SC DEPARTMENT *of*
ENVIRONMENTAL
SERVICES

Bureau of Air Quality
Response to Comments on Air Quality

Duke Energy Carolinas, LLC – Anderson County Combined Cycle Station
Anderson, Anderson County, South Carolina
Permit Number PSD-50000026 v1.0

The following is the South Carolina Department of Environmental Services, Bureau of Air Quality's (SCDES or Department) response to the comments made during the formal comment period held September 11, 2026, through October 20, 2026, regarding the draft Prevention of Significant Deterioration (PSD) construction permit for Duke Energy Carolinas, LLC – Anderson County Combined Cycle Station (Duke Energy or facility). An availability session to answer questions from the public and a public hearing, to receive oral and written comments on the proposed project, were held by the Department on October 13, 2026.

The written Department Decision, final determination, permit, statement of basis, this response document, and a letter of notification are located for viewing at the SCDES Columbia office located at 2600 Bull Street, Columbia SC 29201, and on our webpage at https://des.sc.gov/programs/bureau-air-quality/air-quality-department-decisions.

Hard copies of all the above-listed documents and written comments received can be requested by contacting our Freedom of Information Office at (803) 898-3882.

The following is a summary of the changes to the draft permit and other actions taken by the Department following the comment period:

- Conditions B.67, B.70, B.72, B.78, and B.79 have been updated according to the EPA's changes made to New Source Performance Standard (NSPS) Subpart KKKKa - Standards of Performance for Stationary Combustion Turbines on July 16, 2026.
- Conditions B.2, B.5, B.7, B.8, B.9, B.11, B.13, B.17, B.19, B.20, B.22, B.25, B.26, B.34, B.41, and B.44 have been updated to require reports be submitted to the Department on a quarterly basis rather than less frequent semiannual basis.
- Condition B.41 has been updated to specify actual CO_2 emissions be calculated in accordance with Part 75 for comparison with the calculated emissions limit.
- Condition B.90 was added to require an initial source test to be conducted on specified Hazardous Air Pollutants to verify area source status.

The statement of basis has been updated to indicate that the facility will operate a continuous emissions monitor for ongoing NO_X compliance as required by NSPS KKKKa rather than through subsequent testing and quarterly reporting instead of semiannual. In addition, a clarification has been added to the project emission table concerning HAP and the updated rule information for NSPS TTTTa has been added.

Written comments and oral comments were received during the comment period. The Department has reviewed and considered each comment received. The following is a summary of the comments received and the Department responses to those comments:

Best Available Control Technology (BACT) Analysis

Comments BACT: Comments were received requesting the Department require the best available control technology to limit the impact of the project on the public and environment. Another comment asserted that SCDES should evaluate whether the permit satisfies best available control technology (BACT) standards.

Response: The draft permit is a PSD air construction permit that would allow Duke Energy to construct a new combined-cycle power block consisting of two combined-cycle combustion turbines (CCCT). When drafting PSD permits, the permitting authority must establish emission limitations based on BACT for each pollutant that is subject to PSD at the new major stationary source. As such, the Department conducted a BACT review and included in the draft permit BACT limitations and monitoring requirements for the two proposed combustion turbines and supporting equipment emitting Particulate Matter (PM) (Filterable), Particulate Matter <10 Microns (PM_{10}), Particulate Matter <2.5 Microns ($PM_{2.5}$), Sulfur Dioxide (SO_2), Nitrogen Oxides (NO_X), Carbon Monoxide (CO), Volatile Organic Compounds (VOC), and Greenhouse Gas (GHG) represented as Carbon Dioxide (CO_2) equivalent emissions (CO_2e). The PSD preliminary determination details this review and provides the basis the Department used to determine that the BACT limits contained in the draft permit satisfy the regulatory requirement that the proposed limits reflect the maximum degree of controls that can be applied to reduce emissions, considering the energy, environmental, and economic impacts.

It is important to note that not all CCCTs are the same. There is a range of different CCCT makes (manufacturers) and models, and CCCTs at different sites may be designed and intended to meet different objectives specific to a given project. For instance, higher combustion-zone temperatures and residence times generally result in more complete combustion, lower VOC emissions, and higher efficiency. However, higher temperatures also generally result in higher NO_X formation. Therefore, if a CCCT is designed to be more efficient (e.g., higher temperature) or to meet a certain VOC level, then its NO_X emissions might be higher. Given the variety of potential project designs and objectives, CCCTs are considered inherently different and often cannot be directly compared, and emissions from different

CCCTs controlled by the same technology may vary. In addition, if a company plans to install a CCCT because it meets their specific business purpose, the BACT process is not intended to force that company to install a specific model (e.g., GE, Siemens, or Mitsubishi). Therefore, emissions limits associated with different CCCT projects may not be directly comparable due to the differences in makes (manufacturers) and models of CCCTs, and differences in project scope, needs, and design. BACT emission limits are evaluated on a case-by-case basis.

Comments Comparing Similar Facilities: Comments were received comparing the BACT emission limits and averaging times to combustion turbines permitted at other facilities.

Response: Based on the information reviewed by the Department, the following table lists facilities identified in comments for comparison with the BACT limits at Duke Energy's Anderson Plant:

Date Issued	Facility	Turbine Model	Status
6/12/26	Lowman Energy Center	Mitsubishi 501JAC (Natural Gas Only)	Not Constructed
11/9/20	Plant Barry	Mitsubishi 501JAC with 550 MMBtu/hr Duct Burner (Natural Gas Only)	Operating
6/24/19	Chickahominy Power	Mitsubishi 501JAC (Natural Gas Only)	Not Constructed
Draft	Plant McIntosh	Undisclosed (5,325 MMBtu/hr)	Not Constructed
1/29/26	Plant Bowen	Undisclosed (5,292 MMBtu/hr)	Not Constructed
4/29/21	Renova Energy Center	GE 7HA.02 (Dual Fuel)	Cancelled
12/19/25	Chesterfield Energy Reliability Center	GE 7FA.05 (Dual Fuel)	Not Constructed
7/29/22	Lincoln Land Energy Center	Siemens, Unknown (550 MW)	Not Constructed
6/23/22	Marshall Energy Center	Undisclosed (3,064 MMBtu/hr)	In Construction
6/19/23	Maple Creek Power Plant	GE 7HA.03 (Natural Gas Only)	Not Constructed
4/26/18	Novi Energy C4GT	GE 7HA.02 (Natural Gas Only)	Cancelled
Proposed	Cumberland Fossil Plant	GE 7HA.03 (Natural Gas Only)	Permit Not Issued
1/5/22	Longview Power-Maidsville (aka Moutain State Clean Energy)	GE 7HA.03 (Natural Gas Only)	Not Constructed

Date Issued	Facility	Turbine Model	Status
7/7/22	Alaska Gasline Liquefaction Plant	GE LM6000 and GE LM2500 (Simple Cycle and Natural Gas Only)	Not Constructed
7/2/25	CTC Property LLC	Solar Simple Cycle (16.5 MW) (Natural Gas Only)	Operating
9/15/23	Vantage Data Center	Solar Simple Cycle (16.5 MW) (Natural Gas Only)	Operating
12/20/22	Erickson Station	Simple Cycle (Natural Gas Only)	Unknown

As reflected in the chart above, one factor to be weighed in reviewing other previously permitted CCCT projects is the construction status of the previously permitted project. Although permits for unconstructed sources with unverified limits are relevant in a BACT analysis, it is proper for the determination of BACT for a facility to consider all available information, including manufacturer's information specific to their equipment and operating profile. As discussed above, emission limits associated with different CCCT projects may not be directly comparable due to the differences in make, model, project scope, needs, and design. Factors such as maximum heat rate can differ among turbine models which can affect CO, VOC, and NO_X emissions. The Duke Energy model turbines also differ from other listed GE 7HA.03 turbines because they are configured as dual-fuel turbines. This configuration changes internal parts to allow for the use of different burners. The presence and size of duct burners can also affect the emissions. Although the BACT limits from unconstructed facilities or different combustion turbine models need to be taken into account, the absence of construction prevents a verifying demonstration of compliance, and the BACT emissions limit ultimately should be developed based on the best information available which can include the manufacturer's information and the knowledge of the predicted operating profile of the turbines.

Further responses to more specific BACT-related comments should be viewed as incorporating by reference the above.

Comments Restricting Use of Fuel Oil: A comment was received requesting SCDES to consider prohibiting or at least further restricting the use of fuel oil in the combustion turbines as a BACT limitation, citing other permitted and proposed facilities with similar units that were not permitted to use fuel oil.

Response: BACT is a case-by-case determination based on specifics of individual projects. The absence of fuel oil from the projects referenced reflects the needs and design choices of the individual projects at the time of issuance. Each project must be evaluated based on its distinct scope, needs, and requirements. In this case, as discussed in the supporting BACT determination and Statement of Basis, the project at issue relies on the use of natural gas as primary fuel, with fuel oil (ULSD) only to be fired in a limited capacity as a backup fuel. In

accordance with Duke Energy's fuel-security plan for the Anderson site, they have obtained firm transportation capacity to support Anderson's full-load natural gas requirements and reliable operation. Firm transportation means that Duke Energy has dedicated "space" on the pipeline to deliver gas to the site and gas supply. This firm transportation is provided by Transco (interstate) and Piedmont (intrastate).

Per the facility, fuel oil is a reliability backstop, not the plant's primary fuel. Dual-fuel capability is intended to allow continued operation if natural gas supply is disrupted or constrained, helping preserve electric reliability during unusual system conditions such as a pipeline force majeure. Thus, a limited allowance for fuel oil use is necessary from a reliability standpoint that is specific to the facility's responsibility to provide electricity to the grid. As such, further restriction on the use of fuel oil would not be in keeping with the project's scope and design needs and need not be considered. As set forth in the permit and BACT determination, use of fuel oil in the combustion turbines is restricted to 500 full load equivalent hours per year, and water injection for control of NO_X is required when burning fuel oil. Infrastructure at the site is limited to approximately 7-10 days of operation on fuel oil, at which point the tanks would be taken out of service to allow for refueling, which will take considerable effort, further supporting the planned primary operation on natural gas.

