

**NORTH CAROLINA DIVISION OF
AIR QUALITY
Application Review**

Issue Date: TBD

Region: Asheville Regional Office
County: Rutherford
NC Facility ID: 8100028
Inspector's Name: Christopher Scott
Date of Last Inspection: 09/29/2022
Compliance Code: 3 / Compliance - inspection

<p style="text-align: center;">Facility Data</p> <p>Applicant (Facility's Name): Duke Energy Carolinas, LLC – Cliffside Steam Station</p> <p>Facility Address: Duke Energy Carolinas, LLC - Cliffside Steam Station 573 Duke Power Road Mooresboro, NC 28114</p> <p>SIC: 4911 / Electric Services NAICS: 221112 / Fossil Fuel Electric Power Generation</p> <p>Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V</p>	<p style="text-align: center;">Permit Applicability (this application only)</p> <p>SIP: 02D .0515, .0521, 02D .1100 02Q: .0504, .0711</p> <p>NSPS: n/a NESHAP: n/a PSD: n/a PSD Avoidance: n/a NC Toxics: 02Q .0711, 02D .1100 112(r): n/a Other: CSAPR</p>
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Contact Data			Application Data
<p style="text-align: center;">Facility Contact</p> Steve Hodges Environmental Coordinator (828) 657-2339 573 Duke Power Road Mooresboro, NC 28114	<p style="text-align: center;">Authorized Contact</p> Brandon Sipe General Manager III (828) 657-2001 573 Duke Power Road Mooresboro, NC 28114	<p style="text-align: center;">Technical Contact</p> Daniel Markley Lead Environmental Specialist (704) 382-0696 526 South Church Street Charlotte, NC 28202	<p>Application Numbers: 8100028.22A and .22B Dates Received: 06/17/2022 (.22A) 09/26/2022 (.22B) Application Type: Modification Application Schedule: TV-Sign-501(b)(2) Part II Existing Permit Data Existing Permit Number: 04044/T45 Existing Permit Issue Date: 03/18/2021 Existing Permit Expiration Date: 12/31/2023</p>

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2021	552.47	1796.01	5.65	350.18	237.72	32.87	19.91 [Hexane, n-]
2020	819.27	2074.49	19.55	183.44	240.95	28.66	12.00 [Hydrogen chloride (hydrochlori)]
2019	1383.06	2488.59	46.03	580.53	305.87	34.45	17.63 [Hydrogen chloride (hydrochlori)]
2018	1350.45	1953.62	23.55	934.95	255.95	22.22	13.48 [Hydrogen chloride (hydrochlori)]
2017	858.48	1645.65	11.94	1581.61	240.45	15.94	9.13 [Hydrogen chloride (hydrochlori)]

<p>Review Engineer: Russell Braswell</p> <p>Review Engineer's Signature: _____ Date: _____</p>	<p style="text-align: center;">Comments / Recommendations:</p> <p>Issue 04044/T46 Permit Issue Date: TBD Permit Expiration Date: TBD+5 years (or the date 04044T45 is renewed)</p>
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1.0 Purpose of Application

1.1 Application .22A

Duke Energy Carolinas, LLC – Cliffside Steam Station (DEC; the facility) currently operates a power plant in Rutherford County under Title V permit 04044T45 (the existing permit). The existing permit includes Specific Condition 2.2 G.1, which requires DEC to submit a permit application pursuant to 02Q .0504 within one year of commencing operation of any portion of the wastewater treatment facility. DEC submitted this application in order to comply with that Specific Condition.

After submitting this application, DEC sent a letter to DAQ requesting updates to the list of insignificant activities. Such updates do not require an application for permit modification; DAQ will take this opportunity to update the list of insignificant activities in the existing permit.

As part of this significant modification, DAQ will take this opportunity to make the following corrections to the existing permit:

- Correct the permit condition for the Cross State Air Pollution Rule.
- Add a state-enforceable only condition for 02D .1425.

1.2 Application .22B (consolidated into .22A)

The Unit 6 boiler at this facility burns coal and natural gas. DEC plans to burn coal in Unit 6 that has limestone content up to 1.5% by weight. DEC claims that this change will extend the life of the catalyst in the SCR (CD-19). The coal mine will be responsible for adding and mixing the limestone, and no new mixing operations will be required at this facility.

Note that Unit 5 is already permitted to add limestone up to 1.5% by weight; currently the limestone addition for Unit 5 occurs on-site.

DEC submitted a 502(b)(10) notification in order to incorporate this change into the existing permit.

DAQ will consolidate this 502(b)(10) change into application .22A.

2.0 Application Chronology

Date	Event
June 17, 2022	Application .22A received.
September 8, 2022	Letter received from DEC requesting updates to the list of insignificant activities.
September 26, 2022	Application .22B received.
July 7, 2023	Application transferred to Russell Braswell
August 3, 2023	Request for additional information sent to DEC staff: <ol style="list-style-type: none"> 1. Does DEC have the postmark date available for the .22A application? 2. Does DEC have emission test data (or any other emission calculation methods) available for emission testing performed on the coal mixed with 1.5% limestone?
August 3, 2023	DEC responded to item #1 of the August 3 request. DEC provided a USPS tracking number that showed USPS in possession of the application package on June 16, 2021.
August 8, 2023	DEC responded to item #2 of the August 3 request. <ul style="list-style-type: none"> • The testing previously mentioned by DEC was only to verify the ability of the limestone mixed coal to help mitigate degradation of the SCR's and not cause any other operational issues. • 1.5% addition would not be noticeable with a stack test considering all of the other variables and the very low PM rates.
August 10, 2023	Request for additional information sent to DEC staff: <ul style="list-style-type: none"> • Given the amount of limestone being added, it seems like there is a slim margin to avoid a significant PM emission increase for PSD. • DAQ understands that DEC is not expecting a significant emission increase. However, if the facilities where this initial testing took place were equipped with PM CEMS, is it possible to look at the PM CEMS data while the limestone mix coal was in use?
August 29, 2023	DEC responded to the August 10 request with the following information: <ul style="list-style-type: none"> • Units 5 and 6 have PM(filt) control efficiencies of 99.996% and 99.997%. • Cliffside is already permitted to add limestone to the Unit 5 coal belt. Adding limestone at the mine would eliminate this process from the Cliffside facility. • Testing for arsenic was performed at Gibson Steam Station Unit 5. Gibson Unit 5 is older than Cliffside Unit 6. The PM data showed quite a bit of variability before, during, and after the testing. Given this information, it is inconclusive as to the impact of PM emissions when burning this coal and limestone mixture.
September 5, 2023	Request for additional information sent to DEC staff: <ul style="list-style-type: none"> • Was any emission testing done on Unit 5 with regards to the use of limestone? • Is DEC planning on using the premixed coal on Unit 5 as well?

Date	Event
September 5, 2023	DEC responded to the September 5 request: <ul style="list-style-type: none"> • Current Unit 5 and 6 PM efficiencies are much better than the original Unit 5 control efficiency. • Unit 5 will no longer need to add limestone to the incoming coal belt. • DEC is not aware of any testing previously performed on Unit 5 for PM emissions from limestone addition.
September 8, 2023	Request for additional information sent to DEC staff: <ul style="list-style-type: none"> • Has Cliffside already begun using the premix limestone coal in Unit 5 and Unit 6? • Do any of Duke’s other coal units (except Gibson, mentioned previously) use coal with limestone premixed?
September 8, 2023	DEC responded to the September 8 request: <ul style="list-style-type: none"> • “A few trains were shipped to Cliffside and blended in.” • Currently, no other Duke Energy plants use the coal/limestone mixture.
September 11, 2023	Request for additional information sent to DEC staff: <ul style="list-style-type: none"> • If that new coal has been burned at Cliffside, can you compare PM CEMS data from a similar period to show that there’s no increased PM emissions, or at least that PM emissions are not correlated with limestone usage?
November 1, 2023	DEC responded to the September 11 request: <ul style="list-style-type: none"> • “We do not have enough data to correlate PM emissions with or without limestone in the coal. Using only the coal-only data without natural gas or oil doesn’t leave enough data to make an assessment.” • “For coal-only, emissions range from 0.002 to 0.0045 lb/MMBtu on Unit 5 while Unit 6 has a range of 0.0018 to 0.0023 lb/MMBtu. A 1.5% increase in PM would not be noticed (0.000007 lb/MMBtu) if there would be an increase.”
November 6, 2023	An initial draft of the Title V permit and this application review were sent to DAQ Permits staff.
November 16, 2023	Request for additional information sent to DEC staff: On December 22, 2021, US EPA added 1-bromopropane (1-BP) to the list of HAP. Duke’s original application for the wastewater treatment plant was submitted in 2020, and therefore 1-BP was not addressed as part of that application. Now that a new HAP has been added to the list, can you quantify emissions of that HAP from the WWTP?
December 12, 2023	Reminder sent to DEC regarding the November 16 request.
December 12, 2023	DEC responded to the November 16 request: “[DEC has] concluded that there would be no 1-bromopropane present in the FGD wastewater.”
December 12, 2023	A revised draft of the Title V permit and this application review were sent to DAQ ARO staff, DAQ SSCB staff, and DEC staff.
XXXXX	Public Notice / EPA review
XXXXX	Permit issued.

3.0 Discussion

3.1 Second-step significant modification under 15A NCAC 02Q .0501(b)(2)

Background: As allowed by 15A NCAC 02Q .0501(b)(2) and 02Q .0504, a facility may apply for a significant modification of a Title V permit using a two-step process. If a facility elects to use the two-step process, the facility must submit a second permit application within 12 months of commencing operation of the modified facility.

Applicability: DEC submitted application .20B on December 21, 2020 in order to modify the Title V permit. DEC submitted that application as the first step of the two-step significant modification. In response to application .20B, DAQ issued permit revision T45 (i.e., the existing permit). The existing permit includes Specific Condition 2.2 G.1, which requires DEC to submit a permit application pursuant to 02Q .0504 within one year of commencing operation of any portion of the wastewater treatment facility.

Discussion: DEC submitted application .20B in order to add a new wastewater treatment facility to handle the wastewater output of the flue gas desulfurization (FGD) process associated with Boiler 5. DAQ approved the application and issued the T45 permit revision.

According to application .22A:

“The FGD wastewater treatment facility began operation on July 6, 2021 although the Lime silo began receiving lime on June 16, 2021 thereby triggering the requirement to submit an operating permit (Part II) application. Accordingly, the FGD Wastewater Treatment facility has been constructed and operating as permitted in the first step with no changes in what was presented in the original application.”

According to DEC, the wastewater treatment facility was constructed as applied-for, and therefore no additional changes to the permit or discussion of the original application is required. DAQ’s review of application .20B and permit revision T45 is included here as an Attachment.

Application deadline: DEC was required to submit this second-step application within one year of commencing operation of the wastewater treatment facility. According to the application, the lime silo began operation on June 16, 2021. Therefore, this application was due by no later than June 16, 2022. DEC postmarked the application on June 16, 2022.

