ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

MICHAEL A. ABRACZINSKAS
Director

NORTH CAROLINA
Environmental Quality

May XY, 2020

Mr. Kraig Westerbeek
V.P. Environmental and Manufacturing
Align RNG, LLC
PO Box 856
Warsaw, NC 28398

Subject: Air Permit No. 10644R00
Align RNG, LLC (BF Grady Road)
Turkey, Duplin County, North Carolina
Permit Class: Synthetic Minor
Facility ID# 3100179

Dear Mr. Westerbeek:

In accordance with your completed application received February 27, 2020, we are forwarding herewith Permit No. 10644R00 to Align RNG, LLC for project BF Grady Road, Turkey, Duplin County, North Carolina for the construction and operation of air emissions sources or air cleaning devices and appurtenances. Please note the records retention requirements are contained in General Condition 2 of the General Conditions and Limitations.

If any parts, requirements, or limitations contained in this permit are unacceptable to you, you have the right to request a formal adjudicatory hearing within 30 days following receipt of this permit, identifying the specific issues to be contested. Such a request will stay the effectiveness of the entire permit. This hearing request must be in the form of a written petition, conforming to G.S. 150B-23 of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27699-6714. The form for requesting a formal adjudicatory hearing may be obtained upon request from the Office of Administrative Hearings. Unless a request for a hearing is made pursuant to G.S. 150B-23, this air permit shall be final and binding.

You may request modification of your air permit through informal means pursuant to G.S. 150B-22. This request must be submitted in writing to the Director and must identify the specific provisions or issues for which the modification is sought. Please note that the permit will become final and binding regardless of a request for informal modification unless a request for a hearing is also made under G.S. 150B-23.

Unless exempted by a condition of this permit or the regulations, construction of new air pollution sources or air cleaning devices, or modifications to the sources or air cleaning

devices described in this permit must be covered under a permit issued by the Division of Air Quality prior to construction. Failure to do so is a violation of G.S. 143-215.108 and may subject the Permittee to civil or criminal penalties as described in G.S. 143-215.114A and 143-215.114B.

This permit shall be effective from May XY, 2020 until April 30, 2028, is nontransferable to future owners and operators, and shall be subject to the conditions and limitations as specified therein.

For PSD increment tracking purposes, SO2 emissions from this modification are increased by 10 pounds per hour and NOx emissions from this modification are increased by 1 pounds per hour.

***This permit is the result of a request for a new application for an air quality permit; all emission sources and control devices are new*.** **The Permittee is responsible for carefully reading the entire permit and evaluating the requirements of each permit stipulation. The Permittee shall comply with all terms, conditions, requirements, limitations and restrictions set forth in this permit. Noncompliance with any permit condition is grounds for enforcement action, for permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application.**

Should you have any questions concerning this matter, please contact Dean Carroll at 910-796-7242.

Sincerely,

Brad Newland, Wilmington Regional Supervisor
Division of Air Quality, NC DEQ

Enclosures

c: Wilmington Regional Office
Connie Horne, Cover letter only
WiRO Permit Coordinator
Ibeam Doc Mod ___

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF ENVIRONMENTAL QUALITY

DIVISION OF AIR QUALITY

AIR PERMIT NO. 10644R00

Issue Date: May XY, 2020 Effective Date: May YZ, 2020
Expiration Date: April 30, 2028 Replaces Permit: (new)

To construct and operate air emission source(s) and/or air cleaning device(s), and for the discharge of the associated air contaminants into the atmosphere in accordance with the provisions of Article 21B of Chapter 143, General Statutes of North Carolina (NCGS) as amended, and other applicable Laws, Rules and Regulations,

Align RNG, LLC
(project BF Grady Road)
2940 NC Highway 24 west
Turkey, Duplin County, North Carolina
Permit Class: Synthetic Minor
Facility ID# 3100179

(the Permittee) is hereby authorized to construct and operate the air emissions sources and/or air cleaning devices and appurtenances described below:

Emission Source ID	Emission Source Description	Control System ID	Control System Description
ES-1 GUS Scenario 1 Normal Operation (Including Start-Up Situations)	one Gas Upgrading System (ES-1 GUS) consisting of a pressure swing adsorption (PSA) media system. In Normal Operation, the product gas is delivered to the natural gas pipeline, and the remaining biogas constituents are directed to CD-1, CD-2, and CD-3.	CD-1 Scrubber (CD-1 and CD-2 are in parallel and may operate simultaneously)	one iron sponge (scrubber) system vessel with fixed bed media (iron oxide) for hydrogen sulfide removal
		CD-2 Scrubber (CD-1 and CD-2 are in parallel and may operate simultaneously)	one iron sponge (scrubber) system vessel with fixed bed media (iron oxide) for hydrogen sulfide removal
		CD-3 Enclosed Hybrid Flare	one enclosed hybrid flare (John Zink unit, 10 MM Btu/hr heat input, 2020 model year) for the combustion of tail gas that has been treated by CD-1 and/or CD-2. (this flare may also combust (bypass) tail gas directly from the ES-1 GUS.)
ES-1 GUS Scenario 2 Off-Spec Production	one Gas Upgrading System (ES-1 GUS) as described above; In Off-Spec Production operation, the product gas is directed to CD-4. The remaining biogas constituents are directed to CD-1, CD-2, and CD-3.	CD-1 Scrubber (CD-1 and CD-2 are in parallel and may operate simultaneously)	one iron sponge (scrubber) system vessel with fixed bed media (iron oxide) for hydrogen sulfide removal
		CD-2 Scrubber (CD-1 and CD-2 are in parallel and may operate simultaneously)	one iron sponge (scrubber) system vessel with fixed bed media (iron oxide) for hydrogen sulfide removal

Emission Source ID	Emission Source Description	Control System ID	Control System Description
		CD-3 Enclosed Hybrid Flare	one enclosed hybrid flare (John Zink unit, 10 MM Btu/hr heat input, 2020 model year) for the combustion of tail gas that has been treated by CD-1 and/or CD-2
		CD-4 Candlestick Flare	one elevated candlestick flare (ProPump unit, 45 MM Btu/hr heat input, 2020 model year)
ES-1 GUS Scenario 3 By-Pass Biogas	one Gas Upgrading System (ES-1 GUS); In By-Pass Biogas operation, the Gas Upgrading System is not in operation and the facility must direct biogas to CD-4.	CD-4 Candlestick Flare	one elevated candlestick flare (ProPump unit, 45 MM Btu/hr heat input, 2020 model year)

in accordance with the completed application 3100179.19A received February 27, 2020 including any plans, specifications, previous applications, and other supporting data, all of which are filed with the Department of Environmental Quality, Division of Air Quality (DAQ) and are incorporated as part of this permit.

This permit is subject to the following specified conditions and limitations including any TESTING, REPORTING, OR MONITORING REQUIREMENTS:

A. SPECIFIC CONDITIONS AND LIMITATIONS

1. Any air emission sources or control devices authorized to construct and operate above must be operated and maintained in accordance with the provisions contained herein. The Permittee shall comply with applicable Environmental Management Commission Regulations, including Title 15A North Carolina Administrative Code (NCAC), Subchapter 02D .0202, 02D .0516, 02D .0535, 02D .0540, 02Q .0315, and 02Q .0317 (02D .0530 PSD avoidance).

2. PERMIT RENEWAL AND EMISSION INVENTORY REQUIREMENT - The Permittee, at least **90** days prior to the expiration date of this permit, shall request permit renewal by letter in accordance with 15A NCAC 02Q .0304(d) and (f). Pursuant to 15A NCAC 02Q .0203(i), no permit application fee is required for renewal of an existing air permit (without a modification request). The renewal request (with application Form A) should be submitted to the Regional Supervisor, DAQ. Also, at least **90** days prior to the expiration date of this permit, the Permittee shall submit the air pollution emission inventory report (with Certification Sheet) in accordance with 15A NCAC 02D .0202, pursuant to N.C. General Statute 143 215.65. The report shall be submitted to the Regional Supervisor, DAQ and shall document air pollutants emitted for the **2026** calendar year.

3. SULFUR DIOXIDE CONTROL REQUIREMENT - As required by 15A NCAC 02D .0516 "Sulfur Dioxide Emissions from Combustion Sources," sulfur dioxide emissions from one Gas Upgrading System (ID No. ES-1 GUS) and the facility flares (CD-3 and CD-4) shall not exceed 2.3 pounds per million Btu heat input.