Comment on BACT Limits for NO_X in Combined Cycle Mode: Comments were received expressing concerns on how the proposed emissions limits compare with those applied to similar facilities. A specific comment was received concerning the combustion turbine natural gas NO_X limit of 2.5 ppm (24-hour average), citing other issued or proposed permits using GE 7HA.03 turbines with a limit of 2.0 ppm (3-hour average).

In addition, the commenter expressed concerns with the combustion turbine NO_X limit of 6.0 ppm (24-hour average) during fuel oil combustion, citing other issued or proposed permits using GE 7HA.03 turbines with a limit of 4.0 - 5.0 ppm with a 1–4-hour averaging time.

Response: As stated above, the Preliminary Determination document outlines the rationale for selecting BACT. Other permits may require a NO_X limit of 2.0 ppm when firing on natural gas; however, , data provided by GE indicates uncontrolled NOx emissions leaving the turbine can be as high as 33ppm due to the firing temperatures of this turbine model and configuration. At an emission limit of 2.5 ppm NOx, this is already a 92% reduction in NOx emissions, which represents the top range of control afforded by an SCR. Additionally, BACT limits must account for operation over all potential conditions and for the life of the unit. Over time, catalyst activity reduces between maintenance activities making lower limits unachievable. To meet NOx emission rates below 2.5 ppm, the unit would be required to over-inject of ammonia. Any environmental benefits from a lower NOx limit would likely be offset by an increase in ammonia slip and the potential for additional PM2.5 emissions.

The other permits identified by the commenter require a NO_X limit of 4.0 - 5.0 ppm with a 1–4-hour averaging time when firing on fuel oil; however, for the same reasons as described above, lower emission rates may not be achievable over the life of the unit and all operating scenarios without other adverse environmental impacts. It should be noted that the same model turbines that are not designed to be dual fuel could have different operating specifications, such as temperature, that would impact the ability of the turbine to achieve the lower NO_X emissions. In addition, differences in duct burner size could also impact the ability of the turbine to achieve the lower NO_X emissions.

Comment on NO_X BACT in Simple Cycle Mode: A comment was received questioning the NO_X BACT limit of 15 ppm for operation in simple cycle mode when exhaust is routed through the bypass stack, expressing specific concern that Duke does not explain why the turbines cannot be designed such that emissions would be routed through the SCR system regardless of whether they are operating in combined-cycle or simple-cycle mode.

Response: The proposed turbines are designed for primary operation in combined cycle mode. The SCR requires a specific temperature window to operate as designed (typically 500-700°F). When operating in simple cycle configuration, exhaust temperatures are in excess of 1000°F. When operating in combined cycle mode, the heat recovery steam generator (HRSG) would be operational, and exhaust gas at this temperature would typically be routed through the HRSG, with water circulating through the tubes to accept the excess heat and achieve the optimum SCR operating temperature. In simple cycle mode there would be no water circulating through the HRSG to reduce the exhaust temperatures, and dilution fans would need to be used to introduce ambient air to cool the turbine exhaust to the optimum SCR temperature. This would result in a significant change to the airflow in the HRSG and require that the HRSG 'shell' and catalysts (both SCR and CO) be designed differently to accept the additional air flow. These changes to the HRSG and catalyst design could reduce the efficiency of combined cycle operations, which would not be prudent given combined cycle is the primary mode of operation. Therefore, such changes are considered outside the project design and scope. The simple cycle bypass mode is expected to be used infrequently and is limited to 500 full load equivalent hours per year.

Duke Energy has indicated that the goal is to run the proposed CCCTs in combined-cycle mode as much as possible because of the significant increase in efficiency when the exhaust turbine is used to create steam that can be used to generate additional power in the steam turbine. While Duke Energy has indicated that they plan for outages for the entire plant (turbines and balance of plant), emergent issues can necessitate select equipment to be removed from service. Having the turbines available to operate in simple cycle mode during this time, allows the facility to continue to provide power at a lower cost to customers and avoid running less efficient units or purchase power from other providers.

The following were provided by Duke Energy as relevant examples of situations from other sites speaking to Duke Energy's incorporation of a limited simple cycle bypass mode of operation for this project:

- Following Hurricane Florence, the turbines at the Sutton plant ran in simple cycle mode for a period of time while the HRSG was out of service to address equipment issues from flood waters.
- Units at the HF Lee combined cycle plant have run in bypass mode when the steam turbine was offline for repairs.
- Duke Energy's WS Lee facility does not have the ability to operate in simple cycle mode. When the steam turbine turning gear experienced a failure in 2023, the entire plant was taken offline while repairs were made.

Comment on NO_X BACT for Startup and Shutdown: A comment was received concerning the lack of short-term NO_X limits for startup and shutdown operations. The comment argues that the permit does not reflect the degree of emissions reduction that is required (or proposed) for other operating scenarios in permits for similar facilities.

Response: Startup and shutdown operations are by nature short-term events. Duke Energy has indicated that cold start operations take less than three hours and warm start operations take less than an hour and a half, while hot start operations and shutdowns take less than one hour, each. Condition B.17 in the draft permit defines BACT for these events as adhering to optimal operational practices, consistent with other source BACT determinations. In addition, Condition B.17 establishes emissions limits for each listed event as a lb/event emission factor. Since the nature of these events are short term, the lb/event limit is effective in limiting short term NO_X emissions. The additional annual emission limits contained in Condition B.17 provide an overall cap on emissions from these events and will demonstrate that the facility has adhered to the optimal operational practices that are defined as the BACT work practice standard. The annual emission limit also encourages the facility to minimize the length of time of each of these events to the shortest length that is practicable, thus further limiting short term NO_X emissions.

It should be noted that the first turbine in a cold start scenario would be fired and remain at low loads while the HRSG and Steam Turbine is allowed to warm. This slow warming is required to minimize the stress to metal components from a cold start. Duke Energy's application mentions that these emission rates are conservative and assume that control devices have not been engaged. However, they provided that their operating experience indicates that SCR temperatures will be achieved during the start-up. The system is designed to automatically engage the ammonia flow to the SCR as soon as minimum temperatures are reached. Additionally, this worst-case sequence assumes that all warming is provided by

the combustion turbine. The purpose of the auxiliary boiler is to supplement the heating of the HRSG and steam turbine during a cold start in advance of firing the combustion turbine. Finally, the start-up of the first turbine takes longer. Once the steam turbine is warm, the second turbine can be brought online quicker and blended in. In summary, the operational scenarios for these events are the worst case scenarios.

As to Chesterfield Energy Reliability Center, this is a simple cycle F-frame combustion turbine, which is not comparable to the proposed Anderson project. For Renovo Energy Center, the NOx limitations are also part of Lowest Achievable Emissions Rate (LAER) which would not be comparable to BACT, and the project has been cancelled. Both Chickahominy and Novi projects both appear to have been canceled. The Marshall Energy Center project is rated at 500 MW and 3,364MMBtu/hr of heat input for a one-on-one combined cycle unit. The Duke Energy CCCTs are similarly H-frame turbines but are rated at 5,069 MMBtu/hr when firing natural gas or 50% larger than what is described in the Marshall Energy Center project and therefore not comparable.

As discussed above, emissions limits, including startup and shutdown limits, associated with different CCCT projects may not be directly comparable due to the differences in CCCT models, and differences in project scope, needs, and design. The specific numerical limits in the permit for startup and shutdown are derived from emissions information provided by the CCCT manufacturer, GE. These are based on what the manufacturer has indicated can be achieved over the life of the equipment. As stated above, CCCTs are designed to meet different objectives specific to a given project, and as such there may be variations in what the manufacturer indicates is achievable for a given turbine for a given project need. BACT emission limits are evaluated on a case-by-case basis.

Comment on BACT Limits for VOC: Comments were received with concerns on how the proposed emissions limits compare with those applied to similar facilities. A specific comment was received concerning the combustion turbine natural gas emissions limit for VOC of 2.2 ppm for gas-fired, combined cycle operations. The comment asserted that similar turbines are typically permitted at 0.7–2.0 ppm, and the exact same model turbines (GE7HA.03) have been permitted at 1.0 ppm.

In addition, the commentor expressed concerns with the combustion turbine BACT VOC limit of 3.2 ppm during fuel oil combustion, citing other issued or proposed permits with a BACT VOC limit of 2.0 ppm.

Response: Duke Energy proposes to use good combustion practices, including the use of clean fuels, and catalytic oxidation as VOC BACT for the CCCTs for normal (combined cycle) operations to achieve the BACT emissions limits. These control technologies are consistent with those similar sources identified in the comment. The specific numerical limit for both natural gas and oil firing is derived from emissions data provided by the CCCT manufacturer,

GE. These are based on what the manufacturer has indicated can be achieved over the life of the equipment. As stated above, CCCTs are designed to meet different objectives specific to a given project. As such, there may be variations in what the manufacturer indicates is achievable for a given turbine for a given project need.

Comment VOC BACT in Simple Cycle Mode: Comments were received with concerns on how the proposed emissions limits compare with those applied to similar facilities. A specific comment was made concerning the VOC BACT limit during simple-cycle operations firing natural gas. The comment asserted that the VOC limit of 1.5 ppm could be lowered to 1.0 ppm based on The Chesterfield Energy Reliability Center's GE 7FA-05 simple-cycle turbines, permitted in 2025.