Changes to the existing permit:

- References to 02Q .0504 will be removed from the existing permit because DEC has satisfied the requirement to submit a second-step application.
- Regulatory citations in Section 2.1 S of the permit will be updated to reference 02Q .0508 “Permit Content” because DEC has completed the two-step significant modification process.

3.2 502(b)(10) modification and changes not requiring a permit revision under 15A NCAC 02Q .0523

3.2.1 Background:

A “502(b)(10) modification” is a modification that meets the definition in 15A NCAC 02Q .0523(a). An application for permit modification is not required for 502(b)(10) changes; per 02Q .0523(a)(3), a

502(b)(10) change is integrated into a Title V permit during the next permit renewal or significant permit modification.

In order to make a 502(b)(10) modification, a facility must submit a notification. The notification must include a certification that the proposed modification qualifies as a 502(b)(10) modification. DEC submitted the required notification on September 25, 2022. DAQ consolidated this 502(b)(10) modification into the outstanding application for significant permit modification (application .22A, discussed above).

3.2.2 Proposed modification:

DEC operates two coal-fired boilers at this facility: Unit 5 and Unit 6. The boilers are controlled by (among other control devices) selective catalytic reduction (SCR) systems. DEC plans to burn coal that has limestone mixed in from the mine. DEC states that doing so will extend the life of the SCR catalyst. The notification specifically states that this new mix of coal will only be burned in Unit 6.

Using coal that includes limestone could possibly increase the portion of coal that does not combust, and therefore could increase emissions of particulate matter (PM). Furthermore, the proposed change could trigger applicability requirements under New Source Performance Standards (NSPS; 40 CFR Part 60), Maximum Achievable Control Technology (MACT; 40 CFR Part 63), and Prevention of Significant Deterioration (PSD).

3.2.3 PM emission limits for Unit 6:

Unit 6 is subject to PM emission limits under 02D .0503, 02D .0530, NSPS Subpart Da, and MACT Subpart UUUUU.

In general, DEC demonstrates compliance with these PM limits using a continuous emission monitoring system (CEMS), which is required by MACT Subpart UUUUU (see Specific Condition 2.2 C.1.j of the existing permit).

DEC will continue to demonstrate compliance with the PM emission limits in the permit using the PM CEMS. Therefore, the use of the new coal mix will not alter the existing monitoring, reporting, or recordkeeping for PM emission limits.

3.2.4 Modification under NSPS (40 CFR 60.14):

NSPS Subpart Da applies to electric utility boilers with capacity greater than 250 million Btu per hour and that were constructed, modified, or reconstructed after September 18, 1978 (see §60.40Da(a)). Unit 5 is not subject to this rule because it was constructed before the applicability date and has not been modified or reconstructed after that date. Unit 6 is subject to this rule.

The NSPS rules define “modification” in §60.2:

Modification means any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.

The introduction of a new mix of coal constitutes a change in the method of operation, and therefore could potentially be a modification for the purposes of NSPS. However:

- DEC is not proposing to burn the new coal mix in Unit 5. Therefore, the proposed change will not affect Unit 5’s applicability to NSPS Subpart Da.
- Unit 6 is already subject to NSPS Subpart Da. There are no specific requirements for modified units under NSPS Subpart Da. Therefore, even if Unit 6 is deemed “modified,” Unit 6’s requirements under this rule will remain unchanged.
- There are no other NSPS rules that could apply to Unit 6. Therefore, a modification under NSPS will not cause Unit 6 to be subject to a different NSPS rule.

Therefore, the proposed use of a new coal mix in Unit 6 will not affect DEC’s applicability to any NSPS rule.

3.2.5 Reconstruction under NSPS (40 CFR 60.15):

The NSPS rules define “reconstruction” in §60.15(b):

“Reconstruction” means the replacement of components of an existing facility to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility...

Under Part 63, reconstruction refers to the replacement of components. A change in the method of operation does not constitute reconstruction. There is no replacement of components needed for the firing of the new coal mix in Unit 6. Therefore, the proposed use of a new coal mix in Unit 6 will not be considered “reconstruction” and will not affect DEC’s applicability to 40 CFR Part 60 Subpart Da.

3.2.6 Reconstruction under MACT (40 CFR 63.2):

Unit 5 and Unit 6 are subject to MACT Subpart UUUUU because they are coal-fired electric generating units (see §63.9980 and §63.9981). Under that rule, Unit 5 and Unit 6 are “existing” because they were constructed before May 3, 2011 and have not been reconstructed after that date.

The MACT rules define “reconstruction” in §63.2:

Reconstruction, unless otherwise defined in a relevant standard, means the replacement of components of an affected or a previously nonaffected source to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source...

Under Part 63, reconstruction refers to the replacement of components. A change in the method of operation does not constitute reconstruction. There is no replacement of components needed for the firing of the new coal mix in Unit 6. Therefore, the proposed use of a new coal mix in Unit 6 will not be considered “reconstruction” and will not affect DEC’s applicability to 40 CFR Part 63, Subpart UUUUU.

3.2.7 Major modification under PSD (15A NCAC 02D .0530 and 40 CFR 51.166):

DEC is a major stationary source under PSD. For major stationary sources, a “major modification” under PSD is defined in §51.166(b)(2)(i):

Major modification means any physical change in or change in the method of operation of a major stationary source that would result in: a significant emissions increase (as defined in [paragraph \(b\)\(39\)](#) of this section) of a regulated NSR pollutant (as defined in [paragraph \(b\)\(49\)](#) of this section); and a significant net emissions increase of that pollutant from the major stationary source.

If the proposed change to the new coal mix causes a significant emissions increase, then the use of that coal mix would constitute a major modification. Using coal that includes limestone could possibly increase the ash content of the coal, and therefore increase emissions of particulate matter (PM).

The threshold for a significant emission increase (SEI) is defined in §51.166(b)(23)(i):

- PM: 25 tpy
- PM₁₀: 15 tpy
- PM_{2.5}: 10 tpy

DEC explains that the use of limestone-mixed coal will not cause a significant emission increase:

“Unit 5 is currently permitted to add lime in the portable dry sorbent injection system [CD-U5(DSI)], and Unit 6 has the spray dry absorbers (CD-20) using lime as well. And of course both units are adding limestone in the FGD’s. Adding limestone upfront of these control devices and especially the ESP’s and Baghouses should have no effect on the stack outlet emissions of PM.”¹

“Actual PM filterable efficiencies range from 99.996% to 99.997% for Units 5 and 6. This is determined from the last three years of coal burn and using PM CEMS data when only burning coal.”²

Assuming 100% of the mass of the added limestone becomes pre-control PM emissions, and based on DEC’s statement that the minimum PM control efficiency is 99.996%, then the increase in potential emissions from the use of limestone-mixed coal in Unit 6 can be calculated:³

$$\frac{\left(\text{Unit 6 hourly heat input, } \frac{10^6 \text{ Btu}}{\text{hr}}\right)}{\left(\text{coal heat content, } \frac{\text{Btu}}{\text{lb}}\right)} \times (\text{annual hours}) \times (\% \text{ limestone}) \times (1 - \text{control efficiency}) = \text{annual PM emissions}$$
$$\frac{\left(7,850 \frac{10^6 \text{ Btu}}{\text{hr}}\right)}{\left(12,228 \frac{\text{Btu}}{\text{lb}}\right)} \times \left(8,760 \frac{\text{hr}}{\text{yr}}\right) \times (1.5\% \text{ limestone}) \times (1 - 99.996\%) = 3,373 \frac{\text{lb}}{\text{yr}} = \mathbf{1.69 \text{ tpy}}$$

This amount is less than the SEI for PM, PM₁₀, and PM_{2.5}. Therefore, the proposal to use 1.5% limestone coal in Unit 6 is not expected to be a major modification for PSD.

¹ Email from Dan Markley (Lead Environmental Specialist, DEC) to Russell Braswell (Engineer, DAQ); August 8, 2023.

² Email from Dan Markley to Russell Braswell; August 29, 2023.

³ Unit 6 hourly heat input taken from the existing permit. Coal heat content taken from DEC’s CY2022 emission inventory. Furthermore, note that beginning in 2020, DEC began co-firing natural gas in Unit 5 and Unit 6, which is associated with lower PM emissions and lower coal use. Coal use has declined since beginning co-firing natural gas.

3.2.8 Aggregation under PSD (15A NCAC 02D .0530 and 40 CFR 51.166):

If a facility makes two or more modifications in a relatively short span of time, those projects should be aggregated together when determining PSD applicability if they are substantially related. As a general rule, projects that are not substantially related should be considered separately when determining applicability of PSD/NSR (i.e., not aggregated). In order to determine if two or more projects are substantially related, EPA has suggested looking at the different factors regarding the specific project, such as the timing of activities, technical dependence, and economic dependence.⁴

When considering the time between projects, EPA has stated “once three years have passed, it is difficult to argue that they are *substantially* related and constitute a single project.”⁵ In the previous three years, DEC has made the following modifications to the Title V permit:

Permit Revision (issued)	Description of changes:	Notes	Substantially related?
T45 (March 18, 2021)	Added a new wastewater treatment facility (WWTF) to work with the flue gas desulfurization (FGD) systems.	<ul style="list-style-type: none"> Unit 6 is controlled by a FGD, but the use of the limestone-mixed coal is unrelated to the use of FGD. FGD is used to control SO₂ emissions, whereas the limestone-mixed coal is meant to assist the SCR systems, which do not control SO₂. The WWTF began operation without the use of limestone-mixed coal. 	No. The WWTF is not economically or technically related to the use of limestone-mixed coal.
T44 (November 9, 2020)	2 nd -step application.	<ul style="list-style-type: none"> This concluded a two-step application process initiated in 2017. 	No. The two-step process began more than three years before DEC submitted the 502(b)(10) notification.

⁴ See *Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Aggregation; Reconsideration* (83 FR 57324; November 15, 2018).

⁵ See *Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Aggregation and Project Netting* (74 FR 2378; January 15, 2009).

Permit Revision (issued)	Description of changes:	Notes	Substantially related?
T43 (January 8, 2019)	Renewal of the TV and TIV permits, 2 nd -step application, and significant modification of the TIV permit	<ul style="list-style-type: none"> No changes as a result of TV and TIV renewals. Added biodiesel as allowable fuel for emergency generators. The generators are not directly related to the coal-fired boilers. This concluded a two-step application process initiated in 2014. Incorporated changes to the DEC’s fleet-wide NOx averaging plan under the TIV permit, but made no specific changes to Cliffside’s TIV permit. 	No: <ul style="list-style-type: none"> The two-step process began more than three years before DEC submitted the 502(b)(10) modification. The emergency generators are not directly related to the type of coal burned in Units 5 and 6. Changes to Cliffside’s TIV permit were part of DEC’s fleet-wide averaging plan; no specific changes were made to Cliffside.