In order to meet the SO2 limit of 2.3 lbs/MMBtu heat input, a limitation of the hydrogen sulfide (lb/hr H_2S) to the combustion source CD-3 (10MM Btu/hr heat input hybrid flare) is required. Additionally, CD-3 must be operated within no more than 10% of its maximum rated heat input of 10 MMBtu/hr during Normal and Off-Spec Operational Scenarios (OS1 and OS2 as described in the permit equipment list and in Specific Condition 6). To ensure compliance with this limitation, the following monitoring, recordkeeping, and reporting requirements are required:

a. Monitoring: The Permittee shall monitor; the H_2S concentration (ppm) and flow (scfm) from the outlet of emission source (ES-1 GUS), the concentration (ppm) and flow (scfm) from the outlet of the iron sponge scrubbers, and calculate the flow (scfm) and concentration (ppm) of the tail gas bypassing the iron sponges once every 8 hours (three times per day / minimum of once per operating day) for each day the ES-1 GUS is in operation (see Specific Condition 6). The permittee shall also record the instantaneous natural gas flow rate to CD-3 in scfm at the same time as the measurements above are taken.

b. Recordkeeping: The Permittee shall record; the H_2S concentration (ppm), flow (scfm), and heat input rate (converted to MMBtu/hr) from the monitoring locations as identified in a. above. *No later than the next day,* the Permittee shall calculate the average emission rate of H_2S (lb/hr) to the hybrid flare (CD-3) each day in lb/hr and compare this rate to the hydrogen sulfide limitation. If the calculated rate is higher than the calculated limit, the Permittee is in violation of 2D .0516. The formula for calculating the limit and amount of H_2S (lb/hr) to the hybrid flare (CD-3) is as follows:

- $(Q_{ng})(63{,}000)(2.3E\text{-}06)(OF)(0.523) > 5.7\ [(Qgus - Qscrubber)(Cgus) + (Oscrubber)(Cscrubber)] + [(36X10^{-6})(Q_{ng})(0.523)]$

- *$(Q_{ng})(63{,}000)(2.3X10\text{-}06)(OF)(0.523)$ is the Required Limit of H_2S in lb/r. Representing the 2.3 lb SO2/MMBtu/hr limit expressed as H_2S (lb/hr) where 0.523 = Mole Wt H_2S/Mole Wt SO_2 (34.08/64.06)*
- *Q_{ng} is the average instantaneous flow rate of natural gas (scfm) rates to CD-3 at the time of the H_2S measurements*
- *OF is the H_2S oxidation efficiency (98%) expressed in decimal form as 0.98*
- *Left side of the equation is: (Q_{ng} scfm)(60 min/hr)(1,050 Btu NG/cu.ft.)(2.3 lb SO2/MM Btu/hr) * (98% efficiency)(Mol Wt H_2S/Mol Wt SO_2) = H_2S lb/hr*
- *Right hand side of the equation is: the calculated actual emission rate of H_2S in lb/hr*
- *Where 5.7 = the ideal gas law constant at STP X 60 min/hr conversion factor*

5.7 = 60 (min/hr) * 34.08 (lb H_2S/lbmol) * 14.7 (psia) / 10.73 (psia*ft^3/lbmol*R) * 491.67 (^oR) where 34.08 is the MW of H_2S, 10.73 is the gas law constant "R", 491.67 is Std Temp, and 14.7 is Std Pressure.

- *Qgus is the daily average of the gas flow measured in scfm from ES-1 GUS, which is untreated tailgas*

- *Qscrubber is the daily average of the gas flow measured in scfm passing through the iron sponge scrubbers, which is treated tailgas*
- *(Qgus – Qscrubber) is the flow of the By-Pass (part of Scenario 1)*
- *Cgus is the daily average of concentration of H_2S (decimal i.e. 9,500 ppm = 0.0095) from ES-1 (untreated tailgas from the GUS)*
- *Cscrubber is the daily average of concentration of H_2S (decimal) from the iron sponge scrubbers (treated tailgas)*
- *Q_{ng} is the flow of natural gas fuel to CD-3 in scfm*
- *$36X10^{-6}$ is the emission factor for the amount of SO_2 in natural gas when burning supplemental fuel (**0.6 lb SO2/10^6 scfm * 60 min**/hr)*

c. Reporting: The Permittee shall notify the Regional Supervisor the next business day if the daily load to CD-3 results in an exceedance of the 2.3 lbs SO2/MMBtu limitation. The data is not required to be reported to the Regional Office but must be maintained on site and immediately available for review by DAQ personnel.