Response: As discussed above, the proposed turbines are designed for primary operation in combined cycle mode and as such have very different design criteria that affect the basis for establishing a BACT limit and are thus not comparable to the cited Chesterfield Energy Reliability Center turbines. Specifically, the units proposed at the Anderson facility are GE HA.03 turbines which are considered advanced class unit. The referenced Chesterfield units are F-frame turbines with different firing configurations. When operating in combined cycle mode, typical post-combustion controls will be used. When operating in simple-cycle bypass mode, post-combustion controls introduce operational complexity and challenges for generating units designed to be quickly dispatched for relatively short term, peak demand operations. During simple cycle bypass mode, exhaust gas temperatures and velocity are higher, which makes it difficult for control equipment to function properly and would require significant infrastructure to ensure proper operation (i.e., dilution fans). Finally, the simple cycle bypass mode is expected to be used infrequently and is limited to 500 full load equivalent hours per year. The 1.5 ppm value was provided by the equipment manufacturer as what the turbine is able to achieve when operating in simple cycle mode.

Comment on BACT Limits for PM and $PM_{2.5}$ in Combined Cycle Mode: Comments were received concerning how the proposed emissions limits compare with those applied to similar facilities. Specific comments were received concerning the combustion turbine PM and $PM_{2.5}$ limits when firing on natural gas. The comment asserted the PM limit of 0.0059 lb/MMBtu and the $PM_{2.5}$ limit of 0.008 lb/MMBtu in the draft permit should be lowered to 0.00186–0.0052 lb/MMBtu and 0.004–0.0074 lb/MMBtu, respectively, based on permits for other facilities.

Similar comments were received concerning the combustion turbine PM and $PM_{2.5}$ limits when firing on fuel oil. The comment asserted the PM limit of 0.015 lb/MMBtu and the $PM_{2.5}$ limit of 0.028 lb/MMBtu in the draft permit should be lowered to 0.0122–0.0136 lb/MMBtu and 0.0122 lb/MMBtu, respectively, based on permits for other facilities.

Response: Duke Energy proposes to use good combustion practices and to fire only low-sulfur fuels to meet PM and $PM_{2.5}$ BACT for the CCCTs for normal (combined cycle) operations to achieve the BACT emissions limits. These control technologies are consistent with those used by similar sources identified in the comment. The specific numerical limit for both natural gas and oil firing is derived from emissions data provided by the CCCT manufacturer, GE. These are based on what the manufacturer has indicated can be achieved over the life of the equipment. As stated above, CCCTs are designed to meet different objectives specific to a given project, and as such there may be variations in what the manufacturer indicates is achievable for a given turbine for a given project need.

Comment on BACT Limits for CO in Combined Cycle Mode: Comments were received with concerns on how the proposed emissions limits compare with those applied to similar facilities. A specific comment was received concerning the combustion turbine natural gas CO limit of 2.0 ppm citing other issued or proposed permits using turbines with a limit between 1.0 and 1.8 ppm.

Response: Duke Energy proposes to use good combustion practices, including the use of clean fuels, and catalytic oxidation as CO BACT for the CCCTs for normal (combined cycle) operations to achieve the BACT emissions limits. These control technologies are consistent with those used by similar sources identified in the comment. The specific numerical limit for CO when firing on natural gas is derived from emissions information provided by the CCCT manufacturer, GE. These are based on what the manufacturer has indicated can be achieved over the life of the equipment. As stated above, CCCTs are designed to meet different objectives specific to a given project, and as such there may be variations in what the manufacturer indicates is achievable for a given turbine for a given project need.

Comment on BACT Limits for GHG Comments were received concerning the amount of GHG emissions and asserting that the CO_2 BACT limit is not as stringent as TTTTa and other draft or proposed permits. Another comment asserted that the rates in the table contained in the CO_2 BACT condition are not limits, but rates used to calculate the 30-day rolling average and that NSPS TTTTa is only incorporated by reference.

Response: The rationale outlining the establishment of the CO_2 BACT limit is outlined in the Department's Preliminary Determination for this project and Duke Energy's application. Based on the review of similar sources, BACT was determined to be good combustion practices, efficient operation, and/or the use of low emitting fuels (e.g., pipeline-quality natural gas). Consistent with other sources, the proposed BACT limits for this project are based on (1) the purchase, installation, and operation of high-efficiency GE H Class combined cycle combustion turbines, (2) the implementation of processes and procedures that promote energy efficient operation of the turbines, including performing periodic burner tune-ups, limiting bypass hours, employing a maintenance program, and using low-carbon

fuels (i.e., natural gas). This is also consistent with 40 CFR Part 60, Subpart TTTTa Phase I standards that are based on efficient generation, not add-on controls.

The CCCTs Duke Energy has chosen are considered highly efficient. Based on the manufacturer's website information, the GE H Class model has a combined-cycle efficiency of more than 64%[1]. This highly efficient combined-cycle operation compares to older simple-cycle units with thermal efficiencies as low as 42%[2]. The implementation of a maintenance program for the CCCTs will not only retain the energy efficiency of the units but also help minimize GHG emissions.

The specific numerical limit for both natural gas and oil firing is calculated based on operational load. The CO_2 emissions rate included in the condition and used in the calculation of the BACT limit, which varies by operational load, are derived from emissions data provided by the CCCT manufacturer, GE. These are based on what the manufacturer has indicated can be achieved over the life of the turbines. As stated above, CCCTs are designed to meet different objectives specific to a given project. As such, there may be variations in the CO_2 emissions the manufacturer indicates is achievable at a given load for a specific turbine based on a given project need.

The Department agrees that BACT cannot be less stringent than any applicable standard under 40 CFR Part 60. Since NSPS Subpart TTTTa is an applicable standard for the proposed CCCTs, the commentor is correct that the proposed CO_2 BACT shall be at least as stringent as the limits proposed in Subpart TTTTa. Considering this, the CO_2 emissions information provided by manufacturer, GE, for these turbines for this given project need, and the regulatory uncertainty surrounding the regulation of greenhouse gases and Subpart TTTTa, the Department drafted a two-prong approach to establishing the CO_2 BACT limit. The first prong establishes a limit that can be achieved in practice by these turbines during all operating conditions and scenarios over the life of the source and second prong requires the CCCTs meet any applicable limit for CO_2 emissions as codified at 40 CFR Part 60, including without limitation, as applicable, under Subpart TTTT and/or Subpart TTTTa. The facility will have to manage the operational load condition to ensure compliance with any applicable limits in Subpart TTTTa, even if that operational load condition is allowed in the first prong of the BACT condition as long as the NSPS is in effect. It should be noted that the conditions, including the CO_2 limit and methods for compliance, from NSPS Subpart TTTTa are included

[1] GE 7HA.03 Gas Turbine:
https://www.gevernova.com/content/dam/gepower-new/global/en_US/downloads/gas-new-site/products/gas-turbines/7ha.03-next-evolution-whitepaper.pdf
[2] GE Gas Turbine Evolution 7HA.01/.02 Gas Turbine:
https://powergen.gepower.com/products/heavy-duty-gas-turbines/7ha-gas-turbine.html

in the permit in Conditions B.80 through B.88, as such the Department did not include those details in the BACT condition but rather cited the NSPS.

After reviewing the BACT condition in consideration of the comment that the condition did not include limits, but rather rates that are used to calculate a 30-day rolling average of CO_2 emissions, the Department has modified Condition B.41 to offer additional clarity. The CO_2 emission rates were renamed as limits, and additional language was added to specify that the limits in the table are to be used to calculate a time-weighted average limit, based on actual operating scenario(s) on a 30-day (720 hr) rolling basis. As discussed above, the permit condition also continues to require compliance with any applicable NSPS limits under Subpart TTTT and/or Subpart TTTTa.

Monitoring and Reporting

Comment: Comments were received requesting an increase in reporting frequency, including a specific request to require reporting to be submitted quarterly instead of semiannually.

Response: The semiannual reporting requirements proposed in the draft permit are consistent with applicable law and are considered to be sufficient for purposes of verifying compliance and facilitating Department oversight for this permit. However, Duke Energy has agreed to more frequent reporting, and the permit has been updated to require the facility to submit reports quarterly to the Department.

Comment: Comments were received requesting the Department require strict monitoring for the emissions source. A comment was received requesting that SCDES impose the most protective compliance monitoring, recordkeeping, and reporting requirements possible.

Response: The PSD construction permit contains emission limitations, pollution control requirements, testing, monitoring, recordkeeping, and reporting requirements necessary to demonstrate compliance with the applicable state and federal air quality requirements, including PSD BACT limitations. These requirements include, but are not limited to, the installation and operation of selective catalytic reduction and oxidation catalyst control devices on each turbine to reduce emissions of regulated pollutants. The permit also requires the facility to conduct initial source tests on the turbines to demonstrate compliance with applicable permit limits for filterable PM, PM_{10}, $PM_{2.5}$, NO_X, VOC, and sulfuric acid mist emissions from the turbines. The permit also includes a requirement for the facility to install and operate Continuous Emissions Monitoring Systems (CEMS) on the turbines for ongoing compliance with NO_X and CO emission limits. Along with emissions testing and CEMS operation, the permit requires the facility install and operate a continuous parametric monitoring system (CPMS) for monitoring oxidation catalyst inlet temperature as an indicator of proper operation. The facility is required to maintain monitoring records, as well as additional records such as hours of operation of fuel oil usage, hours of operation in

simple cycle mode, number of cold start, warm start, hot start and shutdown events, fuel switch hours of operation, heat input, tuning sessions, and water system adjustments. Additional monitoring, recordkeeping, and reporting requirements are required for the ancillary equipment and are included in the draft permit.

The facility is required to install, operate, and maintain NO_X and CO CEMS on each turbine per the draft permit. The CEMS are operated continuously to demonstrate compliance with applicable limits and ensure the equipment is operating properly. Records are required to be submitted to the Department quarterly.