Therefore, emission changes from the use of limestone-mixed coal should not be aggregated with any previous projects.

3.2.9 502(b)(10) modifications:

An applicant must confirm that a proposed 502(b)(10) change meets the definition in 02Q .0523(a) by filling out a checklist provided by DAQ. DEC submitted the checklist, certifying that the proposed change to the coal mix would qualify as a 502(b)(10) change.

The below table examines the criteria for a 502(b)(10) change:

502(b)(10) Qualification Checklist	Disallows 502(b)(10)?	Notes
This change does not violate any existing requirement in the current Title V air quality permit.	No	<ul style="list-style-type: none"> DEC will continue to comply with emission limits while using the limestone-mixed coal.
This change does not cause emissions allowed under the permit to be exceeded.	No	

502(b)(10) Qualification Checklist	Disallows 502(b)(10)?	Notes
This change does not require a case-by-case determination (e.g. BACT)	No	<ul style="list-style-type: none"> As discussed above, no case-by-case determination (such as BACT) is required.
This change is not a modification under Title I of the federal Clean Air Act.	No	
This change does not alter (modify or add to) any existing monitoring, reporting or recordkeeping provisions in my current permit.	No	<ul style="list-style-type: none"> DEC will continue to comply with emission limits using the existing monitoring, recordkeeping, and reporting requirements.
This change does not require a change to an existing permit term that was taken to avoid an applicable requirement. (e.g. PSD avoidance condition)	No	<ul style="list-style-type: none"> As discussed above, the use of limestone-mixed coal will not increase emissions such that a PSD avoidance condition is required and will not change any existing PSD avoidance conditions.
This change does not require a permit under the NC Toxics program.	No	<ul style="list-style-type: none"> The use of limestone-mixed coal will not require a new permit for TAP emissions.

3.3 Cross State Air Pollution Rule (CSAPR)

Applicability: This group of rules applies to fossil-fuel-fired combustion sources that 1) produce electricity for sale, and 2) have a generator capacity greater than 25 megawatts. Boilers 5 and 6 at this facility are subject to CSAPR.

Requirements: CSAPR limits NO_x and SO₂ emissions. In general, CSAPR requires tracking and trading emission credits across multiple facilities, including facilities not within the state of North Carolina. Therefore, compliance with CSAPR is generally determined by US EPA.

Changes to the existing permit:

- CSAPR is included in the existing permit under Specific Condition 2.2 C.4. This condition includes a reference to 40 CFR Part 97, Subpart BBBBBB “CSAPR NOX Ozone Season Group 1 Trading Program.” This rule applies to areas that are part of the summer ozone season trading program. As of 2017, North Carolina is not such an area. Because Subpart BBBBBB does not apply to this facility, all references to this rule have been removed from the permit. For further discussion of the nonapplicability of Subpart BBBBBB, see 40 CFR 52.1784(b). This change will not affect DEC’s compliance requirements because Subpart BBBBBB does not apply to this facility. This change is only to ensure the Title V permit accurately reflects DEC’s requirements under CSAPR.
- Specific Condition 2.2 C.4 of the existing permit states that CSAPR is “federal enforceable only.” This is incorrect; although, in general, CSAPR is maintained by US EPA, all provisions of the Title V permit are enforceable by North Carolina. Therefore, the term “federal enforceable only” will be removed from Specific Condition 2.2 C.4. This change is only for clarity and will not affect DEC’s compliance requirements.

3.4 15A NCAC 02D .1425 “NO_x SIP Call Budget” [state-enforceable only]

Applicability: This rule applies to electric generating units (EGU) and large non-EGUs as defined in 02D .1401. Boilers 5 and 6 at this facility meet the definition of EGU, and are therefore subject to this rule. This rule became effective May 1, 2022.

Monitoring, Recordkeeping, and Reporting: This rule does not include a specific emission limit. Instead, DEC must calculate the total NO_x emissions from the EGUs during the summer ozone period and submit a NO_x report annually. DEC must use data gathered in accordance with 40 CFR Part 75 to prepare the report.

Changes to the existing permit: The existing permit does not include a specific condition for this rule. A specific condition for this rule will be added to the new permit. Compliance will be determined when the first annual NO_x report is received.

3.5 Updates to Insignificant Activities

DEC requested the following updates to the list of insignificant activities:

- Add a 578 horsepower diesel-fired emergency generator, and
- Change an existing 172 horsepower diesel-fired portable emergency generator to permanent emergency-use generator

The letter states that both of these generators will be emergency-use and subject to MACT Subpart ZZZZ and NSPS Subpart IIII. The letter included a certification that these engines will comply with the NSPS emission standards.

For Title V facilities, an activity can be considered “insignificant” if it has potential emissions less than the limit in 02Q .0503(8) (i.e., 5 tons per year of a regulated pollutant, and 1,000 pounds per year of hazardous air pollutants). For diesel-fired engines, the limiting factor is NO_x. For emergency-use engines, potential emissions are based on 500 hours of operation per year.⁶

Using the NO_x emission factor from AP-42 Table 3.3-1 for diesel fuel engines,⁷ an emergency-use engine with capacity less than 644 horsepower will be insignificant per 02Q .0503(8):

$$\left(\frac{0.031 \text{ lb}_{\text{NO}_x}}{\text{hp-hr}}\right) \times (644 \text{ hp}) \times \left(\frac{500 \text{ hr}}{\text{yr}}\right) \times \left(\frac{1 \text{ ton}}{2,000 \text{ lb}}\right) = \frac{5 \text{ ton}_{\text{NO}_x}}{\text{yr}}$$

Both of the engines proposed by DEC have capacities less than 644 horsepower, and therefore will be insignificant per 15A NCAC 02Q .0503(8).

⁶ See “Calculating Potential to Emit (PTE) for Emergency Generators”, John Seitz, Director, OAQPS, EPA, September 6, 1995.

⁷ The AP-42 factor for engines is extremely conservative; the NO_x limit under NSPS Subpart IIII is far lower. Therefore, this represents a conservative upper bound.

3.6 Summary of Changes

Page No.	Section	Description of Changes
Throughout	Throughout	<ul style="list-style-type: none"> Updated dates and permit numbers. Updated formatting to match current DAQ standard. Changes to formatting are not intended to affect the Permittee’s compliance requirements.
13	1	<ul style="list-style-type: none"> Added footnote regarding the use of coal with 1.5% limestone additive in Unit 6.
69	2.1 S.	<ul style="list-style-type: none"> Removed references to 02Q .0504. Updated regulatory citations to 02Q .0508 because the Permittee has completed the two-step significant modification. Added requirement for clear reporting of deviations.
87	2.2 C.4	<ul style="list-style-type: none"> Removed reference to 40 CFR Part 97 Subpart BBBBB because that rule does not apply in North Carolina. Removed statement that CSAPR is “federal enforceable only.”
87	2.2 C.5 (new)	<ul style="list-style-type: none"> Added specific condition for 02D .1425. This rule became effective May 2022.
n/a	2.2 G. (former)	<ul style="list-style-type: none"> Removed this section. Removed specific condition for 02Q .0504 because the Permittee has satisfied the requirement to submit a permit application for 2nd-step significant modification.
104	3 (new)	<ul style="list-style-type: none"> Created this section. Moved the list of insignificant activities to this section. Changed description of I-152 to be a permanent engine based on Permittee’s request. Added I-153 at Permittee’s request.
109	4 (new)	<ul style="list-style-type: none"> Created this section. Moved the General Conditions to this section. Updated General Conditions to v7.0.

* This list is not intended to be a detailed record of every change made to the permit but a summary of those changes.

4.0 Draft Permit Review Summary

Initial draft: An initial draft of the permit and this application review were sent to DAQ Permits staff on November 6, 2023. Comments were received in-person on November 16, 2023:

- Permits Comment 1: Typos throughout the draft permit and review.
Response: The indicated issues were corrected.
- Permits Comment 2: The application review should include a discussion of reconstruction under NSPS rules.
Response: This discussion was added to Section 3.2.5 of the application review.
- Permits Comment 3: The existing permit will expire before this draft permit is issued. The draft permit should discuss the upcoming expiration date. DEC has already submitted a timely renewal application.
Response: The permit's expiration date will be corrected based on DAQ's standard language for permits with a timely renewal application in-house.
- Permits Comment 4: Regulatory citations in Section 2.1 S of the Title V permit should be updated now that DEC has submitted the 2nd-step application. Noncompliance statements and deviation reporting should also be added.
Response: The indicated issues were addressed.
- Permits Comment 4: DEC must address the recent addition of 1-BP to the list of hazardous air pollutants.
Response: DEC confirmed by email on December 12, 2023 that there would be no emissions of 1-BP from the WWTP.

Revised draft: A revised draft of the permit and this application review were sent to DAQ SSCB staff, DAQ ARO staff, and DEC staff on December 12, 2023. On December 19, 2023, DEC staff stated that they had no comments on the draft.

5.0 Compliance Status and Other Regulatory Concerns

Compliance status:

- DEC included form E5 “Title V Compliance Certification” with the .22A application. With this form, DEC certified that the facility was in compliance with all applicable requirements.
- This facility was most recently inspected on September 29, 2022 by Christopher Scott. DEC appeared to be in compliance with the Title V permit at that time.
- This facility has not been issued any Notices of Violation in the previous five years.

Application fee:

- Applications for a second-step significant modification require an application fee if the 1st step of the modification began before November 18, 2021. DEC submitted the appropriate application fee via ePay.
- 502(b)(10) modifications do not require an application fee.

PE Seal: Pursuant to 15A NCAC 02Q .0112 “Application requiring a Professional Engineering Seal,” a professional engineer’s seal (PE Seal) is required to seal technical portions of air permit applications for new sources and modifications of existing sources as defined in 15A NCAC 02Q .0103 that involve the criteria in 02Q .0112(a)(1)-(3).

- A PE Seal was not required for the first-step significant modification (see Attachment).
- A PE Seal is not required for the second-step modification because no changes to the permit were made as a result of the second-step modification.
- A PE Seal is not required for 502(b)(10) applications.

Zoning: A Zoning Consistency Determination per 15A NCAC 02Q .0507(d) was required for the first-step significant modification (see Attachment). An additional determination is not required for a second-step modification because no expansion of the facility is occurring as part of the second-step modification. A zoning consistency determination is not required for 502(b)(10) applications.

Removal of References to Affirmative Defense: EPA has promulgated a rule (88 FR 47029, July 21, 2023), with an effective date of August 21, 2023, removing the emergency affirmative defense provisions in operating permits programs, codified in both 40 CFR 70.6(g) and 71.6(g). EPA has concluded that these provisions are inconsistent with the EPA’s current interpretation of the enforcement structure of the CAA, in light of prior court decisions.⁸ Moreover, per EPA, the removal of these provisions is also consistent with other recent EPA actions involving affirmative defenses⁹ and will harmonize the EPA’s treatment of affirmative defenses across different CAA programs.