4. NOTIFICATION REQUIREMENT - As required by 15A NCAC 02D .0535, the Permittee of a source of excess emissions that last for more than four hours and that results from a malfunction, a breakdown of process or control equipment or any other abnormal conditions, shall:

   a. Notify the Director or his designee of any such occurrence by 9:00 a.m. Eastern time of the Division's next business day of becoming aware of the occurrence and describe:

      i. the name and location of the facility,

      ii. the nature and cause of the malfunction or breakdown,

      iii. the time when the malfunction or breakdown is first observed,

      iv. the expected duration, and

      v. an estimated rate of emissions.

   b. Notify the Director or his designee immediately when the corrective measures have been accomplished.

   This reporting requirement does not allow the operation of the facility in excess of Environmental Management Commission Regulations.

5. FUGITIVE DUST CONTROL REQUIREMENT - As required by 15A NCAC 02D .0540 "Particulates from Fugitive Dust Emission Sources," the Permittee shall not cause or allow fugitive dust emissions to cause or contribute to substantive complaints or excess visible emissions beyond the property boundary. If substantive complaints are received or excessive fugitive dust emissions from the facility are observed beyond the property boundaries for six minutes in any one hour (using Reference Method 22 in 40 CFR, Appendix A), the owner or operator may be required to submit a fugitive dust plan as described in 2D .0540(f).

"Fugitive dust emissions" means particulate matter that does not pass through a process stack or vent and that is generated within plant property boundaries from activities such as: unloading and loading areas, process areas stockpiles, stock pile working, plant parking lots, and plant roads (including access roads and haul roads).

6. LIMITATION TO AVOID 15A NCAC 02Q .0501 - Pursuant to 15A NCAC 02Q .0315 "Synthetic Minor Facilities," to avoid the applicability of 15A NCAC 02Q .0501 "Purpose of Section and Requirement for a TV Permit," as requested by the Permittee, facility-wide emissions shall be less than the following:

Pollutant	Emission Limit (Tons per consecutive 12-month period)
SO2	< 100

   a. Operations Restrictions - To ensure emissions do not exceed the limitations above, the following restrictions shall apply:

      i. The SO2 actual emissions shall be less than 100 ton/yr per consecutive 12-month rolling period.

   b. Inspection and Maintenance Requirements -

      i. H_2S Scrubber Requirements – SO2 emissions shall be controlled as described in the permitted equipment list. To comply with the provision of this permit and ensure that SO2 emissions do not exceed the regulatory limits, the Permittee shall perform periodic inspections and maintenance (I&M) as recommended by the manufacturer. In addition, the Permittee shall perform an annual (for each 12 month period following the initial inspection) inspection of each H_2S Scrubber system (CD-1 and CD-2).

      As a minimum, the I&M program and each annual inspection should include the following:

         A. Inspect and maintain the structural integrity of each H_2S Scrubber system / iron sponge (CD-1 and CD-2).

         B. Inspect and maintain the structural integrity of duct work and piping leading to each H_2S Scrubber system (CD-1 and CD-2).

      ii. Hybrid Enclosed Flare and Candlestick Flare Requirements - The Permittee shall perform periodic inspections and maintenance (I&M) as recommended by the manufacturer. Each flare shall be equipped with a heat-sensing device, such as an ultraviolet beam sensor or a thermocouple, installed in proximity of the pilot light, to confirm the presence of a flame. The pilot flame must be present while biogas vapors are displaced to both flares to assure compliance with this permit condition.

iii. H_2S Monitors - The Permittee shall perform periodic inspections and maintenance (I&M) as recommended by the manufacturer as well as periodic calibrations as recommended by the manufacturer.

iv. Flow Meters - The Permittee shall perform periodic inspections and maintenance (I&M) as recommended by the manufacturer as well as periodic calibrations as recommended by the manufacturer.

v. Pressure Meters - The Permittee shall perform periodic inspections and maintenance (I&M) as recommended by the manufacturer as well as periodic calibrations as recommended by the manufacturer.

c. Monitoring Requirements -

i. H_2S Scrubber Requirements -

A. To ensure the proper performance of each H_2S Scrubber system (CD-1 and CD-2), each H_2S Scrubber system shall be equipped with a device to continuously measure the gauge pressure directly upstream and downstream of the Scrubber itself. The device shall be installed in an accessible location and shall be maintained by the Permittee such that it is in proper working order at all times. The pressure drop across the bed shall be recorded electronically for each scrubber (iron sponge) once per day for each day the Gas Upgrading System and CD-1 and/or CD-2 is operating.

B. Monitoring for Breakthrough - Compliance with this permit may be demonstrated by either of the two following options:

I. Differential Pressure - The Permittee shall monitor and electronically record the differential pressure across the media bed for each iron sponge once per day for each day the Gas Upgrading System and CD-1 and/or CD-2 is operating. When the differential pressure across the media bed exceeds the allowable range as specified by the manufacturer (30 inches of water), the scrubber media shall be replaced.