The monitoring, testing, recordkeeping, and reporting requirements in an air permit are the responsibility of the facility. The Department will review all compliance information submitted by the facility (or obtained on site) to determine compliance and will take enforcement action against a permitted facility for any violations identified, as appropriate. The Department's regional inspectors will also conduct routine unannounced inspections to verify that the conditions of the permit are being met, as well as additional inspections on a complaint driven basis. During inspections, the Department may review the records the facility is required to maintain to determine compliance and will take enforcement action against a permitted facility for violations, as appropriate. Alleged violations are referred to the Department Bureau of Air Quality's (BAQ) Enforcement Section. If the Enforcement Section determines that a violation has occurred, the Department may require corrective action and payment of civil penalties.

Comment: A comment requested that SCDES require Duke Energy to hold annual or semi-annual community meetings to go over the emissions report, any exceedances of emissions and any other updates on permitting compliance. Another comment was received requesting SCDES promptly publish monitoring reporting data to a webpage so the public can verify whether Duke Energy is staying within the appropriate permitting requirements.

Response: The Department has shared these requests with Duke Energy for its consideration. While the Department is supportive of measures by permittees to engage with their communities, community meetings or other such activities by a permitted facility are generally outside the scope of Department permit or regulatory requirements. Records required to be maintained but not required to be specifically reported to the Department must be maintained for at least five years from the date generated, will be reviewed during inspections, and must otherwise be made available to the Department upon request. Title V facilities are also required to report emissions to the Department and EPA as part of their Emissions Inventory. The EPA compiles and publishes Emission Inventory data from across the country, and this data is accessible to the public. Alternatively, emission inventory data and compliance reports submitted to the Department may be requested from the Department as part of a FOIA request.

Emissions Calculations

Comment: A comment was received seeking further review of startup, shutdown, and full load PTE estimates based on concerns about Department emissions calculations for other projects. An additional comment was received asking SCDES to require Duke Energy to verify its projected hazardous air pollutant emissions using source-specific emissions testing where appropriate rather than relying solely on generalized emission factors and also asking SCDES to require sufficient monitoring and recordkeeping to verify the assumptions supporting the facility's classification as an area source of hazardous air pollutants.

Response: Criteria pollutants and HAP emissions calculations were reviewed as a part of the technical review for this permit. The startup, shutdown, and full-load maximum potential-to-emit were all considered and included in the emission calculations as requested by the commentor. Secondary air pollutant emissions were calculated and accounted for in the modeling analysis. Emission calculations and their basis can be found in the application documents. The commentor is correct that generalized emission factors were used to calculate emissions of certain HAP, specifically, organic HAP other than formaldehyde. For formaldehyde, another site's data was utilized. The generalized emissions factors that were used are uncontrolled factors from AP-42 and do not factor in the expected reduction of organic HAP from the oxidation catalyst system, which is required pursuant to federally enforceable permit requirements. As such, the Department considers this project to be an area source with respect to HAP, however, the Department agrees that site specific testing is appropriate to verify HAP emissions and has added a condition to require initial source testing for the following: acetaldehyde, ethyl benzene, hexane, propylene oxide, xylene, toluene, and formaldehyde. These organic HAP represent over 80% of the total HAP emissions expected from each turbine and should be sufficient to verify the facility's HAP.

Health and Environmental Impacts

Comment: Comments were received concerning the health impacts on citizens and students at nearby schools. Additional comments were received regarding the potential health impacts to vulnerable populations. Many comments were received expressing concern over the potential health effects of the emissions from the facility. In particular, commenters were concerned about the potential health and environmental effects of NO_X, CO, and fine particulate matter or $PM_{2.5}$ emissions.

Response: Federal and state air quality regulations are established to be protective of public health and the environment using scientific data and human health risk assessments. These regulations include standards for ambient air quality, emissions limits, control requirements, and operational requirements for industrial facilities. The EPA is required to designate areas

of the country as nonattainment when monitoring data shows pollutant concentrations exceed or violate a set federal standard. There are no nonattainment areas in South Carolina for any pollutants.

As part of the Department's technical review of this application, ambient air dispersion modeling was conducted to evaluate the potential air quality impacts of emissions from the proposed facility. This modeling analysis uses EPA-approved computer programs to simulate how the facility's maximum emissions would be dispersed into the atmosphere surrounding the proposed site. The modeling demonstrated compliance with applicable ambient air quality standards beginning at the facility fenceline and extending outward. See a more detailed discussion on this analysis in modeling section discussion below.

Requests for Additional Air Quality Monitoring

Comment: Comments were received requesting ambient air quality monitors in the area to evaluate air quality around nearby schools and nursing homes. An additional comment was received requesting additional monitors near gas plants across the state and a website reporting South Carolina's ambient air quality monitoring data. Similar comments were also received requesting pre-construction and post-construction ambient air quality monitoring to ensure the National Ambient Air Quality Standards (NAAQS) are not exceeded.

Response: South Carolina maintains a statewide network of air monitoring stations as required by EPA regulations to demonstrate compliance with the NAAQS. The Department maintains, quality assures, and certifies the air monitors and data. South Carolina follows requirements set and approved by the EPA for strict quality assurance procedures, including established Quality Assurance Project Plans (QAPP), Standard Operating Procedures (SOP), and set sampling schedules. The monitors must also meet completeness requirements to be used for regulatory purposes. An air monitoring network map is available to the public at the South Carolina Air Quality Network Map. These air monitoring stations are located throughout the state of South Carolina, some of which are located near the facility in the upstate region in Clemson and Greenville. Air monitoring stations collect data throughout the year and follow EPA siting requirements. Siting requirements are designed to ensure that data captured by the monitors is representative of a given area. The real time data from the air monitoring stations is available on AirNow.gov. The data collected from these monitors are not only used to determine whether South Carolina is meeting the requirements of the NAAQS but also provides background information used in modeling demonstrations. Applicants rely on existing SCDES monitoring data for applying a background concentration and preconstruction monitoring requirements (as further discussed in the next section below). For all these reasons, the Department primarily relies on monitors from its established statewide network for monitoring of ambient air quality, and as there are no

applicable state or federal regulations requiring facility installation of additional fenceline or other monitors, the permit does not include such a requirement.

Modeling

Comment: Comments asserted various flaws in the source impact analysis for the facility resulted in an artificially low background concentration for annual $PM_{2.5}$. Specifically, the comments asserted flaws in the monitor site selection (Hillcrest monitor as opposed to Greenville ESC monitor), the data timeframe (2022-2024 as opposed to 2023-2025), and the use of an adjusted as opposed to unadjusted design value. Other comments stated concern with the use of existing monitors for purposes of pre-construction air quality monitoring and development of background concentrations as opposed to additional monitoring nearer to the site.

Response:

1. Monitor Site Selection and Design Value Years

a) Timeframe – SCDES maintains a statewide network of $PM_{2.5}$ air monitoring stations that provide background concentrations used in modeling demonstrations. The most recent certified monitoring data available from this network at the time the Duke Anderson application was submitted is for the 2022-2024 period (modeling background values are based on 3 consecutive years of data).

b) Proximity – As the commenter suggests, the Duke Anderson project site is slightly closer to the Greenville ESC $PM_{2.5}$ monitor (31.0 miles distance) by 0.5 miles, compared to the Hillcrest monitor location (31.5 miles distance). However, the proximity indicator does not significantly favor one site over the other, given the small difference in distance to each monitor. Thus, SCDES relied on the other factors discussed below to guide the assessment of representativeness.

c) Land Use / Development – The Duke project site is located in a more rural, less-developed area than Hillcrest and Greenville monitor locations. One way to demonstrate this is by comparing the percentage of "urban" land use within 3 kilometers of Duke to that near each monitor. This is shown in the table below. SCDES-BAQ's Land Use Tool (https://gis.des.sc.gov/landcover/) was used to compile the data, where "Urban" land use is the sum of the "Developed – Medium Intensity" and "Developed – High Intensity" land use categories (per SCDES Guideline).

Urban Land Use Comparison (% of area within 3 km)			
Land Use Category	**Duke Project Site**	**$PM_{2.5}$ Monitors**	
		Greenville	**Hillcrest**
Developed – Medium Intensity	4.8	28.3	15.1
Developed – High Intensity	3.7	13.3	4.7
Urban	8.5	41.6	19.8

This data indicates that both Greenville and Hillcrest monitor locations will likely overestimate ambient concentrations because they are in more developed regional areas than other, more rural monitors (such as Chesterfield) in the state. Based on the Hillcrest site's less developed land use as compared to the Greenville site, it is considered to be closer to representative of background $PM_{2.5}$ concentrations near the Duke Anderson project location.

d) Climate and Topography – There is no significant difference in climate between Duke and the two monitors in question. Both monitors are upwind of Duke to some degree (i.e., wind predominantly blows from the southwest and northeast in the Anderson-Greenville-Spartanburg area). Also, there is no significant difference in topography between Duke and the two monitors, nor is there a topographical barrier between either of the monitors and Duke. Thus, these factors do not favor one monitor over the other.

e) Existing Monitoring Adequacy (for preconstruction monitoring requirements) - Section 2.4 of EPA's Ambient Monitoring Guidelines for Prevention of Significant Deterioration[3] (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. The available data from the nearby monitor sites are representative of the proposed facility's impact area, considering the land use and human activity affecting both the project site location and the monitor. According to the EPA document listed above, monitoring data from regional monitor sites may be used as representative background data in this case, and SCDES approves the use of this data to fulfill preconstruction monitoring requirements.

Conclusion – Data from the Hillcrest monitor is considered to be the most representative of the $PM_{2.5}$ background concentrations near Duke. While Hillcrest is essentially the same distance from Duke as the Greenville monitor, it is located in an area that is less developed than the area around the Greenville monitor, and more similarly developed to the area around the Duke project site. The existing monitoring network is adequate for the use of preconstruction monitoring as discussed in Part e) above.