⁸ NRDC v. EPA, 749 F.3d 1055 (D.C. Cir. 2014).

⁹ In newly issued and revised New Source Performance Standards (NSPS), emission guidelines for existing sources, and NESHAP regulations, the EPA has either omitted new affirmative defense provisions or removed existing

As a consequence of this EPA action to remove these provisions from 40 CFR 70.6(g), it will be necessary for states and local agencies that have adopted similar affirmative defense provisions in their Part 70 operating permit programs to revise their Part 70 programs (regulations) to remove these provisions. In addition, individual operating permits that contain Title V affirmative defenses based on 40 CFR 70.6(g) or similar state regulations will need to be revised.

DAQ has not adopted these discretionary affirmative defense provisions in its Title V regulations (15A NCAC 02Q .0500). Instead, DAQ has chosen to include them directly in individual Title V permits as General Condition J.

Per EPA, DAQ is required to promptly remove such impermissible provisions, as stated above, from individual Title V permits, after August 21, 2023, through normal course of permit issuance.

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affirmative defense provisions. See, e.g., National Emission Standards for Hazardous Air Pollutants for the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants; Final Rule, 80 FR 44771 (July 27, 2015); National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters; Final Rule, 80 FR 72789 (November 20, 2015); Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units; Final Rule, 81 FR 40956 (June 23, 2016).

6.0 Facility Emissions Review

Proposed modifications:

- Emission changes for the first step of the two-step significant modification initiated by application .20B can be found in the Attachment.
- DEC submitted a 502(b)(10) notification in order begin burning 1.5% limestone mixed coal. DEC estimates, at worst case, an increase of 1.69 tons of PM/PM₁₀/PM_{2.5} per year as a result of this change (see Section 3.2.6 above).

Title V: This facility is a major source for Title V because it has actual emissions of regulated pollutants greater than the threshold in 40 CFR 70.2. The second-step modification and 502(b)(10) applications will not affect this facility's designation as a major source for Title V.

HAP: This is a major source of HAP because it has actual emissions of HAP greater than the threshold in 40 CFR 63.2. The second-step modification and 502(b)(10) applications will not affect this facility's designation as a major source of HAP.

On December 22, 2021, US EPA added 1-bromopropane (1-BP) to the list of HAP. DEC's 1st-step application was submitted in 2020, and therefore 1-BP was not addressed as part of that application.

In correspondence received after the application, DEC confirmed that there would be no 1-BP present in the FGD wastewater.

PSD: This facility is a major stationary source for PSD because it has actual emissions of regulated pollutants greater than the thresholds in 40 CFR 51.166(b)(1)(i)(a). The second-step modification will not affect this facility's designation as a major stationary source for PSD because DEC addressed potential emissions with the first step. The emission changes associated with the 502(b)(10) change will not be a major modification.

PSD Increment Tracking: The Rutherford County airshed been triggered for PSD increment tracking for PM₁₀. The Cleveland County airshed has been triggered for PSD increment tracking for the following pollutants: PM₁₀, PM_{2.5}, NO_x, and SO₂.

- Any PSD increment tracking changes associated with the new wastewater treatment plant were discussed in the first step of the two-step significant modification process (see Attachment).
- No change in emissions of NO_x and SO₂ is expected from the use of limestone-mixed coal. Assuming that 100% of limestone used becomes PM/PM₁₀/PM_{2.5}, the potential hourly emissions from the use of limestone-mixed coal can be calculated:

$$\frac{\left(\text{Unit 6 hourly heat input, } \frac{10^6 \text{Btu}}{\text{hr}}\right)}{\left(\text{coal heat content, } \frac{\text{Btu}}{\text{lb}}\right)} \times (\% \text{ limestone}) \times (1 - \text{control efficiency}) = \text{hourly PM emissions}$$

$$\frac{\left(7,850 \frac{10^6 \text{Btu}}{\text{hr}}\right)}{\left(12,228 \frac{\text{Btu}}{\text{lb}}\right)} \times (1.5\% \text{ limestone}) \times (1-99.996\%) = +0.385 \frac{\text{lb}}{\text{hr}}$$

The cover letter to the new Title V permit will note that PSD increment tracking for PM₁₀ and PM_{2.5} increased by 0.385 lb/hr.

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7.0 Public Notice and EPA Review

A notice of the draft Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0518(b), the EPA will have a 45-day review period. Based on an agreement between DAQ and EPA, this period will generally coincide with the 30-day public notice period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also, pursuant to 02Q .0522, a notice of the draft Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 02Q .0521 above. DAQ voluntarily provides notice to each bordering State (Virginia, Tennessee, Georgia, and South Carolina).

- The Public Notice and EPA Review periods began on XXXXXX.
- The Public Notice period ended on XXXXX.
- The EPA Review period ended on XXXXX.

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8.0 Recommendations

This permit application has been reviewed by NC DAQ to determine compliance with all procedures and requirements. NC DAQ has determined that this facility appears to be complying with all applicable requirements.

DAQ recommends issuance of Permit No. 02218T38. ARO, SSCB, and DEC have received a copy of this permit and submitted comments that were incorporated as described in Section 4.0.

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Attachment
Review of Application 810028.20B and Permit Revision T45

The following document was prepared by DAQ and issued on March 18, 2021. Page numbers of the original document may change due to formatting differences.

**NORTH CAROLINA
 DIVISION OF AIR QUALITY**
 Application Review

Region: Asheville Regional Office
County: Rutherford
NC Facility ID: 8100028
Inspector's Name: Christopher Scott
Date of Last Inspection: 05/14/2020
Compliance Code: 3 / Compliance - inspection

Issue Date: March 18, 2021

Facility Data	Permit Applicability (this application only)
<p>Applicant (Facility's Name): Duke Energy Carolinas, LLC - Cliffside Steam Station</p> <p>Facility Address: Duke Energy Carolinas, LLC - Cliffside Steam Station 573 Duke Power Road Mooresboro, NC 28114</p> <p>SIC: 4911 / Electric Services NAICS: 221112 / Fossil Fuel Electric Power Generation</p> <p>Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V</p>	<p>SIP: 02D .0515, .0521 NSPS: N/A NESHAP: N/A PSD: N/A PSD Avoidance: N/A NC Toxics: 02Q .0711, 02D .1100 112(r): N/A Other: None</p>

Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	<p>Application Number: 8100028.20B Date Received: 12/21/2020 Application Type: Modification Application Schedule: TV-Sign-501(b)(2) Part I Existing Permit Data Existing Permit Number: 04044/T44 Existing Permit Issue Date: 11/09/2020 Existing Permit Expiration Date: 12/31/2023</p>
Steve Hodges Environmental Coordinator (828) 657-2339 573 Duke Power Road Mooresboro, NC 28114	Jeffery Joyce General Manager II (828) 657-2001 573 Duke Power Road Mooresboro, NC 28114	Daniel Markley Lead Environmental Specialist (704) 382-0696 526 South Church Street Charlotte, NC 28202	

Total Actual emissions in TONS/YEAR:							
CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2019	1383.06	2488.59	46.03	580.53	305.87	34.45	17.63 [Hydrogen chloride (hydrochlori)]
2018	1350.45	1953.62	23.55	934.95	255.95	22.22	13.48 [Hydrogen chloride (hydrochlori)]
2017	858.48	1645.65	11.94	1581.61	240.45	15.94	9.13 [Hydrogen chloride (hydrochlori)]
2016	585.91	1172.36	14.16	612.32	162.69	13.48	8.80 [Hydrogen chloride (hydrochlori)]
2015	617.26	1176.38	12.90	541.01	178.96	16.29	9.99 [Hydrogen chloride (hydrochlori)]

<p>Review Engineer: Rahul Thaker</p> <p>Review Engineer's Signature: <i>Rahul P. Thaker</i></p> <p>Date: March 18, 2021</p>	<p align="center">Comments / Recommendations:</p> <p>Issue 04044/T45 Permit Issue Date: 03/18/2021 Permit Expiration Date: 12/31/2023</p>
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1. Purpose

Duke Energy Carolinas, LLC, Cliffside Steam Station (hereinafter Duke Energy or DEC), submitted a Title V application on December 21, 2020 to construct and operate a new flue gas desulfurization (FGD) wastewater treatment facility (WWTF). The application was not considered complete until December 23, 2020 when the application fee was received (electronic). The applicant requested that the application be processed pursuant to a “two-step” process in 15A NCAC 02Q .0501(b)(2) and .0504.

Therefore, this application will be processed as a first-step, in accordance with 02Q .0300 “Construction and Operation Permits”. The Permittee will be required to submit another application within 12 months of beginning operation of the above FGD WWTF emissions units to complete the second step of 02Q .0501(b)(2) and obtain a permit in accordance with 02Q .0500 “Title V Procedures.”

2. Facility Description

DEC owns and operates the Cliffside Steam Station (also known as Rogers Energy Complex), which is located on the Rutherford-Cleveland County border in North Carolina. The Cliffside Station comprises of coal/No. 2 fuel oil/natural gas-fired electric utility steam generating units (EGUs) [Units 5 and 6], auxiliary boilers, emergency generators/fire pumps, cooling tower, and coal, fly ash, limestone and gypsum storage and handling equipment, in addition to a myriad of insignificant activities of different industrial category types.

Unit 5 is equipped with pollution control equipment consisting of a selective catalytic reduction (SCR) system, a flue gas ash conditioning system, a portable hydrated lime dry sorbent injection system, electrostatic precipitators (ESPs), and a flue gas desulfurization system (FGD). Unit 6 pollution control devices include an SCR, spray dryer absorbers, baghouses, and an FGD system.

The facility's primary business activity is classified under the Standard Industrial Classification code 4911 "Electric Services"¹. Under North American Industrial Classification System (NAICS), it is classified under code 221112 "Fossil Fuel Electric Power Generation".

3. Application Chronology

December 21, 2020	DAQ Received the application.
December 23, 2020	DAQ received the application fees and the application was considered complete.
January 15, 2021	DAQ sent the add info email request to the applicant for different items.
January 29, 2021	DAQ received the requested information.
February 15, 2021	DAQ requested a zoning determination from Rutherford County.
February 23, 2021	DAQ received a zoning determination from Rutherford County.

4. Statement of Compliance

Based upon the most recent inspection conducted by the ARO (Chris Scott) on May 14, 2020, “the facility appeared to be operating in compliance with Air Permit No. 04044T43 at the time of this Partial Compliance Evaluation (PCE).”