II. Discontinuous Chemical Analysis – An analyzer shall be installed to determine the concentration of the regulated pollutant (hydrogen sulfide) in the outlet stream once every eight (8) hours (up to three times per day, and a minimum of once per day) for each day the Gas Upgrading System is operating. When the outlet concentration of hydrogen sulfide (H_2S) is greater than 100 parts per million (ppm) for two consecutive samples, the scrubber media shall be replaced.

d. Recordkeeping Requirements

i. The Permittee shall record once (electronically) per every 8 hours of operation (minimum of once per operating day); this reading shall be taken at a set time of day; representative of the 8 hour period of operations. The readings shall be calculated (averaged) monthly and kept on a spreadsheet to calculate the 12 month rolling basis the following:

A. flow rates (in standard cubic feet per minute (scfm)): each Emission Source Operating Scenario shall be recorded once per every 8 hours of operation (minimum of once per operating day):

- Tail gas flow produced by ES-1 Gas Upgrading System
- Tail gas flow to each iron sponge vessel (CD-1 and CD-2)
- Tail gas flow bypassing the iron sponges to enclosed flare (CD-3) calculated as the difference between the two preceding values
- Product gas flow to CD-4 candlestick flare
- Biogas flow to CD-4 candlestick flare
- Total Biogas flow to the ES-1 GUS (incoming raw material)
- Natural gas fuel flow to each flare CD-3 and CD-4 when in operation

B. Hydrogen sulfide (H_2S) concentrations in parts per million, for each Emission Source Operating Scenario, shall be recorded once per every 8 hours of operation (minimum of once per operating day):

- Concentration of H_2S in the tail gas exiting the ES-1 GUS
- Concentration of H_2S in the tail gas exiting CD-1 and/or CD2 based on each scrubber's operational status
- Estimated concentration of H_2S in Biogas bypassing the ES-1 GUS and entering the candlestick flare (CD-4)

C. The facility-wide actual SO2 emissions in ton/month; determined by calculation given the comparative molecular weight of the gas constituents, flow rate of the gas, and operating time for the facility and equipment, given standards for pressure, temperature, and other constant values, as shown below.

- <u>ES-1 Scenario 1, Normal Operation, monthly emissions</u>:

Monthly SO_2 emissions for tail gas oxidation during Normal Operation will be calculated using the following equation:

$$m_{TG} = \frac{60 \times MW_{H2S} \times P}{R \times T} \times (V_{UT} \times PPM_{UT} + V_T \times PPM_T) \times \frac{MW_{SO2}}{MW_{H2S}} \times OF \times \frac{HRS}{2{,}000}$$

where: m_{TG} = SO_2 emission rate from tail gas oxidation (tons/month)
60 = conversion factor = 60 min/hr
MW_{H2S} = molecular weight of H_2S (lb/lbmol) = 34.08 lb/lbmol
P = standard pressure = 14.7 psia
R = gas constant = 10.73 (psia*ft^3)/(lbmol*R)

T = standard temperature = 491.67 R
V_{UT} = measured average monthly untreated tail gas volumetric flow rate (scfm)
PPM_{UT} = measured average monthly untreated tail gas H_2S concentration (ppm)
V_T = measured average monthly treated tail gas volumetric flow rate (scfm)
PPM_T = measured average monthly treated tail gas H_2S concentration (ppm)
MW_{SO2} = molecular weight of SO_2 (lb/lbmol) = 64.06 lb/lbmol
OF = H_2S oxidation efficiency = 98%[1]
HRS = total number of normal operating hours per month
2,000 = conversion factor = 2,000 lb/ton

Monthly SO_2 emissions for natural gas combustion (supplemental fuel) during normal operation will be calculated using the following equation:

$$m_{NG} = \frac{EF \times V_{NG} \times 60 \times HRS}{2{,}000 \times 10^6}$$

where: m_{NG} = SO_2 emission rate from natural gas combustion (tons/month)

EF = SO_2 emission factor = 0.60 lb/MMscfm[2] natural gas
V_{NG} = measured average monthly natural gas volumetric flow rate (scfm)
60 = conversion factor = 60 min/hr
HRS = total number of normal operating hours per month
2,000 = conversion factor = 2,000 lb/ton
10^6 = conversion factor = 10^6 scf/MMscf