2. Adjusted Data

The Hillcrest $PM_{2.5}$ monitor data used in the modeling analysis were adjusted via data exclusions performed by SCDES-BAQ. The discussion below details the foundation and rationale for these exclusions.

Relevant EPA guidance provides a framework for states to exclude ambient air data that are not considered to be representative, including (but not limited to) data reflecting events that

[3] https://www.epa.gov/sites/default/files/2015-07/documents/monguide.pdf

are atypical activities that are not expected to occur again in the future.[4] Such data may arise from events including, but not limited to, construction, roadway repairs, forest fires [wildfires], or unusual agricultural activities. Prescribed fires generally are also considered to be atypical activities. Wildfires and prescribed fires were the focus of SCDES exclusions. EPA's guidance also recognizes that state permitting authorities retain discretion regarding how they evaluate background concentrations using appropriate criteria.

To exclude the impacts of atypical activities from a monitored $PM_{2.5}$ data set, it is necessary to first identify monitored days that are potentially influenced by atypical activities. The SCDES approach for qualifying a day as atypical generally follows the EPA $PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document.[5] The "Clear Causal Relationship" element was satisfied for each Atypical Activity demonstration. With sufficient justification for exclusion, Tier 1 and Tier 2 exclusions were applied at all $PM_{2.5}$ monitored locations in South Carolina. The tiering thresholds were based on the lesser value of either (a) the most recent 5-year month-specific 98th percentile for 24-hour $PM_{2.5}$ data, or (b) the minimum annual 98th percentile for 24-hour $PM_{2.5}$ data for the most recent 5-year period as prescribed by the EPA guidance.

Tier 1 days were days that were greater than or equal to 1.5 times the tiering threshold (the 98th percentile as described above). To exclude a Tier 1 day, fire emissions had to be linked to the monitor location using one of the following two criteria: Evidence from satellite imagery (daytime visible satellite, Aerosol Optical Depth imagery, Smoke Dust Mask, or daily true color images from VIIRS or MODIS for wildfire events); or evidence from Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) forward and backward trajectories with a connection to smoke plumes from the National Oceanic and Atmospheric Administration (NOAA) Hazard Mapping System (HMS) products and/or South Carolina Forestry Commission historical fire information.

Tier 2 days were days with a 24-hour average between the tiering threshold and 1.5 times the tiering threshold. In addition to evidence from one of the above under Tier 1, at least two additional pieces of evidence demonstrating that the fire emissions affected the monitor were necessary to exclude a day. The following additional evidence was reviewed for exclusions under Tier 2: meteograms, smoke text narratives, HRRR near-surface smoke graphics and BlueSky $PM_{2.5}$ hourly maps, SC Forestry Commission Prescribed Fire information, and significant changes in hourly temporal patterns during the $PM_{2.5}$ event.

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[4] See, e.g., 40 C.F.R. Part 51, Appendix W (Guideline on Air Quality Models), Section 8.3.2(c)(ii); U.S. EPA, Additional Methods, Determinations, And Analyses to Modify Air Quality Data Beyond Exceptional Events (https://www.epa.gov/sites/default/files/2019-04/documents/clarification_memo_on_data_modification_methods.pdf); U.S. EPA, Guidance on Developing Background Concentrations for Use in Modeling Demonstrations (https://www.epa.gov/system/files/documents/2024-11/background-concentrations.pdf).

[5] https://www.epa.gov/system/files/documents/2024-04/final-pm-fire-tiering-4-30-24.pdf.

Additionally, if the data were impacted by fireworks (categorized under exceptional events by a holiday and/or cultural event), those data were also excluded if hourly observations also spiked during the standard celebration times. Further, the SCDES Air Lab typically marked fireworks-impacted data with an "IH" qualifier code. A few additional exclusions were made when the SCDES Air Lab flagged events with a smoke indicator separately, using hourly observations and the aforementioned smoke maps, to mark this data with the appropriate smoke-impacted monitor qualifier code. Many additional days were identified as Tier 3 days under the Exceptional Events rule, but SCDES elected not to investigate or exclude them because of the workload involved, unless the SCDES Air Lab had already flagged those events as Canadian wildfire smoke events (noted as "Tier 3" in the table below). In addition, some Tier 2 data did not qualify for exclusion, as noted in the table below.

SCDES excluded a significant amount of 2023 data mainly because of Canadian wildfire smoke. As shown in the table below, a total of 14 days were found to be impacted by Canadian wildfire smoke. In addition, 4 prescribed fire days were excluded from the final adjusted background data in 2023, and an additional two days were excluded due to U.S. wildfire smoke. The number of adjustments made to years 2022 and 2024 due to prescribed fire was similar to 2023, with 2 days excluded in 2022 and 3 days excluded in 2024.

The commenter suggests that because unadjusted design values over the past five years have been consistently higher than the adjusted data, there is not a basis for data adjustment on the basis of atypical activities. A design value is a 3-year average that intentionally smooths any variation between individual years, similar in principle to a rolling average. The 2023 monitor data is largely contaminated with Canadian wildfire activity that meets the criteria for atypical activity and exceptional events. This has contributed to a significantly higher-than-typical 3-year design value average over the past three design value years. Specifically, the unadjusted 2023 annual average was 8.6 $\mu g/m^3$, while the same 2022 and 2024 unadjusted annual averages were 7.3 $\mu g/m^3$ and 7.6 $\mu g/m^3$, respectively. The inclusion of the higher 2023 annual average carries over for the three years to calculate the design value. Although the design value data may seem "typical" to the naked eye based on longer-term trends across a wide area, the individual exclusions reflect specific events in location and time that are not considered typical or are unlikely to recur in the near future.

Prescribed fires and other actions to mitigate wildfire risk are also regularly considered exceptional events eligible for exclusion from air monitoring data for regulatory determinations. The South Carolina Forestry Commission has developed a Smoke Management Plan that outlines guidelines to reduce smoke impacts from forestry, wildlife, and agricultural prescribed burning. The South Carolina Forestry Commission also grants permits to burn on favorable weather days to mitigate fire spread. Prescribed burns and other actions to mitigate wildfire risk, consistent with the state's Smoke Management Plan, make American forests and communities safer, healthier, and cleaner. Consideration of such events as atypical and unrepresentative when analyzing air quality monitoring data

appropriately accounts for their impact in mitigating against more extreme and atypical air quality impacts associated with wildfires and promotes the efficient use of state air quality resources. Such consideration is also consistent with current EPA policy discouraging actions that would limit the strategic deployment of wildland prescribed fire as part of a control strategy for attainment and maintenance of the NAAQS.[6]

The SCDES process applies best professional and technical judgment, consistent with relevant guidance, to exclude data as an atypical activity. In some cases, there were not enough indicators in the Tier 2 demonstrations to confidently exclude such data. Thus, those days were retained (noted as "deferred" as atypical activity) in the calculations to derive background data for air dispersion modeling purposes. See the table below for more information on the screening method applied to Hillcrest monitoring data used as background data for the Duke Energy project.

Table 1. List of days when the measured 24-hour average $PM_{2.5}$ concentrations at the Hillcrest site met the applicable Tier 1 or Tier 2 screening criteria and/or were flagged by the SCDES air lab as a smoke, dust, or fireworks event. Data is sorted from earliest to latest date.

Date	Daily Value (µg/m³)	Atypical?	Event Type	Criteria for Exclusions*
3/6/22	14.7	Yes	Prescribed fire	B, D, E
7/4/22	17.7	Yes	Fireworks	F, H
9/17/22	15.0	Yes	U.S. wildfire	A, D, E
12/28/22	14.1	Deferred	Prescribed fire	N/A – Not excluded
2/8/23	14.1	Yes	Prescribed fire	B, D, E
3/1/23	14.9	Yes	Prescribed fire	B, D, E
3/16/23	13.9	Yes	Prescribed fire	A, B, D, E
3/22/23	16.4	Yes	Prescribed fire	A, B, D, E
5/24/23	15.8	Yes	Canadian wildfire	A, B, D, H
6/2/23	11.7	Yes	Canadian wildfire	G, Tier 3 Canadian Wildfire
6/5/23	12.4	Yes	Canadian wildfire	G, Tier 3 Canadian Wildfire
6/8/23	16.9	Yes	Canadian wildfire	A, D, E, G
6/11/23	13.2	Yes	Canadian wildfire	G, Tier 3 Canadian Wildfire
6/17/23	23.7	Yes	Canadian wildfire	A, G, Tier 1
6/29/23	25.1	Yes	Canadian wildfire	A, G, Tier 1
7/5/23	14.2	Yes	Fireworks	F, G
7/17/23	31.5	Yes	Canadian wildfire	A, G, Tier 1

[6] https://www.epa.gov/system/files/documents/2025-10/signed_final_prescribed-fire-policy-memo_25-06684-oar-gsg.pdf

Date	Daily Value (µg/m³)	Atypical?	Event Type	Criteria for Exclusions*
7/26/23	11.7	Yes	Canadian wildfire	G, Tier 3 Canadian Wildfire
8/19/23	9.5	Yes	Canadian wildfire	G, Tier 3 Canadian Wildfire
8/22/23	16.4	Yes	Canadian wildfire	A, D, E, G
8/25/23	14.3	Yes	Canadian wildfire	A, D, E, G
9/6/23	10.6	Yes	Canadian wildfire	G, Tier 3 Canadian Wildfire
9/18/23	11	Yes	Canadian wildfire	G, Tier 3 Canadian Wildfire
11/5/23	16	Yes	U.S. wildfire	B, D, E, G
11/8/23	18.1	Yes	U.S. wildfire	A, G, Tier 1
2/9/24	18	Yes	Prescribed fire	B, D, E
2/27/24	16.9	Yes	Prescribed fire	B, D, E, G
10/12/24	15.1	Deferred	Unknown	D, E – Not excluded
11/17/24	15.8	Yes	Prescribed fire	B, D