5. Permit Modification/Changes

Both electric utility boilers (Units 5 and 6) at the facility are equipped with FGD systems that remove SO₂ emissions from the exhaust streams. Wastewater generated from the Unit 5 FGD system is currently treated in the existing FGD Wastewater Treatment Facility (WWTF). This existing WWTF consists of equalization tanks, reaction tanks, flocculating clarifiers, and gravity filters, and uses a filter press to separate solids from the wastewater at the treatment facility. The solids are loaded into trucks and transported to the ash and gypsum landfill. The existing WWTF effluent is then sent to the Broad River via Outfall 005 (National Pollutant Discharge Elimination System (NPDES) permit) after combining it with the “final wastewater treatment plant” effluent (i.e., treated wastewater from plant drains and

¹ Includes establishments engaged in generation, transmission and/or distribution of electric energy for sale.

process sumps, material storage pile runoff, RO reject, stormwater, sanitary systems, cooling tower blowdowns, landfill leachate, and ash basin dewatering/decanting).

The existing WWTF is being upgraded to include a new wastewater treatment system (WWTS), comprising of a bioreactor (ID No. ES-WWTFBR) and associated integral bin vent filter (ID No. CD-WWTF-Silo-BF), a lime storage silo (ID No. ES-WWTF Silo), and an 8,000 gallon HCl tank (ID No. IS-WWT HCl Storage Tank). The bio-reactor effluent is routed to a new ultrafiltration unit before being discharged to the above Board River via Outfall 005.

The main purpose of this project is to comply with the US EPA Steam & Electric Effluent Limitation Guidelines (ELG) under Clean Water Act (CWA) for FGD wastewater so that the facility can meet the outfall limits outlined in its NDPES permit. This ELG includes technology-based limits for several pollutants (numeric effluent limitations for mercury, arsenic, selenium, and nitrate/nitrite as nitrogen).

With regard to Unit 6 FGD, it needs to be stated that its wastewater is sent to the existing Spray Dryer Absorber (SDA) in which the liquid is mixed with quicklime and evaporated in the flue gas and captured in the downstream baghouses, but upstream of the FGD system. It is a zero liquid discharge system under typical conditions as per the applicant.

Separately it should be noted that all the wet ash basins located at the Cliffside Steam Station, were used to store wet ash from the bottom of the boilers and the particulate control devices of Units 5 and 6. These basins were previously part of the above referenced “final wastewater treatment plant”, are being decommissioned in compliance with the EPA’s Coal Combustion and Residuals (CCR) regulation and NC’s Coastal Management Act (CAMA) requirements. In brief, the decommissioning of the wet ash basins, as per these statutory and regulatory schemes, is not related to the proposed upgrade to the existing FGD WWTF (i.e. the proposed project under this application).

The DAQ approved the Notice of Intent to Construct (NOIC) for the above project on May 7, 2020 and the applicant started the construction of the project after receiving the NOIC.

In addition to the above project emissions units, the facility has requested to add the following existing sources of insignificant emissions to the insignificant activities list:

- Handling of FGD filter press cake at the existing FGD Wastewater Treatment Facility and ash and gypsum landfill (ID No. IS-WWTF)
- Handling of filter press solids at the existing Final Wastewater Treatment Facility and ash and gypsum landfill (ID No. IS-FWWTP).

Wastewater Treatment Facility Bio-reactor (ID No. ES-WWTFBR)

The bioreactor will be part of the new WWTS. As discussed above, the existing WWTF includes physical and chemical treatment to remove contaminants from the FGD blowdown wastewater. It will be modified to include biological treatment for removing certain heavy metals prior to its discharge. Anaerobic activity of bacteria converts a small fraction of sulfate salts in the wastewater to hydrogen sulfide (H₂S). The design capacity of the bioreactor is 288 gal/min (414,720 gallons/day).

The above design rate for the bioreactor is based upon Unit 5’s FGD scrubber’s ability to discharge wastewater at peak loads without derating the unit. The basis also accounts for any recycle streams internal to the wastewater treatment system based on design mass balance of the system and previous operating experience of similar systems.

Only hydrogen sulfide (H₂S) emissions are expected at a rate of 0.43 lb/hr (10.3 lb/day or 1.87 tons/yr) which is estimated using the sulfate reduction emission factor of 16.7 mg/l, observed in the manufacturer studies². The applicant has argued that the OEM equipment vendor for Cliffside Steam Station’s bioreactor updated more complex

² Red Rock Ranch Pilot Study, California, Suez (GE/Zenon), 2005, as discussed in application review for a similar project for Duke Energy Progress, Roxboro Steam Electric Plant, Air Quality Permit 01001T56 (November 27, 2018).

calculations that demonstrated a lower emission rate (factor) than the above emission factor; however, these calculations are considered confidential business information (CBI). Therefore, to avoid having to submit the CBI and to conservatively estimate emissions, Duke Energy relied on the original calculations developed for the Roxboro Plant's bioreactor in 2005. Anaerobic activity of bacteria converts a small fraction of sulfate salts in the effluent to H₂S. Conservatively, all sulfate reduction is assumed to form H₂S and 50 percent is assumed to be emitted from solution at a pH of 7.5.

Given:

Sulfate (SO₄) reduction = 16.7 mg/l
Molecular Weight of H₂S = 34.08 lb/lb-mole
Molecular Weight of Sulfate = 96.06 lb/lb-mole
Design Flow Rate = 288 gal/min
Hours of Operation = 8,760 per year
Assume 100% Stoichiometric Conversion of Sulfate to H₂S
Assume 50% of H₂S released to Atmosphere at pH ~ 7.5

$$\begin{aligned} H_2S \frac{lb}{day} &= \text{sulfate reduction} \left(\frac{mg}{l} \right) * \text{stoichiometric conversion} (100\%) * \frac{MW_{H_2S}}{MW_{sulfate}} * \\ &\text{design flow rate} \left(\frac{gal}{min} \right) * 60 \frac{min}{hr} * 24 \frac{hr}{day} * 3.785 \frac{lit}{gal} * \frac{lb}{453593 mg} * 50\% \text{ emitted} \\ &= 10.25 \text{ lb/day} \end{aligned}$$

This source may be subject to NC's air toxics program (02Q .0700 and 02D .1100) and its applicability is discussed in Section 7 below. The source being part of the modification (comprising of the bio-reactor, lime storage silo, hydrochloric acid storage tank, and a few insignificant activities) and the modification being subject to some 02D regulations (for example, lime silo subject to 02D .0510 and .0521, as discussed below), it is subject to the state's air toxics program. Refer to Section 7 below for applicability and compliance with the 02Q .0711 and .02D.1100.

No other regulatory requirements shall apply to the proposed bioreactor.

Wastewater Treatment Facility Lime Storage Silo (ID No. ES-WWTF Silo) and Associated Bin Vent Filter (ID No. CD-WWTF-Silo-BF)

Hydrated lime is used in the new FGD WWTS. The lime is stored in a silo equipped with a bin vent filter to minimize emissions during loading/unloading of the silo. Tanker trucks that deliver lime to the facility are used to fill the silo by means of a conventional track blower (800 acfm maximum capacity). Lime is emptied from the silo into the lime slurry tank. The silo will be equipped with dual discharge trains. Each train will include an aerator, rotary feeder, volumetric screw feeder with surge hopper, and a slurry tank. Each surge hopper will be equipped with a vent sock that allows displaced air to be evacuated from the hopper during the filling process.

The size of the silo is 5,200 ft³ (39 feet height, 13 feet diameter). Maximum product throughput is 600 tons/yr while the actual throughput is expected to be 400 tons/yr. The lime unloading rate is 0.2 tons/hr.

The bin vent filter is an air pulse type. The filter surface area is 295.2 ft² (12 cartridges, each with 24.6 ft²). With a maximum air flow rate of 800 cfm, air-to-cloth ration is estimated to be 2.71 ft/min, which is less than the typical gas-to-cloth ratio for air pulse baghouses, controlling lime dust³. Thus, the design of the proposed bin vent filter can be deemed conservative.

With 0.005 grain/dscf manufacturer's guaranteed emission rate (outlet grain loading) and the maximum 800 cfm air flow rate during filling, particulate matter (PM) emission rate is estimated to be 0.0343 lb/hr (0.15 ton/yr). Emissions

³ Table 5 "Typical Gas-to-Cloth Ratios for Various Industries", Page 128, Air Pollution Engineering Manual, Van Nostrand Reinhold, 1992.

of the PM₁₀ and PM_{2.5} are assumed to be the same as PM. As contrast to emissions during filling lime into the silo, PM emissions as a result of unloading lime from the silo to the slurry tanks are expected to be negligible.

The applicant has emphasized that the bin vent filter is part of the lime storage silo and the silo cannot be operated without the filter due to unacceptable loss of raw material. In brief, the applicant has argued that the bin vent filter is not an air pollution control device, instead it is a material recovery equipment, “inherent” to the process.

Regardless of whether the bin vent filter is integral or inherent to the operation of lime silo for applicability of Compliance Assurance Monitoring (CAM, Refer Section 6 below), for applicability with 02D .0510 and .0521, it is considered an air pollution control device. Using the after control emission rate of 0.15 tons/yr and a typical baghouse control efficiency of 99 percent (conservative), the before control emission rate is expected to be 15 tons/yr, exceeding the 5 tons/yr threshold in 02Q .0503(8). In summary, the lime storage silo will not be deemed an insignificant activity under 02Q .0503(8) and will be included in the permit with specific requirements as discussed below.

The lime silo is subject to the requirements in 02D .0510, .0521 and .1100, and 02Q .0700.

15A NCAC 02D .0510 “Particulates from Sand, Gravel, or Crushed Stone Operations”

This standard applies to any sand, gravel, or crushed stone operation, and requires measures to prevent exceeding ambient air quality standards beyond the property line for both PM₁₀ and total suspended particulates. The standard requires control of fugitive non-process emissions according to 15A NCAC 2D .0540 and control of process generated emissions such that the applicable opacity standard is not exceeded. The new lime storage silo is subject to this regulation.

The Cliffside Station will use a bin vent filter to control PM and PM₁₀ from the lime storage silo. The bin vent filter will be regularly inspected and maintained as recommended by the manufacturer. An instantaneous visible emissions check of the pneumatic unloading system, silo, and bin vent filter will be observed once per month per 15A NCAC 2D .0521. An internal inspection of the bin vent filter’s structural integrity will be performed annually.

All inspection results and maintenance performed will be recorded in a logbook. A summary report of monitoring and recordkeeping activities will be submitted to the DAQ on January 30 and July 30 of each calendar year for the preceding six-month period.

15A NCAC 02D .0521 “Control of Visible Emissions”

This rule applies to all fuel burning sources and other processes that may have visible emissions. For sources manufactured after July 1, 1971, visible emissions shall not be more than 20% opacity averaged over a six-minute period. Opacity may exceed 20% one time in an hour, but not more than 4 times in 24 hours. Opacity may never exceed 87%. This limit applies to the lime storage silo. An instantaneous visible emissions check will be performed once per month while the lime storage silo is being loaded. Results will be recorded in a logbook. A summary report of visible emissions will be submitted on January 30 and July 30 of each calendar year for the preceding six-month period.

15A NCAC 02Q .0700 “Toxic Air Pollutant Procedures”

15A NCAC 02D .1100 “Control of Toxic Air Pollutants”

Refer to Section 7 below.