Total monthly SO_2 emissions during Normal Operation will be calculated using the following equation:

$$m_T = m_{TG} + m_{NG}$$

where: m_T = total SO_2 emission rate during normal operation (tons/month)
m_{TG} = SO_2 emission rate from tail gas oxidation during normal operation (tons/month)
m_{NG} = SO_2 emission rate from natural gas combustion during normal operation (tons/month)

- <u>ES-1 Scenario 2, Off-Spec Operation, monthly emissions</u>:

During Off-Spec Operation, the GUS (ES-1) will process biogas to produce product gas and tail gas. The product gas that does not meet pipeline specifications and therefore cannot be injected into the natural gas pipeline will be combusted in the candlestick flare (CD-4). The tail gas will be treated in the iron sponge system (CD-1 and CD-2) for H_2S removal before being oxidized in the enclosed hybrid flare (CD-3). SO_2 emissions will result from the oxidation of tail gas and the combustion of natural gas as supplemental fuel in the enclosed hybrid flare.

SO_2 emissions will also result from the combustion of product gas in the candlestick flare. The product gas flow rate to the candlestick flare will be measured by the Guild PSA system product

[1] Oxidation efficiency based on EPA 40 CFR 60.18 and AP-42 Section 13.5.
[2] Emission factor from AP-42 Section 1.4.

gas flow meter. The H_2S concentration of the product gas will be measured and recorded using an H_2S Analyzer which will be housed in the facility's product gas analyzer building.

Total monthly SO_2 emissions for tail gas oxidation and natural gas combustion in the enclosed hybrid flare will be calculated using the equations provided above for Normal Operation. Monthly SO_2 emissions for product gas combustion in CD-4 during Off-Spec Operation will be calculated using the following equation:

$$m_{PG} = \frac{60 \times MW_{H2S} \times P}{R \times T} \times (V_{PG} \times PPM_{PG}) \times \frac{MW_{SO2}}{MW_{H2S}} \times OF \times \frac{HRS}{2{,}000}$$

where: m_{PG} = SO_2 emission rate from product gas combustion (tons/month)
60 = conversion factor = 60 min/hr
MW_{H2S} = molecular weight of H_2S (lb/lbmol) = 34.08 lb/lbmol
P = standard pressure = 14.7 psia
R = gas constant = 10.73 (psia*ft^3)/(lbmol*R)
T = standard temperature = 491.67 R
V_{PG} = measured average monthly product gas volumetric flow rate (scfm)
PPM_{PG} = measured average monthly product gas H_2S concentration (ppm)
MW_{SO2} = molecular weight of SO_2 (lb/lbmol) = 64.06 lb/lbmol
OF = H_2S oxidation efficiency = 98%
HRS = total number of off-spec operating hours per month
2,000 = conversion factor = 2,000 lb/ton

Total monthly SO_2 emissions during Off-Spec Operation will be calculated using the following equation:

$$m_T = m_{TG} + m_{NG} + m_{PG}$$

where: m_T = total SO_2 emission rate during Off-Spec Operation (tons/month)
m_{TG} = SO_2 emission rate from tail gas oxidation during Off-Spec Operation (tons/month)
m_{NG} = SO_2 emission rate from natural gas combustion during Off-Spec Operation (tons/month) from both flares (CD-3 and CD-4)
m_{PG} = SO_2 emission rate from product gas combustion during Off-Spec Operation (tons/month)

- ES-1 Scenario 3, By-Pass Operation, monthly emissions:

During Bypass Operation, biogas entering the BF Grady Rd facility will bypass the GUS (ES-1) and be directed to the candlestick flare (CD-4) for combustion. The biogas flow rate to the candlestick flare will be recorded by the BF Grady Rd facility master control system. The biogas composition will not be continuously monitored but will be periodically monitored using biogas sampling to determine the average biogas composition. Biogas sampling may occur less frequently than once per month but not less than once per quarter when the biogas collection system operates at least 30 days during the quarter.