*See below for criteria used for exclusion on specific days:
A – SC daytime visible satellite imagery, SC Aerosol Optical Depth (AOD) and/or Smoke Dust Mask, or daily true color images from VIIRS or MODIS
B – HYSPLIT backward and forward trajectories AND fire point/smoke polygon data
C – Meteograms with smoke or haze symbols
D – Smoke text narrative discussions from NOAA's Office of Satellite and Product Operations
E – Near-surface smoke present in the HRRR Model OR BlueSky $PM_{2.5}$ hourly map (100 meters)
F – Data flagged during the day with a fireworks (IH) qualifier code
G – Data flagged during the day with a dust or smoke impact (IA, IM, IT, IF, IG) qualifier code
H – Evidence of changes in hourly temporal patterns not typical of the normal diurnal pattern
Tier 1 – One day (or more for multiple) that qualifies as a Tier 1 Exceptional Event
Tier 3 – One day (or more for multiple) that qualifies as a Tier 3 Exceptional Event and flagged as a Canadian smoke day

In conclusion, the SCDES adjustments to the 2022-2024 certified design value are appropriate and reflect accepted practices for identifying eligible days for exclusions for purposes of evaluating background concentrations for facility modeling analysis. Sufficient evidence supports the conclusions made here and the adjustments to the background concentrations.

Comment: Comments asserted that the modeling for the Duke Anderson facility understates ambient impacts from the plant. The comments assert that the annual $PM_{2.5}$ modeling for the facility improperly relied solely on inputs at 100% load, excluding emission rates and exhaust parameters associated with worst-case normal operating load and those associated with startup and shutdown events.

Response: 40 CFR Part 51, Appendix W (Section 8.2.1.b) states that a facility's "potential operating conditions" are "required inputs to air quality models and are needed to determine

maximum potential impacts." For stationary source applications, "changes in operating conditions that affect the physical emission parameters (e.g., release height, initial plume volume, and exit velocity) shall be considered to ensure that maximum potential impacts are appropriately determined in the assessment." (Section 8.2.2.d).

The Department disagrees with the commenter and considers the annual $PM_{2.5}$ modeling for the facility to have appropriately considered facility operating conditions. First, the annual $PM_{2.5}$ modeled emission rate was developed by assuming operation on fuel oil at the maximum fuel oil $PM_{2.5}$ emission rate for all hours allowed by the permit and operation on natural gas at the maximum natural gas $PM_{2.5}$ emission rate during all remaining hours of the year. The permit limits fuel oil operation to 500 full-load-equivalent hours per year. The maximized modeled annual emission rate is based on the following calculations:

Annual $PM_{2.5}$ from Fuel Oil = 119.3 lb/hr (AP-42 maximum) x 500 hr/yr (limit) = 59,650 lb/yr

Annual $PM_{2.5}$ from Natural Gas = 39.9 lb/hr (AP-42 max) x 8260 hr/yr (remaining hr/yr) = 329,574 lb/yr

Total Modeled Annual $PM_{2.5}$ = 389,224 lb/yr per turbine = 194.6 tpy per turbine = 389.2 tpy (two turbines)

These calculations assume the turbine operates throughout the year at the maximum applicable $PM_{2.5}$ emission rate for each fuel type. Actual annual emissions are expected to be lower than those calculated above due to normal variations in load, operational cycling, and limited use of fuel oil. In addition, the vendor-supplied information from Burns and MacDonald Emissions Summary HA03 Plant shows lower emissions across all scenarios than those calculated by applying the AP-42 rates used in the modeling analyses.

Specific inclusion of startup and shutdown $PM_{2.5}$ emissions would not increase the maximum annual $PM_{2.5}$ emissions modeled for compliance purposes. $PM_{2.5}$ emission rates during startup and shutdown are not greater than the maximum emission rates already assumed in the annual analysis, which is based on continuous operation at the specified maximum rates. Accordingly, separate quantification of startup and shutdown $PM_{2.5}$ emissions is not necessary for the annual $PM_{2.5}$ modeling analysis. This differs from the analysis for pollutants such as NO_X and CO, for which startup and shutdown conditions may result in elevated emission rates that warrant separate consideration.

With respect to variations in operational physical exhaust parameters (e.g., exit velocity, flow rates, and stack temperature) and ambient conditions (e.g., temperature and humidity), it is understood that turbines do not operate at a single load, fuel, and set of ambient conditions for the entire year. The vendor data provides a wide range of expected parameters and presents the expected emissions for those operations and conditions. Thus, a preliminary load screening analysis was performed to determine worst-case parameters for all applicable averaging periods, including the annual averaging period (which was not provided in the application narrative material but was provided as supplemental information in the "Turbine Cases for Modeling" worksheet provided with the submittal package).

If the unit is operating at a high load and combusting a lot of fuel, the exhaust stack velocity (feet/second), exhaust volume (cubic feet/minute), and exhaust temperatures would be high. Conversely, at lower loads, fuel consumption decreases, resulting in lower exhaust temperatures, reduced stack velocities, and lower exhaust flow rates, which can lead to less effective dispersion and potentially higher ground-level concentrations for a given emission rate (1 gram/second, as modeled). Furthermore, operating load also affects the pollutant mass emission rate (lb/hr). Low-load conditions typically involve lower fuel use and correspondingly lower mass emissions, while high-load conditions generally produce higher mass emissions. As a result, the worst-case ambient impact is not determined solely by stack parameters or dispersion characteristics. When identifying the worst-case modeling case, both the emission rate and the associated exhaust conditions for each operating scenario should be evaluated, as the scenario with the highest ground-level concentration may occur under a balance of lower dispersion and lower emissions or higher dispersion and higher emissions. The results revealed that the design scenario (Cases 3-6) were the worst-case scenarios as determined by the annualized emissions-weighting approach, as shown in the results table below. Insignificant variability in resulting concentration (< 0.001 $\mu g/m^3$) was noted between Cases 3, 4, 5, and 6 from changes in ambient conditions (temperatures of 50°F, 62°F, 90°F, and 95°F and relative humidities of 64%, 68%, 63%, and 37%, respectively). Thus, the table below is condensed to only show ambient conditions that are reflective of the annual average for brevity.

Table 2. Worst-case load analysis for PM weighted by maximum annual emissions associated with each scenario. Simplified to only show average ambient conditions.

Case (1)	Scenario Maximum PM Annual Emission Rate (tons/year)	Scenario Maximum Annual Unity Concentration Rate ($\mu g/m^3$)/(g/s) (2)	Scenario Maximum Annual Unity Concentration Rate ($\mu g/m^3$)/(ton/yr)	Annualized Emissions-Weighted Model Concentration ($\mu g/m^3$) (3)
4 – GF100AV	**128.23**	0.0505	1.45E-03	**0.1863**
11 – GU100AV	92.36	0.0505	1.45E-03	0.1341
18 – GU75AV	80.95	0.0616	1.77E-03	0.1435
24 – GUMEAV	64.75	0.0827	2.38E-03	0.1541
30 – G10DFAV	18.71	0.0433	1.24E-03	0.0233
37 – G75DFAV	18.30	0.0559	1.61E-03	0.0294
43 – GUMDFAV	17.73	0.0671	1.93E-03	0.0342

1) See Supporting Vendor Information for full details of each case.
2) See Table C-2 of the application.
3) Annual Emission Rate (tons/year) x Annual Unity Concentration Rate ($\mu g/m^3$)/(ton/yr)

The unity (per gram/second) impacts from operating the equipment in all scenarios concluded that worst-case design parameters came from the low load scenarios (less than 50% load, as shown by the sample case 24 in the table above). When unity impact results from the loading analysis are appropriately weighted by the potential annualized emission rate (and considering a 500-hour permit limit on fuel oil usage) for each respective load case, the worst-case scenario is identified as Cases 4 (the maximum load case) after considering the emission inputs under each scenario. While it makes sense to require worst-case source parameters to be modeled for short-term averaging periods (even when factoring in the emission rates under such conditions), it is overly conservative to assume that those same worst-case short-term operating conditions will occur often enough to significantly contribute to a normalized annual average of the data when the equipment is operated under those scenarios infrequently, as demonstrated by emissions-weighted outputs.

Thus, given the conservatism already built in by modeling maximum annual emission rates (which would not occur in such low-load scenarios) and assuming the worst-case stack parameters (as indicated by the loading analysis scenarios), the calculated annual impact is conservative. When scenario impacts are based on maximum short-term concentrations (for example, the highest 1-hour or 24-hour modeled concentration), the results often contain substantial variability because they are driven by rare meteorological conditions, unusual operating states, or isolated peak events. However, annualizing the impacts (whether modeled or observed) produces a smoother distribution because it spreads these peak-driven effects over a longer time horizon. On an annualized basis and given that the highest emission rate is already modeled, the evidence supports the premise that the source will comply with applicable standards for long-term annual average concentrations, and no further analysis is necessary.