Insignificant Activities

Hydrogen Chloride Storage Tank (ID No. I-WWT HCl Storage Tank)

This is a wastewater treatment facility hydrochloric acid storage tank (with voluntary scrubber control, but no reduction claimed). The operating volume is 8,000 gallons (shell capacity 10,950 gallons), storing a 32% solution of HCl. The applicant has used the US EPA TANKS V 4.09d to calculate HCl emissions. Partial pressure data from

Perry's Chemical Engineers' Handbook has been used to develop required chemical property data input for the TANKS program. The estimated emission rate is 187 lbs/yr (0.093 ton/yr).

“Insignificant activities because of size or production rate” in 02Q .0503(8) is defined as “any activity whose emissions would not violate any applicable emissions standard and whose potential emission of particulate, sulfur dioxide, nitrogen oxides, volatile organic compounds, and carbon monoxide before air pollution control devices, are each no more than five tons per year and whose potential emissions of hazardous air pollutants before air pollution control devices, are each below 1000 pounds per year.”

Potential emissions of HCl, a HAP, from the HCl storage tank before any air pollution control devices are less than 1,000 pounds per year as stated above. Further, there are no “applicable requirements” as defined in 02Q .0503 via 02Q .0103(5). Therefore, the proposed tank is an insignificant activity and will be accordingly identified in the permit by modifying the existing list included in the current permit.

In addition, as requested, the following activities will be categorized as insignificant activities per 02Q .0503(8):

- Handling of FGD filter press cake at the existing FGD Wastewater Treatment Facility and ash and gypsum landfill (ID No. IS-WWTF)
- Handling of filter press solids at the existing Final Wastewater Treatment Plant and ash and gypsum landfill (ID No. IS-FWWTP)

The potential PM emission rate is 0.00138 ton/yr for each of the above activities and each is less than 5 tons/yr before control threshold. Moreover the potential HAP (individual) emission rate is 0000332 lb/year (single largest HAP manganese) for each activity, and is less than 1,000 lbs/yr before control threshold. The above emissions estimate is based upon EPA's AP-42, Section 13.2.4 (Aggregate Handling and Storage Piles) for handling of material at an industrial site and average concentration of Roxboro and Asheville Plants' gypsum products. Finally, they are not subject any “applicable requirements” as defined in the Title V program.

6. NSPS, NESHAPS, PSD, Attainment Status, 112(r), CAM

NSPS

Not applicable.

NESHAP

Not applicable.

PSD

County of Rutherford is in attainment or unclassifiable for all promulgated National Ambient Air Quality standards (NAAQS) in accordance with §81.334. In addition, Cleveland County is also in attainment or unclassifiable for all promulgated NAAQS. The PSD program applies to major stationary sources and major modifications in these Counties.

The Cliffside Steam Station is an existing major stationary source for PSD as per the current permit. Potential emissions for the modification as discussed in Section above 5 are as follows:

Emission Source Description	PM TPY)	PM₁₀ TPY	PM_{2.5} TPY	Pb TPY	H₂S TPY	TRS² TPY
Potential Emissions ¹	0.153	0.153	0.153	3.68E-07	1.87	1.87
PSD Significant Emission Rate	25	15	10	0.6	10	10
Pollutant Subject to PSD Review	No	No	No	No	No	No

1. Includes emissions from the bio-reactor system (ES-WWTFBR), lime storage silo (ES-WWTF Silo), and insignificant activities (ID Nos. IS-WWTF and IS-FWWTP).
2. TRS = Total Reduced Sulfur, including H₂S. TRS emissions in this application are comprised solely of H₂S.

Based on the data in Table above, the modification is not a major modification and not subject to PSD review.

With regard to actual emissions tracking for PSD increments, the Rutherford County air-shed is triggered for increment tracking for PM₁₀. The increase in PM₁₀ due to the modification of 0.153 tons/yr (0.035 lbs/hr) will be tracked. In addition, the Cleveland County airshed is triggered for increment tracking for both PM₁₀, PM_{2.5}, NO_x, and SO₂. Increases in PM₁₀ and PM_{2.5} due to the modification of 0.035 lbs/hr each will be tracked.

112(r)

The facility is subject to CAA 112(r) requirements and the resulting regulatory requirements in 40 CFR 68 “chemical accident prevention provisions”. The current permit includes this applicable requirement (Part 68) in Section 2.3. No further evaluation is required.

CAM

The proposed changes discussed in Section 5 above are processed pursuant to 02Q .0300 “Construction and Operation” permit program and not under 02Q .0500 “Title V Procedures”. When the second step of the application is submitted under 02Q .0504, the DAQ will address and evaluate the applicability for “Compliance Assurance Monitoring (CAM)” in 02D .0614 (40 CFR 64).

Based on the application, it appears that the bin vent filter on the proposed lime storage silo is integral (inherent) to the process and the silo will not operate (load or unload the material) without the concurrent operation of the bin vent filter. Further the silo is to be used as a material recovery device due to unacceptable loss of raw material and not as an air pollution control device; thus, the bin vent filter appears to not be a “control device” in the context of CAM and no further CAM applicability is to be explored at this time.

7. Facility-wide Air Toxics

The facility is currently subject to NC’s air toxics program as per the current permit. Specifically, the permit includes the approved emissions limits in accordance with 02D .1100 for the existing coal storage and handling, and ash storage and handling equipment for the following pollutants: arsenic and inorganic arsenic compounds, beryllium, cadmium, soluble chromate compounds as chromium (VI) equivalent, manganese and compounds, mercury vapor, and nickel metal.

With the proposed changes, it needs to be determined if there is a net increase in emissions or ambient concentration for the above pollutants pursuant to 02D.1100, and emissions of any toxic air pollutant that the facility was not emitting before the modification if such emissions exceed the toxic pollutant emission rates (TPERs) in 02Q .0711.

The following Table 7-1 provides the facility-wide air toxics evaluation for the pollutants expected to be emitted due to the modification. The emissions rates on a source-by-source basis for the pollutants in common with the project pollutants are added and then the facility total emission rate for each pollutant is compared with the applicable TPERs.

Table 7-1: Applicability

CAS #	Compound	TAP Permitting Emissions Rates (TPER)				Cliffside Plant			
		Carcinogens	Chronic Toxicants	Acute System Toxicants	Acute Irritants	Carcinogens	Exceed	Chronic Toxicants	Exceed
		(lb/yr)	(lb/day)	(lb/hr)	(lb/hr)	(lb/yr)	TPER	(lb/day)	TPER
Inorganic, Non-metal Compounds									
7783-06-4	Hydrogen Sulfide		1.70					10.3	Yes
Metal Compounds									
ASC	Arsenic and Inorganic Arsenic Compounds	5.30E-02				137	Yes		
7440-41-7	Beryllium	2.80E-01				24.9	Yes		
7440-43-9	Cadmium	3.70E-01				36.7	Yes		
MNC	Manganese and Compounds		6.30E-01					1.71	Yes
7439-97-6	Mercury, Vapor		1.30E-02					4.02E-01	Yes
7440-02-0	Nickel Metal		1.30E-01					1.35	Yes

Thus, the applicant is required to demonstrate compliance with the Acceptable Ambient Levels (AALs) in 02D .1104 for hydrogen sulfide, arsenic, beryllium, cadmium, manganese, mercury vapor, and nickel metal.

With regard to the question on evaluating chromium emissions for compliance with the applicable AALs, the applicant has contended that emissions of chromium from lime handling activities (part of the proposed project) are not expected to be in a hexavalent oxidation state, i.e., the form regulated under 15A NCAC 2Q .0711 and 2D .1100, either as bioavailable pigments, soluble chromate compounds, or non-specific chromium VI compounds. The applicant expects Cr(VI) emissions from combustion activities and handling of ash and gypsum; however the project is not expected to increase emissions from any of those activities. The only source of metal TAP emissions associated with the project is from the new lime silo, therefore, the applicant does not expect an increase in emission rates of the TAP, forms of chromium as a result of the project, and as such is not required to include Cr(VI) in the evaluation required by 15A NCAC 02Q .0706 (b) and (c).

The following Table 7-2 provides the potential emissions rates for the above triggered pollutants, modeled for compliance with the applicable AALs:

Table 7-2: Potential Emissions Rates

Source ID	H ₂ S	ARSENIC	BERYLLIUM	CADMIUM	MANGANESE	MERCURY	NICKEL
	24-hour	Annual	Annual	Annual	24-hour	24-hour	24-hour
	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
ESWWTFSI	-	6.05E-09	6.48E-10	1.25E-09	3.46E-07	4.32E-11	1.47E-08
ESU5BOIL	-	8.43E-04	1.53E-04	2.30E-04	3.06E-03	9.19E-04	2.68E-03
ESAUXU5	-	5.04E-07	2.34E-08	5.68E-08	1.17E-06	6.76E-08	1.17E-06
ES11	-	2.24E-08	2.40E-09	4.64E-09	1.28E-06	1.36E-10	5.44E-08
LS13_1	-	3.41E-10	3.65E-11	7.06E-11	2.13E-07	2.66E-11	9.06E-09
LS13_2	-	3.41E-10	3.65E-11	7.06E-11	2.13E-07	2.66E-11	9.06E-09
ES6	-	1.09E-03	1.98E-04	2.97E-04	3.96E-03	1.19E-03	3.46E-03
ESAUXU6	-	1.34E-06	6.22E-08	1.51E-07	3.11E-06	1.80E-07	3.11E-06
ESLSSDA	-	8.05E-12	8.63E-13	1.67E-12	1.01E-07	1.26E-11	4.28E-09
BF3BF4	-	4.34E-09	4.65E-10	9.00E-10	1.64E-06	1.74E-10	6.96E-08
Source ID	H₂S	ARSENIC	BERYLLIUM	CADMIUM	MANGANESE	MERCURY	NICKEL

