.2	47.0	27.0	41.4
4	54.6	42.0	23.2	40.1
5	53.3	45.8	27.6	40.8
6	52.1	47.7	28.2	38.9
7	52.1	54.6	33.2	42.6
8	55.8	54.6	28.2	48.3
9	56.4	44.5	21.3	45.8
10	48.3	28.2	13.8	35.1
11	38.3	16.9	10.0	28.2
12	27.0	13.2	11.3	16.3
13	23.2	11.3	8.2	13.2
14	25.7	10.7	8.2	13.2
15	21.9	11.9	8.2	12.5
16	25.7	13.8	10.0	13.8
17	29.5	13.8	12.5	15.7
18	35.1	14.4	12.5	22.6
19	51.4	16.3	13.2	39.5
20	63.3	26.3	15.7	65.8
21	74.6	36.4	23.2	74.6
22	73.4	45.2	30.1	69.6
23	72.1	48.3	32.0	64.0
24	66.5	55.8	37.6	59.6

Table 13 below shows that the facility will comply with SC Standard No. 8.

Table 13 - Standard No. 8 – Toxic Air Pollutants De Minimis Analysis			
Pollutant	CAS Number	Emission Rate (LB/DAY) ⁽¹⁾	De Minimis (LB/DAY)
Benzene	71-43-2	0.086	1.800
Ethyl Benzene	100-41-4	0.145	52.200
Hexane	110-54-3	0.026	10.800
Toluene	108-88-3	1.099	24.000
Xylene (mixed isomers)	1330-20-7	3.024	52.200