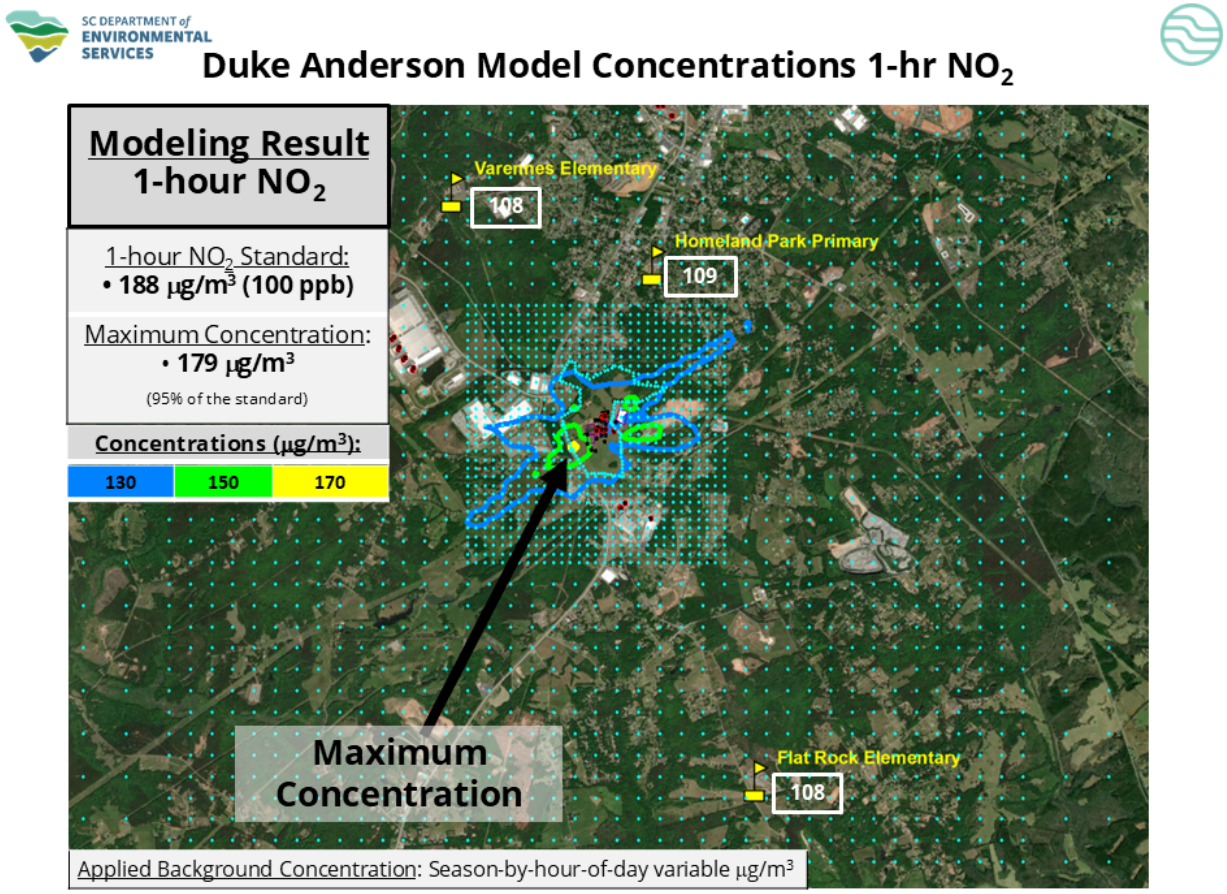
Comment: A comment was received stating concern that several schools and childcare facilities are in the significant impact area for the NO_X, PM_{10}, and $PM_{2.5}$ modeling.

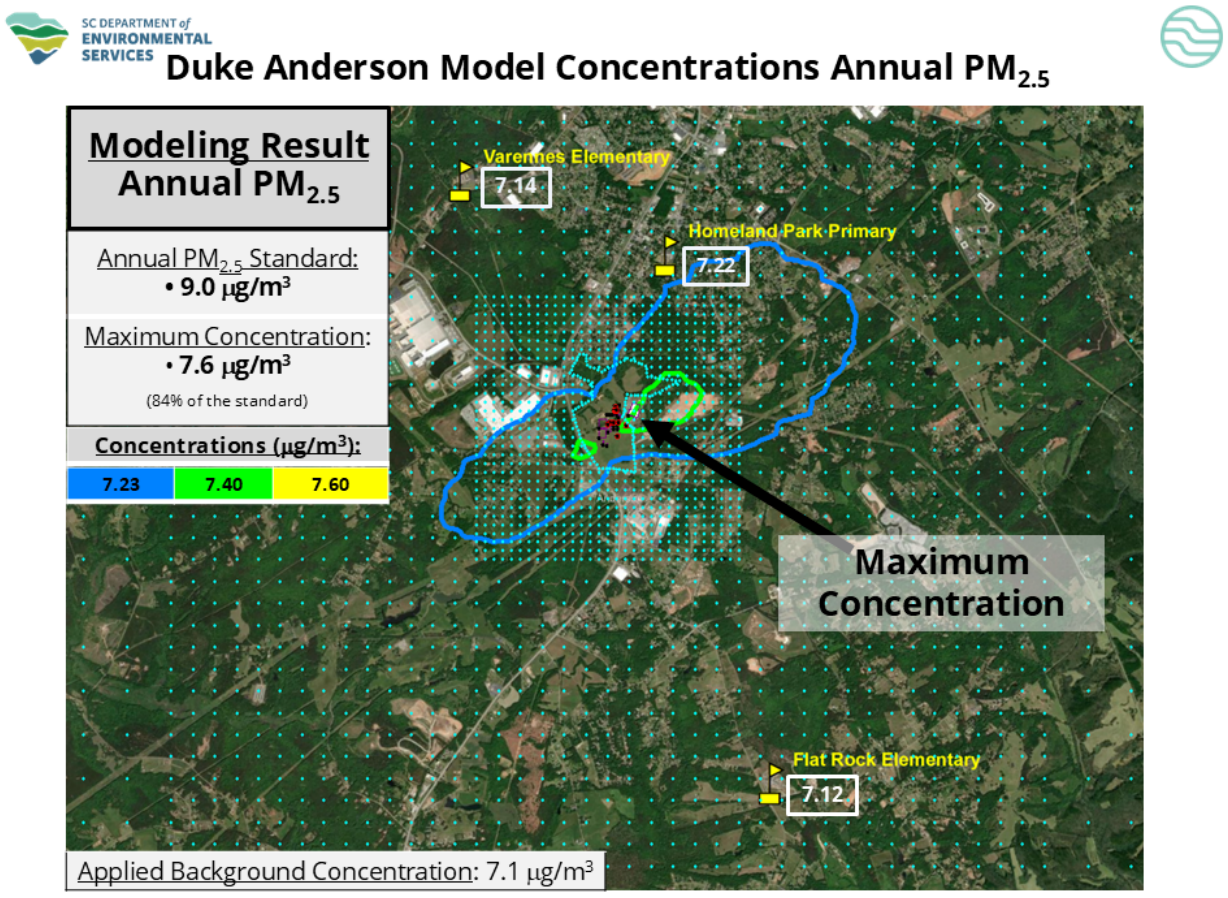
Response: The significant impact area in PSD New Source Review modeling is the area where preliminary modeling analyses predict concentrations in excess of a threshold significant impact level. Preliminary modeling results in excess of a significant impact level are not themselves indicative that pollutant concentrations would exceed any applicable standard. Rather, a significant impact in PSD New Source Review modeling means that the proposed source has the potential to cause a meaningful change in ambient air quality that warrants further evaluation via a full impact air quality analysis. A significant impact is not a violation. Rather, the project's impact is significant enough to require a more detailed assessment via cumulative impact analyses to address NAAQS and PSD increment standards. If the proposed project's impacts exceed a significant impact level at a given location and time when and where there is also a predicted model violation, the applicant will not receive a

permit. Significant impacts *could* contribute to a violation of the NAAQS if the modeling analyses identified a NAAQS or PSD Increment violation. However, cumulative impact modeling analyses for this project show no NAAQS or PSD increment violations for this project.

Comment: Comments were made requesting maps of concentration isopleths with schools closest to the maximum modeled impacts.

Response: Two examples of maps are shown in the two modeling output images below. The first is a map of NO_2 1-hour maximum concentrations, and the second is a map of $PM_{2.5}$ annual average concentrations. The modeled concentration isopleths are superimposed on a background map, showing the Duke property boundary and surrounding areas. The maps below also label local schools and can be used to locate other places relative to the location of the maximum modeled concentrations. For each pollutant and averaging period modeled, the maximum modeled concentrations (impacts), are located on the Duke property boundary and are below the NAAQS.





Comment: A comment was received indicating that SCDES had used Duke's own air quality sampling data for their emissions modeling rather than having SCDES gather independent data.

Response: Duke did not provide any sampling data to the Department. SCDES collected and quality-assured data from the existing SCDES air monitoring network were used as representative background information for the air dispersion compliance demonstrations.

Comment: A comment was received indicating that the project will push the county towards non-attainment.

Response: Federal and state air quality regulations are established to protect public health and the environment using scientific data and human health risk assessments. These regulations include standards for ambient air quality, emissions limits, control requirements, and operational requirements for industrial facilities. The EPA is required to designate areas

of the country as nonattainment when monitoring data show pollutant concentrations exceed or violate a federal standard. There are currently no nonattainment areas in South Carolina for any pollutants.

Furthermore, the PSD New Source Review process that this facility had to undergo is designed to prevent any change to the area's attainment status. This type of permit requires a cumulative impact air dispersion modeling analysis for pollutants that exceed specified significant project-related thresholds. The cumulative impact analyses required modeling of the complete facility's predicted emissions, surrounding facility emissions, and background impacts for applicable pollutants to demonstrate that the area will remain in attainment. SCDES and the EPA reviewed the application for completeness and to ensure that attainment would be maintained with respect to this project.

Comment: Comments were received stating concern about cumulative impacts of the project, including an assertion that SCDES failed to properly analyze the cumulative air quality impact of combining this massive new source with existing regional industrial emissions.

Response: SCDES assessed cumulative air quality impacts in accordance with 40 CFR Part 51, Appendix W - Guideline on Air Quality Models (Guideline), and the modeling analyses were performed in accordance with EPA and SCDES-approved modeling methodology. The air quality analysis included emissions from the proposed project and other nearby stationary sources. The cumulative impact analysis also included representative background ambient air concentrations. The cumulative air impact analyses also considered worst-case emissions from the proposed project. This emissions information is set forth in the engineering analysis.