Total monthly SO_2 emissions during Bypass Operation will be calculated using the following equation:

$$m_{BG} = \frac{60 \times MW_{H2S} \times P}{R \times T} \times (V_{BG} \times PPM_{BG}) \times \frac{MW_{SO2}}{MW_{H2S}} \times OF \times \frac{HRS}{2{,}000}$$

+ (3.6X10E-06)(Q_{NG} CD-4)

where: m_{BG} = SO_2 emission rate from biogas combustion during bypass operation (tons/month)
60 = conversion factor = 60 min/hr
MW_{H2S} = molecular weight of H_2S (lb/lbmol) = 34.08 lb/lbmol
P = standard pressure = 14.7 psia
R = gas constant = 10.73 (psia*ft^3)/(lbmol*R)
T = standard temperature = 491.67 R
V_{BG} = measured average monthly biogas volumetric flow rate (scfm)
PPM_{BG} = most recent measured biogas H_2S concentration (ppm)
MW_{SO2} = molecular weight of SO_2 (lb/lbmol) = 64.06 lb/lbmol
OF = H_2S oxidation efficiency = 98%
HRS = total number of bypass operating hours per month
2,000 = conversion factor = 2,000 lb/ton
Q_{NG} CD-4 = supplemental natural gas fuel supplied to CD-4 (scfm)

e. Reporting Requirement

i. The Permittee shall submit the monthly, total annual, and 12 month rolling total actual SO2 emissions to the Regional Supervisor of NC DEQ – Wilmington Regional Office within thirty (30) days after each calendar year (no later than January 30th of each year).

7. LIMITATION TO AVOID 15A NCAC 02D .0530 "PREVENTION OF SIGNIFICANT DETERIORATION" - In accordance with 15A NCAC 02Q .0317, to comply with this permit and avoid the applicability of 15A NCAC 02D .0530 "Prevention of Significant Deterioration," as requested by the Permittee, emissions shall be limited as follows:

Affected Source(s)	Pollutant	Emission Limit (Tons Per Consecutive 12-month Period)
Facility Wide	SO2	250

a. Operations Restrictions - To ensure emissions do not exceed the limitations above, the following restrictions shall apply:

i. For monitoring of SO2 actual emissions for this PSD avoidance condition (to remain below 250 ton/yr), please see the synthetic minor condition above for monitoring, recordkeeping, and reporting language. The same synthetic minor condition language shall suffice for this PSD avoidance condition.

b. Recordkeeping Requirements - The Permittee shall keep each monthly record on file for a minimum of three years. The following requirements for recordkeeping shall also apply:

i. For recordkeeping of SO2 actual emissions for this PSD avoidance condition, please see the synthetic minor condition above for monitoring, recordkeeping, and reporting language. The same synthetic minor condition language shall suffice for this PSD avoidance condition.

c. Reporting Requirements - Within 30 days after each calendar year (no later than January 30th of each year), regardless of the actual emissions, the following shall be reported to the Regional Supervisor, DAQ:

i. For reporting of SO2 actual emissions for this PSD avoidance condition, please see the synthetic minor condition above for monitoring, recordkeeping, and reporting language. The same synthetic minor condition language shall suffice for this PSD avoidance condition.

d. Calculation of the consecutive 12-month periods shall begin upon the issuance of the initial permit (10644R00).

B. GENERAL CONDITIONS AND LIMITATIONS

1. In accordance with G.S. 143-215.108(c)(1), TWO COPIES OF ALL DOCUMENTS, REPORTS, TEST DATA, MONITORING DATA, NOTIFICATIONS, REQUESTS FOR RENEWAL, AND ANY OTHER INFORMATION REQUIRED BY THIS PERMIT shall be submitted to the:

   Regional Supervisor
   North Carolina Division of Air Quality
   Wilmington Regional Office
   127 Cardinal Drive Extension
   Wilmington, NC 28405 910-796-7215

   For identification purposes, each submittal should include the facility name as listed on the permit, the facility identification number, and the permit number.

2. RECORDS RETENTION REQUIREMENT - In accordance with 15A NCAC 2D .0605, any records required by the conditions of this permit shall be kept on site and made available to DAQ personnel for inspection upon request. These records shall be maintained in a form suitable and readily available for expeditious inspection and review. These records must be kept on site for a minimum of 2 years, unless another time period is otherwise specified.

3. ANNUAL FEE PAYMENT - Pursuant to 15A NCAC 2Q .0203(a), the Permittee shall pay the annual permit fee within 30 days of being billed by the DAQ. Failure to pay the fee in a timely manner will cause the DAQ to initiate action to revoke the permit.

4. EQUIPMENT RELOCATION - In accordance with 15A NCAC 2Q .0301, a new air permit shall be obtained by the Permittee prior to establishing, building, erecting, using, or operating the emission sources or air cleaning equipment at a site or location not specified in this permit.