	24-hour (g/s/m ²)	Annual (g/s/m ²)	Annual (g/s/m ²)	Annual (g/s/m ²)	24-hour (g/s/m ²)	24-hour (g/s/m ²)	24-hour (g/s/m ²)
LANDA8	-	8.79E-09	1.29E-09	1.62E-10	2.50E-08	8.09E-12	1.09E-08
Source ID	H ₂ S	ARSENIC	BERYLLIUM	CADMIUM	MANGANESE	MERCURY	NICKEL
	24-hour	Annual	Annual	Annual	24-hour	24-hour	24-hour
	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
LS1	-	8.51E-10	9.12E-11	1.76E-10	2.66E-06	3.33E-10	1.13E-07
LS6	-	5.11E-09	5.47E-10	1.06E-09	1.47E-05	1.83E-09	6.23E-07
GS3GS4	-	2.92E-09	-	7.30E-10	9.32E-07	7.77E-10	1.55E-08
GS9	-	6.57E-09	-	1.64E-09	1.85E-06	1.54E-09	3.09E-08
FWWTPCU	-	1.62E-09	2.39E-10	2.99E-11	6.48E-09	2.79E-12	2.82E-09
LANDWTCU8	-	1.62E-09	2.39E-10	2.99E-11	6.48E-09	2.79E-12	2.82E-09
WWTFGDC	-	2.39E-11	-	5.97E-12	3.35E-09	2.79E-12	5.59E-11
LANDFGDU8	-	2.39E-11	-	5.97E-12	3.35E-09	2.79E-12	5.59E-11
LANDGU8	-	3.77E-10	-	9.43E-11	3.77E-08	3.14E-11	6.29E-10
LANDAU8	-	1.48E-07	2.18E-08	2.72E-09	4.21E-07	1.36E-10	1.83E-07
Source ID	H ₂ S	ARSENIC	BERYLLIUM	CADMIUM	MANGANESE	MERCURY	NICKEL
	24-hour	Annual	Annual	Annual	24-hour	24-hour	24-hour
	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)
ESWWTFBR	2.08E-04	-	-	-	-	-	-
CFUG	-	2.92E-10	7.53E-11	8.47E-12	1.04E-09	5.20E-12	8.09E-10
CPILEA	-	3.35E-09	8.64E-10	9.72E-11	9.72E-09	4.86E-11	7.56E-09
CPILEIN	-	3.32E-10	8.57E-11	9.65E-12	9.65E-10	4.82E-12	7.50E-10
CPILEBULL	-	7.94E-11	2.05E-11	2.31E-12	2.30E-10	1.15E-12	1.79E-10
APILE1	-	3.29E-10	4.84E-11	6.05E-12	9.65E-10	3.12E-13	4.20E-10
APILE2	-	3.69E-10	5.43E-11	6.79E-12	1.08E-09	3.50E-13	4.71E-10
LS8A	-	7.57E-10	8.11E-11	1.57E-10	4.33E-08	5.41E-12	1.84E-09
LS8IN	-	7.52E-11	8.06E-12	1.56E-11	4.30E-09	5.37E-13	1.83E-10
LS9	-	5.73E-11	6.14E-12	1.19E-11	3.27E-09	4.09E-13	1.39E-10
LANDIN8	-	9.07E-10	1.34E-10	1.67E-11	2.58E-09	8.35E-13	1.12E-09

The following Table 7-3 provides the predicted air impacts of the potential emissions rates included in Table 7-2 above:

Table 7-3: Predicted Impacts of Potential Emissions Rates

Compound	Year	Averaging Period	Maximum Concentration	AAL	Percent of AAL	Optimization Factor
			(µg/m ³)	(µg/m ³)	(%)	
H ₂ S	18100224	24-hour	6.11E+00	1.2E+02	5.09	19.3
ARSENIC	2015	Annual	4.26E-04	2.1E-03	20.31	4.8
BERYLLIUM	2015	Annual	6.53E-05	4.1E-03	1.59	61.6
CADMIUM	2016	Annual	1.99E-05	5.5E-03	0.36	271
MANGANESE	15100424	24-hour	2.63E-02	3.1E+01	0.08	1,155

Compound	Year	Averaging Period	Maximum Concentration	AAL	Percent of AAL	Optimization Factor
			($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	(%)	
MERCURY	18052324	24-hour	3.02E-04	6.0E-01	0.05	1,944
NICKEL	15100424	24-hour	1.19E-02	6.0E+00	0.20	495

The following Table 7-4 provides the optimized emissions rates for all pollutants modeled for compliance. That is, the potential emissions rates in Table 7-2 above are optimized using the optimization factors in Table 7-3 above, complying at 98 percent of the applicable AALs.

Table 7-4: Optimized Emission Rates

Source ID	H ₂ S	ARSENIC	BERYLLIUM	CADMIUM	MANGANESE	MERCURY	NICKEL
	24-hour	Annual	Annual	Annual	24-hour	24-hour	24-hour
	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
ESWWTFSI	-	2.92E-08	3.99E-08	3.40E-07	3.99E-04	8.40E-08	7.27E-06
ESU5BOIL	-	4.07E-03	9.43E-03	6.23E-02	3.54E+00	1.79E+00	1.33E+00
ESAXU5	-	2.43E-06	1.44E-06	1.54E-05	1.35E-03	1.31E-04	5.80E-04
ES11	-	1.08E-07	1.48E-07	1.26E-06	1.48E-03	2.64E-07	2.69E-05
LS13_1	-	1.64E-09	2.25E-09	1.91E-08	2.46E-04	5.18E-08	4.48E-06
LS13_2	-	1.64E-09	2.25E-09	1.91E-08	2.46E-04	5.18E-08	4.48E-06
ES6	-	5.25E-03	1.22E-02	8.04E-02	4.57E+00	2.31E+00	1.71E+00
ESAXU6	-	6.47E-06	3.83E-06	4.09E-05	3.60E-03	3.49E-04	1.54E-03
ESLSSDA	-	3.89E-11	5.31E-11	4.52E-10	1.16E-04	2.45E-08	2.12E-06
BF3BF4	-	2.10E-08	2.86E-08	2.44E-07	1.89E-03	3.38E-07	3.44E-05
Source ID	H ₂ S	ARSENIC	BERYLLIUM	CADMIUM	MANGANESE	MERCURY	NICKEL
	24-hour	Annual	Annual	Annual	24-hour	24-hour	24-hour
	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)	(g/s/m ²)
LANDA8	-	4.24E-08	7.96E-08	4.38E-08	2.89E-05	1.57E-08	5.39E-06
Source ID	H ₂ S	ARSENIC	BERYLLIUM	CADMIUM	MANGANESE	MERCURY	NICKEL
	24-hour	Annual	Annual	Annual	24-hour	24-hour	24-hour
	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
LS1	-	4.11E-09	5.62E-09	4.78E-08	3.08E-03	6.47E-07	5.60E-05
LS6	-	2.47E-08	3.37E-08	2.87E-07	1.69E-02	3.56E-06	3.08E-04
GS3GS4	-	1.41E-08	-	1.98E-07	1.08E-03	1.51E-06	7.69E-06
GS9	-	3.17E-08	-	4.45E-07	2.14E-03	3.00E-06	1.53E-05
FWWTPCU	-	7.83E-09	1.47E-08	8.09E-09	7.49E-06	5.43E-09	1.40E-06
LANDWTCU8	-	7.83E-09	1.47E-08	8.09E-09	7.49E-06	5.43E-09	1.40E-06
WWTFGDC	-	1.15E-10	-	1.62E-09	3.87E-06	5.43E-09	2.77E-08
LANDFGDU8	-	1.15E-10	-	1.62E-09	3.87E-06	5.43E-09	2.77E-08
LANDGU8	-	1.82E-09	-	2.56E-08	4.36E-05	6.11E-08	3.11E-07

Source ID	H ₂ S 24-hour (g/s/m ²)	ARSENIC Annual (g/s/m ²)	BERYLLIUM Annual (g/s/m ²)	CADMIUM Annual (g/s/m ²)	MANGANESE 24-hour (g/s/m ²)	MERCURY 24-hour (g/s/m ²)	NICKEL 24-hour (g/s/m ²)
LANDAU8	-	7.14E-07	1.34E-06	7.38E-07	4.86E-04	2.65E-07	9.07E-05
ESWTFBR	4.01E-03	-	-	-	-	-	-
CFUG	-	1.41E-09	4.63E-09	2.30E-09	1.20E-06	1.01E-08	4.00E-07
CPILEA	-	1.62E-08	5.32E-08	2.63E-08	1.12E-05	9.45E-08	3.74E-06
CPILEIN	-	1.60E-09	5.28E-09	2.62E-09	1.11E-06	9.38E-09	3.71E-07
CPILEBULL	-	3.83E-10	1.26E-09	6.25E-10	2.66E-07	2.24E-09	8.87E-08
APILE1	-	1.59E-09	2.98E-09	1.64E-09	1.12E-06	6.07E-10	2.08E-07
APILE2	-	1.78E-09	3.34E-09	1.84E-09	1.25E-06	6.81E-10	2.33E-07
LS8A	-	3.65E-09	4.99E-09	4.25E-08	5.00E-05	1.05E-08	9.10E-07
LS8IN	-	3.63E-10	4.96E-10	4.23E-09	4.97E-06	1.04E-09	9.04E-08
LS9	-	2.77E-10	3.78E-10	3.22E-09	3.78E-06	7.96E-10	6.89E-08
LANDIN8	-	4.38E-09	8.22E-09	4.53E-09	2.98E-06	1.62E-09	5.56E-07

Therefore, the emissions limits in Table 7-5 below are approved for various pollutants by DAQ and they will be included in the permit on a source-by-source basis. These limits are much higher than the potential to emit for each source. Therefore, monitoring including record keeping will not be required. Hence, reporting shall also not apply.

It should be emphasized that for H₂S, if the optimized emission rate (potential emission rate optimized for 98 percent of its AAL) is to be included in the permit, the rate of increase in emissions will be 197 lbs/day or 35.95 tons/yr. At this rate, the proposed modification would become a major modification under PSD as it exceeds the significant emission rate of 10 tons/yr (assuming a significant net emission increase also occurs). In order to avoid a PSD review for the modification, the H₂S emission rate is proposed to be reduced to 54.7 lb/day, corresponding to 9.98 tons/yr of increase (less than its significance threshold). Since the worst-case H₂S emission rate is 1.87 tons/yr, as discussed above in Section 5, a PSD avoidance limitation is not required for the project as long as H₂S emission rate under the state air toxics limitation is restricted to no more than 54.7 lbs/day. Thus, the DAQ will approve the emission rate of 54.7 lbs/day (and not 197 lbs/day) for H₂S as included in Table 7-5 below for the proposed bioreactor to comply with 02D .1100.