Cumulative Impacts

Comment: Comments included a request for a comprehensive cumulative health risk assessment.

Response: Applicable state and federal air quality regulations do not include provisions for a cumulative health risk assessment study as part of the air permitting process. Such a study therefore is not required as part of an air construction permit application, and no such analysis was reviewed in the Department's evaluation of Duke Energy's air PSD construction permit. As discussed above, the facility submitted air dispersion modeling as part of the ambient air quality analysis to demonstrate the facility will not interfere with the attainment of the NAAQS for PM_{10}, $PM_{2.5}$, NO_2, SO_2, and CO. Background concentrations (which account for emissions from other facilities and naturally occurring emissions) were included in the analysis. A cumulative impact analysis as required by 40 CFR Part 51, Appendix W - Guideline on Air Quality Models (Guideline) and discussed above was performed.

Climate Change and Endangerment Finding

Comment: Comments were received expressing concern over the facility's potential impact on climate change due to increased greenhouse gas emissions. One comment discussed the 2009 EPA Endangerment Finding and suggested that repealing it would weaken the EPA's ability to limit emissions and protect our communities from the growing threats of extreme heat, flooding, and other climate impacts. Another comment stated concern about upstream greenhouse gas emissions from extraction and pipeline transport.

Response: The Department's permitting decision is based on a technical review of the application and regulatory requirements in effect at the time the application was submitted, and whether the facility has demonstrated the ability to meet all applicable air quality regulations if operated according to the information provided in the application. Of note, the Department's air permit is for the specific source and equipment as described in the permit and supporting documents; upstream activities such as extraction and pipeline transport are outside the scope of this permit action. The permit conditions include applicable requirements under the New Source Performance Standard set forth in 40 C.F.R. Part 60, Subpart TTTTa (Subpart TTTTa) Standards of Performance for Greenhouse Gas Emissions for Modified Coal-Fired Steam Electric Generating Units and New Construction and Reconstruction Stationary Combustion Turbine Electric Generating Units. As set forth in the relevant permit conditions, the NSPS and BACT requirements for greenhouse gases under the permit will apply to the facility so long as the underlying federal Subpart TTTTa regulations remain in effect and CO_2 and other GHGs remain regulated NSR pollutants, as defined by regulation. The regulatory status of and decision-making concerning federal GHG emissions regulation and the federal endangerment finding are matters before the EPA and are outside the scope of this permit action. The Department will continue to implement and enforce applicable requirements for GHGs as long as the relevant federal regulations remain in effect. Additionally, irrespective of the regulatory status of GHGs specifically, the use of energy efficient and inherently lower-emitting processes, work practices, and design criteria to meet BACT limits for other pollutants will result in lower natural gas consumption and lower resulting emissions of GHGs as compared to a less efficient model CCCT.

Location

Comment: Comments were received concerning the proposed location of the facility, specifically the location relative to neighborhoods, schools, places of worship, and the Anderson city limits.

Response: As part of the Department's technical review of this application, air dispersion modeling was conducted to evaluate the potential air quality impacts of emissions from the proposed facility. The modeling demonstrated compliance with applicable ambient air quality standards beginning at the facility fenceline and extending outward. These ambient

air quality standards are established to protect public health and the environment, including sensitive or vulnerable populations.

The Department recognizes that commenters have concerns about the facility's proximity to schools and other community locations. However, zoning decisions are made by local authorities and are not part of the Department's technical review of an air construction permit application. The Department does not have authority to dictate a facility's siting decisions but rather bases its permit decision on whether the permit applicant has demonstrated compliance with relevant state and federal requirements.

Environmental Justice

Comment: Comments were received asserting environmental justice concerns related to the proposed project. Commenters asserted that federal government analysis has identified this area as a disadvantaged census tract that already has poor health outcomes. Commenters discussed an Initial EJ Technical Assessment for the site performed by the applicant and the results of the assessment showing elevated risks for various environmental justice concerns.

Response: The Department is committed to protecting the health and environment of all communities in South Carolina and to working closely with communities and permit applicants to address concerns raised during the permitting process. We actively engage with residents and stakeholders across South Carolina to ensure that all communities have meaningful opportunities to participate in our decision-making. For this permit, the Department provided a public notice period from September 11, 2026 through October 20, 2026, and held an availability session and public hearing at McFall Landing in Anderson on October 13, 2026.

The Initial EJ Technical Assessment referenced in comments relied on EPA's EJScreen tool for assessment purposes. When EJScreen was supported by EPA, it provided environmental and demographic information for a selected geographic area and allowed that information to be compared with data for other areas. As described by EPA, EJScreen was a screening tool and was not intended to quantify specific risk values for a particular location. Information provided through EJScreen therefore served a different purpose from the site-specific technical analyses used to determine compliance with applicable air quality requirements.

As stated above, the Department's technical review of this application includes an air dispersion modeling analysis that is required to evaluate the potential air quality impacts of emissions from the proposed facility. The modeling demonstrated compliance with applicable ambient air quality standards beginning at the facility fenceline and extending outward including nearby schools. These ambient air quality standards are established to protect public health and the environment, including sensitive or vulnerable populations.

Data Centers and Electricity Need

Comment: Comments were received asserting that his facility is primarily intended to supply power to high-demand data centers and AI infrastructure rather than baseline local residential need. Additional comments claimed that South Carolina does not need additional electricity generation asserting that the state is already selling power to both Georgia and North Carolina.

Response: The Department does not have the authority to dictate where a public utility delivers the electricity produced. The Department's permitting decision is based on the technical review of the application and regulatory requirements in place at the time the application was submitted and whether the facility has demonstrated that it can meet all applicable state and federal air quality regulations if operated according to the information provided in the application. These requirements aim to protect public health and the environment.

The Department has determined that Duke Energy has demonstrated it can meet the standards and requirements of all applicable state and federal air quality regulations by complying with the conditions of the construction permit, including monitoring for each PSD pollutant. The Public Service Commission is responsible for evaluating the proposed project regarding the need and the demand for electricity.

Public Service Commission

Comment: Comments were received on the Public Service Commission permitting process.

Response: The Public Service Commission reviews applications for new utility projects in the state and issues Certificates of Environmental Compatibility and Public Convenience and Necessity. The Public Service Commission permitting process is entirely separate and independent from the air permitting process. The facility is not required to submit this certificate as part of an air construction permit application, and Public Service Commission's order was not reviewed as part of the technical review for this air permit application. The need for a particular project is not regulated by State or Federal air regulations and was therefore not considered during the Department's review for the air quality construction permit.

Alternative Energy Production

Comment: Comments were received suggesting that there are viable alternative energy sources like utility-scale solar combined with battery energy storage that should be considered. Other comments suggested that cheaper and cleaner energy options are available and should be considered.

Response: The Department's evaluation of an application for a PSD air quality construction permit is based on the project proposed by the applicant and all relevant state and federal air quality requirements in effect at the time of the Department's technical review. For this project, the facility plans to install 2 combined cycle combustion turbines. The permit application and its supporting materials demonstrate that the proposed facility can meet the applicable regulatory standards using the equipment and control technologies specified in the application. The Department does not have the authority, through this air permitting process, to require the applicant to redesign the source or change the fundamental scope of the project.

Water Usage and Pollution

Comment: Comments were received concerning the facility's potential water usage (drought vulnerability), wastewater discharges, and the potential contamination of water.

Response: Potential water usage, water discharges, and potential impacts on water quality are outside the scope of Department air quality permitting and air regulatory requirements. However, Duke Energy is responsible for coordinating and complying with other regulations related to such matters and for submitting applications accordingly. SCDES has developed a website to keep the public informed on the Duke Anderson Project. Please visit www.des.sc.gov/dukeandersonstation.

Noise

Comment: Comments were received concerning noise from the facility's operations.

Response: The Department does not have any noise standards in its air quality regulations and therefore lacks authority to base a permit decision on noise levels. Issues such as noise are typically addressed at the local level by municipalities or counties. Anderson County has adopted a noise ordinance. Noise complaints should be directed to Anderson County Sheriff's Office. However, excessive noise levels not usual for a site should be reported to the SCDES regional office, as abnormal noise could be an indication that equipment is not operating properly.

Community Benefit Agreement

Comment: A comment was received asking SCDES to encourage Duke Energy to enter into a community benefit agreement that establishes the company as the best neighbor it can be. The commenter stated that whether such an agreement provides for after-school programs, energy efficiency measures that improve indoor air quality or indoor air quality monitoring for nearby homes, Duke can try to improve the community and not simply add to its disproportionate public health risks.

Response: Consideration of a community benefit agreement is outside the scope of the Department's review of this air construction permit application and the draft permit. However, the Department has shared the comment with Duke Energy for its consideration.

General Support or Opposition

Comment: Comments were received expressing general support for or in opposition to issuance of the permit.

Response: The Department's technical review of a prevention of significant deterioration (PSD) air construction permit application is conducted in accordance with applicable current state and federal air quality requirements established to protect public health and the environment. Before a PSD air construction permit may be issued, an applicant must demonstrate that the proposed facility can comply with the applicable regulatory requirements. In its application, Duke Energy has provided all the necessary information to demonstrate that it can comply with all relevant state and federal regulations. The Department's permitting decision cannot be based on the number of comments received supporting or opposing a proposed project. Rather, the Department must evaluate the technical and regulatory issues raised in the comments and determine whether those issues affect the facility's ability to comply with applicable current air quality requirements.

The Department has reviewed the comments received regarding the draft construction permit and has addressed the substantive issues raised, as reflected throughout this response-to-comments document.