5. REPORTING REQUIREMENT - In accordance with 15A NCAC 2Q .0309, any of the following that would result in previously unpermitted, new, or increased emissions must be reported to the Regional Supervisor, DAQ:

    a. changes in the information submitted in the application regarding facility emissions;

    b. changes that modify equipment or processes of existing permitted facilities; or

    c. changes in the quantity or quality of materials processed.

    If appropriate, modifications to the permit may then be made by the DAQ to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause a violation of the emission limitations specified herein.

6. In accordance with 15A NCAC 2Q .0309, this permit is subject to revocation or modification by the DAQ upon a determination that information contained in the application or presented in the support thereof is incorrect, conditions under which this permit was granted have changed, or violations of conditions contained in this permit have occurred. In accordance with G.S. 143-215.108(c)(1), the facility shall be properly operated and maintained at all times in a manner that will effectuate an overall reduction in air pollution. Unless otherwise specified by this permit, no emission source may be operated without the concurrent operation of its associated air cleaning device(s) and appurtenances.

7. In accordance with G.S. 143-215.108(c)(1), this permit is nontransferable by the Permittee. Future owners and operators must obtain a new air permit from the DAQ.

8. In accordance with G.S. 143-215.108(c)(1), this issuance of this permit in no way absolves the Permittee of liability for any potential civil penalties which may be assessed for violations of State law which have occurred prior to the effective date of this permit.

9. In accordance with G.S. 143-215.108(c)(1), this permit does not relieve the Permittee of the responsibility of complying with all applicable requirements of any Federal, State, or Local water quality or land quality control authority.

10. In accordance with 15A NCAC 2D .0605, reports on the operation and maintenance of the facility shall be submitted by the Permittee to the Regional Supervisor, DAQ at such intervals and in such form and detail as may be required by the DAQ. Information required in such reports may include, but is not limited to, process weight rates, firing rates, hours of operation, and preventive maintenance schedules.

11. A violation of any term or condition of this permit shall subject the Permittee to enforcement pursuant to G.S. 143-215.114A, 143-215.114B, and 143-215.114C, including assessment of civil and/or criminal penalties.

12. Pursuant to North Carolina General Statute 143-215.3(a)(2), no person shall refuse entry or access to any authorized representative of the DAQ who requests entry or access for purposes of inspection, and who presents appropriate credentials, nor shall any person obstruct, hamper, or interfere with any such representative while in the process of carrying

out his official duties. Refusal of entry or access may constitute grounds for permit revocation and assessment of civil penalties.

13. In accordance with G.S. 143-215.108(c)(1), this permit does not relieve the Permittee of the responsibility of complying with any applicable Federal, State, or Local requirements governing the handling, disposal, or incineration of hazardous, solid, or medical wastes, including the Resource Conservation and Recovery Act (RCRA) administered by the Division of Waste Management.

14. PERMIT RETENTION REQUIREMENT - In accordance with 15A NCAC 2Q .0110, the Permittee shall retain a current copy of the air permit at the site. The Permittee must make available to personnel of the DAQ, upon request, the current copy of the air permit for the site.

15. CLEAN AIR ACT SECTION 112(r) REQUIREMENTS - Pursuant to 15A NCAC 2D .2100 "Risk Management Program," if the Permittee is required to develop and register a risk management plan pursuant to Section 112(r) of the Federal Clean Air Act, then the Permittee is required to register this plan with the USEPA in accordance with 40 CFR Part 68.

16. PREVENTION OF ACCIDENTAL RELEASES - GENERAL DUTY - Pursuant to Title I Part A Section 112(r)(1) of the Clean Air Act "Hazardous Air Pollutants - Prevention of Accidental Releases - Purpose and General Duty," although a risk management plan may not be required, if the Permittee produces, processes, handles, or stores any amount of a listed hazardous substance, the Permittee has a general duty to take such steps as are necessary to prevent the accidental release of such substance and to minimize the consequences of any release. **This condition is federally-enforceable only.**

17. GENERAL EMISSIONS TESTING AND REPORTING REQUIREMENTS - If emissions testing is required by this permit, or the DAQ, or if the Permittee submits emissions testing to the DAQ in support of a permit application or to demonstrate compliance, the Permittee shall perform such testing in accordance with 15A NCAC 2D .2600 and follow all DAQ procedures including protocol approval, regional notification, report submittal, and test results approval. Additionally, in accordance with 15A NCAC 2D .0605, the Permittee shall follow the procedures for obtaining any required audit sample and reporting those results.

Permit issued this the XXYth day of May, 2020.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

_____

Brad Newland
Wilmington Regional Supervisor
By Authority of the Environmental Management Commission