Table 7-5: Permit Limits

Emission Source ID No.	Source Description	Toxic Air Pollutant	Emission Limit	
			(lb/yr)	(lb/day)
ES-WWTF Silo	FGD wastewater treatment facility lime storage silo	Arsenic	2.03E-03	
		Beryllium	2.77E-03	
		Cadmium	2.36E-02	
		Manganese		7.61E-02
		Mercury		1.60E-05
		Nickel		1.38E-03
ES-11	Limestone storage silo	Arsenic	7.52E-03	
		Beryllium	1.03E-02	
		Cadmium	8.75E-02	
		Manganese		2.82E-01
		Mercury		5.04E-05
		Nickel		5.13E-03

Emission Source ID No.	Source Description	Toxic Air Pollutant	Emission Limit	
			(lb/yr)	(lb/day)
LS-11, LS-12, LS-13-1	Limestone reclaim conveyor, limestone silo fill conveyor, limestone silo	Arsenic	1.14E-04	
		Beryllium	1.56E-04	
		Cadmium	1.33E-03	
		Manganese		4.69E-02
		Mercury		9.87E-06
		Nickel		8.54E-04
LS-11, LS-12, LS13-2	Limestone reclaim conveyor, limestone silo fill conveyor, limestone silo	Arsenic	1.14E-04	
		Beryllium	1.56E-04	
		Cadmium	1.33E-03	
		Manganese		4.69E-02
		Mercury		9.87E-06
		Nickel		8.54E-04
ES-LSSDA	Lime silo for SDA	Arsenic	2.70E-06	
		Beryllium	3.69E-06	
		Cadmium	3.14E-05	
		Manganese		2.22E-02
		Mercury		4.67E-06
		Nickel		4.04E-04
BF-3 and BF-4	Two belt feeders (limestone)	Arsenic	1.46E-03	
		Beryllium	1.99E-03	
		Cadmium	1.70E-02	
		Manganese		3.60E-01
		Mercury		6.44E-05
		Nickel		6.56E-03
LS-1, LS-1A and LS-1B	Railcar limestone unloading station and two unloading hoppers	Arsenic	2.86E-04	
		Beryllium	3.90E-04	
		Cadmium	3.32E-03	
		Manganese		5.86E-01
		Mercury		1.23E-04
		Nickel		1.07E-02
LS-6	Limestone stockout conveyor	Arsenic	1.71E-03	
		Beryllium	2.34E-03	
		Cadmium	1.99E-02	
		Manganese		3.22E+00
		Mercury		6.78E-04
		Nickel		5.87E-02
GS-3, GS-4	Gypsum stock-out conveyors	Arsenic	9.80E-04	
		Beryllium		
		Cadmium	1.38E-02	

Emission Source ID No.	Source Description	Toxic Air Pollutant	Emission Limit	
			(lb/yr)	(lb/day)
		Manganese		2.05E-01
		Mercury		2.88E-04
		Nickel		1.47E-03
GS-9	Gypsum truck loading	Arsenic	2.20E-03	
		Beryllium		
		Cadmium	3.10E-02	
		Manganese		4.07E-01
		Mercury		5.71E-04
		Nickel		2.91E-03
IS-FWWTP	Loading Final WWTP cake into truck at WWTP & Final WWTP cake unloading at landfill	Arsenic	1.09E-03	
		Beryllium	2.04E-03	
		Cadmium	1.13E-03	
		Manganese		2.85E-03
		Mercury		2.07E-06
		Nickel		5.32E-04
IS-WWTF	Loading FGD cake into truck at WWTF & FGD cake unloading at the landfill	Arsenic	1.60E-05	
		Beryllium		
		Cadmium	2.25E-04	
		Manganese		1.48E-03
		Mercury		2.07E-06
		Nickel		1.05E-05
Landfill	Gypsum & ash unloading at the landfill, & active/inactive area of wind erosion	Arsenic	1.55E+02	
		Beryllium	2.91E+02	
		Cadmium	1.60E+02	
		Manganese		2.90E+02
		Mercury		1.58E-01
		Nickel		5.40E+01
ES-WWTFBR	FGD wastewater treatment facility (bio-reactor)	Hydrogen Sulfide		5.47E+01
Coal Fugitives ¹ (CFUG)/AREAP OLY	Coal Storage and Handling	Arsenic	2.58E+00	
		Beryllium	8.49E+00	
		Cadmium	4.20E+00	
		Manganese		6.03E+00
		Mercury		5.07E-02
		Nickel		2.01E+00
C-9, C-10	Coal storage pile (active & inactive)	Arsenic	4.49E+01	
		Beryllium	1.48E+02	
		Cadmium	7.33E+01	
		Manganese		8.56E+01

Emission Source ID No.	Source Description	Toxic Air Pollutant	Emission Limit	
			(lb/yr)	(lb/day)
		Mercury		7.20E-01
		Nickel		2.85E+01
C-11	Coal Bulldozing	Arsenic	9.36E-01	
		Beryllium	3.08E+00	
		Cadmium	1.53E+00	
		Manganese		1.78E+00
		Mercury		1.50E-02
		Nickel		5.93E-01
Ash Fugitives (APILE1 & APILE2)/AREA POLY	Ash Storage and Handling ²	Arsenic	2.93E+00	
		Beryllium	5.50E+00	
		Cadmium	3.03E+00	
		Manganese		5.64E+00
		Mercury		3.07E-03
		Nickel		1.05E+00
LS-8	Limestone storage pile (Active & Inactive)	Arsenic	7.69E-01	
		Beryllium	1.05E+00	
		Cadmium	8.94E+00	
		Manganese		2.88E+01
		Mercury		6.06E-03
		Nickel		5.25E-01
LS-9	Limestone bulldozing	Arsenic	5.35E-02	
		Beryllium	7.31E-02	
		Cadmium	6.22E-01	
		Manganese		2.00E+00
		Mercury		4.21E-04
		Nickel		3.65E-02

¹Coal Fugitives include the following sources: C-1, C-2, C-3, C-4, C-7, C-15, C-27, C-28, C-29, C-30, and C-31.

²Ash Fugitives include the following sources: ES-8A/8B, ES-9A/9B, ES-A12, ES-A5, ES-A9, ES-A6, ES-A7, ES-SiloU5, and I-2.

In conclusions, the Air Quality Analysis Branch (AQAB) of DAQ has reviewed the submitted modeling analysis and approved the emissions limits in Tables 7-4 and 7-5 above on a source-buy-source basis through a memorandum dated March 8, 2021.

8. Facility-wide Emissions

The Table 8-1 below provides a facility-wide emissions summary on a potential to emit basis. Page 1 of this application review includes a table on actual emissions data for 2015 through 2019, as reported by Duke Energy Carolinas Inc., Cliffside Steam Station, to DAQ through submittal of its annual emission inventories.

Table 8-1: Facility-wide Emissions

Pollutant	Potential Emissions (with or without control) tons/yr
PM	> 100
PM-10	> 100
PM-2.5	> 100
SO ₂	> 100
NOx	> 100
CO	> 100
VOC	> 100
Lead	> 100
GHG as CO ₂ e	> 75,000
Single HAP (Hydrogen Chloride)	> 10
Aggregate HAP	> 25

9. Public Notice/EPA and Affected State(s) Review

Not Applicable. Applications processed as the 1st step of 2-step significant modification process, in accordance with 02Q .0504 and .0300 generally are not required public participation, and EPA and affected states review.

10. Stipulation Review

The following Table 10-1 lists the changes to the Duke Energy Carolinas, LLC – Cliffside Steam Station’s Air Quality Permit No. 04044T44:

Table 10-1 Summary of Changes to Current Permit

Old Page Air Quality Permit No. 04044T44	Old Section Air Quality Permit No. 04044T44	New Page Air Quality Permit No. 04044T45	New Section Air Quality Permit No. 04044T45	Description of Change(s)
Cover letter & first page of permit				Amended permit numbers and dates. Amended the increment tracking statement in the cover letter.
-	-	-	-	Revise the insignificant activity list (attachment to cover letter) to add three activities: IS-WWT HCl Storage Tank, IS-WWTF, and IS-FWWTP.
8	Section 1 Table	8	Section 1 Table	Include Wastewater Treatment Facility Bio-reactor (ID No. ES-WWTFBR) and Wastewater Treatment Facility Lime Storage Silo (ID No. ES-WWTF Silo) and Associated Bin Vent Filter (ID No. CD-WWTF-Silo-BF). Include a footnote for the above changes being approved per 1 st step of 02Q .0501(b)(2) and a requirement to submit another application (2 nd step) within 12 months of commencement of operation pursuant to Part 70.
21	Section 2.1.C. Table	21	Section 2.1.C. Table	Modify the list of subject sources for 02D .1100.
27	Section 2.1.F. Table	27	Section 2.1.F. Table	Include the requirement of 02D .1100.

Old Page Air Quality Permit No. 04044T44	Old Section Air Quality Permit No. 04044T44	New Page Air Quality Permit No. 04044T45	New Section Air Quality Permit No. 04044T45	Description of Change(s)
30	Section 2.1.G Table	30	Section 2.1.G. Table	Include the requirement of 02D .1100.
-	-	59 through 61	Section 2.1.S.	Include Wastewater Treatment Facility Lime Storage Silo (ID No. ES-WWTF Silo) and Associated Bin Vent Filter (ID No. CD-WWTF-Silo-BF) and all applicable requirements.
75	Section 2.2.D.	77	Section 2.2.D.	Include the emissions sources and the requirement under 02D .1100 as per the new modeling analysis. supporting this application (ID No. 8100028.20B) for arsenic, beryllium, cadmium, manganese, mercury, and nickel, while keeping the previously approved limits (8100028.17A) for chromium (VI) for both coal handling and storage, and ash handling and storage equipment.
-	-	86	Section 2.2.G.	Include the 2 nd step application submittal requirement within 12 months of commencement of operation of Wastewater Treatment Facility Bio-reactor (ID No. ES-WWTFBR) and Wastewater Treatment Facility Lime Storage Silo (ID No. ES-WWTF Silo) and Associated Bin Vent Filter (ID No. CD-WWTF-Silo-BF).

11. Conclusions, Comments, and Recommendations

- A professional engineer (PE) seal is not required.

Among others, the applicant requests a permit for a new emission source (lime storage silo) with a bin vent filter. The maximum air flow rate for the control device is 800 cfm, less than the threshold of 10,000 acfm in 02Q .0112(b)(4). In addition, based on the application, the bin vent filter may be a “non-optional air pollution control equipment that constitutes an integral part of the process equipment as originally designed and manufactured by the equipment supplier” as per 02Q .0112(b)(1). Thus, PE seal requirement does not apply.

- The applicant has included in the application a copy of the local zoning determination request made to the Cleveland County Clerk to the Board of Commissioners. The request is dated December 2, 2020. But, it does not indicate whether it was received by the county clerk (proof does not indicate signed or stamp receipt of the county clerk). The applicant has also provided a copy of an email (Dan Markley of Duke Energy to Phyllis Nowlen of Cleveland County) dated December 2, 2020, including a zoning determination request made to the Cleveland County. But, this email copy as well does not meet the zoning determination requirement for air permitting. Finally, Chris Martin, Senior Planner, Cleveland County, has provided a zoning determination, dated March 9, 2021, stating that “the proposed operation is consistent with applicable zoning ordinances”. Separately, Aubrey Clay, Project Manager, Rutherford County, has issued a zoning determination on February 19, 2021, indicating that “there are no applicable zoning ordinances for this facility at this time”.
- The draft permit was emailed to the applicant for review on March 9, 2021. Dan Markley (Duke Energy) emailed on March 11, 2021 stating that the applicant did not have any comment on the draft permit.
- The draft permit was emailed to the ARO for review on March 9, 2021. Chris Scott (ARO) emailed on March 18th with two minor comments in the Table of Changes included in both the application review and the permit, regarding the section pages referenced in the air permit 04044T45 permit v. the current permit 04044T44. The DAQ will make the changes as stated by Chris Scott. No discussions are required.
- This permit engineer recommends issuing the final permit.